# Proteomic and Chemoproteomic Strategies to Interrogate Post-translational Modifications

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#### Abstract

Protein activity is modulated by hundreds of post-translational modifications (PTMs). This thesis will describe the development and application of proteomic methods to study three chemically distinct PTMs. In the first project we describe the development of a proteomics platform to identify cysteine oxidation sites on interactors of the NADPH oxidase complex in response to EGF activation. The NADPH oxidases (Nox) are the source of  $H_2O_2$  which acts as a secondary messenger during EGFR activation. Known targets of Nox  $H_2O_2$  include phosphatases PTP1B and PTEN. Oxidation of the active site of PTP1B and PTEN temporarily inactivates their phosphatase activity which allows for EGF signal propagation. The platform involves combining TurboID with OxICAT to identify proteins which are oxidized by Nox2 in a spatially and temporally controlled manner. In the second project, our goal is to identify proteins which recognize two Met oxidation sites in actin known to play a role in regulating the transition between F and G actin. We utilized a peptide based photo-crosslinking approach to identify PFKL and HSP70s HSPA8 and HSPA1B as putative "readers" of oxidized or unoxidized methionine in actin respectively. Finally, protein citrullination is a enzyme catalyzed PTM where the guanidinium on arginine is converted into a urea by a family of enzymes called protein arginine deiminases. Aberrant citrullination is linked to many human diseases including rheumatoid arthritis. Therefore, proteomic methods to characterize citrullination can provide insights into disease pathophysiology. We describe the identification of novel protein targets of with a chemoselective biotin phenyl glyoxal probe, and the development of a label free proteomic method to identify sites of citrullination.

For my parents, Gerald and Elli

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## List of Abbreviations

Standard 3-letter and 1-letter codes are used for the 20 natural amino acids.

ABPP	activity-based protein profiling.
ACN	acetonitrile.
ACPA	anti-citrullinated protein antibody.
Akt	protein kinase B.
ALDO	aldolase.
AMP	adenosine monophosphate.
ATP	adenosine triphosphate.
AUC	area under the curve.
BSA	bovine serum albumin.
BTD	benzothiazine dioxide.
CaM	calmodulin.
CaMKII	${\rm Ca^{2+}/CaM}\text{-dependent}$ protein kinase II.
cBio	photocaged biotin.
CBK	caged bromomethyl ketone.
CDI	carbonyldiimidazole.
cDNA	complementary DNA.
СН	calponin homology.
CID	collision-induced dissociation.
CIK4	caged iodomethyl ketone.

Cit	citrulline.
CuAAC	copper-catalyzed azide-alkyne cycloaddition.
DAB	denaturing alkylation buffer.
DAPI	4',6-diamidino-2-phenylindole.
DBIA	desthiobiotin iodoacetamide.
DCM	dichloromethane.
DDA	data dependent acquisition.
DMAP	4-dimethylaminopyridine.
DMF	dimethylformamide.
DMSO	dimethyl sulfoxide.
EBX	ethynyl benziodoxolone.
EDCI	1-ethyl-3-(3-dimethylaminopropyl) carbodiimide.
EGF	epidermal growth factor.
EGFR	epidermal growth factor receptor.
EIC	extracted ion chromatogram.
$\mathrm{ESI}^+$	positive electrospray ionization.
F1,6BP	fructose-1,6-diphosphate.
F6P	fructose 6-phosphate.
FBS	fetal bovine serum.
FMO	flavin-containing monooxygenase.
FPR	false positive rate.
fRMsr	free Met-R-SO reductase.
GAPD	glyceraldehyde 3-phosphate.
GEF	guanine exchange factor.
GPCR	G-protein-coupled receptor.
GPDH	glycerol-3-phosphate dehydrogenase.
GPx	glutathione peroxidase.

Grb2	growth receptor bound protein.
HCD	high-energy collisional dissociation.
HIS	heat inactivated serum.
HOBt	hydroxybenzotriazole.
HRP	horseradish peroxidase.
IA	iodoacetamide.
IAA	iodoacetamide-alkyne.
IAH	IA-alkyne heavy.
IAL	IA-alkyne light.
iBAQ	intensity-based absolute quantification.
ICAT	isotope-coded affinity tags.
IMAC	immobilized metal affinity chromatography.
IMPDH2	inosine-5'-monophosphate dehydratase 2.
isoTOP-ABPP	isotopic tandem orthogonal proteolysis - activity-based protein pro-
	filing.
ITGB4	integrin beta-4.
iTRAQ	isobaric tags for relative and absolute quantization.
KDE	kernel density estimate.
LFQ	label free quantification.
MAPK	Ras/mitogen activated kinase.
MCS	multiple cloning site.
MeOH	methanol.
MOI	multiplicity of infection.
MS	mass-spectrometry.
Msr	methionine sulfoxide reductase.
MsrA	methionine sulfoxide reductase A.
MsrB	methionine sulfoxide reductase B.

MTRP	multiplexed thiol reactivity profiling.
NADH	nicotinamide adenine dinucleotide (reduced).
NADPH	nicotinamide adenine dinucleotide phosphate.
NEM	N-ethylmaleimide.
NET	neutrophil extracellular trap.
NHS	N-hydroxysuccinimide.
NL	neutral loss.
oNB	ortho-nitrobenzyl.
OxICAT	oxidative isotope-coded affinity tags.
PAD	protein arginine deiminase.
PBS	phosphate buffered saline.
PEG	polyethylene glycol.
PFK	phosphofructokinase.
PG	phenyl glyoxal.
PI3K	phosphoinositide 3-kinase.
PIP3	phosphatidylinositol 3,4,5-trisphosphate.
PLCγI	phospholipase C, gamma 1.
PPI	protein-protein interaction.
Prx	peroxiredoxin.
PSA	penicillin-streptomycin-amphotericin B.
PSM	peptide-spectrum match.
PTEN	phosphate and tension homolog.
PTM	post-translational modification.
РТР	protein tyrosine phosphatase.
RA	rheumatoid arthritis.
ReDiMe	reductive dimethylation.
$R_{L/H}$	light to heavy ratio.

RNS	reactive nitrogen species.
ROC	receiver operating curve.
ROS	reactive oxygen species.
RT	retention time.
RTK	receptor tyrosine kinase.
SDS	sodium dodecyl sulfate.
SDS-PAGE	sodium dodecyl sulfate - polyacrylamide gel electrophoresis.
Sec	selenocysteine.
SECIS	selenocysteine insertion sequence).
SERPIN	serine protease inhibitor.
SF	synovial fluid.
SH2	src homology 2.
SILAC	stable isotope labeling by amino acids in cell culture.
SLC-ABPP	streamlined cysteine activity-based protein profiling.
SOD	superoxide dismutase.
SRM	selected reaction monitoring.
Srx	sulfiredoxin.
TBS-T	Tris buffered saline with tween 20.
TCA	trichloroacetic acid.
TCEP	tris(2-carboxyethyl)phosphine.
TEAB	triethylammonium bicarbonate.
TFA	trifluoroacetic acid.
THF	tetrahydrofuran.
TIS	triisopropylsilane.
TKD	tyrosine kinase domain.
TMT	tandem mass tags.
TNR	true negative rate.

TPI	triosephosphate isomerase.
TPR	true positive rate.
UniProt	universal protein resource.

# Chapter 1

Cysteine Oxidation in Cell Signaling

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#### 1.1 Introduction to reactive oxygen species and cysteine

Reactive oxygen species (ROS) are produced as a byproduct of normal cellular processes in all organisms which undergo aerobic respiration. Although high levels of ROS can lead to oxidative stress, and contribute to DNA, protein and lipid damage, at low levels it plays a crucial role in cell signaling.<sup>2</sup> The primary ROS species are superoxide  $(O_2^-)$ , hydrogen peroxide  $(H_2O_2)$ , and the hydroxyl radical ( $^{\bullet}OH$ ), each of which have distinct characteristics and half lives. The majority or ROS in eukaryotes is produced as a byproduct of mitochondrial respiration. Components of the electron chain reduce oxygen  $(O_2)$  to water during adenosine triphosphate (ATP) synthesis, however partial reduction of  $O_2$  can result in the production of  $O_2^{-3}$ . The other major source of ROS are the nicotinamide adenine dinucleotide phosphate (NADPH) oxidases (Nox) which oxidize NADPH and generate  $O_2^{-}$ .<sup>4</sup> In both cases,  $O_2^{-}$  is rapidly converted to  $H_2O_2$  by superoxide dismutases (SODs) 1, 2 and 3 (Figure 1.1). The overproduction of  $H_2O_2$  can result in the formation of hydroxyl radicals via Fenton chemistry catalyzed by divalent metal cations, such as  $Fe^{2+}$ . Hydroxyl radicals are highly reactive and indiscriminately oxidize proteins, lipids, and DNA. The production of hydroxyl radicals is generally associated exclusively with oxidative stress.

#### 1.1.1 Role of cysteine in oxidative signaling

Of the 20 proteogenic amino acids, cysteine is unique in its elevated nucleophilicity and redox sensitivity. Despite its low abundance, cysteine is highly conserved at functionally important sites.<sup>6,7</sup> The high nucleophilicity and redox sensitivity of the cysteine thiolate facilitates key roles in several aspects of protein function:<sup>8</sup> (1) active-site nucleophiles in catalysis, or resolving residues in cellular redox buffering systems;<sup>9</sup> (2) protein structure stabilization through disulfide bonds, and metal coordination; and, (3) regulation of protein function through post-translational modifica-



Figure 1.1: Superoxide  $(O_2^-)$  is produced as either a byproduct of oxidation by NADPH oxidase (Nox), or by incomplete reduction of oxygen during aerobic respiration in the mitochondria.  $O_2^-$  is rapidly converted into  $H_2O_2$  by superoxide dismutases (SODs), where it can go on to oxidize redox sensitive cysteine residues, or be reduced to  $H_2O$  by redox buffering enzymes, such as peroxiredoxins (PRx), glutathione peroxidase (GPx), or catalase (CAT). Extremely high levels of  $H_2O_2$ , can result in the formation of hydroxyl radicals ( $^{\bullet}OH$ ) via Fenton chemistry catalyzed by Fe<sup>2+</sup>, which can lead to lipid oxidation and DNA damage. Figure adapted from Schieber *et. al.*<sup>2</sup>



Figure 1.2: Examples of reversible and irreversible cysteine oxidative PTMs. Figure adapted from Abo *et. al.*<sup>5</sup>

tions (PTMs), such as oxidation, nitrosation, and glutathionylation.<sup>10</sup> Diverse protein classes, including proteases, oxidoreductases, kinases, and acyltransferases, contain reactive and functional cysteine residues.<sup>8</sup> Cysteine is subject to a wide array of distinct PTM including as S-sulfenylation, S-sulfinylation, and S-sulfonylation, as well as inter and intramolecular disulfide formation (Figure 1.2). S-sulfenylation (R–SOH) is readily reversible under cytosolic redox potentials by glutathionone, thioredoxin, and peroxiredoxin.<sup>5</sup> S-sulfinylation (R–SO<sub>2</sub>H) is reversed by sulfiredoxin (Srx),<sup>11</sup> while cysteine S-sulfonylation (R–SO<sub>3</sub>H) is considered to be an irreversible modification.

In addition to the SODs, cells utilize redox buffering systems including the catalase, glutaredoxin / glutathione, thioredoxen / thioredoxin reductase, and the glutathione /glutathione reductase systems to control cellular levels of ROS.<sup>2</sup> Catalase is thought to be exclusively localized to the peroxisome, while glutathione peroxidase (GPx) and peroxiredoxin (Prx) are widely distributed throughout the cell. GPxs are much less abundant than Prxs which account for between 0.1–0.8% of total soluble protein<sup>12</sup> Therefore, Prx family members play a more significant role in regulating  $H_2O_2$  levels in the context of signaling. Kinetic experiments with human Prx1 and 3 revealed that the second order rate constant of the oxidation of the Prx thiolate to the sulfenic acid ( $C_p-S^- \longrightarrow C_p-SOH$ ) by  $H_2O_2$  was between  $1 \times 10^6$  and  $1 \times 10^8 M^{-1} s^{-1}$ , which is several orders of magnitude faster than the thiol groups of other proteins.<sup>13,14</sup> These data suggest that the cysteine residues on Prx are at a competitive disadvantage compared to those on proteins targeted by  $H_2O_2$  during cell signaling, and in order for  $H_2O_2$  to rise to sufficient levels for signaling transduction, the basel level of Prx activity must be overcome.

#### 1.2 EGFR pathway

The epidermal growth factor receptor (EGFR) is the prototypical member of the HER family of receptor tyrosine kinases (RTKs) which regulate many cellular pro-


Figure 1.3: EGFR signaling pathway. Upon stimulation with EGF, EGFR monomeric receptors dimerize and autophosphorylate tyrosine residues in the cytoplasmic domain. Phospo-tyrosines (red circles) act as binding sites for scaffolding proteins for down stream kinases. Two major EGFR effectors, the Ras/ERK and PI3K/AKT pathways are shown. EGFR activation also triggers the assembly of the NADPH oxidase complex (Nox) at the cell membrane.  $H_2O_2$  transiently inactivates phosphatases thereby amplifying growth factor signaling. Figure adapted from Truong *et. al.*<sup>9</sup>

cesses including growth, proliferation, and differentiation. As such, overexpression, and mutations of EGFR and many of its downstream signaling targets are found in a vast majority of cancers.<sup>15</sup> EGFR is a single pass transmembrane protein, comprised of an extracellular ligand binding domain, a transmembrane domain, and an intracellular kinase domain. Activation of RTKs by their specific extracellular ligands leads to the formation of receptor dimers, trans-autophosphorylation, and propagation of activation signals via intracellular mediators (Figure 1.3). The primary EGFR ligand in humans is epidermal growth factor (EGF), a 6 kDa protein which is found ubiquitously in various tissues.<sup>16</sup>

The two most important effectors activated by the binding of EGF to EGFR are the Ras/mitogen activated kinase (MAPK) and the phosphoinositide 3-kinase (PI3K) / protein kinase B (Akt) pathways. Activation of the Ras/MAPK cascade is initiated by the recruitment of growth receptor bound protein (Grb2) to bind to phosphotyrosine (pY) 1068 and pY1086 on EGFR via its src homology 2 (SH2) domain.<sup>16</sup> Grb2 acts as adaptor protein to recruit the RAS guanine exchange factor (GEF) SOS and form the SH2-Grb2-SOS complex. Once associated with the receptor, SOS mediates the guanine nucleotide exchange of Ras, a monomeric GTPase which subsequently activates the Raf-MEK-Erk1/2 kinase cascade. EGFR can also transmit signals through the PI3K/Akt pathway. Upon EGFR stimulation, PI3K generates phosphatidylinositol 3,4,5-trisphosphate (PIP3), which serves as a membrane anchor for activated Akt.<sup>9</sup>

# 1.2.1 Synergy between ROS production and protein phosphorylation during cell signaling

The connection between hydrogen peroxide  $(H_2O_2)$  and EGFR was first suggested when it was observed that cells stimulated with exogenous  $H_2O_2$  showed increased incorporation of [<sup>32</sup>P]phosphate. Although classically thought of as a toxic byproduct



Figure 1.4: A model for local  $H_2O_2$  accumulation. Figure adapted from Woo *et. al.*<sup>17</sup>

of cellular respiration, it was concurrently demonstrated in the late 1990s that  $H_2O_2$ can act as a secondary messenger in cell signaling.<sup>9</sup> A landmark study by Rhee *et al* showed that EGF stimulation increased intracellular levels of  $H_2O_2$  and Tyr phosphorylation on phospholipase C, gamma 1 (PLC $\gamma$ I) and suggested that inactivation of cysteine dependent protein tyrosine phosphatases (PTPs) by  $H_2O_2$  may be required for EGF signaling.<sup>18</sup>

The NADPH oxidases (Nox) are the source of  $H_2O_2$  which acts as a secondary messenger during EGFR activation. Five Nox isoforms and their dual oxidase counterparts (Duox) generate superoxide via electron transfer from NADPH to molecular oxygen. Nox2 directly associates with EGFR upon activation and has been show to sulfeynate several cysteine residues on the receptor and amplify its activity.<sup>19</sup> The hypothesis put forward by Rhee *et al*, that oxidation of PTPs is required for EGF signaling, was confirmed when later studies showed that  $H_2O_2$  produced by Nox temporally inactivates PTP1B<sup>17</sup> (which acts on pY residues on EGFR) and phosphate and tension homolog (PTEN),<sup>20,21</sup> by oxidation of their active site cysteine residues during EGF stimulation. PTEN is a lipid phosphatase which reverses phosphorylation of PIP3 and is commonly inactivated in cancer.<sup>16</sup> In order for  $H_2O_2$  to act as a signaling messenger, its concentration must rise above basal levels of between 20 nM and  $2 \mu M$ .<sup>22</sup> Thus, during EGFR activation, in local areas of the cytosol adjacent to the cell membrane, levels of  $H_2O_2$  are allowed to rapidly rise resulting in inactivation of PTPs, thereby amplifying signal propagation via kinase cascades (Figure 1.4).

#### **1.3** Proteomic methods to characterize cysteine PTMs

Because of the central role cysteine plays in redox signaling and protein function, a wide array of proteomic techniques have been developed for characterizing cysteine PTMs. Herein, we classify these methods into two general categories. The first section describes indirect methods which target the free cysteine thiolate. The second section describes methods to which use chemoselective methods to target specific PTMs.

# **1.3.1** Cysteine targeted chemical-proteomic methods

#### 1.3.1.1 OxICAT

The oxidative isotope-coded affinity tags (OxICAT)<sup>23</sup> approach is based off earlier isotope-coded affinity tags (ICAT) probes.<sup>24</sup> ICAT reagents have a cysteine reactive iodoacetamide (IA) group, a linker with 8 hydrogen or deuterium atoms which allow for the differentiation between heavy and light labeled species by mass-spectrometry (MS), and a biotin enrichment handle (Figure 1.5). In an OxICAT experiment samples are labeled sequentially, first with the light ICAT probe, reduced, then labeled with the heavy probe. Labeled proteins are isolated by streptavidin enrichment, trypsinized, and cysteine containing peptides are recovered. The tagged peptides are then analyzed by LC-MS/MS, where the heavy and light peptide signal intensities



Figure 1.5: OxICAT workflow. Cell lysates are sequentially labeled with light then heavy isotope-coded affinity tags (ICAT) reagent. Labeled proteins are enriched and trypsin digested. Labeled peptides are then recovered and analyzed by LC-MS/MS.

are used to determine the stoichiometry of reduced vs. oxidized cysteines (Figure 1.5). A modified version of the OxICAT workflow utilizing a cleavable biotin can also be used to facilitate a more efficient recovery of labeled peptides from strep-tavidin beads.<sup>25,26</sup> Another variant, used a bifunctional IA probe coupled to a non-hydrolyzable phosphate which enables the purification of labeled peptides utilizing existing immobilized metal affinity chromatography (IMAC) techniques already used in phosphoproteomics.<sup>27</sup> Variants of OxICAT has been used to quantify the extent of cysteine oxidation in both purified proteins,<sup>25</sup> and in a wide array of model organisms in including yeast,<sup>28</sup> Drosophila,<sup>29</sup> mammalian cells,<sup>26</sup> as well as several mouse tissues.<sup>27</sup>



Figure 1.6: (A) General isoTOP-ABPP workflow. Reactive cysteine residues on two proteome samples are labeled with iodoacetamide-alkyne (IAA), followed by CuAAC with an isotopically heavy or light biotin-azide cleavable linker. The two lysates are combined, biotinylated proteins are enriched on streptavidin-agarose beads, and subjected to an on-bead trypsin digestion. The IA-labeled peptides are released and analyzed by LC/LC-MS/MS. Heavy and light peptide pairs are quantified by their extracted MS1 peaks. (B) IAA structure and cysteine-labeling scheme. (C) The protease cleavable biotin-azide tag for isoTOP-ABPP.

#### 1.3.1.2 Activity based protein profiling

One disadvantage of OxICAT is that the detection of oxidative modified as well as highly reactive cysteines may be diminished by other highly abundant cysteine containing proteins.<sup>10</sup> Instead of measuring the percent of oxidation within a single sample, an alternative strategy is to target the analysis to highly reactive cysteines and compare reactivity or site occupancy across two separate samples. Isotopic tandem orthogonal proteolysis - activity-based protein profiling (isoTOP-ABPP) is a derivative of activity-based protein profiling (ABPP), a pioneering technology for interrogating protein activity directly in complex biological systems. In general, ABPP probes contain three elements: (1) a reactive warhead for covalently labeling target proteins; (2) a reporter tag for affinity purification or fluorescence detection; and, (3) a linker to minimize steric hindrance between the reporter and reactive groups.<sup>30,31</sup> Early ABPP methods utilized reactive warheads targeting a specific enzyme family, such as the fluorophosphonate probe for the serine hydrolases.<sup>32</sup> In latter iterations, more reactive and promiscuous electrophiles were utilized,<sup>33</sup> culminating in the use of an iodoacetamide-alkyne (IAA) probe for modification of reactive cysteines in the proteome. The isoTOP-ABPP platform couples the IAA probe with an isotopically tagged cleavable linker enabling the selective enrichment, release, and MS relative quantification of IA-labeled peptides from two samples. The isoTOP-ABPP platform involves the following steps: (1) treatment of lysates with IAA to label reactive cysteine thiolates; (2) conjugation of IA-labeled cysteines in control and experimental samples to isotopically differentiated cleavable azide-biotin tags using coppercatalyzed azide-alkyne cycloaddition (CuAAC);<sup>34</sup> (3) enrichment of IA-labeled proteins on streptavidin beads, followed by on-bead tryptic digestion, and linker cleavage to release IA-labeled peptides; and, (4) analysis of the resulting isotopically heavy and light peptide pairs using LC/LC-MS/MS to quantify reactivity differences in two samples using light:heavy isotopic ratios<sup>6</sup> (Figure 1.6).

Since the initial development of the isoTOP-ABPP platform, various iterations to the initial workflow have been reported, including variations to: (1) the cysteinereactive electrophile; (2) the cleavable biotin-azide tag; and, (3) the mode of heavy isotope incorporation. These recent advances are summarized below.

IAA is widely used as the reactive warhead in ABPP,<sup>6,35,36</sup> however other electrophiles have also been incorporated into the isoTOP-ABPP workflow. A photocaged bromomethyl ketone (CBK),<sup>37</sup> and iodomethyl ketone (CIK4)<sup>38</sup> were shown to have lower cytotoxicity compared to IA-alkyne and used to profile reactive cysteines in live cells with high spatial and temporal control (Figure 1.7A,B). CBK was used to monitor changes in cysteine reactivity in A431 cells in response to the EGF stimulated release of reactive oxygen species.<sup>37</sup> However, one challenge of live cell labeling followed by reactivity profiling is that the starting protein concentrations of the



Figure 1.7: Structures of (A) caged bromomethyl ketone (CBK), (B) caged iodomethyl ketone (CIK4), (C) iodoacetamide alkyne heavy and light and, (D) desthiobiotin iodoacetamide (DBIA).

heavy and light samples must be equalized during the process of culturing the cells. Normalizing the protein concentration after lysis will result in changes in the stoichiometry of the cysteine reactive probes used to label the cells. Alternatives to halo acetamide electrophiles have also been developed, including aryl halides such as pchloronitrobenzene,<sup>39</sup> and hypervalent iodine regents, such as ethynyl benziodoxolone (EBX).<sup>40</sup>

The initial isoTOP-ABPP platform utilized isotopically labeled, protease-cleavable biotin-azide tags for CuAAC-mediated conjugation to probe-labeled proteins. Due to the advent of a wide-variety of cleavable chemistries, isotopically tagged variants of chemically cleavable<sup>41</sup> and photocleavable<sup>42,43</sup> biotin-azide tags have been generated and shown to be compatible with the isoTOP-ABPP workflow.

Lastly, approaches to incorporate isotopic labels into the isoTOP-ABPP workflow have been explored, including: (1) stable isotope labeling by amino acids in cell culture (SILAC) to incorporate isotopes into the proteomes under evaluation; (2) isotopically tagged cysteine-reactive probes; (3) isotopically light and heavy biotinazide linkers; and, (4) post-digest peptide labeling using reductive dimethylation

(ReDiMe) or isobaric tags (iTRAQ, TMT). Incorporation of isotopic labels into the cysteine-reactive probe was accomplished through synthesis of isotopically differentiated iodoacetamide-alkyne probes containing a  ${}^{12}C_6$  or  ${}^{13}C_6$  benzyl moiety, termed IA-alkyne light (IAL) or IA-alkyne heavy (IAH), respectively<sup>25</sup> (Figure 1.7C). IAL and IAH can be obtained through a more facile synthesis, and using less expensive starting materials compared to the isotopic biotin-azide tags.<sup>25</sup> IAL and IAH also support the profiling of reversible cysteine modifications within the same sample in a work flow similar to the OxICAT method.<sup>23</sup> Combining TOP-ABPP with reductive dimethylation (ReDiMe) results in a method called rdTOP-ABPP.<sup>42</sup> rdTOP-ABiPP was shown to be comparable to several commercially available linkers for site of identification, and has the added benefit of supporting triplex quantitative experiments.<sup>42</sup> Multiplexed thiol reactivity profiling (MTRP) cysteine profiling with isobaric tags for relative and absolute quantization (iTRAQ) labeling allows for quantitative site of labeling to be performed with up to eight samples in parallel.<sup>43</sup> Although MTRP reagents are more expensive than those used for rdTOP-ABPP, MTRP requires less sample input when highly multiplexed comparisons are required for an experiment. Another multiplexed cysteine profiling method, termed streamlined cysteine activitybased protein profiling (SLC-ABPP) uses desthibition iodoacetamide (DBIA) which allows for a streamlined one-pot sample preparation<sup>44</sup> (Figure 1.7). The SLC-ABPP method further improves the depth of proteome coverage by employing real time searching<sup>45</sup> to MS reduce analysis time to 3 hours instead of a longer multidimensional fraction approach traditionally used for isoTOP-ABPP.<sup>6,46</sup>

# 1.3.2 Cysteine PTM targeted chemical-proteomic methods

Cysteine targeted approaches rely on the intrinsic reactivity of cysteine and therefore do not differentiate between specific PTMs such as sulfenic acids, sulfinic acids, and disulfides.<sup>5</sup> A complementary strategy is to target the analysis to specific cys-



**Figure 1.8:** Structures of sulfenic acid probes. **(A)** Reaction between sulfenic acid and dimedone, and structures of dimedone probes. **(B)** Structures of benzothiazine dioxide (BTD) and iodo BTD (iBTD) probes. Figure adapted from Abo *et. al.*<sup>5</sup>



Figure 1.9: Structures of sulfinic acid probes. (A) 2-nitroso benzoic acid probes for sulfinic acid. (B) Reaction between diazine probe and sulfinic acid. Figure adapted from Abo *et.*  $al.^5$ 

teine PTMs. One strategy for selective profiling of sulfenylation is to selectively reduce sulfenic acids with arsenite, then label with a biotin maleamide probe,<sup>47</sup> in a workflow analogous to the biotin switch assay.<sup>48</sup> Newer methods use chemoselective probes to directly react with sulfenic acids. The enolate form of dimedone will undergo nucleophilic attack to the sulfenic acids to form a covalent adduct.<sup>5</sup> Azide functionalized dimedone derivatives **DAz-1** and **DAz-2** which are compatible with bioconjugation, were assessed for live cell labeling and proteomic applications<sup>49</sup> (Figure 1.8A). **Dyn-2** was shown to have superior cell permeability and reactivity and was used to identify 175 candidate sites of sulfenation.<sup>49</sup> In later iterations of dimedone probes, the azide was replaced with an alkyne to develop probes with better *in vitro* stability<sup>50</sup> (Figure 1.8A). Application of **DYn-2** in A431 cells revealed an EGF dependent sulfenation of Cys797 on EGFR.<sup>19</sup>

In addition to identifying sites of sulfenation, another important goal is to measure the extent of modification. 2-iodo dimedone will selectively label the free cysteine thiol, thereby enabling the percent of sulfenylation on a peptide to be quantified by sequential labeling with D<sub>6</sub>-dimedone and 2-iodo dimedone.<sup>51</sup> A similar approach approach developed by Albertolle *et al.* uses benzothiazine dioxide (BTD) and iodo-BTD probes to simultaneously quantify relative levels of sulfenic acids, free thiols, and reversable oxidative PTMs, however the lack of an enrichment handle limited the number of sulfenylated residues which were identified to ~ 600 sites<sup>52</sup> (Figure 1.8B). Finally, Shi *et. al* used triphenylphosphonium ylide probes with enrichment handles to quantify the percent of ~ 2000 sites in the mitochondria.<sup>53</sup>

S-sulfinulation was originally regarded an irreversible artifictual oxidation event, but more recent studies have suggested that the modification is reversible,<sup>11</sup> but also important in redox signaling.<sup>54</sup> Prx 1-4 are believed to be regulated by S-sulfinulation as well as reduction by Srx<sup>55</sup> 2-nitroso benzoic acid derivatives will undergo an electrophilic reaction to selectively capture sulfinic acids<sup>56</sup> (Figure 1.9A). A significant drawback of **NO-Bio** probes is that they exhibit complex fragmentation patterns which are incompatible with identification of the site of sulfination by MS. To facilitate the detection sites of S-sulfinylation, Akter *et al.* developed a diazene probe (**DiaAlk**) which shows superior sensitivity and suports the site site-centric identification and quantification of sulfinic acids.<sup>57</sup>

# 1.3.3 Summary

Above we have summarized indirect and modification targeted methods to study cysteine PTMs. There is an nuanced difference between what the quantitative information given by each method represents. Cysteine targeted methods give information about the site occupancy and stoichiometry of labeling. However information about the chemical nature of the specific modification(s) is lost. In addition, some modifications occur at such low levels that they are difficult to discern in indirect labeling experiments. While it is true that changes in redox state may not be as apparent in data from indirect approaches compared to PTM targeted approaches, it is also important to note that many solvent exposed cysteine residues are non-specifically oxidized to some extent.<sup>23,29,58,59</sup> For example, a transition from 0.01 % to 0.5 percent oxidation would represent a 50-fold change, however such a small overall level of oxidation is unlikely to have significant biological consequences.<sup>27</sup> Therefore, PTM directed methods are more informative about the nature of the modification, but loose the context of the overall extent of modification of the protein.

#### 1.4 Proximity dependent labeling methods

As mentioned in section 1.2.1, ROS produced during cell signaling is localized to specific sub cellular regions. Cell fractionation workflows can be combined with cysteine profiling to enrich subsets of proteins confined to a particular organelle,<sup>26,60</sup> however such approaches are not amenable to profiling targets of ROS during signaling



Figure 1.10: BirA hydrolyzes ATP to form a reactive biotinoyl-5'-AMP intermediate. Wild-type BirA remains bound to biotinoyl-5'-AMP until it is transferred to the apo acetyl-CoA carboxylase subunit. The R118G BirA<sup>\*</sup> mutant still hydrolyzes ATP, but does not retain the affinity for biotinoyl-5'-AMP after it forms. Instead reactive biotinoyl-5'-AMP will be released allowing it to react with interacting proteins within a ~10 nm radius. In a BioID experiment, biotinyated proteins can be enriched, digested and identified by LC-MS/MS. Figure adapted from Varnaite *et. al.*<sup>61</sup>

because ROS production mostly occurs in the cytosol. In the following sections, we will provide an overview of two proximity ligation strategies, BioID and APEX which are which provide a potential platform to spatially control profiling of ROS targets during cell signaling.

#### 1.4.1 BioID

BioID is a proximity dependent labeling technique which offers significant advantages over traditional tools used to identify protein-protein interactions (PPIs). Specifically, because the labeling process occurs in live cells, transient or weak PPIs

which would otherwise not survive harsh cell lysis conditions can still be identified. BioID uses a mutant form of the *E. coli* biotin ligase ( $BirA^*$ ) to promiscuously biotinylate interacting proteins.<sup>61,62</sup> The wild-type BirA is a biotin ligase which transfers biotin to a subunit on the *E. coli* acetyl-CoA carboxylase.<sup>61,63</sup> The transfer of biotin to acetyl-CoA carboxylase is a two step process. First BirA hydrolyzes one molecule of ATP and transfers it to biotin to form a highly reactive biotinovl-5'-AMP (adenosine monophosphate) intermediate<sup>63</sup> which is then transferred to the  $\varepsilon$ -amine on a lysine on the protein target to form an amide bond accompanied by the release of AMP.<sup>64</sup> Wild-type BirA binds to biotinoyl-5'-AMP with a high affinity until it is transferred to a lysine residue on the apo domain of acetyl-CoA carboxylase. The R118G BirA mutant (BirA<sup>\*</sup>) retains the ability to hydrolyze ATP but has a reduced affinity for the intermediate, and therefore releases activated biotin in a reactive cloud where it labels interacting proteins in a proximity dependent manner (Figure 1.10). The labeling radius of  $BirA^*$  was estimated to be ~10 nm based off the known structure of the nuclear pore complex.<sup>65</sup> In a BioID experiment, a bait protein is expressed fused to  $BirA^*$  and  $50 \mu M$  exogenous biotin is added to initiate labeling. After labeling is complete, cells are lysed and biotinylated proteins are isolated and identified by LC-MS/MS. For the first generation biotin ligases, the labeling process takes between 3 and 24 hours.<sup>62,66</sup> Therefore labeled proteins represent a history of interactions over the course of several hours, rather than an instantaneous snapshot.

To improve on the temporal resolution of the original BirA<sup>\*</sup>, Branon *et. al* used yeast display directed evolution of the *E. coli* BirA to engineer a faster biotin ligase, named TurboID.<sup>67</sup> TurboID exhibits a 6 fold increase in activity relative to BirA<sup>\*</sup> and is able to achieve the same level of labeling in 10 minutes compared to the same level of labeling achieved in 18 hours with BirA<sup>\*</sup>. TurboID has a total of 14 mutations Interestingly, most of the mutations are located distal to the catalytic site and are distributed through the structure of the protein. Due to the wide distribution of



Figure 1.11: In APEX, a bait protein of interest is expressed fused to a peroxidase, which in the presence of  $H_2O_2$ , oxidizes biotin pheonol to the phenoxyl radical. The activated biotin forms a covalent adduct with electron rich amino acids, such as tyrosine, cysteine, and histidine on proximal proteins.

mutations in TurboID, there is no clear mechanistic explanation for how they effect activity.<sup>67,68</sup> Due to its increases catalytic efficiency TurboID is also compatible with *in vivo* applications. Branon and coworkers also demonstrated the use of TurboID in *Drosophila* and *C. elegans.*<sup>67</sup> Others have used TurboID in mice,<sup>69</sup> Zebrafish,<sup>70</sup> and *Arabidopsis.*<sup>71</sup>

# 1.4.2 APEX

Another proximity labeling method, termed APEX, uses an engineered ascorbate peroxidase to activate biotin-pheonol by oxidation to form a phenoxyl radical. Biotinphenoxide then reacts with tryosine, cysteine, and histidine on proximal proteins to forma a covalent adduct (Figure 1.11). Although horseradish peroxidase (HRP) can also be used for similar applications extracellularly, it is inactive when expressed in the cytosol, presumably due to the presence of four structural disulfide bonds which depend on binding to  $Ca^{2+}$  for the enzyme to function.<sup>72</sup> APEX was initially used as a genetically encoded electron microscopy contrast tag<sup>73</sup> and was later used to map the proteome of the mitochondrial matrix,<sup>74</sup> and inter membrane space.<sup>75</sup> APEX is also compatible with *in vivo* applications in *Drosophila* where it was used with tissue specific and subcellular resolution.<sup>76</sup> A notable difference between APEX and first generation biotin ligases is that cells are first incubated with biotin phenol and labeling is activated with the addition of 1 mM H<sub>2</sub>O<sub>2</sub>. The labeling process takes as little as 1 minute before the reaction is quenched. Therefore APEX provides a short snapshot of protein interactions compared to the longer labeling time required by BioID. Importantly, the shorter labeling time allowed APEX to be used in a temporally controlled experiment to profile interactors of G-protein-coupled receptors (GPCRs).<sup>77,78</sup> However, the requirement of 1 mM H<sub>2</sub>O<sub>2</sub> is likely to interfere with endogenous production of H<sub>2</sub>O<sub>2</sub> used to regulate cell signaling pathways.

### 1.4.3 Design of proximity labeling experiments

Normally, bait proteins are ectopically expressed via lentiviral transduction,<sup>79</sup> by insertion into a recombinant site<sup>80</sup> in Flp-In cell lines, or transiently expressed for *in vivo* applications.<sup>69</sup> However, Vandemoortele *et. al* used CRISPR/Cas9 to append BirA<sup>\*</sup> to the C-terminus of the endogenous p53 tumor suppressor gene in HCT116 cells.<sup>81</sup> To achieve the most biologically relevant relevant results from a proximity labeling experiment, the native activity of the bait protein should be preserved as much as possible. Indeed, excessive protein overexpression can have a deleterious effect on localization and activity.<sup>82,83</sup> A significant advantage of their approach is that the expression of the bait protein is under the control of the endogenous promoter which limits artifacts caused by constitutive overexpression of a bait protein. Even if a complex and labor intensive genome editing method is not used to express a bait protein, the proper localization and retention of native activity should still be verified.

Even if the bait retains the behavior of the native protein, negative controls are essential to account for non-specific interactions *in cellulo* as well as contaminants which are pulled down during streptavidin enrichment.<sup>84</sup> Depending on experimental design, several types of negative controls are necessary to discrimination in true vs. false interactions. The first type of control could be the cell line in the absence of labeling reagents (omission of supplemental biotin for BioID or  $H_2O_2$  or biotin-phenol for APEX), which can help to identify endogenously biotinylated proteins as well as non-specific binders to the matrix used for affinity purification.<sup>68</sup> Another type of control involves expression of BirA<sup>\*</sup> or APEX without the bait fusion accounts for non-specific interactions with the bait protein.<sup>68</sup> Finally in experiments where the same bait construct is being used to compare interactors in the presence of some stimulant, the a sample with the omission of the stimulant can serve as a negative control. For example, Zheng *et. al* compared interactors of the same protein arginine deiminase (PAD) 2 BioID construct (+/-) of 5  $\mu$ M ionomycin to identify proteins involved in the nuclear import of PAD2.<sup>85</sup> For measuring the relative abundance or proteins in control vs. bait samples, a wide array of quantification methods have been used including SILAC,<sup>75,85,86</sup> label free quantification (LFQ),<sup>69,81</sup> label free selected reaction monitoring (SRM),<sup>78</sup> tandem mass tags (TMT),<sup>77</sup> and spectral counting.<sup>65</sup> However maintaining consistent expression and labeling levels between controls which are different from the bait construct are necessary for the quantitative information to be meaningful.

## 1.5 Conclusion

In summary, we have provided an overview of redox regulation of cell signaling, proteomic methods to characterize cysteine oxidative PTMs, and proximity biotinylation methods compatible with live cells. The next chapter will describe the development of a proteomic platform combining TurboID with OxICAT to identify localized sites of cysteine oxidation during EGFR activation.

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# Chapter 2

Spatially Controlled Profiling of Redox Signaling During EGFR Activation

## 2.1 Introduction

Reactive oxygen species (ROS) are generated by all aerobic organisms as a byproduct of cellular respiration and other cellular processes. In addition to spontaneous production of ROS,  $H_2O_2$  has been shown to play an important role in cell signaling.<sup>1,2</sup> The epidermal growth factor receptor (EGFR) pathway is an important and widely studied cell signaling pathway responsible for regulating growth, proliferation, and differentiation.<sup>3</sup> In addition to an increase in protein phosphorylation, activation of EGFR is also accompanied by a rapid increase in cellular ROS levels.<sup>2</sup> Cells maintain tight control over both H<sub>2</sub>O<sub>2</sub> levels through redox buffering systems including catalase, peroxiredoxins (Prxs), and glutathione peroxidases (GPxs), and phosphorylation through protein phosphatases.<sup>4</sup> Upon engagement of EGFR, cells must overcome basal levels of phosphatase activity to allow signal propagation to occur. Protein tyrosine phosphatases (PTPs) are inactivated by oxidation by  $H_2O_2^{5,6}$  and  $Src^7$  and  $EGFR^2$ kinases are activated by it. In addition, the lipid phosphatase PTEN is known to be reversibly inactivated by oxidation.<sup>8</sup> Conversely, phosphorylation of the redox buffering enzymes  $PrdxI^{4,9}$  and  $PrdxII^{9-11}$  allows localized  $H_2O_2$  levels to rise as high as 10 µM during signaling.<sup>1</sup> Thus, the simultaneous inactivation of both phosphatases by oxidation and Prxs by phosphorylation act as a positive feedback loop necessary for sustained growth factor signaling.

The primary source of  $H_2O_2$  used in cell signaling is the Nox family of nicotinamide adenine dinucleotide phosphate (NADPH) oxidases. The protopical NADPH oxidase is Nox2 which exists as a multi subunit transmembrane complex comprised of two multi-pass transmembrane subunits (CYBA and NOX2), and several cytosolic subunits (NCF1, NCF2, NCF4).<sup>12</sup> Nox enzymes function by transferring electrons from cytosolic NADPH to oxygen to form superoxide ( $O_2^-$ ). The  $O_2^-$  is rapidly dismutated by SOD3 to  $H_2O_2$ .<sup>12</sup> The extracellular  $H_2O_2$  then re-enters the cell either through passive diffusion or through specialized aquaporin channels.<sup>13</sup> Two important features of ROS generated by Nox2 during signaling is that it is relatively short lived, the concentration of  $H_2O_2$  peaks after 5 minutes and returns to base line after 20 minutes,<sup>2</sup> and it is localized to cytosolic regions adjacent to the cell membrane where the signal is propagating from.<sup>14</sup>

While the targets of EGFR dependent ROS have been studied on a global scale,<sup>2,15</sup> no study has yet achieved the spatial resolution required to identify local targets of ROS generated by Nox2 upon EGF stimulation. To that end, the goal of this study is to capture EGF-dependent protein-protein interactions (PPIs) with Nox2. The technique used to capture such interactions has two main requirements: (1) it must be capable of capturing transient PPIs in live cells, and (2) it must have high temporal resolution because EGFR mediated kinase activity lasts for ~6 minutes.<sup>16</sup> Proximity-dependent biotinylation (BioID) represents an intriguing tool because it supports the profiling of protein interactions in live cells.<sup>17–19</sup> However, one significant limitation of first and second generation biotin ligases is that the labeling process takes place over the course of ~24 hours.<sup>17,18</sup> In this study we explore methods of improving the temporal resolution of BioID towards, the development of a proteomics platform which supports redox proteomic profiling of EGF dependent interactors of Nox2.

# 2.2 Results and discussion

#### 2.2.1 Use of photocaged biotins to increase the temporal control of BioID

#### 2.2.1.1 First generation caged biotins

A possible strategy to improve the temporal resolution of BioID is to use biotin analogues which contain a photolabile protecting group. After being saturated with photocaged biotin, cells can be briefly irradiated with UV light to rapidly increase the intracellular concentration of free biotin and initiate biotin labeling. For a proof of concept system, a previously reported BioID construct, histone H3A,<sup>20</sup> was fused to BirA<sup>\*</sup> and stably expressed in 293T cells. A time course experiment with 0.1 µM supplemental biotin was performed and saturation of labeling was reached after  $\sim 24$ hours (Figure 2.1). There are 2 possible rate limiting steps which could lead to the slow labeling process; the first is the diffusion of supplemental biotin into the cell, the second is the slow kinetic activity of the biotin ligase. Under the hypothesis that the rate limiting step is the diffusion of biotin into cells, we synthesized a panel of photocaged biotin (cBio) analogs (Figure 2.2A) in which the carboxylic acid in biotin is blocked by a ortho-nitrobenzyl (oNB) caging group. oNB derivatives are widely used for caging biomolecules such as neurotransmitters, and chemical probes due to their high uncaging efficiency and biocompatibility.<sup>15,21–23</sup> In a BioID workflow utilizing cBio, cells can be saturated with cBio without any background labeling, next the photolabile protecting group can then be rapidly removed by irradiation with UV light to initiate proximity-dependent labeling in a controlled manner. **cBio1-3** show UV and time dependent uncaging in vitro (Figure 2.2C). However, when added to cells expressing a BirA<sup>\*</sup> fusion protein they show biotinylation even in the absence of UV irradiation (Figure 2.2B). The caging group on **cBio1-3** is attached via an ester bond so the most likely explanation for the UV independent uncaging is the activity of cellular esterases.

### 2.2.1.2 Second Generation Caged Biotins

To address the problem of esterase mediated uncaging, we synthesized a second generation of caged biotins using two different strategies. The use of nitroindoline groups have been widely used to cage neurotransmitters.<sup>24–27</sup> **cBio4** has a 4-methoxy-7-nitroindoline caging group attached by an amide bond. In addition the 5-nitroindoline isomer (**NPA1**) is generated as a byproduct in the synthesis of **cBio4** (Figure 2.3A, Scheme 2.2). **NPA1** is not photoactive and was included as a negative



**Figure 2.1:** Timecourse experiment with BirA<sup>\*</sup>. HEK 293T stably expressing histone H3A fused to BirA<sup>\*</sup>-HA were treated with  $0.1 \,\mu$ M biotin from 0 to 48 hours. A 293T cell line not expressing a biotin ligase was included as a negative control.



Figure 2.2: Characterization of first generation caged biotins. (A) Uncaging reaction of cBio1-3. (B) An aqueous solution of  $400 \,\mu\text{M}$  cBio1-3 were irradiated with UV light for the the indicated time. The percentage of caged compound remaining was quantified by LC/MS. Error bars represent the standard deviation of 3 measurements. (C) 0.1  $\mu\text{M}$  cBio1-3 were added to HEK 293T stably expressing H3A-BirA<sup>\*</sup>-HA and incubated at 37 °C and 5 % CO<sub>2</sub> for 24 hours. Cells were then irradiated with UV light for 5 minutes, incubated at 37 °C for an additional 10 minutes then harvested.



Figure 2.3: Second generation caged biotins allow for the control of biotin labeling in live cells. (A) Structures of cBio4-6 and non photoactive (NPA) biotins 1 and 2. (B) 0.1 µM of various cBio analogues were added to H3A-BirA<sup>\*</sup>-HA 293T cells and incubated for 24 hours. Cells were then irradiated with UV light for 5 min and incubated at 37 °C for an additional 24 hours. Labeled proteins were then detected by biotin blot.



Figure 2.4: 293T cells stably expressing H3A or NCF1 fused to BirA<sup>\*</sup>-HA were incubated with  $0.1 \,\mu\text{M}$  cBio4 for 24 hours, then irradiated with UV light for 10 minutes, and harvested at the indicated time points.

control. The use of a photocaging group to control the interaction between biotin and avidin has been previously reported.<sup>28,29</sup> **cBio5-6** have a *o*NB caging group attached to the biotin uredo ring. The carboxylic acid on **cBio5** has a methyl ester protecting group and is an intermediate in the synthesis of **cBio6** (Figure 2.3A, Scheme 2.3). We included the methyl ester intermediate to test whether it would show improved cell permeability. The entire panel of biotin analogues were tested in a BioID cell line. As expected **NPA1-2** showed a low level of labeling comparable level of labeling to DMSO. **cBio1-3** again showed UV independent uncaging comparable to both biotin and biotin methyl ester. **cBio4-6** showed UV dependent uncaging with UV irradiated cells showing a comparable level of labeling to unmodified biotin (Figure 2.3B). However, when a timecourse experiment was performed with **cBio4**, cells still needed a full 24 hours after UV irradiation to achieve a saturation of biotin labeling (Figure 2.4). Unfortunately, the initial hypothesis, that the rate limiting step in BioID was



Figure 2.5: Time and concentration course experiments with TurboID. (A) 293T cells stably expressing NCF1 fused to TurboID-HA and the TurboID-HA control were treated with 50  $\mu$ M biotin and harvested after 10, or 30 minutes, or 1, 2, or 24 hours. (B) 293T cells expressing NCF1 fused to either BirA<sup>\*</sup>-HA or TurboID-HA were treated with 0-50  $\mu$ M biotin for 24 hours for BirA<sup>\*</sup>, or 10 minutes for TurboID.

the diffusion of biotin into the cell was incorrect. In order to improve the rate of biotinylation a biotin ligase with faster catalytic activity is necessary.

# 2.2.2 Generation of A431 cell lines stably expressing TurboID

A biotin ligase with higher catalytic efficiency, named TurboID has recently been developed through directed evolution.<sup>30</sup> TurboID shows saturation of labeling as fast as within 10 minutes.<sup>30</sup> Two TurboID constructs were expressed in HEK 293T cells; one with the Nox cytosolic subunit NCF1, fused to TuboID-HA, and another with just the free TurboID-HA. Both constructs showed robust biotinylation within 10 minutes and labeling intensity increased over the course of 24 hours (Figure 2.5A). TurboID shows a similar level of biotinylation in as fast as 10 minutes, compared to 24 hours for the second generation BirA<sup>\*18</sup> (Figure 2.5B). Interestingly although TurboID was much faster, it was only able to achieve a comparable level of labeling



Figure 2.6: Biotin blot showing biotin labeling and HA western blot showing fusion protein expression in A431 cells transduced with or without spinoculation.

to BirA<sup>\*</sup> at a mininum concentration of 10  $\mu$ M supplemental biotin, whereas BirA<sup>\*</sup> showed biotinylation activity at as low as 50 nM (Figure 2.5B). The wild type *E. coli* BirA was used as the starting point for the directed evolution of TurboID<sup>30</sup> which requires 10–50  $\mu$ M supplemental biotin for proximity biotinylation.<sup>17,31</sup> However the second generation BirA<sup>\*</sup> was based off the the *Aquifex aeolicus* BirA which is active at a much lower biotin concentration.<sup>18</sup> The *A. aeolicus* BirA even shows labeling in the absence of suplemental biotin with some constructs which necessitates culturing cells in biotin depleted media prior to initiating biotin labeling.<sup>18</sup>

Next, we sought to generate an A431 cell line expressing TurboID fused to multiple Nox subumits. A431 cells are an epidermoid carcinoma line which naturally overexpresses EGFR, and are widely used as a model cell line for studies of the EGFR pathway.<sup>2,4,32</sup> A431 cells are a suitable stable transduction host,<sup>32</sup> but do not express recombinant proteins as readily as 293T cells. To improve the transduction and expression efficiency, we transduced A431 cells with a modified spinoculation protocol.<sup>33</sup> Spinoculation involves centrifuging cells at  $800 \times g$  after adding adding virus particles to increase the concentration of virus at the surface of target cells, resulting in



Figure 2.7: Stimulation of TurboID cell lines with EGF. (A) A431 cells were incubated for 10 minutes in 50 µM biotin and the presence of absence of 100 ng mL<sup>-1</sup> EGF. Whole cell lysates were analyzed by western blot with streptavidin-HRP and antibodies for EGFR, phospo-EGFR, HA, V5, and GAPDH. (B) A431 cells were incubated for 5 minutes in the presence of absence of 100 ng mL<sup>-1</sup> EGF. Cells were then fixed, and subjected to immunofluorescence staining with antibodies against the HA or V5 tags on TurboID (green) and phosphorylated EGFR (red); nuclei were stained with DAPI (blue).

more cells being infected.<sup>33</sup> A431 cells which were infected by spinoculation showed significantly higher levels of fusion protein expression and biotin labeling (Figure 2.6).

Four TurboID constructs were generated and expressed in A431 cells: (1) a TurboID control with an N-terminal HA tag, (2) the Nox2 organizer subunit NCF1 with an N-terminal TurboID-HA fusion, (3) the Nox2 activator subunit NCF2 with a Cterminal V5-TurboID fusion, and (4) the Nox1 organizer subunit NOXO1 with an N-terminal TurboID-HA fusion. Each cell line shows varying levels of biotinylation and all show EGF dependent phosphorylation of EGFR (Figure 2.7A). Immunofluorescence analysis shows that each construct co-localizes with phosphorylated EGFR upon stimulation with 100 ng mL<sup>-1</sup> EGF (Figure 2.7B).



Figure 2.8: Workflow to identify protein targets of Nox2 ROS. A431 cells stably expressing Nox2 TurboID constructs are treated with 50  $\mu$ M biotin and (+/-) 100 ng mL<sup>-1</sup> EGF for 15 minutes at 37 °C then harvested. Whole cell lysates are streptavidin enriched, trypsinized on bead, and dimethylated with isotopically heavy and light formaldehyde. Proteins which were labeled by TurboID are identified by LC-MS/MS.

To identify proteins that selectively interact with Nox2 during EGF stimulation, the cell line for each construct was treated with 50 µM biotin in the presence or absence of 100 ng mL<sup>-1</sup> EGF. The biotinylated proteins are enriched on streptavidin-agarose beads, digested with trypsin, and subjected to reductive dimethylation (ReDiMe).<sup>34</sup> The digest from the cells treated with EGF was dimethylated with heavy formaldehyde and the no EGF control with light formaldehyde (Figure 2.8). The light to heavy ratio ( $R_{L/H}$ ) represents the abundance ratio between proteins associating with the bait protein in the presence or absence of EGF. Thus, a high  $R_{L/H}$  indicates that the labeled protein selectively interacts with the bait during EGF stimulation.

We performed 2 technical replicates of the experiment descried in Figure 2.8. The  $R_{L/H}$  in replicate 2 is plotted vs. the ratio in replicate 1 (Figure 2.9, Table 2A.1). Proteins with elevated  $R_{L/H}$  in both replicates are in the upper right corner of each panel. A total of 26 proteins had  $R_{L/H} > 2$  which were consistent across both replicates. Only 1 protein fell into this category in the TID-HA dateset while 11, 9, and 5 were in the V5-TID-NCF1, NCF2-TID-HA, and NOXO-TID-HA datasets


**Figure 2.9:** Identification of protein targets of Nox2 ROS. Protein  $R_{L/H}$  in the second technical replicate (y-axis) are plotted vs. the first technical replicate (x-axis). Each panel contains data from a different bait protein. The red dotted lines have slopes of 2 and 0.5 and the 2 vertical and horozintal grey lines are at a  $R_{L/H}$  of 2 in each replicate. Proteins are considered to be reproducible EGF dependent interactors with the bait protein if they have a  $R_{L/H} > 2$  in both replicates and are between the 2 red dotted lines.

respectively. Encouragingly, NCF2 had a  $R_{L/H}$  of 20 in both V5-TID-NCF1 replicates which indicates that the NCF1 fusion protein retains the activity of the wild type. A number of proteins with involvement in cell cycle and mitogen signaling were also identified. Most notibly, BRCC3 is a deubiquitinase and a subunit in the BRCA1/2 complex, a well characterized tumor suppressor gene.<sup>35,36</sup> In addition, SFN is a 14-3-3 scaffolding protein which binds to phosphoserine and phosphothreonine residues on receptor tyrosine kinases (RTKs)<sup>37</sup> and has been show to stabilize EGFR and MET by recruiting deubiquitinases to prevent their degradation.<sup>38</sup> A ubiquitin ligase, TRIM25 known to regulate SFN was also identified in multiple datasets,<sup>39</sup> but it did not have an elevated  $R_{L/H}$ .

# 2.2.3 Mass spectrometry method development

# 2.2.3.1 Dual enrichment strategy

With the A431 TurboID cell lines in hand, we next sought to identify cysteine residues which are targeted by Nox2 ROS. The oxidative isotope-coded affinity tags (OxICAT) method uses cysteine reactive probes with differential isotopic tags to quantify the stoichiometry of cysteine labeling within a sample.<sup>41–43</sup> However, because the TurboID and OxICAT sample preparations both use a biotin-streptavidin enrichment step, it is necessary to modify the workflow when combining both approaches to allow for both the enrichment of proteins labeled by TurboID and cysteine containing peptides. To maximize the coverage of cysteine residues we first tested a dual enrichment workflow in which the first enrichment is performed for cysteine labeled by the TurboID bait construct and the second enrichment is performed for cysteine containing peptides (Figure 2.10). A test sample preparation was performed with 2 and 4 mg of lysate from cells expressing TurboID treated with 50 µM supplemental biotin following the workflow in figure 2.10. The percent oxidation of a total of 6 and 376 cysteines in the 2 and 4 mg samples respectively were quantified, with only 4



Figure 2.10: Dual enrichment workflow. A431 cells expressing a Nox TurboID construct are stimulated with EGF then lysed under denaturing conditions in the presence of 10 mM iodoacetamide-alkyne (IAA) light to cap free cysteine thiols, oxidized cysteines are reduced with TCEP then caped with 10 mM IAA-heavy. The first of 2 streptavidin pull downs is performed to enrich proteins biotinylated by the TurboID construct, then digested with trypsin. Copper-catalyzed azide-alkyne cycloaddition (CuAAC) is performed on the tryptic digest with a chemically cleavable biotin azide tag, followed by a second streptavidin enrichment and chemical cleavage of the biotin tag to obtain cysteine containing peptides.



Figure 2.11: Cysteines identified by the dual enrichment workflow. (A) Percent oxidation of cysteine residues identified in the 2 and 4 mg samples. (B)  $UpSet^{40}$  depicting the number of quantified cysteines which were unique and overlapping between each sample.



**Figure 2.12:** Isotopically linked feature detection and targeted fragmentation workflow. A431 cells expressing a Nox TurboID construct are stimulated with EGF, and split into 2 fractions. The first is labeled with a 1:1 ratio of IAA-light and heavy, enriched on streptavidin beads, trypsinized and analyzed by LC-MS/MS. A list of putative cysteine containing peptides is generated by performing feature detection and linking isotopically related peptides on the MS1 level data. The list of isotopically linked features is used to generate a mass list to target the MS2 fragmentation to peptides of interest in a second sample.

cysteines being identified in both samples (Figure 2.11A,B). Thus, a dual enrichment workflow using TurboID and OxICAT is feasible, but it requires 4 or more mg of cell lysate per sample.

# 2.2.3.2 Isotopically linked feature detection and targeted fragmentation

A significant disadvantage of a dual enrichment workflow is that  $\sim 2 \text{ mg}$  of both IAA-light and heavy is required per sample. Because IAA must be prepared in house using costly starting materials,<sup>43</sup> we sought an alternative approach which supports the use of commercially available reagents. One technique to address the problem of dual enrichment is to eliminate one of the enrichment steps all together. In such a workflow, the first enrichment for proteins biotinylated by the bait construct would be



Figure 2.13: Steps MS1 data reduction. Profile MS1 peaks are centroided, then peaks from the same peptide are grouped by the m/z and RT dimensions to form features. Coeluting features which are 6 Da apart in the m/z dimension are grouped to form consensus features.

retained and cysteine containing peptides would be targeted for MS2 fragmentation using an inclusion list. The inclusion list containing putative cysteine containing peptides would be obtained by analyzing a portion of the sample of interest which has been labeled with a 1:1 ratio of a heavy and light cysteine reactive reagent. Then a list of masses of peptides which co-elute and have a mass difference equivalent to that of the tag would be constructed by analyzing the MS1 level data (Figure 2.12). Because MS1 level data is comprehensive, all cysteine containing peptides should be visible at that level, even if a MS2 scan was not obtained for a given peptide. The MS2 coverage of cysteine containing peptides could be maximized by analyzing a second portion of the same sample with a mass list to target fragmentation of those peptides.

In the analysis of mass spectrometry data, feature detection is a data reduction

Parent file	Sequest PSMs	Consensus features	PSMs mapped	Single id	Multiple id identical	Multiple id divergent	TPR
IA HL 1-1 01	0	140	0	0	0	0	NA
IA HL 1-1 02	363	1099	182	69	108	5	50.14
IA HL 1-1 03	1216	2634	904	278	609	17	74.34
IA HL 1-1 04	1221	2583	884	283	561	40	72.40
IA HL 1-1 05	191	153	19	9	10	0	9.95
Total	2991	6609	1989	639	1288	62	66.50

**Table 2.1:** True positive rate (TPR) for MS1 features compared to Sequest identifications. The number of peptide-spectrum matches (PSMs), features, and PSMs matches to features in each of the 5 sample fractions are shown. PSMs which are mapped to features can be broken down into 3 categories: (1) in "single id" matches, only a single PSM was mapped to a feature, (2) in "multiple ID identical" matches, multiple PSMs with the same sequence are mapped to a feature, and (3) in "multiple ID divergent" matches, multiple PSMs with differing sequences are mapped to the same feature.

technique where isotopic peaks belonging to the same peptide are linked in the m/z dimension and isotopic clusters eluting in adjacent scans are linked in the retention time (RT) dimension.<sup>44</sup> There are various open source software tools which implement feature detection algorithms, including the Trans-Proteomic Pipeline,<sup>45</sup> MaxQuant,<sup>46</sup> and OpenMS.<sup>44,47</sup> Because the individual tools in OpenMS are modular, highly extensible, and available as both stand alone command line tools as well as a C++ or Python library, we chose to use it to perform the custom feature detection step.

To evaluate the utility of mass list targeted fragmentation of cysteine containing peptides, we treated A431 cells expressing a Nox TurboID construct with 50  $\mu$ M biotin in the presence or absence of 100 ng mL<sup>-1</sup> EGF. Two replicates of a sample where half the sample is labeled with 100  $\mu$ M IAA heavy and half with 100  $\mu$ M IAA light. In the evaluation of this method we used IAA heavy and light, but any cysteine reactive reagent with a stable isotope label, such as N-ethylmaleimide (NEM) H<sub>5</sub> and D<sub>5</sub>, would also be supported because the alkyne on IAA is not required. Biotinylated proteins were enriched on streptavidin beads, digested with trypsin. The entire tryptic digest from the first replicate was analyzed by LC-MS/MS. MS1 peaks were centroided, then the OpenMS centroid feature finder<sup>44,47</sup> tool was used to group



Figure 2.14: Kernel density estimate (KDE) plot showing the distribution of feature intensities for peptide features which were matches or not matches to PSMs identified by Sequest.

peptide features into a feature map data structure. Co-eluting features in the RT dimension which are 6 Da apart in the m/z dimension are grouped together and stored in a consensus map data structure (Figure 2.13). The MS2 level data in the first sample were also analyzed with Sequest<sup>48</sup> to determine how peptides in the MS1 level data were also identified by database searching. The number of PSMs identified by Sequest in each on MudPIT fraction<sup>49</sup> are shown in Table 2.1. Overall 66.50% of peptides identified by Sequest were also identified in the feature detection data. The most likely reason that many features were not also identified by Sequest is that the Sequest IDs were biased towards higher intensity features (Figure 2.14), because those are the most likely to be sampled for MS2 fragmentation. The benefit of using a mass list based off putative cysteine containing peptides is that fragmentation would also be targeted to lower abundance peptides.

Next, the second sample replicate was run with a mass list comprised of features identified in the first replicate which met the requisite m/z and RT criteria. Overall, 368 cysteine containing peptides were identified which were found in both samples, 74 additional peptides were unique to the sample run with a mass list, and 148 additional peptides were unique to the no mass list run (Figure 2.15). Surprisingly,



Figure 2.15: Numbers of cysteine containing peptides identified with and without a mass list targeting heavy and light peptide pairs.



Figure 2.16: Representative retention time (RT) and m/z distribution of consensus features. (A) Mass of consensus features identified by with a RT window of 1, 5, 10, and 20 minutes. (B) Number of consensus features at a given RT with varying RT windows for consensus features.



Figure 2.17: TurboID OxICAT workflow. Nox TurboID A431 cells are stimulated with  $100 \text{ ng mL}^{-1}$  EGF and  $1000 \text{ UmL}^{-1}$  PEG-catalase. Lysates are labeled sequentially with 10 mM NEM-H<sub>5</sub> and NEM-D<sub>5</sub>. A streptavidin pull down is then performed to enrich for proteins which are biotinylated by TurboID and digested with trypsin on bead. The full tryptic digest is then analyzed by LC-MS/MS.

more cysteines were quantified in the sample run without a mass list. To investigate why using a mass list did not increase cysteine coverage, we examined the m/z and RT distribution of features with a range of RT tolerances around each feature. Most features eluted between 60 and 160 minutes in the representative MudPIT fraction we examined (Figure 2.16A). The maximum number of features were 43, 44, 77, and 389 with feature retention time windows of 1, 5, 10, and 20 minutes respectively (Figure 2.16B). Even if the mass list were to be broken down in to several segments over the course of the sample acquisition, the high complexity and number of target masses is likely beyond what is possible in a data dependent acquisition (DDA) experiment.

#### 2.2.4 Turbo-OxICAT

To identify cysteine residues which are targeted by Nox2 ROS we adopted a single enrichment strategy where proteins labeled by TurboID are pulled down by streptavidin enrichment and the entire tryptic digest is analyzed by LC-MS/MS (Figure 2.17). Non cysteine containing peptides are then removed during the data analysis



Figure 2.18: (A) Percent oxidation of proteins pulled down with NCF1, NCF2, and NOXO1. The cell line expressing each bait protein was treated with  $100 \text{ ng mL}^{-1}$  EGF,  $50 \,\mu\text{M}$  biotin, and  $(+/-) 1000 \,\text{U}\,\text{mL}^{-1}$  PEG-catalase. (B) Moving average (window of 50) of cysteine functional annotations as percent of total peptides.



Figure 2.19: Percent oxidation of cysteines identified in each bait protein data set in (A) EGFR and (B) integrin beta-4 (ITGB4) with the locations of extracellular and intracellular domains shown.

process. A challenge with the workflow is that there could be a change in both the binding partners of the TurboID bait as well as the level of oxidation on those proteins. In an attempt to reduce the sample variability all cells were treated with EGF and supplemental biotin and cells were either treated or not treated with 1000 U mL<sup>-1</sup> polyethylene glycol (PEG)-catalase. Pre-treatment of cells with PEG-catalase can be used to attenuate EGFR activation by eliminating extracellular  $H_2O_2$ .<sup>50,51</sup> Our hypothesis is that the bait protein binding partners of the (+/-) PEG-catalase datasets should remain relatively consistent, but the oxidation profile of those proteins should be altered.

The NCF1, NCF2, and NOXO1 TurboID A431 cell lines were treated with 50  $\mu$ M biotin, 100 ng mL<sup>-1</sup> EGF, and (+/-) 1000 U mL<sup>-1</sup> PEG-catalase in technical triplicate. The level of oxidation on between 500 and 800 peptides were quantified in each of the 6 samples. No trends were apparent in the number of peptides or overall levels of oxidation in each sample (Figure 2.18A, Table 2A.2). One important difference between OxICAT and activity or reactivity based methods is that all cysteines, not just reactive ones, will be labeled by OxICAT reagents. Therefore, we would expect to see more structural disulfide bonds with high oxidation percentages. We used a

custom python script<sup>52</sup> to query the universal protein resource (UniProt) database and retrieve functional annotation information for each cysteine we identified. The running average percentage of proteins which fall into several functional categories are shown in Figure 2.18B. For all samples, annotated disulfides comprised up to half of half of all cysteines with an oxidation percentage over 75%. For NCF1 and NCF2, several nitrosylated, ADP-ribosylated, and succinylated cysteines on GAPDH were found with lower oxidation percentages.

EGFR and ITGB4 are both homologous, single pass transmembrane proteins which have transmit signals across the cell membrane. 17 and 11 distinct cysteine containing peptides were identified on EGFR and ITGB4 respectively, and their membrane topology and oxidation profile provides an additional means of validating the OxICAT method because the cytosol is a reducing environment and the extracellular space is oxidizing. A stark transition in percent oxidation is apparent between the extracellular and intracellular transition in both proteins (Figure 2.19). There is also a slight increase increase between the carboxyl tail in EGFR relative to fully reduced cysteines in the tyrosine kinase domain (TKD) (Figure 2.19A). Cysteines were essentially fully oxidized or reduced in ITGB4 depending on what side of the cell membrane they are located (Figure 2.19B).

Ultimately, the goal of this study is to identify sites on proteins which are selectively oxidized in EGF stimulated cells. To identify proteins with a higher level of oxidation in the (-) PEG-catalase sample, we plotted the percent oxidation in the (-) PEG-catalase sample vs. the (+) PEG-catalase sample (Figure 2.20, Table 2A.2). EGFR C311 is located in EGFR extracellular domain and showed 60 vs. 82% oxidation in the NCF1 (+) vs. (-) PEG-catalase treatment. Another residue in EGFR, C797 is already an established site of regulatory sulfenylation,<sup>2</sup> however we did not observe it in our data.  $\beta$ -integrins are involved in transmitting signals across the cell membrane via the activation of tyrosine kinases.<sup>53</sup> A peptide containing both C568



**Figure 2.20:** Percent oxidation of cysteines identified in the (-) catalase, (+) EGF sample vs. cysteines identified in the (+) catalase, (+) EGF sample. Peptides in blue have a percent oxidation which is across both cell treatments. Peptides in red are considered to be selectively oxidized in one or the other treatment.

and C574 ITGB1 79 vs. 100 % oxidation in the NCF2 (+) vs. (-) PEG-catalase sample. CTTN is a substrate of Src kinase and a known oncogene which contributes to oncogenesis by inhibiting the ubiquitin of EGFR.<sup>54</sup> CTTN C112 showed 23 vs. 63% oxidation in the NOXO1 (+) vs. (-) PEG-catalase sample.

# 2.3 Conclusion

In summary, we describe the development of a proteomics platform combining TurboID and OxICAT to identify localized sites of cysteine oxidation during EGFR activation. Proteins we identified sites on a number of proteins responsible for regulating cell growth and proliferation. Future experiments will include validating oxidation sites on EGFR, CTTN, and ITGB1 to determine how they alter activity.

#### 2.4 Materials and methods

#### 2.4.1 Synthesis of cBio1-3



Scheme 2.1: Synthesis of cBio1-3.

#### 2.4.1.1 cBio1



D-Biotin (1 eq, 488.6 mg, 2 mmol) was dissolved in dry DMF (10 mL) by gentle heating. EDCI (1.1 eq, 341.6 mg), DMAP (1 eq, 244.3 mg) and HOBt (cat.) were added the the reaction was stirred for 30 minutes at room temperature. (2nitrophenyl)methanol (1.1 eq, 336.9 mg) dissolved in dry DMF (3 mL) was added dropwise and the reaction was left overnight stirring at room temperature. The reaction was diluted with 100 mL ethyl acetate and washed with 1 M HCl ( $3 \times 75$  mL). The organic layer was then washed with saturated NaHCO<sub>3</sub> and dried with MgSO<sub>4</sub>. The crude product was then purified by flash chromatography using a solvent system containing 2-4 % MeOH in DCM to afford **cBio1** as a orange solid (327.5 mg, 31.3 % yield). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$ : 8.09 (dd, J = 8.1, 1.3 Hz, 1H), 7.70 – 7.62 (m, 1H), 7.57 (d, J = 7.7 Hz, 1H), 7.51 (t, J = 7.7 Hz, 1H), 7.26 (s, 3H), 5.50 (s, 2H), 4.56 – 4.49 (m, 1H), 4.33 (dd, J = 7.8, 4.6 Hz, 1H), 3.17 (dd, J = 12.0, 7.3 Hz, 1H), 2.93 (dd, J = 12.8, 5.1 Hz, 1H), 2.73 (d, J = 12.8 Hz, 1H), 2.44 (t, J = 7.4 Hz, 2H), 1.70 (dt, J = 16.7, 8.3 Hz, 4H), 1.52 – 1.44 (m, 1H). <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>)  $\delta$ : 172.92, 163.33, 146.92, 133.70, 131.95, 129.38, 128.88, 125.04, 62.98, 61.87, 60.07, 55.32, 40.52, 33.74, 28.28, 28.21, 24.71. HRMS for C<sub>17</sub>H<sub>21</sub>N<sub>3</sub>O<sub>5</sub>S + H<sup>+</sup>: m/z calcd. 380.1280; obsd. 380.1264.

#### 2.4.1.2 cBio2



D-Biotin (1 eq, 488.6 mg, 2 mmol) was dissolved in dry DMF (10 mL) by genthe heating. EDCI (1.1 eq, 341.6 mg), DMAP (1 eq, 244.3 mg) and HOBt (cat.) were added the the reaction was stirred for 30 minutes at room temperature. 1-(2nitrophenyl)ethan-1-ol (1.1 eq, 367.8 mg) dissolved in dry DMF (3 mL) was added dropwise and the reaction was left overnight stirring at room temperature. The reaction was diluted with 100 mL ethyl acetate and washed with 1 M HCl  $(3 \times 75 \text{ mL})$ . The organic layer was then washed with saturated  $NaHCO_3$  and dried with  $MgSO_4$ . The crude product was then purified by flash chromatography using a solvent system containing 2-4 % MeOH in DCM to afford **cBio2** as a yellow solid (316.4 mg, 40.2 % yield). <sup>1</sup>H NMR (600 MHz, CDCl<sub>3</sub>)  $\delta$ : (s, 1H), 6.98 (s, 1H), 6.15 (s, 1H), 5.46 (s, 2H), 4.51 - 4.45 (m, 1H), 4.29 (dd, J = 7.8, 4.6 Hz, 1H), 3.95 (d, J = 21.3 Hz, 6H), 3.13 (ddd, J = 8.5, 6.4, 4.5 Hz, 1H), 2.88 (dd, J = 12.8, 5.0 Hz, 1H), 2.70 (d, J = 12.8, 5.0 Hz, 1H), 2.80 (d, J = 12.8, 5.0 Hz, 1H), 2.70 (d, J = 12.8, 5.12.8 Hz, 1H), 2.43 (td, J = 7.5, 1.1 Hz, 2H), 1.77 – 1.60 (m, 4H), 1.44 (qd, J = 8.6, 6.5 Hz, 2H). <sup>13</sup>C NMR (151 MHz, CDCl<sub>3</sub>) δ: 175.17, 166.49, 150.44, 136.25, 131.03, 129.89, 129.87, 127.02, 70.64, 62.77, 58.12, 58.09, 43.17, 30.98, 30.90, 27.33, 27.31, 24.54. HRMS for  $C_{18}H_{23}N_3O_5S + H^+$ : m/z calcd. 394.1424; obsd. 394.1437.

#### 2.4.1.3 cBio3



D-Biotin (1 eq, 488.6 mg, 2 mmol) was dissolved in dry DMF (10 mL) by gentle heating. EDCI (1.1 eq, 341.6 mg), DMAP (1 eq, 244.3 mg) and HOBt (cat.) were added the the reaction was stirred for 30 minutes at room temperature. (4,5-dimethoxy-2-nitrophenyl)methanol (1.1 eq, 470.4 mg) dissolved in dry DMF (3 mL) was added dropwise and the reaction was left overnight stirring at room temperature. The reaction was diluted with 100 mL ethyl acetate and washed with 1 M HCl  $(3 \times 75 \text{ mL})$ . The organic layer was then washed with saturated  $NaHCO_3$  and dried with MgSO<sub>4</sub>. The crude product was then purified by flash chromatography using a solvent system containing 2 - 4 % MeOH in DCM to afford **cBio3** as a pale yellow solid (128.5 mg, 14.6 % yield). <sup>1</sup>H NMR (600 MHz, CDCl\_3)  $\delta:$  7.92 – 7.88 (m, 1H), 7.66 – 7.59 (m, 2H), 7.41 (ddt, J = 8.5, 6.0, 2.3 Hz, 1H), 6.29 (qd, J = 6.5, 3.5 Hz, 1H), 6.11 – 6.08 (m, 1H), 5.61 (s, 1H), 4.46 (dd, J = 7.9, 5.0 Hz, 1H), 4.25 (ddd, J = 7.8, 4.6, 3.0 Hz, 1H), 3.10 (dddd, J = 10.9, 8.5, 6.3, 4.6 Hz, 1H), 2.86 (ddd, J = 12.8, 5.1, 3.7 Hz, 1H), 2.68 (d, J = 12.8 Hz, 1H), 2.39 – 2.27 (m, 2H), 1.72 – 1.56 (m, 6H), 1.44 – 1.32 (m, 2H), 1.32 - 1.21 (m, 1H). <sup>13</sup>C NMR (151 MHz, CDCl<sub>3</sub>)  $\delta$ : 175.70, 166.48, 150.98, 142.76, 129.49, 113.54, 110.94, 64.59, 62.78, 59.16, 59.08, 58.17, 36.51, 31.01, 30.88,27.48. HRMS for  $C_{19}H_{25}N_3O_7S + H^+$ : m/z calcd. 440.1491, obsd. 440.1491.



Scheme 2.2: Synthesis of cBio4.

#### 2.4.2.1 4-methoxyindoline (1)



To a solution of 4-methoxy-1H-indole (1.0 eq, 1 g, 6.8 mmol) in acetic acid (10 mL, 0.68 M), sodium cyanoborohydride (1.1 eq, 472 mg, 7.5 mmol) was added slowly over the course of 10 minutes. The reaction was sired at room temperature for 3 hours, then adjusted to pH 10 with 0.5 N NaOH. The reaction was extracted with ethyl acetate ( $3 \times 40$  mL) and the organic layer washed with brine, then dried over Na<sub>2</sub>SO<sub>4</sub>. The crude product was purified by flash chromatography with 5 – 10 % ethyl acetate in hexane to afford **1** as a brown solid (0.861 g, 84.9% yield). <sup>1</sup>H NMR (600 MHz, Chloroform-d)  $\delta$ : 7.00 (t, 1H), 6.33 (d, J = 7.8 Hz, 1H), 6.30 (d, J = 8.2 Hz, 1H), 3.82 (s, 3H), 3.75 (s, 1H), 3.57 (t, J = 8.5, 1.0 Hz, 2H), 3.00 (t, J = 8.5 Hz, 2H). HRMS for C<sub>9</sub>H<sub>11</sub>NO + H<sup>+</sup>: m/z calcd. 150.0919; obsd. 150.0921.

#### 2.4.2.2 Compound 2



D-Biotin (2 eq, 16.52 mmol, 4.037 g) was dissolved in dry DMF by gentle heating (25 mL). Compound **2** (1 eq, 8.26 mmol, 1.23 g), EDCI (2 eq, 2.56 g) DMAP (2 eq, 2.02 g) were added and the reaction was heated to 80 °C overnight. The reaction mixture was diluted with 5 % MeOH in DCM (100 mL) and extracted with 1 M HCL ( $3 \times 100$  mL) and saturated NaHCO<sub>3</sub> ( $3 \times 100$  mL). The organic layer was dried with Na<sub>2</sub>SO<sub>4</sub> and purified by flash chromatography using a gradient of 5 - 10 % MeOH in DCM to to give **2** as a beige solid (2.47 g, 79.6 % yield). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$ : 12.53 (s, 2H), 7.17 (t, J = 8.2 Hz, 1H), 6.70 (s, 1H), 4.60 (dd, J = 8.0, 4.7 Hz, 1H), 4.41 (dd, J = 8.0, 4.5 Hz, 1H), 4.07 (t, J = 8.4 Hz, 2H), 3.82 (s, 3H), 3.22 (td, J = 7.4, 4.4 Hz, 1H), 3.10 (t, J = 8.4 Hz, 2H), 2.94 (dd, J = 13.1, 4.9 Hz, 1H), 2.77 (d, J = 13.1 Hz, 1H), 2.48 (t, J = 7.4 Hz, 2H), 1.83 - 1.61 (m, 3H), 1.58 - 1.45 (m, 1H). <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>)  $\delta$ : 172.38, 164.94, 155.74, 143.45, 129.08, 118.90, 110.45, 106.72, 62.51, 60.82, 55.33, 55.01, 48.73, 40.28, 35.31, 28.15, 27.90, 24.92, 24.33. HRMS for C<sub>19</sub>H<sub>25</sub>N<sub>3</sub>O<sub>3</sub>S + H<sup>+</sup>: m/z calcd. 376.16166; obsd. 376.1705.

#### 2.4.2.3 cBio4



Compound 2 (1 eq, 3.09 mmol) was dissolved in TFA (10 mL) and NaNO<sub>3</sub> (0.9 eq, 289.2 mg) was added. The reaction was stirred at room temperature for 1 hour then the reaction mixture was added to saturated NaHCO<sub>3</sub> and extracted with 5 % MeOH in DCM. The crude product was purified by flash chromatography give a mixture of the 7 and 5 nitro regioisomers of **cBio4**. The isomers were separated by HPLC with a gradient of increasing ACN 0.1 % TFA (solvent) in water- 0.1 % TFA (solvent A) to give cBio4 as a bright yellow sold (217.5 mg, 16.7% yield). <sup>1</sup>H NMR (400 MHz, Acetone-D<sub>6</sub>)  $\delta$ : 7.72 (d, J = 9.0 Hz, 1H), 6.87 (d, J = 9.0 Hz, 1H), 4.60 – 4.53 (m, 1H), 4.44 – 4.39 (m, 1H), 4.35 (t, J = 8.2 Hz, 2H), 3.96 (s, 3H), 3.83 (s, 0H), 3.32 – 3.24 (m, 1H), 3.11 (t, J = 8.0 Hz, 2H), 2.97 (dd, J = 12.6, 5.0 Hz, 1H), 2.74 (d, J = 12.6 Hz, 1H), 2.55 (t, J = 7.4 Hz, 2H), 1.80 (ddd, J = 12.6, 9.5, 6.5 Hz, 1H), 1.68 (ddt, J = 25.6, 14.3, 7.7 Hz, 3H), 1.54 (p, J = 6.8 Hz, 2H). HRMS for C<sub>19</sub>H<sub>24</sub>N<sub>4</sub>O<sub>5</sub>S + H<sup>+</sup>: m/z calcd. 421.1467, obsd. 421.1545.

# 2.4.3 Synthesis of cBio5-6



Scheme 2.3: Synthesis of cBio5-6.

### 2.4.3.1 Biotin methyl ester $(biotin-OMe)^{28,29}$



Acetyl chloride (1.6 eq, 13.3 mmol, 946.5 mL) was added dropwise to ice cold MeOH and stirred for 5 minutes to generate a methanolic solution of hydrogen chloride. The acetyl chloride / MeOH solution was added to a suspension of D-biotin (1 eq, 8.19 mmol, 2 g) in MeOH (10 mL) and stirred at room temperature for 3 hours. The reaction was then concentrated *in vacuo* and partitioned between 5 % MeOH / DCM and saturated NaHCO<sub>3</sub>. The aqueous layer was extracted again with 5 % MeOH / DCM and the combined organic layers were dried with Na<sub>2</sub>SO<sub>4</sub> and concentrated *in vacuo* to afford biotin-OMe as a white solid (1.9 g, 90 % yield). <sup>1</sup>H NMR (600 MHz, Chloroform-d)  $\delta$ : 5.86 (s, 1H), 5.47 (s, 1H), 4.56 – 4.47 (m, 1H), 4.31 (ddd, J = 7.8, 4.6, 1.5 Hz, 1H), 3.66 (s, 3H), 3.15 (ddd, J = 8.4, 6.4, 4.6 Hz, 1H), 2.91 (dd, J = 12.8, 5.0 Hz, 1H), 2.74 (d, J = 12.8 Hz, 1H), 2.33 (t, J = 7.5 Hz, 2H), 1.76 – 1.62 (m, 4H), 1.45 (dtd, J = 14.0, 6.8, 3.4 Hz, 2H). HRMS for C<sub>11</sub>H<sub>18</sub>N<sub>2</sub>O<sub>3</sub>S + H<sup>+</sup> ester: m/z calcd. 258.3360; obsd. 258.3312.

# 2.4.3.2 cBio5<sup>28,29</sup>



To a solution of methylnitropiperonyl alcohol (1 eq, 2.37 mmol, 500 mg) in dry THF, 1M sodium *t*-butoxide (236 mL) was added and stirred for 10 minutes at room tem-

perature. CDI (1.5 eq, 575.9 mg) was added and the reaction was stirred overnight at room temperature under  $N_2$ . The solvent was removed under reduced pressure and the residue was suspended in carbon tetrachloride then filtered through Celite. The filtrate was concentrated *in vacuo* and resuspended in chloroform **Biotin-OMe** (0.6 eq, 367 mg) and sodium hydride (63 mg, 60 % dispersion in mineral oil) were added and the mixture was refulxed under  $N_2$  for 3 days. The reaction was quenched with 3 drops of acetic acid. The reaction mixture was concentrated *in vacuo* and purified by flash chromatography (3 % acetone, 3 % MeOH in DCM) to afford **cBio5** as a pale yellow solid (422 mg, 65.9 % yield). <sup>1</sup>H NMR (400 MHz, Acetone-D<sub>6</sub>)  $\delta$ : 7.53 (d, J = 2.8 Hz, 1H), 7.48 (s, 1H), 6.85 (d, J = 5.9 Hz, 1H), 6.42 (p, J = 6.2 Hz, 1H), 6.24 (p, J = 1.0 Hz, 2H, 4.95 (ddd, J = 7.7, 4.9, 1.5 Hz, 1H), 4.88 (ddd, J = 7.8, 4.8, 1.5 Hz, 1H), 4.39 - 4.31 (m, 1H), 3.61 (d, J = 0.8 Hz, 3H), 3.33 (ddt, J = 9.1, 6.6, 3.4 Hz, 1H), 3.05 (ddd, J = 10.2, 7.1, 3.2 Hz, 2H), 2.32 (t, J = 7.4 Hz, 3H), 1.89 - 1.75 (m, T)1H), 1.70 - 1.57 (m, 7H), 1.55 - 1.39 (m, 2H). <sup>13</sup>C NMR (101 MHz, Acetone-D<sub>6</sub>)  $\delta$ : 174.13, 153.80, 148.54, 136.04, 107.60, 104.65, 71.03, 63.59, 58.70, 56.23, 56.21, 39.21,39.09, 34.19, 25.69, 22.74, 22.69. HRMS for  $C_{21}H_{25}N_3O_9S$ ,  $[2M + Na^+]$ : m/z calcd. 1013.2522, obsd. 1013.2521.

#### 2.4.3.3 cBio6<sup>28,29</sup>



**cBio5** (0.667 mmol, 329.9 mg) was dissolved in a 1:1 solution of 1 N HCl in THF and heated to 70 °C under refulx overnight. The reaction was extracted with 1 N HCl, 5 % MeOH in DCM, and dried over NaSO<sub>4</sub>. The crude product was purified by HPLC with a gradient of increasing ACN 0.1 % TFA (solvent) in water- 0.1 %

TFA (solvent A) to give cBio6 as a yellow sold (171.5 mg, 52 % yield). <sup>1</sup>H NMR (600 MHz, acetone-D<sub>6</sub>)  $\delta$ : 7.53 (d, J = 4.2 Hz, 1H), 7.48 (d, J = 1.8 Hz, 1H), 6.46 – 6.39 (m, 1H), 6.27 – 6.23 (m, 2H), 4.96 (dd, J = 7.5, 5.5 Hz, 1H), 4.40 – 4.32 (m, 1H), 3.34 (ddd, J = 8.4, 6.1, 4.2 Hz, 1H), 3.13 – 3.00 (m, 2H), 2.31 (t, J = 7.4 Hz, 2H), 2.10 – 2.05 (m, 2H), 1.83 (ddt, J = 12.8, 9.5, 6.4 Hz, 1H), 1.69 – 1.60 (m, 6H), 1.50 (dqd, J = 11.8, 6.4, 3.0 Hz, 2H). HRMS for C<sub>20</sub>H<sub>23</sub>N<sub>3</sub>O<sub>9</sub>S, [2M + Na<sup>+</sup>]: m/z calcd. 985.22077, obsd. 985.22923.

### 2.4.4 Molecular biology

#### 2.4.4.1 Constructs

The biotin ligase, TurboID was subcloned from V5-TurboID-NES in pcDNA3.1 (Addgene plasmid 107169)<sup>30</sup> into a pDonor221 Gateway destination vector via a BP recombination. Three different TurboID constructs were generated, with additional elements added by primer overhang: (1) TurboID with a 5' multiple cloning site (MCS) and a 3' HA tag and stop codon (Figure 2A.1 2A.2), (2) TurboID with a 5' start codon and V5 tag and a 3' MCS (Figure 2A.3, 2A.4), and (3) TurboID with a 5' start codon and 3' MCS (Figure 2A.5). Human NCF1 (NP\_000256.4), were cloned into V5-TurboID-MCS pDonor221 (Figure 2A.6) and human NCF2 (NP\_000424.2), and NOXO1 (NP\_001254650.1) were cloned into MCS-TurboID-HA pDonor221 (Figure 2A.7, 2A.8). A LR recombination was performed to move the payload of the pDonor vector into the Gateway destination vector, pLenti CMV Puro DEST (Addgene plasmid 17452).<sup>55</sup>

#### 2.4.4.2 Cloning primers

att $B1_V5_for (53-mer)$ :

5'-GGGGACAAGTTTGTACAAAAAAGCAGGCTTCAGCCACCATGGGCAAG CCCATC-3' TurboID\_MCS\_attB2\_rev (81-mer):

5'-GGGGACCACTTTGTACAAGAAAGCTGGGTCGGATCCGAATTCCACTG TCTCGAGCGGCCGCCTTTTCGGCAGACCGCAGAC-3'

attB1-MCS-TurboID\_for (90-mer):

5'-GGGGACAAGTTTGTACAAAAAAGCAGGCTTCCTCGAGCGGCCGCTCC GGATTCGAATTCGGATCCAAAGACAATACTGTGCCTCTGAAGC-3' attB2\_HA\_rev (83-mer):

5'-GGGGACCACTTTGTACAAGAAAGCTGGGTCCTATGCGTAATCCGGTA

 ${\it CATCGTAAGGGTAAGCCTTTTCGGCAGACCGCAGAC-3'}$ 

attB1-start-TurboID\_for (65-mer):

5'-GGGGACAAGTTTGTACAAAAAAGCAGGCTGCCACCATGGGCAAAGAC AATACTGTGCCTCTGAAG-3'

NCF1\_for\_2 (37-mer):

5'-TTCAGTGCGGCCGCTGGCATGGGGGACACCTTCATCC-3'

NCF1\_rev\_6 (34-mer):

5'-TTCAGTGAATTCTCAGACGGCAGACGCCAGCTTC-3'

NCF2\_rev\_1 (34-mer):

5' - TTCAGTGGATCCGACTTCTCTCCGAGTGCTTTCC-3'

NCF2\_for\_1 (32-mer):

5'-TTCAGTGCGGCCGCGCCACCATGTCCCTGGTG-3'

NOXO1\_rev (31-mer):

5'-TTCAGTGGATCCCTGCTCCGTCGTGGGGTGC-3'

NOXO1\_for (30-mer):

5'-TTCAGTGCGGCCGCGCCACCATGGCAGGCC-3'

#### 2.4.4.3 Lentivirus concentration and spinoculation

For each TurboID construct, HEK293T cells were split into  $4 \times 10$  cm plates and grown to ~70% confluency in DMEM supplemented with 10% heat inactivated serum (HIS). Cells were co-transfected with 2µg each of VSV-G (Addgene plasmid 8454), psPAX (Addgene plasmid 12260), and the TurboID construct in a pLenti plasmid using Lipofectamine 2000 (Fisher Scientific). After 24 hours cells were re-fed with fresh DMEM containing HIS. 24 hours later, the supernatant was harvested and filtered through a 0.45 µm PES syringe filter. For every 3 volumes of viral supernatant, 1 volume of virus concentrator solution (1.2 M NaCl, 40% (w/v) PEG-8000, 100 mM phosphate, pH 7.2) was added and the solution was incubated overnight at 4 °C with agitation. The viral pellet was collected by centrifugation (1,600 × g, 60 min, 4 °C), resuspend in serum free DMEM, and stored at -80 °C until use.

 $7.5 \times 10^3$  A431 cells per well were seeded into a 6 well plate in DMEM supplemented with HIS and incubated at 37 °C for 24 hours. Concentrated virus was thawed at 37 °C and polybrene (3 µL of 10 mg mL<sup>-1</sup> stock) was added to the virus solution. The virus solution was added to the appropriate target cell well and the 6 well plate was centrifuged at 800 × g for 30 min at 25 °C. Cells were incubated with virus for a further 24 hours at 37 °C. After 24 hours, the media was replaced and cells were selected with 0.5 µg mL<sup>-1</sup> puromycin. The selection was considered complete when the (-) virus control cells were completely dead.

### 2.4.4.4 Cell culture and biotin labeling

A431 TurboID cell lines were grown in DMEM supplemented with 10% dialyzed fetal bovine serum (FBS) (Gibco) and 1% penicillin-streptomycin-amphotericin B (PSA) (Gibco) at 37 °C and 5% CO<sub>2</sub>. In the final passage prior to biotin labeling, cells were grown in biotin depleted media. To prepare biotin depleted media, 1 mL of a streptavidin agarose slurry (Thermo Fisher) was washed with PBS ( $3 \times 5$  mL) and added to 500 mL complete DMEM. The media was rotated overnight at  $4^{\circ}$ C, then sterile filtered through a 0.2 µm cellulose membrane. Cells were grown to  $\sim$ 70 % confluency and stimulated with 50 µM biotin (from 100 mM stock in DMSO), 100 ng mL<sup>-1</sup> EGF (Sigma), and (+/-) 1000 U mL<sup>-1</sup> PEG-catalase (Sigma) for 15 minutes at 37 °C. Cells were harvested by scraping and stored at  $-80^{\circ}$ C until use.

### 2.4.4.5 Antibodies

Streptavidin-HRP Conjugate (EMD Millipore); EGFR (D38B1), Phospho-EGFR (Tyr1068) (D7A5), HA-Tag (C29F4), GAPDH,  $\alpha$ -rabbit-HRP,  $\alpha$ -mouse-HRP,  $\alpha$ -mouse IgG Alexa Fluor 488,  $\alpha$ -rabbit IgG Alexa Flour 594, (Cell Signaling); V5-Tag (Invitrogen) antibodies were used for western blotting and/or immunofluorescence assays.

#### 2.4.4.6 Immunofluorescence

A431 cells expressing a TurboID construct were trypsinized and plated onto 35 mm glass bottom dishes (MatTek Corporation, P35G-1.5-10-C) and after 48 hours were treated with or without 100 ng mL<sup>-1</sup> EGF as above. Cells were then washed with 5 mL PBS and fixed with 4 % paraformaldehyde in PBS for 15 minutes at room temperature. Plates were washed (3 × 5 min) with PBS and blocked with 5 % goat serum, 0.3 % Tween-20 in PBS. The cells were incubated with a rabbit  $\alpha$ -Phospho-EGFR (Tyr1068) at a 1:800 dilution and a mouse  $\alpha$ -HA-tag or  $\alpha$ -V5-tag antibody at a 1:400 dilution in 1 % BSA, 0.3 % Tween-20 in PBS overnight at 4 °C. Then, cells were washed (3 × 5 min) with PBS, then incubated with an  $\alpha$ -rabbit-A549 and  $\alpha$ -mouse-488 antibody diluted 1:500 in 1 % BSA, 0.3 % Tween-20 in PBS for 1 hour at room temperature. Cells were washed (3 × 5 min) with PBS and mounted with Prolong Gold Antifade reagent with DAPI (Cell Signaling Technologies). Images were acquired on a Leica (Wetzlar, Germany) TCS SP5 scanning confocal microscope using

a Plan-Apochromat  $63 \times /1.40$  numerical aperture lens.

#### 2.4.4.7 Western blotting

Samples were separated on a 10 % SDS-PAGE gel then transferred to nitrocellulose membranes at 15 V for 18 hours (EGFR and pEGFR) or 75 V for 100 minutes (all others). The membranes were blocked with 5 % non-fat powdered milk in TBS-T for 1 hour at room temperature. The membrane was probed with primary antibody (1:1000) in 5 % powdered milk / TBS-T overnight at 4 °C. The blot was washed ( $3 \times 5$  min) with TBS-T then incubated with a  $\alpha$ -rabbit-HRP conjugated secondary antibody (1:2000) for 2 hours at room temperature. For biotin-blots, after electrotransfer, membranes were blocked overnight with 5 % non-fat dry milk in TBS-T at room temperature. The membrane was then washed ( $3 \times 5$  min) and probed with streptavidin-HRP (1:1000) in TBS-T for 1 hour at room temperature. After probing with secondary antibody or streptavidin-HRP, membranes were washed  $3 \times 5$  min with TBS-T and treated with chemiluminescence reagents (Thermo Fisher) and developed on a Bio-Rad ChemDoc MP imaging system.

#### 2.4.5 Proteomics experiments

# 2.4.5.1 Identification of protein targets of Nox2 ROS and ReDiMe labeling

#### Sample preparation

Cells were lysed by sonication and lysates were diluted to  $2 \text{ mg mL}^{-1}$  in PBS. A total of 2 mg of protein was used for each of the heavy and light samples for a total of 4 mg protein per prep. Proteins were precipitated by the addition of 10% TCA (100 µL of 100% (w/v) TCA in PBS) and frozen at  $-80 \,^{\circ}\text{C}$  overnight. After thawing, proteins were pelleted by centrifugation (15,000 × g, 15 min) and the supernatant discarded. Pellets were resuspended in 500 µL ice cold acetone by sonication and

pelleted by centrifugation  $(15,000 \times g, 15 \text{ min}, 4 \,^{\circ}\text{C})$ . After removing the supernatant and allowing the pellet to air dry, pellets were resuspended in 1.2% SDS in PBS and solubilized by heating at 65 °C and sonication. Once dissolved, samples were diluted to a final concentration of 0.2% SDS by the addition of  $5 \,\mathrm{mL}$  PBS and incubated with a streptavidin agarose slurry  $(170 \,\mu\text{L})$  overnight at  $4\,^{\circ}\text{C}$ , then 3 hours at room temperature. The beads were washed with PBS  $(3 \times 5 \text{ mL})$ , and water  $(3 \times 5 \text{ mL})$ . The beads were pelleted by centrifugation  $(1400 \times g, 3 \text{ min})$  between washes. The washed beads were resuspended in  $500\,\mu\text{L}$  6 M urea / TEAB and 10 mM DTT and incubated at 65 °C for 15 min. 20 mM iodoacetamide was then added and the samples were incubated at 37 °C for 30 min. After reduction and alkylation the beads were pelleted by centrifugation (1400  $\times q$ , 3 min), and resuspended in 200 µL 2 M urea / TEAB 1 mM CaCl<sub>2</sub>, and 2 µg trypsin (Promega) and incubated overnight at 37 °C. After tryptic digest, reductive dimethylation $^{34,56}$  was performed by the addition of  $8\,\mu L$  of  $20\,\%$  light (<sup>12</sup>COH<sub>2</sub>) (+ EGF) or heavy (<sup>13</sup>COD<sub>2</sub>) (- EGF) formaldehyde and  $40\,\mu\text{L}$  of  $0.6\,\text{M}$  sodium cyanoborohydride at room temperature for 2 hours. The reaction was quenched by the addition of  $8\,\mu\text{L}$  ammonium hydroxide. The light (+ EGF) and heavy (- EGF) tryptic peptide samples were then combined, desalted on a Sep-Pak, and dried by speed-vac. Peptide samples were stored at -20 °C until LC-MS/MS analysis.

#### Liquid chromatography mass spectrometry

Mass spectrometry was performed on an LTQ Orbitrap Discovery (Thermo Fisher) coupled to an Agilent 1200 series HPLC. Peptide pellets were resuspended in 200  $\mu$ L 1% formic acid and pressure loaded onto a 250  $\mu$ m fused silica desalting column, packed with 4 cm Aqua C18 reverse phase resin (Phenomenex). Peptides were eluted onto a 100  $\mu$ m fused silica biphasic column, packed with 4 cm strong cation exchange resin (Watman) and 10 cm C18 resin using a using a five-step multidimensional LC/LC-MS/MS protocol (MudPIT).<sup>49</sup> Each of the five runs begins with a salt

push (0%, 25%, 50%, 80%, and 100% buffer C), followed by a gradient 0–100% buffer B in buffer A (buffer A: 95% water, 5% ACN, 0.1% formic acid; buffer B: 20% water, 80% ACN, 0.1% formic acid; buffer C 95% water, 5% ACN, 500 mM ammonium acetate). The flowrate was ~0.25 µL min<sup>-1</sup> and the spray voltage was set to 2.75 kV. One survey MS1 scan (400-1800 m/z) was followed by 8 data dependent scans of the n<sup>th</sup> most intense ion.

#### Data analysis

Peptides were assigned to MS2 spectra using the SEQUEST<sup>48</sup> algorithm, searching against a human reverse-concatenated non-redundant protein database. Data sets were searched independently for peptides containing isotopically light and heavy dimethyl modifications. Static modifications for specified for cysteine (+57.0215*Da*, iodoacetamide alkylation), and N-terminal and lysine dimethylation (+28.031 30 Da, light), (+34.063 12 Da, heavy). MS2 matches were assembled by protein and filtered to achieve a false discovery rate of 5% using DTASelect 2.0.<sup>57</sup> Light/heavy intensity ratios ( $R_{L/H}$ ) were calculated using the CIMAGE quantification package as described previously.<sup>49,58</sup> CIMAGE reports peptide  $R_{L/H}$  for co-eluting light and heavy peptides. The peptides are grouped by protein and a representative  $R_{L/H}$  for each protein is calculated from the median  $R_{L/H}$  for each peptide identified for that protein.

# 2.4.5.2 TurboID-OxICAT

#### Sample preparation

Methods for OxICAT sample preparation were adapted from Topf *et al.*<sup>42</sup> and Bechtel *et al.*<sup>59</sup> A431 cell pellets were resuspended in 500 µL denaturing alkylation buffer (DAB) (6 M urea, 200 mM Tris-HCl, 10 mM EDTA, 0.5 % SDS, pH 8.5) and 10 mM NEM-H<sub>5</sub> and lysed using an ultrasonic tip sonicator. After lysis, cells were labeled for 2 hours at 37 °C. Lysates were diluted 3-fold with dH<sub>2</sub>O and precipitated with the addition of 5 sample volumes of ice cold acetone and incubated at -20 °C for

2 hours. Precipitated proteins were pelleted by centrifugation  $(4, 500 \times g, 4^{\circ}C)$ , pellets were washed with ice cold acetone and centrifuged for a further 10 min  $(4, 500 \times q)$ 4 °C). Pellets were resolubilized in DAB and protein concentrations were determined using the DC Assay Kit. 4 mg protein was brought to a final volume of  $400\,\mu\text{L}$  in DAB. Samples were treated with 2.5 mM TCEP and incubated at 37 °C for 5 min. Following reduction, samples were diluted with  $600\,\mu\text{L}$  DAB.  $10\,\text{mM}$  NEM-D<sub>5</sub> was added and samples were incubated at 37 °C for 2 hours. Samples were diluted 3-fold with  $dH_2O$  and proteins were precipitated with 5 sample volumes of ice-cold acetone and incubated overnight at -20 °C. Pellets were washed with ice-cold acetone, centrifuged for 10 min  $(4,500 \times g, 4^{\circ}C)$ , and allowed to air dry. Pellets were resuspended in 1.2% SDS in PBS and solubilized by heating at 65 °C and sonication. Once dissolved, samples were diluted to a final concentration of 0.2% SDS by the addition of 5 mL PBS and incubated with a streptavidin agarose slurry  $(170 \,\mu\text{L})$  overnight at  $4^{\circ}$ C, then 3 hours at room temperature. The beads were washed with PBS (3  $\times$  5 mL), and water  $(3 \times 5 \text{ mL})$ . The beads were pelleted by centrifugation  $(1400 \times g, 3)$ min) between washes. After the final wash, beads were resuspended in  $200 \,\mu\text{L} 2 \text{ M}$ urea / PBS 1 mM CaCl<sub>2</sub>, and 2 µg trypsin (Promega) and incubated overnight at 37 °C. The tryptic digest was collected, and the beads were washed  $2 \times 75 \ \mu L$  with water and the washes combined with the tryptic digest for a final sample volume of  $\sim 350 \,\mu L$ . Samples were then desalted on a Sep-Pak, and dried by speed-vac. Peptide samples were stored at -20 °C until LC-MS/MS analysis.

#### Mass spectroscopy

Mass spectrometry was performed on an Orbitrap Exploris 240 (Thermo Fisher) coupled to UltiMate 3000 RSLCnano LC system. Samples were loaded onto a Pepmap 100 C18 trap (Thermo Fisher) and eluted onto a Pepmap 100 C18 analytical column with a gradient 0-30% buffer B in buffer A (buffer A: 0.1% formic acid in H<sub>2</sub>O, buffer B: 0.1% formic acid in ACN). Under positive ionization mode, one survey MS1

scan (350-1800 m/z) was followed by 20 data dependent scans of the n<sup>th</sup> most intense ion. The orbitrap mass resolution was set to 60,000; isolation window 2.0 m/z units; default charge 2<sup>+</sup>; maximum ion time, 50 ms; dynamic exclusion, 20.0 s.

#### Data analysis

The LC-MS/MS raw data were processed using Thermo Proteome Discoverer (PD) 2.4 (Thermo Fisher). The data was searched searched against the Human SwissProt database with the addition of the TurboID biotin ligase sequence. The PSM search was performed using Sequest HT. The search parameters included searching specific protease cleavage sites with 2 maximum missed cleavages. Protein N-terminal acetylation, methionine oxidation, and cysteine modification with NEM-H<sub>5</sub> and NEM-D<sub>5</sub> were set as dynamic modifications. NEM-H<sub>5</sub> and NEM-D<sub>5</sub> were used as modifications for the the light and heavy quantification channels respectively. The normalized peptide intensity reported by PD for the heavy and light quantification channels was used to calculate the percent oxidation by the formula:

$$\% oxidation = \frac{heavy_{int}}{heavy_{int} + light_{int}}$$
(2.1)

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# Chapter 3

Regulation of Protein Function by Targeted Methionine Oxidation
#### **3.1** Introduction

The other sulfur containing amino acid, methionine is also subject to oxidative modifications. Natural production of reactive oxygen species (ROS) through cellular respiration or enzymatic processes is well known to play a role in oxidative stress as well as cell signaling.<sup>1</sup> While the role of reversible cysteine oxidation is well established and widely studied,<sup>2</sup> the oxidative modification of other residues are less well characterized. Although methionine is known to be oxidized *in vivo* both under stress and normal conditions, the lower reactivity of the thioether on methionine relative to that of the thiolate on cysteine represents a paradox.<sup>3</sup> This chapter will discuss the targeted oxidation and reduction of protein methionine residues, and the role that methionine oxidation plays is regulating function.

# 3.2 Sources of methionine oxidation

It is generally accepted that oxidants such as  $H_2O_2$  or hypochlorous acid, damage protein and free methionine in a nonspecific manner, and damaged proteins are repaired by methionine sulfoxide reductases (Msrs) (Figure 3.1, 3.3). In this model, oxidation is a chemical step and the reduction is an enzymatic step. The model is influenced by a similar paradigm in cysteine mediated redox signaling. The high intrinsic nucleophilicity of the cysteine thiolate mediates reactions with  $H_2O_2$  and,<sup>5</sup> reactive nitrogen species (RNS).<sup>6</sup> Moreover the microenvironment proximal to a given cysteine can further increase reactivity towards specific oxidants, which in effect transforms the chemical step into a catalytically-driven reaction.<sup>7,8</sup> However a similar model where methionine is oxidized randomly in a chemical process, then repaired by an enzymatic one is not supported by experimental evidence. The thioether on the methionine side chain is much less nucleophilic than cysteine, and the thioether has no acid base equilibrium at physiological pH. In the reaction between oxidants such



Figure 3.1: Biological sources of methionine oxidation. Nonspecific oxidation by reactive oxygen species (ROS) produced by NADPH oxidases, components of the electron transport chain, or by fenten chemistry will result in a mixture of the methionine R and S diastereomers. Direct oxidation by Micals will result in the formation of exclusively the R isomer. Further oxidation to methionine sulfone is irreversible. Figure adapted from Kaya *et. al.*<sup>4</sup>



Figure 3.2: Conserved domain topology of mammalian Micals. Mamals have 3 Mical genes comprised of flavin-containing monooxygenase (FMO) domains, actin binding calponin homology (CH) domains, and LIM, and DUF3585 domains. Figure adapted from Manta *et.*  $al.^3$ 

as  $H_2O_2$  during oxidative stress, the sulfide on methionine acts as a nucleophile resulting in the formation of methionine sulfoxide (MetO). Due to the additional lone pair of electrons on sulfur, sulfoxides adopt a trigonal pyramidal geometry. The energy barrier to pyramidal inversion of sulfoxide is between 34–43 kcal mol<sup>-1</sup>, which is sufficiently high for methionine sulfoxide to exist as R and S diastereomers under physiological conditions.<sup>9,10</sup> After an oxidation with  $H_2O_2$ , MetO would exist as a racemic mixture of the Met-(S)-O and Met-(R)-O diastereomers. However the activity of Msrs is steriospecific, which suggests that the chirality of MetO is biologically significant.<sup>10</sup> In addition, methionine reacts with  $H_2O_2$  with a rate constant of  $\sim 1 \times 10^{-2} \,\mathrm{M^{-1} \, s^{-1}}$ ,<sup>11</sup> which is 3 to 4 orders of magnitude slower than peroxiredoxins or glutathione peroxidase.<sup>12-14</sup> Although a small fraction of methionines may be oxidized in cells, significant oxidation by chemical oxidants is unlikely to occur even under conditions of oxidative stress.<sup>3</sup>

A more likely scenario is that both the oxidation and reduction of methionine are enzyme catalyzed. Indeed, the Mical family of flavin-containing monooxygenase (FMOs) have recently gained attention as redox modulators of actin polymerization.<sup>15–17</sup> Humans have 3 Mical family members each with a FMO domain, calponin homology (CH) actin binding domain, a LIM domain and a C-terminal domain of unknown function (3.2). An interaction between *Drosophila* Mical and Plexin which is a transmembrane signaling proteins involved in cytoskeleton remodeling, was first discovered by Terman *et. al.*<sup>18</sup> It was later shown that Mical catalyzes the steriospecific oxidation of two methionine residues in actin which are conversed across both vertebrates and invertebrates.<sup>15</sup> Unlike diffuse production of ROS during cysteine mediated redox signaling, Mical must be in close contact with actin for the oxidation to occur.<sup>16</sup> In addition actin treated with  $H_2O_2$  did not mimic the effect of oxidation by Mical,<sup>15,16</sup> and treatment with reduction and ROS scavengers did not effect the activity of Mical.<sup>16,19</sup> Lee *et. al* later determined that mammalian Mical1 and 2 also exhibit the same regulatory redox activity against human actin.<sup>17</sup>

#### 3.3 Methionine sulfoxide reductases

There are three classes of enzymes methionine sulfoxide reductase A (MsrA), methionine sulfoxide reductase B (MsrB), and free Met-R-SO reductase (fRMsr), which catalyze the reduction of MetO back to Met (Table 3.1). Each enzyme class exhibits stereospecific activity on their respective substrates (3.3). MsrA was first discovered over 40 years ago, and charcterized with respect to its activity towards *E. coli* ribosomal protein L12.<sup>20</sup> MsrA is selective for the Met-*S*-SO stereomer and is active towards both protein MetO and free MetO. The enzyme has such a broad substrate specificity that it is also active against small molecules containing *S*-methylsulfinyl groups.<sup>10,21</sup> The implications of MsrA activity on drug metabolism are that if a compound is pharmacologically active with a methylsulfinyl group it should be administered as

Msr	Substrate	Subcelluar localization	
MsrA	Protein and free Met- $S$ -SO	Cytosol, nucleus, and mitichrondria	
MsrB1	Protein Met- $R$ -SO	Cytosol and nucleus	
MsrB2	Protein Met- $R$ -SO	Mitochondria	
MsrB3	Protein Met- $R$ -SO	ER and mitochondria	
fRMsr	Free Met- $R$ -SO	Cytosol and nucleus (only single celled eukaryotes)	

Table 3.1: Stereospecificity and subcellular distribution of methionine sulfoxide reductases.



**Figure 3.3:** Activity of mammalian methionine sulfoxide reductase (Msr). MsrA and MsrB steriospecifically reduce Met-*R*-SO and Met-*R*-SO respectively.

the *R*-sulfoxide, whereas if the thioether analog is active, it should be administered as a pro-drug in the form of *S*-sulfoxide.<sup>21</sup> In addition to broad reductase activity, MsrA also plays a regulatory role as a bidirectional stereospecific Met oxidase in and reductase calmodulin (CaM).<sup>22,23</sup>

Mammals express three MsrB isoforms each of which have different subcellular localization. MsrB1 is localized to to the cytosol and nucleus, MsrB2 to the mitochondria, and MsrB3 to the endoplasmic reticulum (Table 3.1). Unlike MsrA, MsrB only is active towards protein Met-*R*-SO.<sup>4</sup> Mammalian MsrB1 is a selenoprotein that contains a selenocysteine (Sec) as the active site residue. The insertion of Sec is mediated by a selenocysteine insertion sequence) (SECIS) in the 3'-untranslated region of the MsrB1 mRNA transcript in response to a UGA stop codon.<sup>24</sup> Due to its higher pK<sub>a</sub>, higher polarizability, and the ease to which it can be reared when overoxidized, Sec is generally more catalytically active than than an analogous Cys residue.<sup>25</sup> The third type of, Msr, fRMsr is the most recently discovered and is only found in single cell eukaryotes.<sup>26</sup> It is not currently clear how or whether mammals are able to reduce free Met-*R*-SO.



Figure 3.4: Actin polymerization is redox regulated. Figure adapted from Lee et. al.<sup>17</sup>

# 3.4 Regulatory roles of methionine oxidation

There are several well studied examples of oxidation of methionine affecting protein function. One of the most well studied examples is the regulation of CaM and  $Ca^{2+}/CaM$ -dependent protein kinase II (CaMKII).<sup>22,23</sup> Methionine oxidation has also been shown to negitivally regulate cytoskeleton organization impacting actin,<sup>27–29</sup> myosin,<sup>30</sup> and cofilin<sup>31</sup> function. Followup studies on the Mical regulation of actin showed that the oxidation is reversed by MsrB1, but not MsrA, indicating that Mical selectivally generates the Met-*R*-SO<sup>17,19</sup> (Figure 3.4). In addition to destabilizing actin filaments, the oxidation events were shown to enhance the binding of the actin severing protein cofilin.<sup>32</sup> Given the important role that cofilin has been shown to play in promoting actin filament disassembly and remodeling, through the recognition of oxidized methionine, in the next chapter we will discuss the use of a peptide base photocrosslinking approach to to identify proteins which selectively recognize oxidized and reduced forms of methionine in actin.

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# Chapter 4

HSPA8 and PFKL Act As Readers of Distinct Methionine Oxidation States

# 4.1 Introduction

Oxidative post-translational modifications (PTMs) play an important role in regulating protein function. Cells produce reactive oxygen species (ROS) as a byproduct of metabolism or in a controlled manner during oxidative signaling. Cysteine is traditionally thought of as the primary ROS target due to its highly reactive thiol side chain. However, the other sulfur containing amino acid methionine (Met) can also undergo reversible oxidation to form Met sulfoxide. Methionine sulfoxide is reduced by Met sulfoxide reductases A (MsrA) and B (MsrB).<sup>1</sup> Spontaneous Met oxidation generates a mixture of diastereomers, Met-S-sulfoxide and Met-R-sulfoxide, which are reduced stereospecifically by MsrA and MsrB respectively.<sup>1</sup> Met oxidation typically inhibits protein function, and Msrs act to restore it. Several examples of targeted, reversible Met oxidation playing a regulatory role on protein function have been reported.<sup>2</sup> Met oxidation has been shown to regulate ROS sensing transcription factors in *E. Coli*,<sup>3</sup> activation of CaMKII<sup>4</sup> and the activity of calmodulin.<sup>5,6</sup>

Of particular interest is the role Met oxidation has been shown to play in regulating actin dynamics. Actin filaments provide mechanical support, are the driving force for cell movement, and are critical for trafficking intracellular vesicles.<sup>7</sup> Eukaryotic actin can exist in either a soluble form (G-actin) or filamentous form (F-actin). Mical monooxygenases stereospecifically oxidize actin M44 and M47 to Met-R-sulfoxide and promote actin filament disassembly.<sup>8,9</sup> MsrB1 reduced both residues and facilitates filament assembly.<sup>10</sup> We are interested in identifying proteins which recognize a specific Met oxidation state in actin and play a role in regulating the transition between F and G actin.

Significant progress in proteomics has been made in detecting PTMs, however identifying the specific "readers" of distinct PTMs remains a challenge. Existing methods for studying protein-protein interactions (PPIs) which involve the cellular expression of a bait protein, provide no easily accessible methods of controlling the PTM state of said protein in the cellular milieu. In the case of stable, non-reversible PTMs, genetic code expansion approaches,<sup>11</sup> could be a solution. However, in the case of Met sulfoxide, there is no way of guaranteeing that once the protein is expressed, the modification is not reversed by Msr activity. Likewise, oxidation by Micals or nonspecific ROS could oxidize an unmodified bait protein. To circumvent challenges associated with controlling Met oxidation in whole actin either in live cells or lysates, we utilized a peptide based photo-crosslinking approach.<sup>12</sup> We identified PFKL and HSP70s HSPA8 and HSPA1B as putative "readers" of oxidized or reduced methionine in actin respectively.

# 4.2 Results and Discussion

#### 4.2.1 Design of probes

Our probe design was inspired by similar photo-cross-linking based workflows which have been used to identify readers of trimethylated,<sup>12</sup> and succinylated lysine.<sup>13</sup> The probe has three essential structural features. (1) 2 oxidized or reduced methionine residues; (2) a benzophenone photo-cross-linker, which upon UV irradiation forms a covalent adduct with proximal C–H bonds, enabling the capture of transient probe–protein interactions; and (3) biotin tag, which facilitates detection (by biotin blot), or affinity enrichment by biotin-streptavidin enrichment. Two peptides spanning the sequence from H42 to K52 in human actin B (ACTB), with M46 and M49 reduced (probe **1**) or oxidized (probe **2**) were used to identify proteins which selectively interact the oxidized or reduced ACTB (Figure 4.1A). Both probes showed a concentration dependent labeling of MCF7 lysates including a strongly labeled protein at ~75 kDa in the probe **1** samples (Figure 4.1B).



Figure 4.1: An approach to identify readers of methionine oxidation. (A) Structures of actin probes 1 and 2. (B) Probes 1 and 2 label MCF7 lysates in a concentration dependent manner and show distinct labeling patterns.

# 4.2.2 SILAC experiments to identify readers of reduced and oxidized methionine

To achieve a robust analysis of Met(O) and Met specific readers, we performed two independent photo-crosslinking experiments in MCF7 lysates which had been SILAC labeled with isotopically heavy or light arginine and lysine. In a "forward" experiment, probe **1** was added to "light" lysate and probe **2** was added to "heavy" lysate. In a "reverse" experiment, the probes were switched. A plot was generated where the light to heavy ratio  $(R_{L/H})$  for the forward experiment is plotted on the x-axis, and the  $R_{L/H}$  for the reversed experiment is plotted on the y-axis. Proteins which did not show any selective affinity for either probe are clustered around 1, and proteins which are selective for probe **1** or probe **2** will be clustered at the top right or top left corners respectively (Figure 4.2B, Table 4.1). Of the 5 proteins enriched by either probe, only PFKL has been shown previously to directly bind to actin.<sup>14</sup> PFKL is stabilized by associating with F-actin and other cytoskeletal filaments.<sup>14</sup> HSPA8 has been shown to be involved in regulating myofibril integrity by interacting with actin binding protein CapZ, but a direct interaction with actin has not been



Figure 4.2: Identification of readers of reduced and oxidized methionine. (A) Workflow used to identify proteins which interact selectively with oxidized or reduced methionine. 50 µM probes 1 or 2 are crosslinked in isotopically heavy or light MCF7 lysates. After UV crosslinking, equal amounts of heavy and light lysate are combined. Proteins which are bound to the probe are enriched on streptavidin agarose beads, trypsinized, and subjected to LC-MS/MS analysis. (B) 2D plot showing SILAC  $R_{L/H}$  for each protein in the "forward" (x-axis) and "reversed" (y-axis) experiments. Proteins which selectively interact preferentially with probe 1 are in the upper right portion of the plot and preferential interactors of probe 2 are in the bottom left portion.

ID	Protein	Description	$R_{L/H}$ forward	$R_{L/H}$ reverse
P08107	HSPA1B	Heat shock 70 kDa protein $1A/1B$	12.54	0.18
P11142	HSPA8	Heat shock cognate 71 kDa protein	10.36	0.24
P52272	HNRNPM	Heterogeneous nuclear ribonucleoprotein M	2.31	0.37
Q5JRX3	PITRM1	Presequence protease, mitochondrial	2.42	0.46
P17858	$\mathbf{PFKL}$	6-phosphofructokinase, liver type	0.35	7.03

**Table 4.1:** Proteins which are selective interactors of probe 1 or 2. The average SILAC  $R_{L/H}$  from 3 technical replicates are shown.

reported.<sup>15</sup>

#### 4.2.3 Verification of interacting proteins identified by LC-MS/MS

To confirm the MS results, we performed a crosslinking experiment, biotin enrichment, and eluted bound proteins from the beads by boiling in SDS. A western blot was then performed to detect HSPA8 and PFKL in the enriched and unenriched fractions. HSPA8 was shown to selectively bind to probe **1** and PFKL was shown to selectively bind to probe **2** (Figure 4.3), which provided a secondary confirmation of the results of the MS experiment.

#### 4.2.3.1 Crosslinking With recombinant HSPA8 and PFKL

Next we measured the ability of probes 1 and 2 to bind to recombinant HSPA8 and PFKL. HSPA8 with an N-terminal HA tag was overexpressed in BL21 cells. PFKL was expressed in sf9 cells via baculovirus transduction.<sup>16</sup> To verify that PFKL was active we performed an activity assay at varying concentrations of fructose 6-phosphate (F6P) using an established protocol.<sup>16,17</sup> Briefly, PFKL activity is determined by a coupled enzyme assay in which the F6P and ATP are converted to fructose-1,6diphosphate (F1,6BP). F1,6BP is converted into glyceraldehyde 3-phosphate (GAPD) by the activity of aldolase (ALDO) and triosephosphate isomerase (TPI). Then, the initial rate of the reaction is measured by monitoring the consumption of NADH by glycerol-3-phosphate dehydrogenase (GPDH) (Figure 4.4A). The  $V_{max}$  of PFKL was calculated as  $2.45 \times 10^{-3} \text{ s}^{-1}$ . We measured the  $K_{m,F6P}$  as 2.3 µM which is consistent



Figure 4.3: Detection of endogenous PFKL and HSPA8 in MCF7 lysates enriched with probe 1 or 2. MCF7 lysates were crosslinked with 75  $\mu$ M of the indicated probe. An aliquot of the labeled lysate was taken and run as the "input" fraction. The labeled proteins were pulled down on streptavidin-agarose beads. The bound proteins were eluted by heating in gel loading dye and 50  $\mu$ M biotin to obtain the "enriched" fraction. Each fraction was analyzed by western blot antibodies for HSPA8 and PFKL and streptavidin-HRP to detect probe labeled proteins.



Figure 4.4: PFKL activity assay. (A) Coupled enzyme assay used to measure PFKL activity. (B) Michaelis–Menten plot of recombinant PFKL activity at varying concentrations of fructose 6-phosphate (F6P).



Figure 4.5: Crosslinking with recombinant PFKL and HSPA8.  $12 \mu$ M of the indicated probe was combined with  $1 \mu$ M purified (A) HSPA8 and (B) PFKL *in vitro*. Each lane is a biological replicate performed with a new preparation of protein. (C) Mean densitometry measurements of 3 biological replicates shown in A and B. Band intensities from the streptavidin blot were normalized to the intensity of the HA or PFKL band and then normalized intensity of the most intense replicate, such that the intensity of the most intense replicate is set to 1. Replicates were statistically analyzed by Student's t test (\*p < 0.005). Error bars represent the standard deviation of the 3 measurements.

with the value of  $2.0 \pm 0.2 \,\mu\text{M}$  reported by Webb *et al*<sup>16</sup> (Figure 4.4B).

Crosslinking reactions with recombinant protein were performed with 1  $\mu$ M HSPA8 or PFKL and a 12 molar excess of probes 1 or 2, and 0.2 mg mL<sup>-1</sup> casein. The experiment was performed in 3 biological replicates. Both probes showed a statistically significant preference for the expected protein. Probe 1 showed a ~5 fold selectivity for HSPA8 and probe 2 showed a ~2 fold selectivity for PFKL (Figure 4.3).

# 4.2.4 Mical1 shows oxidase activity on probe 1

A limitation of of our bait peptide approach is that the peptide can only duplicate the amino acid sequence in actin between H42 and K52. Secondary and tertiary structural elements will not necessarily be preserved. Therefore, it can not be assumed that protein interactions with the actin peptide probes will also occur in the full length



Figure 4.6: Micall NADPH consumption in the presence of probe 1. The consumption of NADPH by the catalytic domain of human Micall was monitored by the A340 in the presence of 0 to 100  $\mu$ M probe 1, as well as in the presence of 0 and 100  $\mu$ M probe 1 absent Micall.

protein. As a first step at investigating how well the peptide probes approximate the full length protein, we tested the oxidase activity of Mical1 against probe **1**. Mical redox enzymes have been shown to induce actin disassembly through targeted oxidation of actin M46 and M49.<sup>8–10,18</sup> Although MICALs have some basal level of NADPH consumption even in the absence of substrate,<sup>18,19</sup> they are known to show an increased rate of NDAPH consumption in the presence of F-actin.<sup>8,9,18,19</sup> The purified catalytic domain of human Mical1 did not show any change in the rate of NADPH consumption at concentrations of probe **1** ranging from 0 to 100 µM probe **1** (Figure 4.6). Even though Mical1 activity was not affected by the presence of probe **1** as a substrate, probe **1** was slightly oxidized by Mical1 (Figure 4.7A,B). Taken together these data suggest that although our peptide probes are not perfect representations of full length actin, they do interact with some of the natural actin binding proteins.

# 4.2.5 Confirming oxidation state dependent interactions at the protein level

Next we sought to verify that the interactions with the actin peptides also occur at the protein level. PFKL but not HSPA8 were shown to co-immunoprecipitate



Figure 4.7: Micall oxidizes probe 1.  $100 \,\mu$ M probe 1 was treated with  $1 \,\mu$ M Micall in the or absence of  $200 \,\mu$ M NADPH. The doubly oxidized probe 2 was run as a positive control. (A) Representative extracted ion chromatograms (EICs) of the mass of fully reduced, singly oxidized, and double oxidized probe 1. (B) Mean EIC area of 3 technical replicates. Error bars represent the standard deviation of the 3 measurements.



Figure 4.8: PFKL interacts with actin *in situ*. (A) Co-immunoprecipitation of ACTB in MCF7 lysates. (B) 25 µg biotin-phalloidin was added to MCF7 lysates with then incubated with streptavidin-agarose beads. The input (I) and bead bound (E) fractions were analyzed by western blot.

with ACTB in MCF7 lysates (Figure 4.8A). Biotin-phalloidin can be used to identify proteins which selectively associate with F-actin.<sup>20</sup> Only PFKL was shown to associate with F-actin (Figure 4.8B). PFKL binds to both probes **1** and **2**, although it preferentially binds to the oxidized form of the actin bait peptide. The interaction of all phosphofructokinase (PFK) isoforms with cytoskeletal filaments is well established.<sup>14,21,22</sup> Therefore, it is not surprising that PFKL binds to F-actin to some extent. To better understand how the oxidation state of actin affects PFKL binding, we directly compared the co-precipitation of reduced or Mical oxidized actin with PFKL. PFKL interacts with both forms of actin but interacts to a greater extent with the oxidized form (Figure 4.9A,B).



Figure 4.9: Actin pulldown. (A) 50 µg reduced or Mical oxidized G-actin was labeled with biotin-NHS then bound to streptavidin-agarose beads. 6 µM recombinant HSPA8 and PFKL were combined and incubated with the immobilized actin and the eluting fractions were analyzed by an anti HA (HSPA8) and PFKL western blot. A representative of 3 biological replicates is shown. The input fraction (I) was the combined HSPA8 prior to addition to pulldown. The elution fraction (E) was the soluble fraction after boiling the streptavidin-agarose beads in gel loading buffer. (B) Mean densitometry measurements of 3 biological replicates of the experiment shown in A. Replicates were statistically analyzed by Student's t test (\*p < 0.05, \*\*p < 0.005). Error bars represent the standard deviation of the 3 measurements.

# 4.3 Conclusion

In summary we show that HSPA8 and PFKL interact with actin peptides containing reduced and oxidized methionine respectively. It is well established that PFK interacts with cytoskeletal fillaments.<sup>14,21,22</sup> Several recent studies have also started to unveil a possible interplay between cell metabolism and cytoskeletal organization.<sup>23–25</sup> Indeed, a recent study showed that all 3 PFK isoforms are downregulated by changes in cellular microenvironment via polyubiquitination by TRIM21.<sup>26</sup> The preferential interaction between PFKL and oxidized actin suggests a possible mechanism through TRIM21 is recruited to ubiquitinate PFKL.

Although HSPA8 showed robust and selective labeling by probe 1, the interaction could not be confirmed at the protein level. There are two possible reasons for this; (1) the interaction between HSPA8 and actin is transient and not strong enough to withstand immunoprecipitation or (2) HSPA8 only interacts with the actin peptide probe, but not the full length protein. Additional experiments are warranted to further characterize the biological consequences of methionine oxidation on the dynamics between actin HSPA8 and PFKL.

#### 4.4 Materials and methods

# Synthesis of Met/Met(O) peptide probes

# Ac-F(p-Bz)-H-Q-G-V-M(O)-V-G-Met(O)-G-Q-Ahx-PEG<sub>3</sub>-Biotin Met(O) probe

Peptides were synthesized by manual solid-phase synthesis on Fmoc-PEG Biotin NovaTag<sup>TM</sup> resin (Millipore Sigma) using Fmoc as the protecting group for  $\alpha$ -amino

groups. The success of each deprotection and coupling was confirmed by Kaiser test following the standard protocol. 6-(Fmoc-amino)hexanoic acid, Fmoc-Lys(Boc)-OH, Fmoc-Gln(trt)-OH, Fmoc-Gly-OH, Fmoc-Met-OH, Fmoc-Gly-OH, Fmoc-Val-OH, Fmoc-Met-OH, Fmoc-Val-OH, Fmoc-Gly-OH, Fmoc-Gln(trt)-OH, Fmoc-His(trt)-OH, Fmocp-Bz-Phe-OH residues were added under standard coupling conditions. The same same order of residues was used for the Met(O) probe with the substitution of Fmoc-Met(O)-OH for Fmoc-Met-OH. After the final Fmoc deprotection, dry DCM was added to the resin. Acetic anhydride (10 eq) and pyridine (10 eq) were added dropwise and the vessel was shaken for 3 hours. After acetyl capping the peptide was cleaved from the resin in 90% TFA, 5% DCM, 2.5% TIS, 2.5% water for 2 hours. The peptide was purified by preparative HPLC with a gradient of increasing ACN 0.1% TFA (solvent) in water- 0.1% TFA (solvent A) and analyzed on a Agilent triple TOF mass spectrometer coupled to a Agilent 1200 series LC to give the pure peptide. HRMS for Met probe  $(C_{92}H_{144}N_{22}O_{22}S_3 + 3H^+)$ : 669.6667 m/z calcd.; obsd.  $[M + 3H^+]$  669.6755, HRMS for Met(O) probe  $(C_{92}H_{144}N_{22}O_{24}S_3 + 3H^+)$ : 680.3333 m/z calcd.; obsd.  $[M + 3H^+]$  680.3427

#### Cell culture

MCF7 cells were grown in RPMI media minus L-lysine and L-arginine (Thermo Fisher) supplemented with 10 % dialyzed FBS (Gibco), 1 % Penicillin-Streptomycin-Amphotericin B (Gibco), and either  $84 \,\mu g \, m L^{-1} \, [^{13}C/^{15}N]$ -L-arginine (R10) and  $146 \,\mu g \, m L^{-1} \, [^{13}C]$ -L-lysine (K6) or  $84 \,\mu g \, m L^{-1}$  L-arginine (R0) and  $146 \,\mu g \, m L^{-1}$  L-lysine (K0) at  $37 \,^{\circ}C$  and  $5 \,\% \, CO_2$  for a minimum of 6 passages.

#### Verification of Heavy Amino Acid Incorporation for SILAC

Soluble cell lysates were diluted to  $1 \text{ mg mL}^{-1}$  and precipitated with the addition of 10 % TCA followed by incubation at  $-80 \text{ }^{\circ}\text{C}$  for 1 hour. Proteins were pelleted by

centrifugation (17,000 × g for 10 min) at 4 °C and pellets washed twice with ice-cold acetone. Pellets were air dried at room temperature then resuspended in 8 M urea in PBS (30 µL) and solubilized by heating (65 °C for 5 min) and sonication. Once the pellet had dissolved, 70 µM NH<sub>3</sub>HCO<sub>3</sub> (70 µL) was added, and the sample was treated with 15 mM DTT (15 min 65 °C) and 20 mM iodoacetamide (room temperature, 30 min). The urea concentration was diluted to 2 M with PBS and 1 mM CaCl<sub>2</sub> and 2 µg trypsin (Promega) were added and the sample was incubated overnight at 37 °C. The trypsin was quenched with the addition of formic acid (15 µL) and the samples were centrifuged at 15000 rpm for 20 min. Our observation of light/heavy intensity ratios ( $R_{L/H}$ ) for most peptides conformed complete metabolic labeling with heavy amino acids (Figure 4A.1).

#### MS sample prep

Probes 1 or 2 (50 µM) were added to soluble, isotopically heavy or light, MCF7 lysates at 2 mg mL<sup>-1</sup> (500 µL). The mixture was subjected to UV irradiation for 1 hour on ice. The heavy and light samples were combined and precipitated with the addition of 10 % TCA and incubated at  $-80 \,^{\circ}$ C for 1 hour. Samples were centrifuged at 17,000 × g for 10 min and the pellets were washed twice with ice cold acetone. After allowing the protein pellets to air dry, pellets were resuspended in 1.2% SDS by repeated rounds of heating at 65 °C and sonication. The SDS was diluted to 0.2% with the addition of 5 mL PBS and the solution was incubated with 170 µL streptavidin agarose beads (Thermo Fisher) overnight at 4 °C then 3 hours at room temperature. The beads were washed with PBS (3×5 mL), and water (3×5 mL). The beads were pelleted by centrifugation (1400 × g, 3 min) between washes. The washed beads were resuspended in 500 µL 6 M urea / PBS and 10 mM DTT and incubated at 65 °C for 15 min. 20 mM iodoacetamide was then added and the samples were incubated at 37 °C for 30 min. After reduction and alkylation the beads were pelleted by centrifugation ( $1400 \times g$ , 3 min), and resuspended in 200 µL 2 M urea / PBS, 1 mM CaCl<sub>2</sub>, and 2 µg trypsin (Promega) and incubated overnight at 37 °C. The tryptic digest was collected, and the beads were washed 2 × 75 µL with water and the washes combined with the tryptic digest for a final sample volume of ~350 µL. The trypsin was quenched with the addition of 15 µL formic acid and stored at -20 °C until MS analysis.

#### Liquid chromatography mass spectrometry

Mass spectrometry was performed on an LTQ Orbitrap Discovery (Thermo Fisher) coupled to an Agilent 1200 series HPLC. Protein digests were pressure loaded onto a 250 µm fused silica desalting column, packed with 4 cm Aqua C18 reverse phase resin (Phenomenex). Peptides were eluted onto a 100 µm fused silica biphasic column, packed with 4 cm strong cation exchange resin (Watman) and 10 cm C18 resin using a using a five-step multidimensional LC/LC-MS/MS protocol (MudPIT).<sup>27</sup> Each of the five runs begins with a salt push (0%, 25%, 50%, 80%, and 100% buffer C), followed by a gradient 0–100% buffer B in buffer A (buffer A: 95% water, 5% ACN, 0.1% formic acid; buffer B: 20% water, 80% ACN, 0.1% formic acid; buffer C 95% water, 5% ACN, 500 mM ammonium acetate). The flowrate was ~0.25 µL min<sup>-1</sup> and the spray voltage was set to 2.75 kV. One survey MS1 scan (400-1800 m/z) was followed by 8 data dependent scans of the n<sup>th</sup> most intense ion.

# Peptide identification

Peptides were assigned to MS2 spectra using the SEQUEST<sup>28</sup> algorithm, searching against a human reverse-concatenated non-redundant protein database. Data sets were searched independently for peptides containing isotopically light and heavy amino acids. For the light search the default masses of lysine and arginine were used, for the heavy search a static modification was specified for lysine (+6.02013 Da) and arginine (+10.00826 Da). A static modification was specified for cysteine residues (+57.0215 Da, iodoacetamide alkylation) in both heavy and light samples. MS2 matches were assembled by protein and filtered to achieve a false discovery rate of 5% using DTASelect  $2.0.^{29}$ 

# Ratio quantification

Light/heavy intensity ratios  $(R_{L/H})$  were calculated using the CIMAGE quantification package as described previously.<sup>27,30</sup> CIMAGE reports peptide  $R_{L/H}$  for co-eluting light and heavy peptides. The peptides are grouped by protein and a representative  $R_{L/H}$  for each protein is calculated from the median  $R_{L/H}$  for each peptide identified for that protein.

#### PFKL expression and activity assay

Recombinant PFKL was prepared by baculovirus expression as described previously.<sup>16,17</sup> Briefly, complementary DNA (cDNA) encoding isoform b of *Homo sapiens* PFKL (NP\_002617) was inserted into pFastBac HTa vectors. Baculovirus was used to infect sf9 cells at a density of  $2 * 10^6$  cells/mL at a multiplicity of infection (MOI) of 2 for 48 hours in a shaking flask at  $26 \,^{\circ}$ C.

The activity of recombinant PFKL was confirmed with an auxiliary enzyme assay.<sup>17</sup> Reactions were performed at a final volume of 200 µL containing 50 mM HEPES at pH 7.4, 100 mM KCl, 10 mM MgCl<sub>2</sub>, 0.15 mM NADH, 0.675 U mL<sup>-1</sup> aldolase, 5 U mL<sup>-1</sup> triosephosphate isomerase,  $2 \text{ U mL}^{-1}$  glycerol phosphate dehydrogenase, 0.25 mM ATP, and 0.25 mM ADP. Auxiliary enzymes were de-salted using an Amicon Ultracel-10K Centrifugal Filter Unit prior to use. The consumption of NADH was monitored by the measuring the absorbance at 340 nm using a SpectraMax M5 plate reader (Molecular Devices). The initial reaction rates were measured at various concentrations of F6P. The rate and the concentration of F6P were fit the Michaelis-Menten equation having the form:

$$r = \frac{V_{max}C}{K_m + C} \tag{4.1}$$

where r is the reaction rate, C is the substrate concentration  $V_{max}$  is the maximum rate of the system, and  $K_m$  is the Michaelis–Menten constant.

#### **Constructs and antibodies**

Mouse Mical1 (NP\_612188.1) (residues 1-611),<sup>10</sup> and transcript variant 1 of human HSPA8 (NP\_006588.1), were cloned into pET28b and expressed in BL21 *E. Coli.* Streptavidin-HRP Conjugate (EMD Millipore); PFKL, and HSPA8 (1F2-H5) (Novus Biologicals);  $\beta$ -actin mouse mAb (15G5A11/E2) (Invitrogen);  $\beta$ -actin Rabbit Ab, HA-Tag (C29F4), GAPDH (Cell Signaling) antibodies were used for western blotting and/or immunoprecipitation assays. Purified reduced and Mical oxidized rabbit skeletal muscle actin were purchased from Cytoskeleton Inc.

# **Protein purification**

Cell pellets were thawed on ice and resuspended in PBS (5 mL). Cells were lysed by sonication and centrifuged at  $10,000 \times g$  for 20 minutes at 4 °C. The supernatant was loaded onto a Ni-NTA column equilibrated with PBS, 10 mM imidazole (pH 7.4). The column was washed with 10 column volumes 25 mM imidazole in PBS, and the purified protein was eluted with  $4 \times 1$  column volume fractions with 250 mM imidazole in PBS. Elution fractions were analyzed for purity by SDS-PAGE and the protein containing fractions were combined. Protein fractions were desalted to remove imidazole using a NAP-5 column (Thermo Fisher).

# Immunoprecipitation

200 µg MCF7 lysate at  $1 \text{ mg mL}^{-1}$  was incubated with 10 µg of a mouse  $\alpha$ -ACTB mAb overnight at 4 °C. The mixture was then incubated with 50 µL protein-G agarose beads (Thermo Fisher) for 2 hours at room temperature. The bound proteins were eluted from the beads by heating to 85 °C in SDS-PAGE loading buffer for 30 minutes. The input and eluting fractions were then analyzed by western blot.

#### F-actin pulldown

 $200 \,\mu\text{g}$  MCF7 lysate at  $1 \,\text{mg}\,\text{mL}^{-1}$  was incubated with  $25 \,\mu\text{g}$  biotin-phalloidin (Thermo Fisher) incubated at room temperature for 1 hour. The mixture was incubated with  $50 \,\mu\text{L}$  streptavidin-agarose beads overnight at  $4 \,^{\circ}\text{C}$  with constant rotation. The bound proteins were eluted from the beads by heating to  $85 \,^{\circ}\text{C}$  in SDS-PAGE loading buffer for 30 minutes. The input and eluting fractions were then analyzed by western blot.

### Actin pulldown

10 µg reduced or Mical oxidized rabbit skeletal muscle actin was solubilized in G-actin buffer as described previously<sup>8</sup> and diluted to 6 µM, then labeled with 20 molar excess biotin-LC-LC-NHS ester (Thermo Fisher) according to the manufacturer's protocol. The biotinylated actin was desalted on a NAP-5 column to remove excess linker then immobilized on 50 µL streptavidin-agarose beads by incubation at room temperature for 2 hours with constant rotation (200 µL 6 µM actin per sample). Recombinant PFKL and HSPA8 were combined and diluted to a final concentration of 6 µM with actin G-buffer and added to the immobilized actin (200 µL per sample), and incubated overnight at 4 °C overnight with constant rotation. The beads were washed with PBS (3 × 1 mL) and pelleted by centrifugation (1400 × g, 3 min) between washes. The bound proteins were eluted from the beads by heating to 85 °C in

SDS-PAGE loading buffer for 10 minutes. The input and eluting fractions were then analyzed by western blot.

#### Western blotting

Samples were separated on a 10 % SDS-PAGE gel then transferred to nitrocellulose membranes at 75 V for 100 minutes. The membranes were blocked with 5 % non-fat powdered milk in TBS-T for 1 hour at room temperature. The membrane was probed with primary antibody (1:1000) in 5 % powdered milk / TBS-T overnight at 4 °C. The blot was washed (3 × 5 min) with TBS-T then incubated with a  $\alpha$ -rabbit-HRP conjugated secondary antibody (1:2000) for 2 hours at room temperature. For biotinblots, after electrotransfer, membranes were blocked overnight with 5 % non-fat dry milk in TBS-T at room temperature. The membrane was then washed (3×5 min) and probed with streptavidin-HRP (1:1000) in TBS-T for 1 hour at room temperature. After probing with secondary antibody or streptavidin-HRP, membranes were washed 3×5 min with TBS-T and treated with chemiluminescence reagents (Thermo Fisher) and developed on a Bio-Rad ChemDoc MP imaging system.

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# Chapter 5

Development of Proteomic Tools to Study Protein Citrullination

A significant portion of the work described in this chapter has been published in:

Tilvawala, R. et al. The Rheumatoid Arthritis-Associated Citrullinome. Cell Chem Biol 2018, 25, 691–704.

Maurais, A. J. et al. A Streamlined Data Analysis Pipeline for the Identification of Sites of Citrullination. *Biochemistry* **2021**, *60*, 2902–2914.

The first part of the human RA and healthy biotin-PG sample preparation was performed by Son Nguyen. Target validation and SERPIN activity assays were performed by Ronak Tilvawala. Protein purifications, PAD autocitrullination MS sample preparation, and HEK-PAD2 MS sample preparation were performed by Ari Salinger.

#### 5.1 Introduction

Protein citrullination is an enzyme-catalyzed post-translational modification (PTM) that converts an arginine residue into citrulline.<sup>3,4</sup> This irreversible hydrolysis reaction is catalyzed by the protein arginine deiminase (PAD) family of enzymes. There are five PAD isozymes in humans and other mammals, of which, only PADs 1-4 are catalytically active. Of note, PAD activity requires high, micromolar levels of calcium.

Aberrant PAD expression and citrullination is a hallmark of rheumatoid arthritis (RA).<sup>5</sup> In fact, patients with RA generate autoantibodies that target citrullinated proteins, and the occurrence of these anti-citrullinated protein antibodies (ACPAs) is the most specific diagnostic for RA. Antibodies targeting the citrullinated forms of vimentin,  $\alpha$ -enolase, and fibrin correlate with different RA subtypes<sup>6</sup> and higher ACPA titers correlate with disease onset and severity.<sup>7</sup> In addition to RA, dysregulated PAD activity is associated with lupus, ulcerative colitis, sepsis, and idiopathic lung fibrosis.<sup>8–13</sup> The exact role of citrullination in driving the pathogenicity of such disparate diseases is not firmly established due to the challenges associated with identifying citrullinated proteins from complex biological samples.

Given the important role of protein citrullination in diverse disease pathologies, numerous chemical probes and mass-spectrometry (MS) strategies have been developed to enrich and identify citrullinated proteins.<sup>4,14–16</sup> Selective chemical derivatization of the urea group in citrulline (Cit) can be achieved with reagents such as 2,3-butanedione and phenyl glyoxal (PG).<sup>17</sup> PG derivatives functionalized with rhodamine and biotin have enabled the visualization and enrichment of citrullinated proteins and peptides.<sup>1,3,18,19</sup> However, assignment of the exact sites of citrullination within these proteins has been confounded by unpredictable fragmentation patterns and poor fragmentation efficiency of peptides containing the PG adduct. Alternatively, the presence of Cit can be detected directly by the +0.984 Da mass shift that occurs upon deimination. However, the small mass shift, coupled with the low abundance of citrullinated peptides within a proteome, necessitate the use of stringent filtering criteria to limit false-positive assignments. Specifically, false-positive identifications can result from: (1) the incorrect assignment of the monoisotopic peak within the isotopic distribution for a given peptide, and (2) the presence of a deamidated glutamine (Gln) and/or asparagine (Asn) within a peptide, which results in a mass shift that is identical to that expected for Cit.

Several strategies have been developed to minimize the number of false-positive hits resulting from database searches for citrullinated peptides. The simplest method is to use stringent precursor mass tolerances of 5 ppm to minimize the incorrect assignment of the monoisotopic species.<sup>20</sup> However, this approach does not account for misannotations driven by the presence of deamidated Gln and Asn. A second approach utilizes a dual database searching strategy, where searches are performed with and without a +0.984 differential modification on Arg, Asn, and Gln. Peptides that score higher with the differential modification on Arg, relative to Asn and Gln, are considered true matches.<sup>20,21</sup> A third approach is to specifically search for diagnostic fragment ions that are unique to citrullination. These diagnostic ions include the immonium ion of Cit, and the -43.0058 Da neutral loss of isocyanic acid (HNCO) from Cit that occurs upon peptide fragmentation. In particular, the isocyanic acid neutral losses can be used as diagnostic fragment ions for the unambiguous detection of a Cit-containing peptide $^{16,22,23}$  because the fragmentation of peptides containing deamidated Gln and/or Asn do not generate similar neutral losses. Several recent studies have exploited this Cit-specific neutral loss to identify citrullinated peptides. For example, one study developed a logistic regression model to determine sites of citrullination based on the presence of predictive diagnostic ions, including the Citspecific neutral loss species.<sup>24</sup> In a second study by Lee *et al*, a library of  $\sim 2200$ 

citrullinated peptides were chemically synthesized as reference spectra to unambiguously differentiate citrullinated peptides from their corresponding deamidated counterparts. Manual comparisons of the experimental spectra to the synthetic standards enabled the high-confidence assignment and validation of citrullinated peptides from 30 human tissues. Additionally, these studies confirmed that the neutral loss of isocyanic acid from fragment ions was a key characteristic required for assignment of sites of citrullination with high confidence.<sup>16</sup> The requirement to detect neutral loss fragment ions was subsequently applied in a study by Salinger et al to identify sites of citrullination from neutrophil extracellular traps (NETs).<sup>25</sup> Both the Lee *et al* and Salinger et al studies confirmed the importance of applying stringent criteria to minimize false-positives in citrulline assignments, but relied on labor-intensive manual assessment of fragmentation spectra to identify determining neutral loss peaks. A recent study by Chaerkady  $et \ al^{26}$  identified 833 citrullination sites in ionomycintreated neutrophil and mast cells using neutral-loss ion-based searches in MaxQuant. Importantly, the generated data were then used to benchmark a machine-learning model to predict sites of citrullination to further facilitate sequence-based prediction of novel citrullination events.

Herein, we describe two studies which take distinct approaches to identifying targets of protein citrullination. In the first study, we describe the use of PG-based probes to identify novel citrullinated proteins from RA patient serum, synovial fluid (SF), and synovial tissues. We identified an increase in many ACPA-target proteins in RA samples consistent with the hypothesis that ACPAs are disease causing. Moreover, we identified numerous metabolic enzymes as well as serine protease inhibitors (SERPINs). Importantly, for a subset of SERPINs, we show that citrullination can abolish their inhibitory activity and thereby modulate SERPIN-regulated pathways including the complement pathway, blood clotting, fibrinolysis, and cell motility. Increased protease activity would allow for enhanced complement activation and degradation of the extracellular matrix that would enable the influx of other immune cells and consequently potentiate the inflammatory response.

In the second study, we report a streamlined computational workflow for assigning sites of citrullination with high confidence, based on two newly developed algorithms, termed ionFinder and envoMatch. The first algorithm, ionFinder, can rapidly identify Cit-containing peptides from tandem MS data by identifying the presence of diagnostic neutral loss ions. The second algorithm, envoMatch, automates the matching of isotopic envelopes to confirm that the monoisotopic species displays the required +0.984 Da mass shift. Both algorithms are now available as opensource programs. The ionFinder program is designed to be implemented downstream of the database-searching step of standard proteomic workflows to differentiate between high-confidence and low-confidence identifications of Cit-containing peptides. As such, ionFinder is compatible with the outputs of common database-searching algorithms, including SEQUEST, Mascot and MaxQuant, and functions on both collision-induced dissociation (CID) and high-energy collisional dissociation (HCD) fragmentation datasets. The accuracy of ionFinder was evaluated using fragmentation spectra from verified Cit-containing, and non Cit containing, synthetic peptides generated in the study by Lee  $et \ al^{16}$  as well as proteomic data from human cells and tissues.<sup>16,26</sup> To demonstrate the versatility of the ionFinder and envoMatch workflow, we comprehensively mapped the sites of autocitrullination in all four active PAD isozymes. Moreover, we used this workflow to map the citrullinome of cells expressing PAD2, resulting in the identification of over 350 unique Cit-containing peptides from 220 proteins.


Figure 5.1: (A) PADs convert arginine to citrulline. Biotin-PG can selectively react with the urea on citrulline at low pH. Citrullinated proteins can then be isolated and identified by MS. (B) Volcano plot showing citrullinated proteins identified in serum, SF, and tissue from RA patients. The spectral count ratio is plotted on the x-axis and the p-value from three replicates of each pool of samples is on the y-axis. Proteins which show a statistically significant increase in citrullination in RA patients are on the top right corner of each plot.

## 5.2 Results

#### 5.2.1 Identification of citrullinated proteins with biotin-PG

PG probes can be used to chemoselectively label the urea on citrulline under acidic conditions and facilitate the visualization and identification of citrullinated proteins in complex proteomes (Figure 5.1A). We sought to utilize biotin-PG to identify proteins that are selectively citrullinated in human serum, SF (the fluid surrounding joints), and synovial tissue samples (granulation tissue which surrounds joints) in patients with RA. Serum samples were obtained from healthy donors (n = 16; 7 females and)9 males) and RA patients (n = 16; 9 females and 7 males). The SF samples were collected from healthy donors (n = 16; 6 females and 10 males) and RA patients (n = 16; 6 females and 10 males). The synovial tissue samples were obtained from one healthy donor and two RA patients. The RA serum, SF and synovial tissue samples were obtained from confirmed RA patients but different individuals. The serum and SF samples were pooled to generate representative samples. RA and healthy controls were labeled with biotin-PG and citrullinated proteins were enriched on streptavidin-agarose. After extensive washing, we performed an on-bead trypsin digest and subsequent multidimensional chromatography coupled with tandem mass spectrometry analysis.

Relative levels of protein citrullination were determined by comparing the spectral counts for a given protein in RA vs. healthy samples. Only proteins with an average of greater than 10 spectral counts in RA samples were used to calculate spectral count ratios. Proteins with a RA/healthy spectral count ratio > 1 and a p value < 0.05 were considered to be selectively citrullinated in the RA sample (Figure 5.1). One readily apparent trend is that the number of citrullinated proteins increases as the sample source progresses from serum to, SF, to synovial tissue. These observations are consistent with increased citrullination occurring within the affected area.



Figure 5.2: (A) Subcellular localizations of proteins with elevated citrullination in synovial fluid (SF) and synovial tissue. (B) Statistical over representation test for Panther protein classes enriched in SF. The percentage of proteins in which belong to a particular protein class are compared to the percentage of proteins in the human proteome belonging to the same class. The classes which showed the highest degree of enrichment in RA SF are shown.

Notably, several proteins that show high ratios with significant p values in SF, also appear in the serum data at lower levels and at lower confidence. This likely reflects the leaching of these proteins from SF into serum. Among the various other citrullinated proteins discovered, the majority were secreted (85% in SF and 33% in synovial tissue) and cytoplasmic (36% in synovial tissue) proteins (Figure 5.2A), suggesting that both intra- and extracellular citrullination contributes to pathogenesis. We detected elevated levels of known citrullinated proteins including vimentin, fibrin, keratin, and enolase from synovial tissue and SF. In addition to these known substrates, we identified a wide variety of novel citrullinated proteins covering various functional classes, among which were SERPINS, serine proteases, carriers/transporters, and complement system components. A PANTHER overrepresentation test<sup>27</sup> was used to identify protein classes and biological processes that were enriched in SF. The complement pathway, SERPINS, and serine proteases were the most elevated in SF (Figure 5.2B).

SERPINs are ubiquitous secreted proteins which regulate protease activity.<sup>28</sup> SER-PINs react with serine proteases through a loop called the reactive center loop (RCL). The RCL is an extended, exposed sequence above the body of the SERPIN scaffold. Upon RCL cleavage, the SERPIN undergoes a conformational change that traps the



Figure 5.3: (A) Schematic showing the effect of citrullination on serine protease inhibitor (SERPIN) activity. Citrullination of the P1-arginine in SERPINs abolishes their inhibitory activity against their cognate proteases. (B) IC<sub>50</sub> plots showing inhibition of plasmin by citrullinated and uncitrullinated antiplasmin. Plasmin (50 nM) was mixed with different concentrations of citrullinated or uncitrullinated antiplasmin and incubated for 30 min at room temperature. Hydrolysis of the plasmin substrate D-Val-Leu-Lys-pNA (1 mM) was monitored spectrophotometrically at 405 nm. (C) Fold Change in SERPIN IC<sub>50</sub> for (+/-) pretreatment with various PAD isoforms.

protease in an inactive acyl-enzyme complex. In some SERPINs, the P1 position in the RCL is occupied by an arginine residue, which is responsible for docking the RCL into the protease active site.<sup>29</sup> Given the important role of the P1-arginine in the SERPIN-protease interaction, a possible consequence of citrullination on SER-PIN activity is that the binding affinity to their cognate protease would be reduced (Figure 5.3A). To determine how citrullination effects SERPIN activity, antiplasmin, anithrombin, and antitrypsin were recombinant expressed and purified. The IC<sub>50</sub> of each SERPIN was determined by measuring the activity of the target protease while titrating in increasing concentrations of SERPIN, either pretreated or not pretreated with PAD. Antiplasmin and anithrombin were found to have a reduced IC<sub>50</sub> when pretreated with PAD (Figure 5.3B,C). However PAD-treated antitrypsin did not show any change in IC<sub>50</sub> of neutrophil elastase, which is consistent with the fact that antitrypsin has a Met residue in the P1 position instead of an Arg as in antiplasmin and anithrombin. To confirm that SERPIN inactivation is due to citrullination of the P1-arginine, we generated an antiplasmin variant in which the P1-arginine was mutated to a lysine and evaluated its ability to inhibit plasmin. In contrast to wild-type antiplasmin, citrullination of the R376K mutant does not alter the inhibition profile of the mutant SERPIN; the IC<sub>50</sub> values for citrullinated and uncitrullinated mutant enzymes are almost identical (Figure 5.3C). In total, these results demonstrate that citrullination inhibits a large subset of SERPINs via citrullination of the P1-arginine.

### 5.2.2 Development ionFinder

A limitation of the biotin-PG probe used in the previous section is that the peptides actually bearing the citrulline residue remain bound to the streptavidin beads, so the site of citrullination cannot be determined. To facilitate the unambiguous detection of citrulline and automate the process of validating peptide-spectrum matches (PSMs) of citrullinated peptides assigned by database-searching algorithms, we developed a software package named ionFinder. As a starting point for ionFinder, we adapted the empirically determined rules developed by Lee et al,<sup>16</sup> where the first step in the workflow was the elimination of peptides annotated as having a C-terminal Cit, because citrullinated Arg residues no longer serve as a recognition element for trypsin. In subsequent filtering steps, a requirement for diagnostic neutral loss (NL) peaks in the fragmentation spectra was instituted to unambiguously assign sites of citrullination. As a first step to automating the identification of NL species, we developed a decision tree to categorize diagnostic fragment ions for peptides annotated to contain Cit. For a given MS2 spectra, each fragment ion is classified into 1 of 4 categories (Figure 5.4): (1) a Cit-determining fragment ion (Det), where a +0.984Da mass shift from the unmodified Arg peptide can be assigned to a Cit-containing peptide fragment that does not contain Asn or Gln; (2) a Cit-determining neutral loss fragment ion (DetNL), where a Cit-containing peptide fragment shows a -43.0058Da neutral loss; (3) an artifact neutral loss fragment ion (ArtNL), where a -43.0058



Figure 5.4: A decision tree depicting how each fragment ion within an MS/MS spectrum is binned into one of five categories: a citrulline-determining fragment (Det); (2) a citrulline-determining neutral loss fragment (DetNL); (3) an artifact neutral loss fragment (ArtNL); and, (4) an ambiguous fragment (Amb).

Da neutral loss is observed for a peptide fragment that does not contain Cit; and, (4) an ambiguous fragment ion (Amb), which lacks diagnostic peptide fragments to confidently assign the presence or absence of Cit.

After classifying the fragment ions from each MS2 scan into the different categories, the number of each type of fragment ion (Det, DetNL, ArtNL, and Amb) is then used to assign a value of "true", "likely", "ambiguous", or "false" to each peptide identification according to a second decision tree (Figure 5.5). Spectra containing two or more DetNL fragment ions are classified as "true", whereas spectra with no Det or DetNL fragment ions are classified as "false". Spectra containing a single DetNL fragment ion, or any number of Det fragment ions, are classified as "likely".



**Figure 5.5:** A decision tree depicting how each PSM is assigned categories of "true", "likely", "ambiguous" and "false", based on the number of DetNL, Det, and Amb fragments.



**Figure 5.6:** Representative fragmentation spectra from peptides classified as "true", "likely", and "ambiguous" by ionFinder.

Lastly, spectra containing no Det or DetNL, and only Amb fragment ions, are listed as "ambiguous". For example, if a peptide is annotated as containing a single Cit, ionFinder rapidly searches the fragmentation data and automates the categorization of each PSM into the "true", "likely", "ambiguous", or "false" categories. For those peptides that contain multiple annotated Cit residues, the categorization of "true", "likely", "ambiguous", or "false" is given to each individual site, and then the value assigned to the peptide as a whole is the lowest classification of all sites. For example, a doubly citrullinated peptide will only be classified as "true" if both individual Cit sites are categorized as "true". Representative PSMs with ion type classifications and the overall value assigned to the spectra are shown in Figure 5.6.

# 5.2.3 Validation of ionFinder Against Ground Truth Datasets

To validate the utility of ionFinder, we first applied this algorithm to a previously described dataset<sup>16</sup> that includes Cit-containing synthetic peptides, as well as non-Cit containing peptide controls. Specifically, we randomly selected fragmentation spectra from 100 Cit-containing peptides (validated "true" hits), and 100 non-Cit containing peptides that contain one or more deamidated Asn or Gln residues (validated "false" hits). Upon initial application of ionFinder to this dataset, we observed numerous ArtNL fragments, where a -43.0058 Da neutral loss was observed for fragments that did not contain a Cit residue. Upon manual inspection, many of these ArtNL fragment peaks displayed relatively low intensity, compared to the majority of DetNL peaks. Moreover, these ArtNL fragments were a very small fraction of the total NL species, where DetNL fragments clearly dominated (Figure 5.7A-B). Nevertheless, we sought to eliminate these ArtNL fragments. Initially, we evaluated the use of m/z ppm cutoffs, as well as signal-to-noise cutoffs, to minimize the number of ArtNL fragments.



Figure 5.7: (A) Bar graphs depicting DetNL and ArtNL fragments upon varying the m/z ppm cutoff value (left panels), signal-to-noise cutoff (middle panels), and a dynamic % ArtNL cutoff (right panel). The data are depicted as total counts of fragments. (B) Bar graphs depicting DetNL and ArtNL fragments upon varying the m/z ppm cutoff value (left panels), signal-to-noise cutoff (middle panels), and a dynamic % ArtNL cutoff (right panel). The data are depicted as ArtNL/DetNL ratios (bottom panels). (C) Plot depicting how varying the m/z ppm cutoff value (left panels), signal-to-noise cutoff (middle panels), signal-to-noise cutoff (middle panels), and a dynamic % ArtNL cutoff (right panel). The data are depicted as ArtNL/DetNL ratios (bottom panels). (C) Plot depicting how varying the m/z ppm cutoff value (left panels), signal-to-noise cutoff (middle panels), and a dynamic % ArtNL cutoff (right panel) affects the true positive rate (TPR) and true negative rate (TNR) rates.



Figure 5.8: Verifying the accuracy of ionFinder and envoMatch using an established "true" and "false" dataset. (A) Fragmentation spectra from 100 Cit-containing and 100 non-Cit containing synthetic peptides that contain confirmed deamidation events from Lee *et al*<sup>16</sup> were analyzed by ionFinder, envoMatch, or both. The number of verified "true" and "false" hits that fell into each category by ionFinder and envoMatch are shown. (B) 2644 PSMs from a complex proteomic analysis were analyzed by ionFinder, envoMatch, or both. The percentage of verified "true" and "false" hits that fell into each category by ionFinder analyzed by ionFinder, envoMatch, or both. The percentage of verified "true" and "false" hits that fell into each category by ionFinder and envoMatch are shown.

However, the use of more stringent ppm and signal-to-noise cutoffs not only reduced the ArtNL fragment counts, but also led to a corresponding decrease in total fragment counts (Figure 5.7A-C). Consequently, we evaluated the use of a dynamic ion-intensity cutoff, wherein the cutoffs are set to self-adjust to provide an abundance of ArtNL fragments below a specified percentage of the total abundance of all other fragment types. We tested several potential cutoffs before establishing that a 1% threshold reduced the number of ArtNL fragments significantly, without altering the number of Det and DetNL fragments (Figure 5.7A-C). In summary, the use of these criteria to minimize ArtNL fragments provides higher confidence of NL peak assignments that are used as diagnostic species for the presence of Cit residues.

When this optimized version of ionFinder was applied to the verified "true" and "false" spectra from the study by Lee *et al*,<sup>16</sup> 77 of the 100 "true" spectra were

automatically assigned as "true" by ionFinder (Figure 5.8A; Table 5A.1). By contrast, only 11 of the 100 "false" spectra were assigned as "true" by ionFinder. Examination of the annotated fragmentation spectra confirmed that the "true" spectra contained high-intensity NL peaks, whereas the annotated NL peaks in the "likely" assignments were of low intensity and precluded high-confident assignment of that PSM as a definitive Cit-containing peptide (Figure 5.6). We then expanded our test dataset to include deep proteomic data from human tissues used in the study by Lee *et al*,<sup>16</sup> where Cit-containing peptides were assigned by comparing to synthetic standards. We analyzed 2644 PSMs from these proteomic datasets, of which 456 and 2188 were classified as true and false, respectively. Analysis of these 2644 PSMs with ionFinder resulted in ~71% of the verified hits being classified as "true", while only ~17% of the false hits were annotated to be "true" (Figure 5.8B).

To further improve the reliability of our assignments, we developed an isotopic envelope matching algorithm, termed envoMatch, that would verify the proper monoisotopic peak identification of Cit-containing peptides. Note that isotopic envelope matching was excluded from the analysis by Lee et al.,<sup>16</sup> but successfully employed by Salinger *et al.*<sup>25</sup> to identify Cit-containing peptides from NETs. In this previous study, isotopic envelope matching was performed by using commercial software to predict MS1 chromatograms for both Arg- and Cit-containing peptides. Then, subsequent manual comparisons of the experimental and predicted envelopes were performed to determine an appropriate fit. The envoMatch program automates this process by comparing experimental isotopic envelopes to predicted Arg- and Cit-containing isotopic envelopes. The program then assigns a value of "true" or "false" quantitatively based on a Pearson correlation between the experimental and predicted isotopic envelopes. When the synthetic sample datasets were analyzed, envoMatch correctly classified the Cit-containing isotopic envelopes with  $\leq 95$  % accuracy (Figure 5.8A). As expected, 95% of the "false" dataset was also classified as "true", because these



**Figure 5.9:** Receiver operating curve (ROC) for a logistic regression classifier trained against a complex proteomic dataset (human) and a dataset comprised of synthetic peptides. The true positive rate (TPR) and false positive rate (FPR) observed for ionFinder is also shown on each panel.

"false" peptides were all deaminated, and therefore have the same isotopic distribution as the citrullinated peptide. Isotopic envelope verification through envoMatch becomes more important when analyzing complex proteomic samples where there is a higher likelihood of observing co-eluting isobaric species. When the 2644 PSMs from the complex proteomic sample were analyzed by both ionFinder and envoMatch, the number of verified true positives decreased from 70 % to 58 % (Figure 5.8B). We also observed an ~5 % decrease in the false-positive rate, where the detNL-containing species did not display the required isotopic distribution. We therefore recommend a workflow by which spectra are analyzed by both ionFinder and envoMatch to generate high-confidence assignments of sites of citrullination, i.e., those that receive annotations of "true" based on an analysis of both MS1 and MS2 spectra.

# 5.2.4 Comparison of ionFinder and envoMatch to a logistic regression classifier

Huh *et al* used spectra from synthetic peptides containing citrulline or arginine to train a logistic regression model which calculates the probability that a peptide in a given PSM is citrullinated. However, a significant disadvantage of their model is that it was not trained against PSMs from deamidated peptides.<sup>24</sup> We implemented

a modified ionFinder workflow to compare how ionFinder would compare to a binary classifier on data containing deamidated peptides. The ionFinder ion classification decision tree (Figure 5.4) would still be for feature engineering and reducing MS2 spectra into a list of ion type classifications, but the empirically designed decision tree in Figure 5.5 would be replaced by a logistic regression classifier. For each PSM, the fragment ion classifications given by the decision tree in Figure 5.4 and the output from envoMatch were used to engineer features for each site of citrullination comprised of the number of ions found in the MS2 in each category, and a boolean depicting whether the isotopic envelope in the MS1 was classified as valid. Both the synthetic peptide and complex proteomic ground truth datasets were split into two groups by random sampling. 70% of each dataset was used to train the model and 30% was used to test its performance. The receiver operating curve (ROC) plots had an area under the curve (AUC) of 0.861 and 0.901 for the human proteome and synthetic peptide datasets respectively (Figure 5.9). The output of the binary classifier is an odds ratio between 1 and 0 reflecting the odds that the given feature falls into one or the other category. Because ionFinder gives 1 of 4 ordinal, discrete values, a ROC curve cannot be generated. However, the static TPR and FPR can be used to access its performance. Interestingly, the ionFinder TPR and FPR are almost exactly the same as the binary classifier. Although the logistic regression classifier performed just as well as ionFinder, we chose to continue with the original ionFinder algorithm because ionFinder is designed to handle peptides with multiple sites of citrullination. The available training datasets have fewer multiply citrullinated peptides than we observe in our own data which hinders the training and assessment of a binary classifer in context of multiple sites of citrullination.



Figure 5.10: The residues that are identified as citrullinated for each individual PAD under three different digestion conditions; LysC/GluC, Trypsin/GluC, and Trypsin are shown. The PAD4 data were compared to a previous study. Citrullination sites identified in that Mondal *et al*<sup>30</sup> are shown in blue. Unique sites are shown in red.



Figure 5.11: Specificity of autocitrullination. (A) Sequence logos depicting the substrate specificity determinants of autocitrullination by PAD1, PAD2, PAD3, and PAD4 (top to bottom). (B) Structure of the holo PAD2 dimer (PDBID: 4N2C) with citrullinated Arg residues shown in blue. (C) Cartoon showing how histone H3 binds in the active site of PAD4 (PDB ID: 2DEW). The interactions are primarily between the enzyme and the substrate backbone, indicating that specific side chains do not make a major contribution to substrate specificity.



**Figure 5.12:** Secondary structural analysis of PAD2 autocitrullination shows that many of the sites of citrullination do not fall on canonical secondary structural regions. The cartoon highlights the sites of citrullination, different secondary structures, the FF-motif which plays a role in nuclear localization, and the location of the active site cysteine.

# 5.2.5 Sites of autocitrullination in PADs 1, 2, 3, and 4

To evaluate the utility of ionFinder in a "real world" situation, we examined the autocitrullination of PADs 1-4. Note that extensive research has established that the PADs autocitrullinate in biological systems, and once modified, protein-protein interactions are impacted.<sup>30–32</sup> Notably, recombinant, purified PADs readily undergo autocitrullination under reducing conditions in the presence of  $Ca^{2+}$ . PADs 1-4 were incubated with  $Ca^{2+}$  (5 mM) and TCEP (1 mM) at 37 °C for 1 h to induce autocitrullination. The proteins were processed for tandem mass spectrometry using different combinations of proteases (LysC/GluC, Trypsin/GluC, and Trypsin) to increase the depth of coverage and mitigate the lower efficiency of trypsin towards Cit-containing proteins. After processing the resulting data using envoMatch and ionFinder, we found that a large percentage of arginine residues from each PAD were autcitrullinated. Specifically, ionFinder unambiguously mapped 28 citrullinated residues on PAD1 (76 % of arginine residues), 20 on PAD2 (61 % of arginine residues), 19 on PAD3 (49 % of arginine residues), and 21 on PAD4 (78 % of arginine residues) (Figure 5.10). We compared the PAD4 autocitrullination sites obtained from ionFinder to a previously published dataset where sites of autocitrullination of PAD4 were evaluated in a time-dependent manner using tandem mass tags (TMT) labeling.<sup>30</sup> The sites identified by ionFinder displayed significant overlap with the previously determined sites of PAD4 autocitrullination.

Since these autocitrullination sites were obtained using purified, recombinant PADs, we cannot conclude that they all occur endogenously. However, we can use these data to search for patterns in PAD substrate preferences. First, we examined the citrullination data for each PAD to establish the existence of a consensus amino acid sequence flanking the site of citrullination (Figure 5.11A). Upon inspection, the results indicate that there are no obvious consensus sequences for PAD autocitrullination. For example, PADs 1, 2, and 4 show no discernable preference for a particular

residue, or type of residue, in positions that span a 3-residue window N-terminal and C-terminal to the site of citrullination. PAD3, however, does show a small preference for hydrophobic residues at the R + 2 and R + 3 positions.

Next, we mapped the sites of PAD2 autocitrullination onto high-resolution structures of PAD2 available in the protein databank.<sup>33</sup> These structural analyses revealed that 9 of the 20 citrullinated residues are not on strands or helices, and are instead located on looped or intermediate regions of the enzyme (Figure 5.12). The Cit residues that lie in regions of canonical secondary structure seem to be on the cap region, such as the C-termini of  $\alpha$ -helices, and both termini of  $\beta$ -strands. Finally, we found that a quarter of the citrullinated residues were present at, or adjacent to, the dimer interface in PAD2 (Figure 5.12). These data indicate that PADs preferentially citrullinate Arg residues that are accessible and lie on flexible regions of proteins. Consistent with this notion is the fact that the PAD active site consists of a narrow  ${\sim}21\,\text{\AA}$  long channel that interacts with the substrate guanidinium and main chain carbonyls of a substrate. While this organization confers steric selectivity for peptidyl-arginine over free arginine, active site residues only contact water and the backbone of the substrate and not key side chains in the R-3 to R+3 positions, as revealed from structures of PAD4 bound to histone tail analogues (Figure 5.11).<sup>34</sup> As such, PADs preferentially citrullinate protein domains that are flexible enough to provide access to the enzyme, rendering looped regions, or caps of helices and strands, ideal locations for citrullination. Based on the MS data presented here, and the strong homology amongst PAD isozymes, we hypothesize that this explanation likely holds true for all PADs.

# 5.2.5.1 The HEK-PAD2 citrullinome

Having established the utility of envoMatch and ionFinder for identifying Citcontaining peptides from a simple purified protein system, we next sought to eval-



Figure 5.13: Global analysis of the HEK293T-PAD2 citrullinome. (A) Comparison between the citrullinome identified by ionFinder and Lewallen *et al.*<sup>15</sup> (B) Kernel density estimate plot depicting the probability distribution of protein families, TRUE and FALSE, abundance based on cumulative intensity-based absolute quantification (iBAQ) values from fractionated samples. The iBAQ at the maximum density in the plot was  $7.45 \times 10^7$  for Cit-containing proteins and  $1.94 \times 10^7$  for non-Cit-containing proteins. Thus, the maximum probability density of protein iBAQ values was 3.8 times greater for Cit-containing proteins than non-Cit containing proteins. (C) Number of overlapping citrulline containing proteins and (D) peptides in this work, Lee *et al.*,<sup>16</sup> and Chaerkady *et al.*<sup>26</sup>

uate the assignment of Cit residues within a complex proteome. For these studies, we used a previously described HEK293T-PAD2 cell line<sup>15</sup> that stably overexpresses PAD2. Addition of  $Ca^{2+}$  and ionomycin to the cell growth medium leads to robust citrullination of hundreds of proteins. After quenching with EDTA, cells were harvested, and proteomes were extracted and proteolytically digested for MS. Based on our prior work identifying citrullinated peptides in NETs,<sup>25</sup> we expected that a two-dimensional peptide fractionation step prior to MS analysis, would provide improved coverage of low-abundant Cit peptides. Therefore, samples were segmented offline into 12 fractions on a C18 column at high pH, followed by on-line reverse-phase separation at neutral pH. The resulting MS data were analyzed with envoMatch and ionFinder, resulting in the identification of ~350 unique Cit-containing PSMs on over 220 proteins (Table 5A.2).

Employing biotin-PG, we previously identified proteins that are citrullinated in the HEK-PAD2 cell line upon treatment with Ca<sup>2+</sup> and ionomycin.<sup>15</sup> Comparing the data from the biotin-PG-enriched lysates (500 µg), and the unenriched lysate analyzed with envoMatch and ionFinder (50 µg), we found 53 common proteins amongst the two groups. Notably, ionFinder identified an additional 171 citrullinated proteins that were distinct from the biotin-PG dataset (Figure 5.13A). Differences between the two datasets are expected given the numerous variations in the analysis workflows. For example, the protein hits generated using biotin-PG are determined by the stoichiometry of the chemical reaction of the probe with citrullinated proteins. In addition, biotin-PG does not directly identify the sites of citrullination, instead protein identification is based on non-citrullinated tryptic peptides from citrullinated proteins that were modified by biotin-PG. Therefore, the abundance of MS-amenable tryptic peptides can further skew the protein identifications. By contrast, envoMatch and ionFinder directly identify the exact site of citrullination, without the need for biotin-PG labeling and enrichment. Here, peptide identifications are dependent on the ionization and fragmentation characterizations of the Cit-containing peptide. Additionally, due to the lack of an enrichment step, Cit identifications are also biased by the relative abundance of the citrullinated protein. In fact, the proteins identified as being citrullinated by ionFinder were, on average, over the 70<sup>th</sup> percentile in protein abundance (as assessed with cumulative intensity-based absolute quantification (iBAQ) values) (Figure 5.13B). We also compared the Cit identifications from the Lee et al<sup>16</sup> and the Chaerkady *et al*<sup>26</sup> studies to our HEK-PAD2 data. These three studies were similar in that there was no specific enrichment of Cit peptides, but differed in the data analysis workflows used for Cit identification. There was little overlap across the three studies (Figure 5.13C,D), likely due to the significant differences in the proteomes that were analyzed in these three studies (various human tissues, neutrophils, and HEK cells, respectively).

As in the PAD autocitrullination experiments, there was no clear consensus sequence for citrullination in HEK cells (Figure 5.14A). However, many of the proteins we identified as being citrullinated with envoMatch and ionFinder were nuclear proteins, with an overrepresentation of DNA and RNA-binding proteins (Figure 5.14B). In fact, 58% of the citrullinated proteins are annotated as localized to the nucleus based on information provided by Uniprot. In addition, 21% of citrullinated proteins are classified as nucleotide binding proteins (PANTHER: PC00171). This is unsurprising when one considers that Arg-rich proteins are often responsible for binding to the net negatively charged backbone of DNA and RNA.<sup>37</sup> One interesting example is the splicing factor U1 70K snRNP, which is citrullinated at Arg222. Arg222 is in a S/R/E rich region adjacent to the N-terminal RNA-binding motif, and many studies have shown that the surrounding Ser residues can be phosphorylated to regulate alternative splicing, cell death, and autoantigenicity.<sup>37-40</sup> Another intriguing example is eEF1, an EF-Tu homologue, which acts as an elongation factor that facilitates aminoacyl-tRNA binding into the A-site of ribosomes during translation. The region



Figure 5.14: (A) Sequence logo depicting the substrate specificity determinants of citrullination of PAD2 in HEK293T cells. (B) Cellular localization of the citrullinated proteins identified by ionFinder, demonstrating that many of the proteins are, as expected, nuclear. (C) Crystallographic depiction of IMPDH2 electrostatic distribution (PDB 1NF7) showing the location of Arg224 in the apo state of the enzyme.<sup>35,36</sup> Arg224 is in an exposed, and positively charged region, making it a target for citrullination by PAD2. When GTP is bound, Arg224 is no longer as accessible, as it lies in the nucleotide binding pocket near the dimer interface.

that is citrullinated (Arg96, 427, and 430) is part of a positively charged cluster of amino acids involved in binding tRNA. Lastly, the enzyme inosine-5'-monophosphate dehydratase 2 (IMPDH2) is citrullinated at Arg224. This region of IMPDH2 is involved in nucleotide binding, where Arg224 contributes to GTP binding in the holo conformation.<sup>41</sup> In the apo form, Arg224 is on a positively charged, readily accessible loop (Figure 5.14C) where this residue is far more exposed and available to act as a substrate for a PAD. Fascinatingly, mutations of this arginine residue in IMPDH1 are associated with retinopathy.<sup>42</sup>

## 5.2.6 Conclusions

Aberrant citrullination is linked to many human diseases including RA.<sup>5</sup> To gain a better understanding of the role of citrullination in disease pathogenesis, we used citrulline selective probes to identify proteins with elevated citrullination in RA serum, synovial fluid, and synovial tissue. In addition to identifying known PAD substrates such as vimentin, fibrin, and enolase, we also identified more than 150 novel citrullinated proteins. Among the most notable classes of novel proteins were SERPINs which we demonstrated to show lower activity when citrullinated.

Citrullination remains an understudied area of research. While many advances have been made over the last several decades, site-specific decoding of the citrullinome has remained challenging. Identifying sites of citrullination by mass spectrometry is plagued by false-positive annotations due to the small mass shift that results from the modification, as well as confounding isobaric Asn and Gln deamidations. Accurate assignment of Cit residues within peptides requires extensive mining of fragmentation spectra for the presence of neutral loss species that are unique to Cit. Previous studies used manual spectral matching to confirm sites of citrullination. Here, we automated this process through the development of a suite of computational tools, envoMatch and ionFinder, which can mine fragmentation data to unambiguously map the sites of citrullination. These tools are intended to be incorporated downstream of databasesearch algorithms, such as SEQUEST, Mascot, or MaxQuant, to further parse for high-confident assignments of Cit-containing peptides. In the recent Chaerkady et  $al \, \mathrm{study}^{26}$  a similar approach was taken, where MaxQuant data was parsed for hits that specifically displayed Cit-specific NL species. Our described workflow incorporates more stringent filtering than that available through MaxQuant by setting a dynamic NL cutoff to differentiate determining from artifactual NL species. Additionally, MaxQuant does not implement the isotopic envelope matching performed by envoMatch, which serves to further decrease false positives from the output and increase confidence in the identified hits. EnvoMatch and ionFinder were used to comprehensively map of the sites of PAD autocitrullination. Our data indicate that PADs prefer substrate Arg residues on flexible, surface-exposed regions of the protein, supporting the hypothesis that PADs are opportunistic in their substrate selection. Furthermore, many of these resulting Cit residues were in the dimer interface of the protein, suggesting that autocitrullination may therefore affect PAD dimerization. With these citrullination maps at our disposal, our future work is focused on discovering the molecular consequences of autocitrullination on enzyme structure, activity, and subcellular localization.

In addition to sites of autocitrullination on purified PAD proteins, envoMatch and ionFinder also identified a long list of cellular targets for PAD2. Upon activating cells with calcium and ionomycin, PAD2 re-localizes to the nucleus.<sup>43</sup> Our data confirms the nuclear localization of PAD2 because the majority of the identified sites of citrullination were found on nuclear proteins. Furthermore, many of the targets, nuclear or otherwise, are involved in nucleotide binding. Proteins which bind to nucleotides are often arginine-rich and have higher pI values to promote a favorable interface with the negatively charged sugar-phosphate backbone. These qualities make this family of proteins prime targets for the PADs. Future work entails mechanistic investigation of these targets to understand the functional consequences of citrullination in vitro and in cells using our recently described approach to site-specifically incorporate citrulline into proteins.<sup>30</sup>

In summary, ionFinder and envoMatch, automate the process of verifying the assignment of Cit annotations by standard database-search algorithms, primarily through the automated assignment of diagnostic neutral loss species. The primary strength of ionFinder and envoMatch is the speed of analysis, which far exceeds the throughput amenable by manual spectral matching. Additionally, the programs are flexible in the types of instruments, fragmentations modes, and database-search algorithms that are used to generate the input data. The primary limitation in the described ionFinder workflow is the limited coverage of citrullination events on low abundance proteins. Since the input data for ionFinder is generated from cell lysates that have not specifically been enriched for Cit-containing proteins or peptides, there is an expected bias toward identification of sites of citrullination from abundant proteins within the proteome. Further advances in peptide fractionation methodology, and the advent of instruments with faster scan times, will likely help to overcome this abundance bias, and allow for a deeper interrogation of citrullination events from complex biological samples. Lastly, although specifically designed for analysis of sites of citrullination, ionFinder and envoMatch are easily adapted to other PTMs that show diagnostic NL species. We believe that the customizable nature of ionFinder and envoMatch will provide a useful tool for proteomic analyses in general, by setting more stringent criteria for assignment of modified peptides.

#### 5.3 Materials and methods

# 5.3.1 Methods for biotin PG labeled samples

# 5.3.1.1 Biotin-PG labeling and proteomic analysis

Samples were labelled with biotin-PG similarly to previously described methods.<sup>14,15</sup> Briefly, samples (300 µg) were diluted in buffer (100 mM HEPES pH 7.6 to a final concentration of 1 µg µL<sup>-1</sup> in a reaction volume of 300 µL) and incubated with 20 % trichloroacetic acid (60 µL of 100 % TCA) and 0.5 mM biotin-PG (5 µL of 5 mM stock) for 30 min at 37 °C. After a 30 min incubation, the reaction was quenched with 60 µL of 0.1 M citrulline dissolved in 50 mM HEPES pH 7.6. Proteins were precipitated by placing the reaction mixtures on ice for 30 min followed by centrifugation (13,500 rpm, 15 min) at 4 °C. The supernatants were discarded and the protein pellet was washed twice with cold acetone and dried.

Protein pellets were then resuspended in 1.2% SDS in PBS, boiled for 10 min and sonicated for 12-15 min. Once dissolved, samples were diluted in PBS buffer (0.2% final SDS concentration) and incubated with streptavidin agarose slurry (170 µL) overnight at 4 °C, and a further 3 h at 25 °C. Streptavidin beads were then washed with PBS containing 0.2% SDS, with PBS alone (3 × 5 mL), and water (3 × 5 mL) in order to remove any unbound proteins. Streptavidin beads were heated in a buffer containing 500 µL of 6 M urea in PBS and 10 mM DTT (65 °C, 20 min) followed by iodoacetamide (20 mM) addition and further incubation for 30 min at 37 °C. The beads were pelleted by centrifugation (1, 400 × g for 3 min), resuspended in a premixed solution of 2 M urea 1 mM CaCl<sub>2</sub> and 2 µg trypsin in PBS and incubated overnight at 37 °C. The beads were then pelleted by centrifugation and the supernatant, containing the peptide digests was collected. The pellet was washed twice with water (50 µL) and the collected supernatant fractions were combined. Formic acid (15 µL) was added to the peptide mixture and samples were stored at -20 °C until MS analysis

# 5.3.1.2 LC-MS/MS and data processing

Mass Spectrometry was performed on a LTQ Orbitrap Discovery (Thermo Fisher) coupled to an Agilent 1200 series HPLC. Protein digests were prepared as described above and pressure loaded onto a 250 µm fused silica desalting column, packed with 4 cm Aqua C18 reverse phase resin (Phenomenex). Peptides were eluted onto a 100 µm fused silica biphasic column, packed with 4 cm strong cation exchange (Watman) and 10 cm C18 resins using a five-step multidimensional LC/LC-MS/MS protocol (MudPIT).<sup>44</sup> Each of the five runs begins with a salt push (0%, 25%, 50%, 80%,and 100%), followed by a gradient 0-100% buffer B in buffer A (buffer A: 95%water, 5% acetonitrile, 0.1% formic acid; buffer B: 20% water, 80% acetonitrile, 0.1% formic acid) with  $0.25 \ \mu L \ min^{-1}$  flow rate and  $2.75 \ kV$  spray voltage. One full MS1 scan (400-1800 m/z) was followed by 8 data dependent scans of the nth most intense ion. Peptides were assigned to MS2s using the SEQUEST<sup>45</sup> algorithm, searching against a human reverse-concatenated non-redundant protein database. A static modification was specified for cysteine residues (+57.0215 m/z, iodoacetamide alkylation). MS2 matches were assembled by protein and filtered using DTASelect  $2.0.^{46}$  Spectral counts for proteins identified in each sample were combined into a single file using custom in house software.

# 5.3.1.3 Statistical overrepresentation test of PANTHER protein class and GO biological process

PANTHER gene list analysis was used to determine which protein classes/biological processes were significantly overrepresented in the lists of proteins identified in SF and tissue samples obtained from Healthy and RA patients.<sup>27</sup> The PANTHER software determines the number of proteins which would be expected to be found for a specific category in the input protein list, given a reference list (complete human genome). The expected number of proteins in each category is then compared to the actual

number of protein in that category in the input dataset. Proteins with an average of greater than 10 spectral counts, and a P-value for the RA/healthy spectral count ratio less than 0.05 were included. A binomial test is used to determine the statistical significance the overrepresentation value calculated for each category, using a P-value cutoff of 0.05. The test does not make any assumptions about how the datasets were generated, and only assumes that the input and reference datasets were taken from the same protein population.

# 5.3.2 Methods for ionFinder experiments

# 5.3.2.1 Automated assignment of "true" citrullinated residues using ion-Finder

ionFinder was written in C++11. Results were exported from Scaffold in the form of a spectrum report and converted into a format suitable for ionFinder using a custom python script. After reading the required input files, ionFinder analyzes peptide-spectrum matches (PSM) in 3 major steps. In the first step, PSM assigned by PD are re-searched by ionFinder for a customized list of theoretical fragment ions. For each peptide, a list of masses for theoretical b and y ions are calculated. In addition, b and y -43.0058 Da NL ion masses are calculated for citrullination up to the multiplicity of citrulline residues on the peptide. In this work, the MS2 spectra were charge deconvoluted prior to searching with PD, so that only singly charged fragment ions were considered. Each MS2 spectrum was searched for theoretical fragment ions within a 10 ppm m/z tolerance. If multiple ions are found in the specified range, ties are broken by intensity. In cases where multiple fragments have the same predicted mass, all possible fragments are considered found if the ion is found in the MS2 spectrum. In the second analysis step, fragment ions which were identified in the spectrum are classified into 1 of 5 categories with respect to how they provide evidence supporting or contradicting the citrullination of a given peptide. These assignments were based on the decision tree shown in Figure 5.4. Unmodified b or y ions which do not contain any citrullines are classified as ambiguous (Amb); fragment ions which are citrullinated, but also contain N or Q will also be classified as Amb; b or y ions which contain Cit are classified as Cit determining (Det). NL ions which unambiguously belong to a Cit containing fragment are classified as Cit determining NL (DetNL); NL ions on multiply modified peptides which cannot unambiguously be assigned to 1 or both modifications are classified as ambiguous (Amb); if a NL is observed for an ion which does not contain Cit it is classified as artifact NL (ArtNL). ArtNL ions in effect function as decoy fragment ions because they would not be expected to be observed in the fragmentation spectrum in significant abundance. Once each fragment ion has been classified, a dynamic ion intensity cutoff is set such that the percentage of ArtNL ion intensities in the spectrum is less than 1 %. The sum of intensities for ion type t, above cutoff k is defined as:

$$A_t = \sum_{i=1}^n \begin{cases} \text{if } a_{i,t} \ge k, & a_{i,t} \\ \text{else}, & 0 \end{cases}$$
(5.1)

where  $a_{t,i}$  is the intensity for an ion *i* of type *t* (out of *n* ions of type *t*). The fraction of intensity from ArtNL ions out of all ion types is defined as:

$$P_{ArtNL} = \frac{A_{ArtNL}}{A_{ArtNL} + A_{AmbNL} + A_{DetNL} + A_{Det} + A_{Amb}}$$
(5.2)

k is set such that  $P_{ArtNL} \leq x$  where x is the user specified allowable percentage of intensity from ArtNL ions.

In the third analysis step, the number of ions observed in each of the 5 classes are used to assign each site of citrullination as "true", "likely", "ambiguous", or "false" according to the decision tree in (Figure 5.5). A classification of true, likely, ambiguous, or false is assigned to each site on multiply-citrullinated peptides individually, then the value assigned to the peptide is the lowest classification of all sites; i.e. a doubly citrullinated peptide will only be classified as "true", if both sites are classified as "true".

# 5.3.2.2 Automated verification of precursor isotopic envelopes with envoMatch

envoMatch is written in Python3 and utilizes routines from the Pyteomics<sup>47</sup> package for calculation of isotopic envelopes and mzXML and mzML file parsing. envoMatch compares the observed isotopic envelope for the precursor peptide with the theoretical envelope of the PSM peptide. For a peptide with n citrulline residues, theoretical envelopes of a peptide with  $\{n, n-1, \ldots, 0\}$  citrulline residues are calculated. An envelope similarity score comparing the observed envelope to each theoretical isotopic envelope is generated using a Pearson correlation. A peptide is considered to have a "true" site of citrullination if the best match was for the envelope with n cit residues and if the similarity score is greater than 0.8.

### 5.3.2.3 Software availability

ionFinder and envoMatch are open-source software and are distributed under MIT licenses. Source code and installation instructions can be found at their respective GitHub repositories. ionFinder (https://github.com/weerapana-lab/ionFinder), and envoMatch (https://github.com/weerapana-lab/envoMatch).

# 5.3.2.4 Expression and purification of PAD1,2, & 3

PAD1, PAD2, and PAD3 were expressed and purified similarly to previously described methods.<sup>33,48</sup> Briefly, E. coli BL21 (DE3) were transformed with a plasmid encoding a PAD protein with an N-terminal 10X-His tag. Single colonies were used to inoculate a 5 mL starter culture that was grown overnight in LB (0.1 mg mL<sup>-1</sup> ampicillin, 0.025 mg mL<sup>-1</sup> chloramphenicol) agitating at 37 °C. The starter culture (1 mL) was used to inoculate 1 L of pre-warmed LB media (0.1 mg mL<sup>-1</sup> ampicillin, 0.025 mg mL<sup>-1</sup>). Expression cultures were grown to an OD600 of 0.6-0.8. Flasks were cooled on ice for 20 min before expression was induced by the addition of 0.1 mM Isopropyl  $\beta$ -D-1-thiogalactopyranoside (IPTG). Cultures were agitated overnight at 16 °C and cell pellets were harvested via centrifugation and frozen in liquid nitrogen. Frozen cells pellets were stored at -80 °C.

To lyse the cells, pellets were thawed in a water bath at room temperature. Per each g of frozen cell pellet, 1 mL of lysis buffer (20 mM Tris pH 7.6, 400 mM NaCl, 5 mM MgCl<sub>2</sub>, 5 mM imidazole, 0.5 mM TCEP, 1 % Triton X-100) was added in addition to PierceTM EDTA-free protease inhibitor tablets. The slurry was agitated for 30 min after which the mixture was spiked with universal nuclease (Promega). The mixture was briefly sonicated before clarifying the lysate of insoluble debris. Soluble lysate was applied to Ni-NTA resin via gravity. The resin was washed thoroughly with a buffer consisting of 20 mM Tris pH 7.6, 400 mM NaCl, 20 mM imidazole, 0.5 mM TCEP, and 10 % (w/v) glycerol. PAD protein was eluted with wash buffer containing 250 mM imidazole. Purity was assessed via SDS-PAGE and Coomassie blue staining. The eluted protein was dialyzed overnight into a buffer of 20 mM Tris pH 7.6, 500 mM NaCl, 0.5 mM TCEP, and 10% (w/v) glycerol. Protein concentration was measured using the Bradford Assay.

### 5.3.2.5 Recombinant PAD4 expression and purification

PAD4 was expressed and purified as described previously<sup>49</sup> with the following alterations: after the GST tag was removed with Precision Protease, PAD4 protein was dialyzed overnight against a buffer consisting of 20 mM Tris pH 7.6, 100 mM NaCl, 1 mM EDTA, 10% (w/v) glycerol, and 2 mM DTT. This low-salt buffer caused full length PAD4 to precipitate, whereas the GST tag and GST-tagged PAD4 remained in solution. The precipitate was collected via centrifugation in a 50 mL Falcon tube and washed 2 X with 20 mL of the low-salt buffer. Finally, pure PAD4 was resolubilized gently in 3 mL of buffer consisting of 20 mM Tris pH 8.1, 500 mM NaCl, 1 mM EDTA, 10% (w/v) glycerol, and 2 mM DTT. Purity was assessed via SDS-PAGE and Coomassie blue staining. Protein concentration was measured using the Bradford Assay.

# 5.3.2.6 Preparation of purified proteins for tandem MS analysis

Purified PADs (30  $\mu$ g) were autocitrullinated for 1 h at 37 °C in 100  $\mu$ L of buffer consisting of 100 mM HEPES pH 7.6, 100 mM NaCl, 1 mM TCEP, and 5 mM CaCl<sub>2</sub>. Autocitrullination was stopped by the addition of trichloroacetic acid to a final concentration of 20% (w/v). Reactions were placed on ice for 1 h to promote protein precipitation. Sample tubes were centrifuged in a 4 °C tabletop centrifuge at top speed for 15 min. The precipitant was washed with 300  $\mu$ L cold acetone, which was then removed via pipette after another 10 min centrifugation at top speed. The pellets were air dried and then resuspended in a solution of 8 M urea in PBS (30  $\mu$ L). Once solubilized, 100 mM ammonium bicarbonate (70  $\mu$ L) was added to dilute the urea concentration to 2.4 M. The samples were then reduced by the addition of 1 M DTT (1.5 µL), and further denatured by placing them at 65 °C for 15 min. Reduced cysteines were then alkylated with iodoacetamide (12.5 mM final concentration) at 21 °C in the dark for 30 min. The urea concentration was then further diluted by the addition of PBS (120 µL). Both GluC and LysC (Promega) were used in combination (1:30 ratio, enzyme:substrate). Trypsin was used both in combination with GluC and alone (1:50, enzyme:substrate) in the presence of  $1 \text{ mM CaCl}_2$ . Digests were agitated by rotating at 37 °C overnight. Protein digestion was stopped by the addition of formic acid to 5 % (v/v). Peptides were then desalted using Pierce<sup>TM</sup> C18 spin columns and dried to a powder. After resuspension in water, the peptide concentration was assessed using a PierceTM quantitative fluorometric peptide assay.

# 5.3.2.7 HEK-PAD2 cell culture and lysate prep

HEK293T cells that stably express full length PAD2 (HEK-PAD2 cells)<sup>15</sup> were propagated according to previously described methods.<sup>15</sup> Briefly, cells were grown in DMEM supplemented with 10% fetal bovine serum (FBS) and 1% penicillin / streptomycin. The cultures were maintained in a humidified atmosphere with 5 % CO2 at 37 °C. Cellular citrullination was induced according to previously described methods.13 Briefly, cells were grown to passage 5 on T-175 plates until ~90% confluency. They were then treated with Ca<sup>2+</sup> (2 mM final concentration) and ionomycin (5  $\mu$ M final concentration) for 1 h. After incubation, cells were scraped, washed with cold PBS, and then snap-frozen. Pellets were stored at -80 °C until lysis. To lyse the cells, pellets were thawed on ice in 5 mL of buffer consisting of PBS, 5 mM EDTA, 1 % Triton X-100, and Pierce protease inhibitor. Lysis was achieved in an ice bath via iterative rounds of sonication using a Sonic Dismembrator (Fisher Scientific) fitted with a microtip (amplitude 10, 10x1 sec bursts with 30 sec of rest between cycles, 4 cycles total). Lysates were cleared by centrifugation, and the protein concentration assessed via the DC assay.

## 5.3.2.8 Preparation of HEK-PAD2 lysate for tandem MS analysis

Cell lysate (50 µg) was precipitated on ice for 30 min by the addition of trichloroacetic acid to 20 % (w/v). Sample tubes were centrifuged in a 4 °C tabletop centrifuge at top speed for 15 min. The precipitate was washed with 300 µL cold acetone, which was then removed via pipette after another 10 min centrifugation at top speed. The pellets were air dried and then resuspended in a solution of 8 M urea in PBS (30 µL). Once solubilized, 100 mM ammonium bicarbonate (70 µL) was added to dilute the urea concentration to 2.4 M. The samples were then reduced by the addition of 1 M DTT (1.5 µL), and further denatured by placing them at 65 °C for 15 min. Reduced cysteines were then alkylated with iodoacetamide (12.5 mM final concentration) at 21 °C in the dark for 30 min. The urea concentration was then further reduced by the addition of PBS (120 µL). Trypsin was used at a concentration of 1:50 (enzyme:substrate) in the presence of 1 mM CaCl<sub>2</sub>, and samples were proteolyzed overnight agitating by rotation at 37 °C. After digestion, tryptic peptides were separated on a ZORBAX extended C18 column (Agilent) over a 1 h, biphasic gradient from 0 % Buffer A (10 mM ammonium bicarbonate) to 100 % Buffer B (10 mM ammonium bicarbonate, 90 % acetonitrile). Fractions (0.5 mL) were collected in a 96 well plate and pooled by column (as opposed to by row) to yield 12 samples. The 12 samples of pooled fractions were dried in a vacuum concentrator and resuspended in 5 % acetonitrile/0.1 % trifluoroacetic acid.

### 5.3.2.9 Tandem MS

Peptide mixtures were separated on a NanoAcquity UPLC (Waters Corporation, Milford, MA) using an in-house packed pre-column (C18, 200 A, 5 µm, 2 cm) and an in-house packed analytical column (C18, 100 A, 5 µm, 2 cm) using the aqueous mobile phase of water + 0.1 % formic acid (A) and an organic mobile phase of acetonitrile + 0.1 % formic acid (B). Peptide trapping was operated at 4 min at 4 µL min<sup>-1</sup> µL/min and 5 % B. Then the peptides were transferred to the analytical column at the flow rate of 300 nL/min using the gradient of 5 % to 35 % B over 60 minutes, then 35 % to 60 % B for 30 min, followed by 15 min of high organic wash of 90 % B and 18 min of 5 % B for re-equilibration. Ions were then introduced to a Q Exactive hybrid quadrupole-Orbitrap (Thermo Fisher Scientific Inc., Waltham, MA) mass spectrometer, performing at positive electrospray ionization (ESI<sup>+</sup>) with the ionization voltage set at 1.4 kV. The full MS (MS1) data scan was acquired in a m/z scan range of 300-1750 Da, using an AGC target of  $1 \times 10^6$ , the maximum injection time of 30 ms and a resolution of 70000 at m/z 200. The MS/MS (MS2) data were acquired in data-dependent acquisition mode, performing MS/MS on the top 10 most abundant precursor ions using an AGC target of  $1 \times 10^5$ , a maximum injection time of 110 ms, an isolation width of 1.6 Da, a resolution of 17500 at m/z 200, and a collision energy of 27 volts using HCD.

#### 5.3.2.10 MS data analysis

The LC-MS/MS raw data were processed using Thermo Proteome Discoverer (PD) 2.1.1.21 (Thermo Fisher Scientific Inc.). The data obtained for the autocitrullinated PADs was searched against an E. coli SwissProt database FASTA file that included the sequences corresponding to the PAD proteins, and the HEK-PAD2 samples were searched against the Human SwissProt database. Both searches were performed using Mascot Server 2.6.2 (Matrix Science Ltd). The search parameters included searching specific protease cleavage sites with 2 maximum missed cleavages. Carbamidomethyl cysteine modifications were set as a fixed modification, while variable modifications included: peptide N-terminal acetylation, methionine oxidation, N-terminal glutamine to pyroglutamate, and citrullination of arginine. In addition to these modifications, the deamidation of Asn and Gln was set as variable modifications. A 10 ppm m/z cutoff was employed for the precursor mass and 0.05 Da for the fragment ion mass tolerance. Protein identification and validation was done using Scaffold 4.10.0 (Proteome Software Inc.), employing 1 % FDR threshold for peptides, and a 99 % probability threshold for protein identification, using Peptide Prophet and Protein Prophet algorithms.29, 30 The mass spectrometry proteomics data have been deposited to the ProteomeX change Consortium via the PRIDE31 partner repository with the dataset identifier PXD027358.

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## Appendix I

Supplemental figures



Figure 2A.1: MCS-TurboID-HA pDonor221 map.



Figure 2A.2: Workflow to generate MCS-TurboID-HA pDonor221.



Figure 2A.3: V5-TurboID-MCS pDonor221 map.



Figure 2A.4: Workflow to generate V5-TurboID-MCS pDonor221.



Figure 2A.5: Workflow to generate start-TurboID-HA pLenti control.



Figure 2A.6: Workflow to generate V5-TurboID-NCF1 pLenti.



Figure 2A.7: Workflow to generate NCF2-TurboID-HA pLenti.



Figure 2A.8: Workflow to generate NOXO1-TurboID-HA pLenti.



Figure 4A.1: Verification of SILAC labeling in MCF7 cells. (A) Light to heavy peptide ratios in unlabeled cell line. (B) Heavy to light peptide ratios in heavy labeled cell line.

## Appendix II

Mass spectrometry tables

**Table 2A.1:** Proteins which were selectively enriched in either the NCF1, NCF2, or NOXO1 bait datasets. The  $R_{L/H}$  from 2 technical replicates is are shown in the "Ratios" column. The median ratio is shown in the "Median ratios" column. The ratios (if identified) of the protein in the TurboID control dataset are shown in the "TurboID control" and "TID median" columns.

Accession	Protein	Description	Bait	Ratios	Median ratio	TurboID	TID
						control	median
O15381	NVL	NVL Nuclear valosin-containing protein-like	NCF1	20.00 20.00	20.00		
O43719	HTATSF1	HTATSF1 HIV Tat-specific factor 1	NCF1	20.00 20.00	20.00	13.65	13.65
P19878	NCF2	NCF2 Neutrophil cytosol factor 2	NCF1	20.00 20.00	20.00	0.98 1.18	1.08
P43487	RANBP1	RANBP1 Ran-specific GTPase-activating	NCF1	20.00 20.00	20.00		
		protein					
Q13148	TARDBP	TARDBP TAR DNA-binding protein 43	NCF1	20.00 20.00	20.00	1.28	1.28
P47756	CAPZB	CAPZB F-actin-capping protein subunit beta	NCF1	20.00 16.51	18.25	10.55	10.55
O43175	PHGDH	PHGDH D-3-phosphoglycerate dehydrogenase	NCF1	13.21 20.00	16.61		
P46777	RPL5	RPL5 60S ribosomal protein L5	NCF1	14.63 10.41	12.52	20.00 1.05	10.52
P11388	TOP2A	TOP2A DNA topoisomerase 2-alpha	NCF1	10.51 10.73	10.62	1.11 0.94	1.02
Q14315	FLNC	FLNC Filamin-C	NCF1	10.59 10.46	10.52	20	20.00
Q9NSE4	IARS2	IARS2 Isoleucine-tRNA ligase,	NCF1	8.50 10.47	9.49	0.75	0.75
Q9ULK4	MED23	MED23 Mediator of RNA polymerase II transcription subunit	NCF1	1.77 2.99	2.38	0.86	0.86
P14635	CCNB1	CCNB1 G2/mitotic-specific cvclin-B1	NCF1	2.97   1.53	2.25		
P10599	TXN	TXN Thioredoxin	NCF1	2.74 1.55	2.14	0.72 0.91	0.82
P01857	IGHG1	IGHG1 Immunoglobulin heavy constant	NCF2	20.00 20.00	20.00		
		gamma 1					
P01861	IGHG4	IGHG4 Immunoglobulin heavy constant	NCF2	20.00 20.00	20.00		
		gamma 4					
P02768	ALB	ALB Serum albumin	NCF2	20.00 20.00	20.00		
P26232	CTNNA2	CTNNA2 Catenin alpha-2	NCF2	20.00 20.00	20.00		
P47929	LGALS7	LGALS7 Galectin-7	NCF2	20.00 20.00	20.00		
P46736	BRCC3	BRCC3 Lys-63-specific deubiquitinase BRCC36	NCF2	20.00 10.31	15.16	0.95 1.08	1.01
O43303	CCP110	CCP110 Centriolar coiled-coil protein of 110	NCF2	10.49 10.48	10.49		
P31047	SEN	SEN 14.3.3 protein sigma	NCF2	4 6415 70	5.17		
P04702	HSPB1	HSPB1 Heat shock protein beta 1	NCF2	4 13 9 95	3 10		
P57791	PCBP3	PCBP3 Poly(rC) binding protoin 3	NOX01	20.00/20.00	20.00		
092614	MYO18A	MYO18A Unconventional myosin-XVIIIa	NOXOI	10.38 20.00	15.19		
P07204	THED	THBD Thrombomodulin	NOXOI	10.44 10.75	10.10	2 02/20 00	11.01
P46777	BPL5	BPL5 60S ribosomal protein L5	NOXO1	10.35 10.46	10.00	20.0011.05	10.52
09UM54	MYO6	MV06 Unconventional myosin-VI	NOX01	2 87 2 97	2.92	1 68 1 50	1 59
P62805	HIST1H4A	HIST1H4A Histone H4	NOXOI	2.80 1.82	2.32	1 34 0 45	0.90
P0CG47	UBB	UBB Polyubiquitin-B	NOX01	2 42 2 16	2.01	1 3	1 30
P0CG48	UBC	UBC Polyubiquitin-C	NOXOI	2.42 2.10	2.20	1.0	1.30
P62979	BPS27A	BPS27A Ubiquitin-40S ribosomal protein	NOXO1	2 42 2 16	2.29	1.3	1.30
1 02010	101 02111	S27a		2.12 2.10	2.20	1.0	1.00
P62987	UBA52	UBA52 Ubiquitin-60S ribosomal protein L40	NOXO1	2.42 2.16	2.29	1.3	1.30

**Table 2A.2:** Percent oxidation of proteins identified in each bait dataset. There is a row for each bait protein and peptide sequence. The mean percent oxidation for the peptide in the (-) CAT and (+) CAT datasets are shown on the same row. The "Different" column indicates whether the protein was selectively oxidized in either the (-) CAT, (+) CAT datasets.

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
O95372	LYPLA2	DLAILQC*HGELDPMVPVR	C171	NOXO1	25.38	0.00	(-) CAT	
O95373	IPO7	GIDQC*IPLFVEAALER	C757	NCF1	13.06	0.00	(-) CAT	
O95551-1	TDP2	C*GGLPNNIVDVWEFLGKPK	C273	NCF1	14.36	0.00	(-) CAT	
P00367	GLUDI	C*AVVDVPFGGAK	C172	NOXO1	16.43	0.00	(-) CAT	MOD_RES
P00533-1	EGFB	AC*GADSYEMEEDGVBK	C311	NCF1	81.52	60.56	(-) CAT	DISULFID
T 00000-1	Inche		C011	NGFA	100.02			DISULFID:
P05556-1	ITGBI	SNGLIC*GGNGVC*K	C568; C574	NCF2	100.00	78.90	(-) CAT	DISULFID
		EAMC*PGVSGEDSSLLLATOVEGOAT						
P14923	JUP	NLOR	C90	NCF1	18.71	5.71	(-) CAT	
P21333	FLNA	YWPQEAGEYAVHVLC*NSEDIR	C649	NCF1	29.24	13.73	(-) CAT	
P35221	CTNNA1	C*VIALQEK	C526	NCF2	21.80	0.00	(-) CAT	
P49792	RANBP2	VIPDFVC*QGGDITK	C3122	NCF1	13.69	0.00	(-) CAT	
Q03701	CEBPZ DVD1	ASHLLETLLC*K	C411 C200	NCF2	84.75	64.48	(-) CAT	
Q13855 014247-1	CTTN	HC*SOVDSVB	C112	NOX01	62.92	23.47	(-) CAT	
Q14241-1	HNRNPUL2	DLLVQQASQC*LSK	C518	NCF1	27.61	0.00	(-) CAT	
Q69YH5-1	CDCA2	SPATPAC*R	C315	NCF2	30.48	9.76	(-) CAT	
Q8IWI9-1	MGA	SAFC*SDKLDEYLENEGK	C823	NCF1	15.42	0.00	(-) CAT	
Q9HD45	TM9SF3	YFSLPFC*VGSK	C66	NCF2	40.63	17.09	(-) CAT	
Q9NQS7	INCENP	MGTTAPGPIHLLELC*DQK	C15	NCF1	20.09	0.00	(-) CAT	
Q9NRD9	DUOX1	AC*QLINR	C1533	NOXO1	43.79	0.00	(-) CAT	
Q9ULV4	DVD2	NDQU"YDDIR TTERREACVC*ELALREDLOLDR	C23	NCF2 NCF2	13.82	0.00	(-) CAT	
Q91446-2 O60716_1	CTNND1	I I SRPEAGVC"SLALPSDLQLDR NC*DCVPALVP	C33	NCF2	18.21	0.00	(-) CAI	
P04075	ALDOA	ALANSLAC*OGK	C339	NCF2	0.00	17.08	(+) CAT	
104075	ALDOA	ADANGDAO QGR	0333	10012	0.00	17.00	(+) OA1	MOD RES
P04406-1	GAPDH	VPTANVSVVDLTC*R	C247	NOXO1	9.91	25.63	(+) CAT	MOD_RES
P05023	ATP1A1	C*SSILLHGK	C518	NOXO1	0.00	19.30	(+) CAT	
P05023	ATP1A1	LIIVEGC*QR	C705	NCF2	6.92	24.23	(+) CAT	
P14618	PKM	NTGIIC*TIGPASR	C49	NCF2	0.00	16.53	(+) CAT	
P14923	JUP	VAAGVLC*ELAQDKEAADAIDAEGAS	C609	NCF2	5.48	21.12	(+) CAT	
P30050-1	BPL12	C*TCCEVCATSALAPK	C17	NOXO1	0.00	91.01	$(\pm)$ CAT	
P37802	TAGLN2	DGTVLC*ELINALYPEGOAPVKK	C63	NCF1	1.03	13.73	(+) CAT	
P39023	RPL3	VAC*IGAWHPAR	C253	NCF1	8.51	25.13	(+) CAT	
P62244	RPS15A	QVLIRPC*SK	C30	NCF2	0.00	100.00	(+) CAT	
P62280	RPS11	NMSVHLSPC*FR	C116	NCF2	0.00	14.79	(+) CAT	
P62879	GNB2	TFVSGAC*DASIK	C204	NCF2	0.00	21.31	(+) CAT	
Q13470-2	TNK1 FIF2M	LPRPPLC*SR	C348	NCF1	0.00	29.91	(+) CAT	
Q7L2H7	AUNAKO	YTVYC*SLIK VDDEC*SVEDSV	C125	NOXOI	0.00	100.00	(+) CAT	
Q81VF 2-3	KIAA1599	C*SLHSASPASVB	C4879	NOYO1	73.22	20.31	(+) CAT	
Q91 200-2 Q9Y624	F11B	LVC*YNNK	C74	NOX01	0.00	16.82	(+) CAT	DISULFID
401021	KIAA1598		0.11	Nonor	100.00	10.02	(1) 0111	21001112
AUMZ66	SHTN1	VTFQPPSSIGC*R	C565	NOXOI	100.00		same	
F2Z333	ENDC10	SPARGFRC*QAPGC*VLHAPAGR	C64;C69	NCF2	100.00	100.00	same	
O00148	DDX39A	C*MALAOLLVEONFPAIAIHR	C299	NCF1		100.00	same	
O00148	DDX39A	C*MALAQLLVEQNFPAIAIHR	C299	NCF2		100.00	same	
O00151	PDLIM1	C*GTGIVGVFVK	C263	NCF1		13.80	same	METAL
O00151	PDLIM1	C*GTGIVGVFVK	C263	NCF2		9.19	same	METAL
O00213	APBB1	SSVAVNNC*IR	C397	NCF1	0.00		same	
O00213	APBBI	NIATSLHEIC*SK	C499	NCF1	0.00	0.00	same	
000443	NDUEA4	SIANC"HLER LAIENDDVC*WDD	C317	NCF1	29.19		same	
O00485 O00505	KPNA3	DOVEYLVOONVIPPEC*NLLSVK	C417	NCF1	0.00	0.00	same	
O00515	LAD1	GLPC*TELFVAPVGVASK	C428	NCF1	0.00	0100	same	
O00515	LAD1	GLPC*TELFVAPVGVASK	C428	NCF2	0.00		same	
O00541-1	PES1	DLDDALSMC*FLFSTFPR	C141	NCF1	0.00		same	
O00541-1	PES1	C*HVQTIQLC*R	C153;C161	NCF1	0.00	0.00	same	
O00567	NOP56	IINDNATYC*R	C211	NCF1	0.00	0.00	same	
O00567	NOP56	IINDNATYC*R	C211	NCF2	0.00	0.00	same	
000567	NOP56	DI MAC*AOTCSCK	C211	NOX01	0.00	0.00	same	
000571	DDX3X DDX3X	VBPC*VVVGGADIGOOIB	C223	NCF1	14.68	25.67	same	
O00571	DDX3X	VRPC*VVYGGADIGQQIR	C298	NCF2	11.00	0.00	same	
O00571	DDX3X	GC*HLLVATPGR	C317	NCF1	0.00	0.00	same	
O00571	DDX3X	IGLDFC*K	C341	NCF1	0.00	0.00	same	
O00571	DDX3X	IGLDFC*K	C341	NCF2	0.00	0.00	same	
O00571	DDX3X	IGLDFC*K	C341	NOXO1	0.00	0.00	same	
014617-1	AP3D1	LEDPDPGVQSAAVNVIC*ELAR	C208	NCF1	0.00	0.00	same	
014017-1	AP3D1 AP2D1	LEDEDEGVQSAAVNVIC*ΕΙΑΚ LEDEDEGVOSAAVNVIC*ΕΙΑΡ	C208	NOF2	0.00	0.00	same	
014617-1	AP3D1	ASC*ILQLVK	C574	NCF1	0.00	37.80	same	
014672	ADAM10	TITLQPGSPC*NDFR	C632	NCF2	100.00	100.00	same	DISULFID
O14672	ADAM10	TITLQPGSPC*NDFR	C632	NOXO1	100.00	100.00	same	DISULFID
O14684	PTGES	HGGPQYC*R	C59	NCF1	0.00		same	
O14684	PTGES	HGGPQYC*R	C59	NCF2	0.00	0.00	same	
		Continued	on next p	bage				

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Table $Z$	A.z -	continued	from	previous	page

OLSEAD         NCFI         D.000         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
01586-1         AVKRUPS         LLXSEGAPT/TEK         C334         NCF1         0.00         same           01586-5         NKPF         LCVLSTAC-EVR         CA12         NCF1         0.00         0.00         same           01586-5         NKPF         LCVLSTAC-EVR         CA12         NCF1         0.00         0.00         same           01586-5         NCENTRACE         CA12         NCF1         0.00         0.00         same           01586-6         NCENTRACE         CA12         NCF1         0.00         same           01586-7         NCENTRACE         CA12         NCF1         0.00         same           01586-8         HESSENVECTR         CA12         NCF1         0.00         same           01586-7         HESSENVECTR         CA22         NCK01         0.00         same           04114         DIKAS         FEDCTSAK         CA22         NCK01         0.00         same           04312-1         DIKAS         FEDCTSAK         CA220         NCK01         0.00         same           04312-1         DIKAS         CHATTRACE         CA220         NCK01         0.00         same           043200         SATTL         NCAATTR	O14776-1	TCERG1	YLVLDC*VPEER	C1062	NCF1	0.00	0.00	same	
ÓLSZE         NKRP         LITDGVAG-EVR         CAL2         NCP1         95.78         masses           ÓLSZE         NKRP         LIDGVAG-EVR         C.242         NCP1         0.00         0.00         escare           ÓLSZE         SURFI         LCUESTFLEDCIR         C.22         NCP2         0.00         0.00         escare           ÓLSZE         SURFI         LCUESTFLEDCIR         C.22         NCP2         0.00         escare           ÓLSZE         SURFI         LCUESTFLEDCIR         C.23         NCP1         0.00         escare           ÓLSZE         SURFI         LCUESTFLEDCIR         C.230         NCP1         0.00         escare           ÓLSZE         SURFI         LCUESTFLEDCIR         C.230         NCP1         0.00         escare           ÓLSZE         TOTTÓLKFEWUXK         C.730         NCP1         0.00         escare           ÓLSZE         SARTI         CALVENTRATESTER         C.260         NCP1         0.00         escare           ÓLSZE         SARTI         CALVENTRATESTER         C.260         NCP1         0.00         escare           ÓLSZE         SARTI         CALVENTRATESTER         C.260         NCP2         0.00	O15084-1	ANKRD28	LLVSHGAEVTC*K	C234	NCF1		0.00	same	
C12222         NRTHP         LLTPSYLC=PWR         C222         NCX01         000.00         mass           C12200-13         StR14         LC-LESTFLEDCIBL         C.22         NCX01         0.00.00         mass           C12300-13         StR14         LC-LESTFLEDCIBL         C.22         NCP1         0.00         mass           C12400         NCP1         C.00         0.00         mass         mass           C1240         NCP1         C.00         0.00         mass           C1241         DIRGS         PLESTSK         C.226         NCP1         0.00         0.00         mass           C1241         DIRGS         PLESTSK         C.226         NCP1         0.00         0.00         mass           C1241         DIRGS         PLESTSK         C.200         NCP1         0.00         0.00         mass           C1242         SARTI         CANTANATESPETTR         C.200         NCP1         0.00         0.00         mass           C12200         SARTI         CANTANATESPETTR         C.200         NCP1         0.00         mass           C12200         SARTI         KOATTANATESPETTR         C.200         NCP1         0.00         mass	015226	NKDE	LITDOVAC*EVP	C242	NCE1	26 76	0.00	same	
01326.         NUTP         LeftEPTEPDE         Cost         NUCP         1000         0.00         same           01340.1         SUBPL         LeftEPTERIG         C13         NUCP         0.00         0.00         same           01340.1         SUBPL         LeftEPTERIG         C13         NUCP         0.00         same           01341.3         DIRIS         FEDEVESAR         C126         NUCP         0.00         same           0341.3         DIRIS         FEDEVESAR         C226         NUCP         0.00         same           0341.3         DIRIS         FUNCTSSAR         C226         NUCP         0.00         same           0411.2         FIRTH         C'MULKONINK         C500         NUCP         0.00         same           0411.2         FIRTH         C'MULKONINK         C500         NUCP         0.00         same           042200         SARTI         CAUPARATERC'R         C560         NUCP         0.00         same           042200         SARTI         CAUPARATERC'R         C565         NUCP         0.00         same           042200         SARTI         CAUPARATERC'R         C151         NUCP         0.00         same <td>015220</td> <td>NKRF</td> <td>LIDGIACIEVA</td> <td>0242</td> <td>NOFT</td> <td>20.70</td> <td></td> <td>same</td> <td></td>	015220	NKRF	LIDGIACIEVA	0242	NOFT	20.70		same	
013201.         SUB54         LCTLETTLEDER         C32         NCPb         0.00         0.00         manual           01540         ARCCS         MERGEOC'R         CL250         NCPb         0.00         manual           01540         ARCCS         MERGEOC'R         CL260         NCPb         0.00         manual           01541         DEDCS         MERGEOC'R         CL260         NCPb         0.00         manual           01541         DEDCS         MERGEOC'R         CL260         NCX01         0.00         manual           041143         DENTA         TCTLENER         CC200         NCX01         0.00         manual           041143         DENTA         TCTLENER         CC300         NCX01         0.00         manual           041143         DENTA         TCTLENER         CC300         NCX01         0.00         manual           041143         DENTA         TCTLENER         CC300         NCX01         0.00         manual           041200         SARTI         RCANARTERCER         CC300         NCX01         0.00         manual           042200         SARTI         RCANARTERCER         CC30         NCP1         0.00         manual	O15226	NKRF	LLTDGYAC*EVR	C242	NOXO1	100.00		same	
013904         SURF4         LCPLSTPLENDIGR         C12         NCP2         0.00         same           01404         DECS         VIELENCET         C1200         NCP1         0.00         name           04144         DIK15         FEDCTSAK         C220         NCP1         0.00         name           04144         DIK15         FEDCTSAK         C220         NCP1         0.00         name           04144         DIK15         FEDCTSAK         C220         NCP1         0.00         name           04141         DIK15         FEDCTSAK         C220         NCP1         0.00         0.00         name           04141         DIK15         FEDCTSAK         C700         NCP1         0.00         0.00         name           04124         DIK16         CAUPANISARCAR         C700         NCP1         0.00         name         name           04230         SARTI         CAUPANISARCAR         C700         NCP1         0.00         name         name           04230         SARTI         RCAUPANISARCAR         C741         NCP1         0.00         name           04230         SARTI         RCAUPANISARCAR         C714         NCP1	O15260-1	SURF4	LC*LISTFLEDGIR	C32	NCF1	0.00	0.00	same	
01540         ABCC5         VIELEGGCTIK         C126         NCT1         0.00         same           01540         ABCC5         HESNIVERN         C226         NCT2         0.00         same           04141         DIR15         FEDCTSAR         C226         NCT2         0.00         same           04141         DIR15         FEDCTSAR         C226         NCT2         0.00         same           04141         DIR16         FEDCTSAR         C226         NCT1         0.00         0.00         same           04141         DIR16         FEDCTSAR         C269         NCT1         0.00         0.00         same           04142         DIR16         CALVENATESCTR         C369         NCT1         0.00         same           04230         SARTH         CALVENATESCTR         C360         NCT1         100.00         same           04230         SARTH         SCALVENATESCTR         C360         NCP2         10.00         100.00         same           04230         SARTH         SCALVENATESCTR         C364         NCP2         10.00         10.00         same           04230         SARTH         SCALVENATESCTR         C364         NCP2	O15260-1	SURF4	LC*LISTFLEDGIR	C32	NCF2		0.00	same	
Olsake         ALCCS         HESEDYNC'R         Class         NOXOL         0.00         mane           Olsake         DISTS         FEDC'SSAK         C228         NOXOL         0.00         same           Oblake         CHARTENER         C100         NOXOL         0.00         same           Oblake         CHARTENER         C100         NOXOL         0.00         same           Oblake         SATTI         CAATPAATSEC'R         C260         NOXOL         0.00         same           OL320         SATTI         CLARTPAATSEC'R         C260         NOXOL         0.00         same           OL320         SATTI         CLARTPAATSEC'R         C260         NOCP         1.00.00         same           OL320         SATTI         CLARTPAATSEC'R         C260         NOCP         1.00.00         same           OL320         SATTI <td< td=""><td>015440</td><td>ABCC5</td><td>IVELSCCC*IK</td><td>C1250</td><td>NCF1</td><td></td><td>0.00</td><td>samo</td><td></td></td<>	015440	ABCC5	IVELSCCC*IK	C1250	NCF1		0.00	samo	
OLDER         ALBESTS         PERCUPENAL         CODE         NACCH         DOB         D.00         D.00         Baser           OLDER         DEDUCTSAL         FEDUCTSAL         C.226         NCX01         D.00         Baser           OLDER         DETUCTSAL         FEDUCTSAL         C.226         NCX01         D.00         Baser           OLDER         DETUCTSAL         C.226         NCX01         D.00         Baser           OLDER         FERT         C'SINTELORILL         C.260         NCX01         D.00         Baser           OLDER         FERT         C'SINTELORILL         C.260         NCX01         D.00         Baser           OLDER         SARTI         KCALTPANTSECTR         C.260         NCP1         100.00         Baser           OLDER         SARTI         KCALTPANTSECTR         C.260         NCP1         100.00         Baser           OLDER         SARTI         SLESAVCCTEDK         C.443         NCP1         0.00         Baser           OLDER         SLESAVCCTEDK         C.443         NCP1         0.00         Baser           OLDER         SLESAVCCTEDK         C.444         NCP1         0.00         Baser           OL	015440	ADOOS	LEGODUNCED	C1250	NOVOI	0.00	0.00	same	
Oddital         DIRALS         FEDC**SAK         CC22         NCTS         0.00         annee           043143         DIRALS         FEDC**SAK         C226         NCNO1         0.00         annee           043143         DIRALS         TC*TURKTEWUXK         C750         NCR1         0.00         annee           043143         DIRALS         TC*TURKTEWUXK         C750         NCR1         0.00         annee           043143         DIRALS         TC*TURKTEWUXK         C750         NCR1         0.00         annee           043200         SARTI         GALVEXATSATERC*R         C560         NCR1         0.00         annee           043200         SARTI         GALVEXATSATERC*R         C564         NCR1         0.00         annee           043200         SARTI         GALVEXALLC*QNK         C644         NCR1         10.00         annee           043200         SARTI         SLPANYC*TEEN         C568         NCR1         10.00         annee           043201         SARTI         SLPANYC*TEEN         C744         NCR1         10.00         annee           043201         FRANK         LEDC*TPQR         C143         NCR1         10.00         annee	015440	ABCC5	HESSDVNC*R	C146	NOXOI	0.00		same	
Odd3183         DHX110         PEDC*SSAK         CC200         NCP2         0.00         same           Odd31841         DHX10         PCTPENAN         CC200         NCP1         0.00         comme           Odd31841         DHX10         PCTPENAN         CC200         NCP1         0.00         comme           Odd31841         DHX10         PCTPENAN         CC200         NCP1         0.00         comme           Odd3200         SART1         KGAVYFNATSETC*R         CC300         NCP1         0.00         comme           Odd2200         SART1         KGAVYFNATSETC*R         CC300         NCP1         0.00         comme           Odd2200         SART1         SLPAYCYELEX         CC40         NCP1         0.00         comme           Odd2200         SART1         SLPAYCYELEX         CC42         NCP1         0.00         comme           Odd2200         SART1         SLPAYCYELEX         CC42         NCP1         0.00         comme           Odd2300         SART1         SLPAYCYELEX         CC42         NCP1         0.00         comme           Odd2301         SLPAYCYELEX         CC42         NCP1         0.00         comme           Odd30	O43143	DHX15	FEDC*SSAK	C226	NCF1	0.00	0.00	same	
Odilation         DIRXIS         FEDC*SAR         C220         NXXC1         0.00         same           Odilation         DRNN         TCP101000         0.00         anne           Odilation         DRNN         TCP101000         0.00         anne           Odilation         DRNN         TCP101000         0.00         anne           Odilation         SARTI         GALVERAISECT         C560         NCC1         0.00         anne           Odilation         SARTI         KCALVERAISECT         C560         NCC1         0.00         anne           Odilation         GLASO         NCC1         0.00         0.00         anne           Odilation         NCC1         0.00         0.00         anne	O43143	DHX15	FEDC*SSAK	C226	NCF2		0.00	same	
Cold all         DEX.IS         TC*TEDIALEPWAYA         CTS0         NCF1         0.00         name           Cold B172.1         PRFH         CTINFLECHLK         CS90         NOAD         0.00         same           Cold B20         PRFH         CTINFLECHLK         CS90         NOAD         0.00         same           Cold B20         SARTI         KGAVPN ATSEPC"R         CS00         NCF2         100.00         same           Cold B200         SARTI         KGAVPN ATSEPC"R         CS00         NCF2         100.00         same           Cold B200         SARTI         KGAVPN ATSEPC"R         CS00         NCF1         0.00         same           Cold B200         SARTI         SLPSAVCTEEX         CF43         NCF1         0.00         same           Cold B31         EDFAVCTEEX         CF43         NCF1         0.00         same           Cold B41         EDFAVCTEEX         CF44         NCF1         0.00         same           Cold B41         EDFAVCTEEX         CF44         NCF1         0.00         same           Cold B41         EDFAVCTEEX         CF44         NCF1         0.00         same           Cold B41         EDFAVCTEX         CF44 </td <td>043143</td> <td>DHX15</td> <td>FEDC*SSAK</td> <td>C226</td> <td>NOXO1</td> <td></td> <td>0.00</td> <td>samo</td> <td></td>	043143	DHX15	FEDC*SSAK	C226	NOXO1		0.00	samo	
041173         DFEPS         LTELELECTIC K         CODE         0.00         same           0411721         PITP4         CTIMPLECHLK         C399         NCC1         0.00         same           042200         SARTI         GARPTANTSETCTR         C589         NCC1         0.00         same           042300         SARTI         KGAVTYNATSETCTR         C580         NCC1         0.00         same           042300         SARTI         KGAVTYNATSETCTR         C580         NCC1         0.00         same           042300         SARTI         KGAVTYNATSETCTR         C580         NCC1         100.00         same           042300         SARTI         KGAVTYNATSETCTR         C580         NCC1         100.00         same           042300         SARTI         SLPANYCENK         C643         NCC1         100.00         same           043151         MGAN         LDCYLRCFR         C335         NCC1         100.00         same           04385         PATAN         LEDCTTPR         C143         NCP1         100.00         same           04385         TSTANA         LEDCTTPR         C143         NCP1         10.00         same           04387	040140	DIIX15	TEDO SSAR mommune	0220	NOROI	0.00	0.00	same	
04112-1         PHPF1         C'HRFERIUR         CB99         NCF1         0.00         same           04230         SARTI         GAVENTSTEEC'R         CB00         NCF1         0.00         same           04230         SARTI         KGAVENTSTEEC'R         CB00         NCF1         0.00         same           04230         SARTI         GLAALLICYENTSTEEC'R         CB00         NCF1         0.00         same           04230         SARTI         GLAALLICYENTSTEEC'R         CB00         NCF1         0.00         same           04230         SARTI         GLAALLICYENTSTEEC'R         CB45         NCF1         0.00         same           04230         SARTI         GLAALLICYENTSTEEC'R         CB45         NCF1         0.00         100.00         same           04330         PRIPS         VLGFERTYR         CB45         NCF1         0.00         100.00         same           04381         HUKAN         LEDCTTRR         CB45         NCF1         10.00         same           04382         TERAM         LEDCTTRR         CB45         NCF1         0.00         10.00         same           04382         TERAM         LEDCTTRR         CB45         NCF1 <td>043143</td> <td>DHX15</td> <td>ICTIDIKPEWLVK</td> <td>0750</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	043143	DHX15	ICTIDIKPEWLVK	0750	NCF1	0.00	0.00	same	
04172-1         PRP1         C'IMPELCENTRA         CC309         NOX01         0.00         same           042200         SARTI         GALVENATESTECT         C560         NCT1         100.00         ince           042200         SARTI         GALVENATESTECT         C560         NCT2         100.00         ince           042200         SARTI         KLAVENATESTECT         C560         NCT2         100.00         ince           042200         SARTI         SLPSAVYC'IEBK         C563         NCF1         0.00         0.00         ince           042200         SARTI         SLPSAVYC'IEBK         C564         NCF1         0.00         0.00         ince           042200         SARTI         SLPSAVYC'IEBK         C483         NCF1         100.00         ince         ince           042301         SARTI         SLPSAVYC'IEBK         C183         NCF1         100.00         ince         ince           04380-1         EPRPIN         VLATESTEPTR         C183         NCF1         100.00         ince         ince           04380-1         ENSTAND         LEDC'TPRR         C183         NCP1         100.00         ince         ince           04380-1 <t< td=""><td>O43172-1</td><td>PRPF4</td><td>C*IMFLEGHLK</td><td>C399</td><td>NCF1</td><td>0.00</td><td></td><td>same</td><td></td></t<>	O43172-1	PRPF4	C*IMFLEGHLK	C399	NCF1	0.00		same	
Odd200         SARTI         CALTERNATESECTR         C560         NCP1         0.00         exame           042300         SARTI         KGALVENATESECTR         C560         NCATI         0.00         exame           042300         SARTI         KGALVENATESECTR         C560         NCATI         0.00         exame           042300         SARTI         KGALVENATESECTR         C560         NCATI         0.00         exame           042300         SARTI         KGALALLCQNK         C647         NCTI         0.00         exame           042301         SARTI         KGALALLCQNK         C647         NCTI         0.00         exame           043305         PEPTS         VLCEPTYCK         C658         NCFI         100.00         exame           04367         TSPAM         LEDCYTPQR         C183         NCFI         100.00         exame           04367         TSPAM         LEDCYTPQR         C183         NCCI         100.00         exame           04367         TSPAM         LEDCYTPQR         C183         NCCI         100.00         exame           043687         TSPAM         LEDCYTPQR         C183         NCCI         100.00         exame	O43172-1	PRPF4	C*IMFLEGHLK	C399	NOXO1		0.00	same	
0.43200         SART         KGATUFYANTSEPC'R         C560         NCF2         100.00         100.00         same           0.43200         SART         KGATUFYANTSEPC'R         C560         NCF2         0.00         0.00.00         same           0.43200         SART         KGATUFYANTSEPC'R         C560         NCK21         0.00         0.00         same           0.43200         SART         SLENAVC*UEDR         C674         NCF2         0.00         0.00         same           0.43200         SART         SLENAVC*UEDR         C674         NCF2         0.00         same           0.43201         SLENAVC*UEDR         C674         NCF2         0.00         same           0.43201         SLENAVC*UEDR         C648         NCF1         0.00         100.00         same           0.43207         TSEANG         EEDC*TPQR         C488         NCF1         0.00         same         same           0.4327         TSEANG         EEDC*TPQR         C183         NCK01         1.00         same         same           0.4327         TSEANG         EEDC*TPQR         C183         NCK01         1.00         same         same         same           0.4327 <td>O43290</td> <td>SABT1</td> <td>GAIVENATSEEC*B</td> <td>C560</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	O43290	SABT1	GAIVENATSEEC*B	C560	NCF1	0.00	0.00	same	
04330         SARTI KGAMPENATELC'R         C660         NCF2         100.00         same           04320         SARTI KGAMPENATELC'R         C660         NCK01         100.00         same           04320         SARTI GLAAAILG'QK         C643         NCK1         0.00         same           04320         SARTI GLAAAILG'QK         C643         NCF2         0.00         same           04320         SARTI GLAAAILG'QK         C643         NCF2         0.00         same           04330         SARTI GLAAAILG'QK         C653         NCF1         1.00.00         100.00         same           04381         WCAM LLOCYLC'K         C133         NCK01         100.00         same         same           04381         WCAM LLOCYLC'K         C183         NCK01         100.00         same           04387         TSRAM         LEPC'TPQR         C183         NCK01         100.00         same           04387         TSRAM         LEPC'TPQR         C144         NCF1         0.00         same           04387         TSRAM         LEPC'TPQR         C339         NCF1         0.00         same           04387         TSRAM         LEPC'TPQR         C144         NCF1<	040200	CADE1		CECO	NODI	100.00	0.00	Same	
042300         SART         KGANPENATSEC*R         C560         NCF1         100.00         isome           042300         SART         SLFANTC/FEDK         C674         NCF1         0.00         isome           042300         SART         SLFANTC/FEDK         C674         NCF1         0.00         isome           042301         SLFANTC/FEDK         C674         NCF1         0.00         isome           042301         SLFANTC/FEDK         C675         NCF1         100.00         isome           043811         FILL         UCVEHINTFYR         C685         NCF1         100.00         isome           043811         FILL         CVEHINTFYR         C685         NCF1         100.00         isome           043867         TSFANG         LEPC-TPQR         C138         NCP1         100.00         isome           043752         MYOB         LVASYVAXVC*GK         C129         NC72         0.00         same           043754         MYOB         LVASYVAXVC*GK         C129         NC72         0.00         same           043754         MYOB         LVASYVAVC*GK         C14         NC72         0.00         same           04379         LVASITTC*SAMAC	043290	SARII	KGAIVFNAISEFU"K	0560	NOFI	100.00		same	
043200         SARTI         KGAUTENTSERC'R         Ch60         NXCP1         0.00         same           043200         SARTI         GLANTLICYCK         C0474         NXCP2         0.00         0.00         same           043200         SARTI         GLANTLICYCK         C074         NXCP2         0.00         same           043200         SARTI         GLANTLICYCK         C355         NXCP1         100.00         100.00         same           043305         FPP3         VLASPETYTQR         C265         NXCP1         100.00         100.00         same           04357         TSPANS         LEDCTTQR         C383         NXCP1         100.00         100.00         same           04357         TSPANS         LEDCTTQR         C383         NXCP1         100.00         100.00         same           04357         TSPANS         LEDCTTQR         C383         NXCN1         0.00         same           04357         TSPANS         LEDCTTQR         C383         NXCN1         0.00         same           04357         TSPANS         LEDCTTPQR         C141         NCF1         0.00         same           043335         DIX16         TOMESITYTPCYSK	O43290	SART1	KGAIVFNATSEFC*R	C560	NCF2	100.00	100.00	same	
042300         SART         CLAAALL/CTQNK         C045         NCF1         0.00         same           042300         SART         SLSANCTEDK         C047         NCF1         0.00         0.00         same           04380         SRT         SLSANCTEDK         C37         NCF1         1.00         0.00         same           04380         SRT         SLSANCTEDK         C38         NCF1         1.00         0.00         same           04381         MCAM         LIGCHTC'R         C388         NCF1         0.00         1.00         same           043907         TSTAN         LECCTTCQR         C188         NCF2         0.00         1.00.00         same           043957         TSTAN         LECCTTCQR         C188         NCF2         0.00         0.00         same           043957         TSTAN         LECCTTCQR         C184         NCF2         0.00         0.00         same           043951         DLX16         TCMESLTYTTC'SK         C714         NCF2         0.00         same           040231         DLX16         TCMESLTYTTC'SK         C714         NCF2         0.00         same           040241         SMARCA         SVC	O43290	SART1	KGAIVFNATSEFC*R	C560	NOXO1		100.00	same	
0.13200         SART         SLPSAVTC*IEDK         COF4         NCF1         0.000         same           0.13200         SART         SLPSAVTC*IEDK         COF4         NCF2         0.000         same           0.43304         PRP53         VLCFRSFTVUTALANC*VCK         C37         NCF1         1.0.00         1.0.00         same           0.43305         PRP51L2         VCVERHTFYR         C383         NCF1         1.0.00         1.00.00         same           0.43907         TSHAKE         LEDC*TTQR         C383         NCF2         1.00.00         same           0.43907         TSHAKE         LEDC*TTQR         C183         NCF2         1.0.00         same           0.439052         TSHAKE         LEDC*TTQR         C183         NCF2         1.0.00         same           0.437052         TSHAKE         LEDC*TTQR         C184         NCF1         1.0.00         same           0.437052         TSHAKE         LEDC*TTQR         C128         NCF1         1.0.00         same           0.437052         TSHAKE         TCHTSTTPC*SK         C714         NCF1         0.00         same           0.437054         TSHAKE         TSTTTC*SK         C714         NCF1 </td <td>043200</td> <td>SART1</td> <td>GLAAALLLC*ONK</td> <td>C645</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>samo</td> <td></td>	043200	SART1	GLAAALLLC*ONK	C645	NCF1	0.00	0.00	samo	
043300         3ARD 1         215 PS WY-THEOR         CV73         NCF1         0.000         same           043305         PHF13         ULEPSIPTY-VLALCY'GK         C36         NCF1         10.000         0.00         same           04381         MGAM         LLGGVLEYK         C365         NCF1         10.000         0.00         same           04381         MGAM         LLGGVLEYK         C365         NCF1         10.000         100.00         same           043857         TSHANN         LEDC'TT'QR         C383         NCF2         100.00         100.00         same           043857         TSHANN         LEDC'TT'QR         C383         NCF2         0.00         1.00         same           043857         TSHANN         LEDC'TT'QR         C129         NCF2         0.00         0.00         same           043854         TSHANN         LEDC'TT'QR         C144         NCF1         0.00         0.00         same           043854         TSHANN         LEDC'TT'QR         C714         NCF2         0.00         0.00         same           043854         TSHANN         LEDC'TT'QR         C714         NCF1         0.00         same         0.00         <	043230	CADE1	CL DC AVVC*IEDV	0040	NOPI	0.00	0.00	same	
Odd230         SARET         SLPSAV(V)TER         CD74         NCP2         0.00         manual           Odd351         MCAM         LDOVLECY         CS         South         South         South         South           Odd351         MCAM         LDOVLECY         C488         NCF1         100.00         100.00         south           Odd357         TEPANG         LEDC"TPQR         C183         NCF2         100.00         south           Odd357         TEPANG         LEDC"TPQR         C183         NCF2         0.00         south           Odd3552         MYOIB         LVMSYVAXC*GK         C129         NOK21         0.00         south           Odd3552         MYOIB         LVMSYVAXC*GK         C124         NCF1         0.00         south         south           Odd354         SMACA5         SVC*LIGDKEQR         C100         NCF1         0.00         south         south           Odd264         SMACA5         SVC*LIGDKEQR         C259         NCF2         0.00         south         south           Odd264         SMACA5         SVC*LIGDKEQR         C259         NCF1         0.00         south         south           Odd264         SMACA5	043290	SARII	SLPSAVYC"IEDK	0674	NCF1	0.00	0.00	same	
Od3365         PRPF3         VLGFSEPTVTTALINC*VGK         C37         NCF1         7.37         6.16         same           Od4361         MGAM         LEDC*TFQR         CB68         NCF1         100.00         100.00         same           Od3571         TSPAN6         LEDC*TFQR         CB58         NCF1         100.00         100.00         same           Od3571         TSPAN6         LEDC*TFQR         CB58         NCF1         100.00         100.00         same           Od35751         TSPAN6         LEDC*TFQR         C183         NCF1         100.00         0.00         same           Od35351         TSPAN6         LEDC*TFQR         C183         NCF1         0.00         same           Od2315         DHN16         TGMESLTYTFC*SK         C714         NCF1         0.00         same           Od2315         DHN16         TGMESLTYTFC*SK         C714         NCF1         10.01         same           Od2345         MARCA5         SYC*LIGDKCR         C259         NCF2         10.00         same           Od2345         SMARCA5         SYC*LIGDKCR         C259         NCF2         0.00         0.00         same           Od2347         PFL	O43290	SART1	SLPSAVYC*IEDK	C674	NCF2	0.00		same	
Odd31         MGAM         ILDCYLFC*K         C665         NCF1         100.00         name           Odd357         TSPAN         LEDC*TPQR         C183         NCP1         100.00         name           Odd357         TSPAN         LEDC*TPQR         C183         NCP1         100.00         name           Odd357         TSPAN         LEDC*TPQR         C183         NCP1         100.00         name           Odd3552         MYO1B         LYMSYVAACCGK         C129         NCS2         0.00         name           Odd3552         MYO1B         LYMSYVAACCGK         C124         NCP1         0.00         name           Odd351         DHN6         TGMESLYTPC*SK         C714         NCP1         0.00         name           Odd264         SMARCAS         SYC*LIGDKEQR         C299         NCF1         10.00         name           Odd264         SMARCAS         SYC*LIGDKEQR         C299         NCF1         0.00         name           Odd264         SMARCAS         SYC*LIGDKEQR         C299         NCF1         0.00         name           Odd37         PPL         CPLLEYQLK         C126         NCF1         0.00         name           O	O43395	PRPF3	VLGFSEPTVVTAALNC*VGK	C37	NCF1	7.37	6.16	same	
OldSdorl         CPB4IL2         VC*VEHITFYR         C688         NCF1         0.00         same           OdSdorf         TSPANG         LEDC*TPQR         C183         NCF2         100.00         100.00         same           OdSdorf         TSPANG         LEDC*TPQR         C183         NCF2         100.00         100.00         same           OdSdorf         TSPANG         LEDC*TPQR         C183         NCF2         100.00         same           OdSdorf         TSPANG         LEDC*TPQR         C183         NCF2         100.00         same           OdSdorf         TSPANG         LEDC*TPQR         C183         NCF2         100.00         same           OdSdorf         TSPANG         LEDC*TPQR         C129         NOXOI         0.00         same           OdSdorf         TSPANG         LEDC*TPQR         C129         NOXOI         0.00         same           OdSdorf         TSPANG         LEDC*TPQR         C141         NCF1         0.00         same           OdSdorf         SMARCAS         SVC*LIGDREQR         C129         NCF2         0.00         same           OdSdorf         SPL         C*DLEYQLR         C1265         NCF2         0.00 <td>043451</td> <td>MGAM</td> <td>ILDGYLEC*K</td> <td>C565</td> <td>NCF1</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	043451	MGAM	ILDGYLEC*K	C565	NCF1	100.00	100.00	same	
Obsider         TEPALA         VEDUCTINGER         CBS         NCF1         100.00         same           Odsiger         TSPAN         LEDCTTYGR         C183         NCF2         100.00         100.00         same           Odsigs         TSPAN         LEDCTTYGR         C183         NCF2         100.00         100.00         same           Odsigs         TSPAN         LEDCTTYGR         C183         NCF1         100.00         0.00         same           Odsigs         TSPAN         LEDCTTYGR         C184         NCF1         0.00         0.00         same           Oddial         SMARCAS         CYCHIGDKEQR         C714         NCF1         0.00         same           Oddial         SMARCAS         SYCHIGDKEQR         C100         NCF1         0.00         same           Oddial         SMARCAS         SYCHIGDKEQR         C259         NCF2         0.00         0.00         same           Oddial         SMARCAS         SYCHIGDKEQR         C259         NCF2         0.00         0.00         same           Oddial         SMARCAS         SYCHIGDKEQR         C259         NCF2         0.00         same           Oddial         FPL	040401 1	EDD41L0	VONVENUEVD	C100	NODI	100.00	100.00	Same	
Oddsort         TSPAR         LEDUCTING         Class         NCP1         D00.00         same           Oddsort         TSPANG         LEDUCTING         Class         NCP1         D00.00         same           OddSort         TSPANG         LEDUCTING         Class         NCP2         0.00         same           OddSort         TSPANG         LEDUCTING         Class         NCP2         0.00         same           OddSort         TSPANG         LEDUCTING         Class         NCP2         0.00         same           OddSort         TSPANG         LEDUCTING         Class         NCP1         0.00         same           OddSort         TSPANG         LEDUCTING         Class         NCP1         0.00         same           OddSort         SMARCAS         SVCTLIDER         Closs         NCP1         0.00         same	045491-1	EFD41LZ	VUVERNIFIK	0400	NOFI	0.00	0.00	same	
Oddsfr         TSPANS         LEDC*TPQR         Class         NCP2         100.00         100.00         same           Oddsfr         STPANS         LEDC*TPQR         Class         NOXOI         10.00         10.00         same           Oddsfr         STPANS         LEDC*TPQR         Class         NOXOI         0.00         same           Oddsfr         MYOIB         LVMSYVAAVCGK         Class         NOXOI         0.00         same           Oddsfr         GRMSLTYTPC*SK         CT4         NCP2         0.00         0.00         same           Oddsfr         BHX16         TGMESLTYTPC*SK         CT4         NCP2         10.00         100.00         same           Oddsfr         BHX16         TGMESLTYTPC*SK         CT4         NCP2         100.00         same           Oddsfr         SMARCAS         SVC*LICDKEQR         C259         NCP2         100.00         same           Oddsfr         SMARCAS         SVC*LICDKEQR         C226         NCP1         0.00         same           Oddsfr         PPL         CTDLRYQLK         C1265         NCP1         0.00         same           Oddsfr         PPL         CTDLRYQLK         C1265         NCP1 <td>O43657</td> <td>TSPAN6</td> <td>LEDC*TPQR</td> <td>C183</td> <td>NCF1</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	O43657	TSPAN6	LEDC*TPQR	C183	NCF1	100.00	100.00	same	
Odd857         TSFANS         LEDC*TPGR         Cl33         NOX01         100.00         same           Od375-2         MY01B         LVMSYVAAVC*GK         Cl29         NOX01         11.50         same           Od375-2         MY01B         LVMSYVAAVC*GK         Cl29         NOX01         0.00         same           Od375-2         MY01B         LVMSYVAAVC*GK         Cl29         NOX01         0.00         same           Od3735-2         MY01B         LVMSYVAAVC*GK         Cl29         NOX01         0.00         same           Od3735-2         MY01B         LVMSYVAAVC*GK         Cl29         NCR1         0.00         same           Od264         SMARCAS         SVC*LIGDKQR         Cl29         NCP1         0.00         same	O43657	TSPAN6	LEDC*TPQR	C183	NCF2	100.00	100.00	same	
OldSPS:2         MYQ1B         LVARSYVAAVC*GK         C129         NCC2         D.0.0         D.0.0         mame           043755:2         MY01B         LVARSYVAAVC*GK         C129         NCC2         0.00         0.00         same           040331         DHX16         TGMESLTYTPC*SK         C714         NCF1         0.00         oame           040341         DHX16         TGMESLTYTPC*SK         C714         NCF2         0.00         oame           040343         SMARCA         SVC*LICDKEQR         C259         NCF1         10.00         same           040244         SMARCA         SVC*LICDKEQR         C259         NCF2         0.00         0.00         same           040244         SMARCA         SVC*LICDKEQR         C255         NCF2         0.00         0.00         same           04037         PPL         C7DERYQLK         C1205         NCF2         0.00         same           040437         PPL         C7DERYQLK         C1205         NCF2         0.00         same           060437         PPL         C7DERYQLK         C1205         NCF2         0.00         same           060437         PPL         SQW         C449         NC	043657	TSPAN6	LEDC*TPOR	C183	NOXO1	100.00	100.00	samo	
Order Solution         Diversity of the second	043037	MVOID	LUNGVUA ANG*GK	C100	NCEO	100.00	100.00	same	
04378-2         MYQ1B         LVMSYVAAVC*CK         Cl29         NOX01         11.50         same           04331         DHN16         TGMESLTYTPC*SK         C714         NOX01         0.00         6.00         same           060231         DHN16         TGMESLTYTPC*SK         C714         NOX01         0.00         6.00         same           060264         SMARCAS         SVC*LIDDKEQR         C229         NCP1         19.31         same           060264         SMARCAS         SVC*LIDDKEQR         C229         NCP1         0.00         same           060264         SMARCAS         SVC*LIDDKEQR         C229         NCP1         0.00         same           060264         SMARCAS         SVC*LIDDKEQR         C1265         NCP1         0.00         same           060437         PPL         C7DLENQLK         C1265         NCP1         0.00         same           060437         PPL         LIPAVC*VPTPTDFEALALADSLG         C449         NCP1         0.00         same           060437         PPL         EQREC*PDLER         C604         NCP1         0.00         same           060437         PPL         EQREC*PDLER         C604         NCP1 <td< td=""><td>043795-2</td><td>MYOIB</td><td>LV MSY VAAV C*GK</td><td>0129</td><td>NCF2</td><td>0.00</td><td></td><td>same</td><td></td></td<>	043795-2	MYOIB	LV MSY VAAV C*GK	0129	NCF2	0.00		same	
OG0231         DHX16         TGMESLIVTPC*SK         C714         NCF1         0.00         same           OG0231         DHX16         TGMESLIVTPC*SK         C714         NCF1         0.00         same           OG0231         DHX16         TGMESLIVTPC*SK         C714         NCF1         0.00         same           OG0234         SMARCA5         SVC*LIGDKEQR         C229         NCF1         10.01         same           OG0234         SMARCA5         SVC*LIGDKEQR         C229         NCF2         0.00         0.00         same           OG0234         SMARCA5         SVC*LIGDREQR         C229         NCF2         0.00         0.00         same           OG0234         SMARCA5         SVC*LIGDREQR         C225         NCF2         0.00         0.00         same           OG0337         PFL         C7DLFNQLK         C1265         NCF1         0.00         0.00         same           O60437         PFL         C7DLFNQLK         C449         NCF1         0.00         same           O60437         PFL         SQYR         C449         NCF1         0.00         same           O60437         PFL         SQYR         C334         NCP2	O43795-2	MYO1B	LVMSYVAAVC*GK	C129	NOXO1		11.50	same	
Odd231         DHX16         TGMESLIVTPC*SK         C714         NCP2         0.00         same           Odd234         SMARCA         C*NTLITLER         C1001         NCP1         19.01         same           Odd244         SMARCA         C*NTLITLER         C1001         NCP1         19.01         same           Odd244         SMARCA         SVC+1GDKEQR         C259         NCP2         0.00         same           Odd244         SMARCA         SVC+1GDKEQR         C259         NCP2         0.00         same           Odd244         SMARCA         SVC+1GDKEQR         C259         NCP1         0.00         same           Odd245         SMARCA         SVC+1GDKEQR         C4125         NCP1         0.00         same           Odd37         PFL         CTPLKPIPTALALC*DFEEGEQGLISR         C449         NCP2         0.00         same           Odd37         PPL         LLPAVC*FVIPTDPEALALADSLG         C449         NCP1         0.00         same           Odd37         PPL         LLPAVC*FVIPTDPEALALADSLG         C449         NCP2         0.00         same           Odd37         PPL         LLPAVC*FVIPTDPEALALADSLG         C449         NCP2         0.00	O60231	DHX16	TGMESLTVTPC*SK	C714	NCF1	0.00	0.00	same	
OG0631         DHX16         TCXMERITYTPC*SR         CTAL         NCX01         0.00         base           OG06364         SMARCA5         SVC*LIGDKEQR         C259         NCF1         0.00         0.00         same           OG06364         SMARCA5         SVC*LIGDKEQR         C259         NCF2         100.00         same           OG06364         SMARCA5         SVC*LIGDKEQR         C259         NCF2         100.00         same           OG06364         SMARCA5         SVC*LIGDKEQR         C259         NCF1         0.00         0.00         same           OG06364         SMARCA5         SVC*LIGDKEQR         C259         NCF1         0.00         0.00         same           O60437         PFL         C7DLETYQLK         C1265         NCF1         0.00         same           O60437         PFL         LIAPAVC*PTVPTDFEALALADSLG         C448         NCF2         0.00         same           O60437         PFL         LIAPAVC*PTVPTDFEALALADSLG         C449         NCF1         0.00         same           O60437         PFL         LIAPAVC*PTVPTPTPEALALADSLG         same         same         same           O60437         PFL         LIAPAVC*PTVPTPTPT         C449<	060231	DHX16	TCMESI TVTPC*SK	C714	NCF2	0.00	0.00	samo	
OB0241         DATA D         LOWELLINE SA         CLA         NCAPI           0.00         same           OB0264         SUARCAS         SVC*LIGDKEQR         C229         NCF1         19.5.1         same           OB0264         SUARCAS         SVC*LIGDKEQR         C229         NCF2         0.00         0.00         same           OB0264         SUARCAS         SVC*LIGDKEQR         C259         NCF2         0.00         0.00         same           OB0264         SUARCAS         SVC*LIGDKEQR         C259         NCF2         0.00         0.00         same           OB0264         SUARCAS         SVC*LIGDKEQR         C259         NCF2         0.00         0.00         same           OB0264         SUARCAS         SVC*LIGDKEQR         C1205         NCF1         0.00         0.00         same           OB0437         PPL         ETPLKPIPTVEALC*DECEQCILSR         C408         NCF2         0.00         same           OB0437         PPL         ETPLKPIPTVPTDPEALALADSLG         C449         NCF2         0.00         same           OB0437         PPL         EQERC*PDEER         C694         NCF1         0.00         same           OB0437         PPL	000231	DIIX10	TOMESET VITO SK TOMESET WITO SK	0714	NOVOI	0.00	0.00	same	
060264         SNAARCAS         C'NTLITLIER         C1001         NCF1         10.00         same           060264         SNAARCAS         SVC*LIGDKEQR         C259         NCF1         19.51         0.000         same           060264         SNAARCAS         SVC*LIGDKEQR         C259         NCF1         10.000         same           060264         SNAARCAS         SVC*LIGDKEQR         C229         NCF1         0.00         0.00         same           060264         SNAARCAS         SVC*LIGDKEQR         C229         NCF1         0.00         0.00         same           060437         PFL         C*DLEIYQLK         C1265         NCF1         0.00         0.00         same           060437         PFL         ETPLKPIPYEALC*DPEGEQGLISR         C408         NCF2         0.00         same           060437         PFL         SQYR         C449         NCF2         0.00         same           060437         PFL         PCEHC*PDLER         C694         NCF2         0.00         same           060716-1         CTNND1         SNAAYUPHC*TR         C394         NCT2         1.03         same           060716-1         CTNND1         SNAAYUPHC*TR         <	060231	DHX16	TGMESLIVTPC*SK	C714	NOXOI	0.00		same	
060264         SMARCA5         SVC*LIGDKEQR         C259         NCF1         10.51         same           060264         SMARCA5         SVC*LIGDKEQR         C259         NCF2         10.00         100.00         same           060264         SMARCA5         SVC*LIGDKEQR         C259         NCF1         0.00         0.00         same           06037         PFL         C*DLEIYQLK         C1265         NCF1         0.00         same           060437         PFL         C*DLEIYQLK         C1265         NCF1         0.00         same           060437         PFL         C*DLEIYQLK         C1265         NCF1         0.00         same           060437         PFL         LTPLKPIPVEALC*DFECEQCLISR         C408         NCF1         0.00         same           060437         PFL         LQVR         C449         NCF2         0.00         same           060437         PFL         FQHC*PPDLER         C469         NCF2         0.00         same           060437         PFL         FQHC*PPDLER         C499         NCF1         0.00         same           060437         PFL         FQHC*PPDLER         C394         NCP2         1.01         5.2	O60264	SMARCA5	C*NTLITLIER	C1001	NCF1	0.00	0.00	same	
O60264         SMARCA5         SVC*LIGDK Park         C259         NCF2         100.00         same           O60264         SMARCA5         SVC*LIGDKRQR         C259         NOXO         0.00         same           O60264         SMARCA5         SVC*LIGDKRQR         C259         NOXO         0.00         same           O60264         SMARCA5         SVC*LIGDKRQR         C259         NOXO         0.00         same           O60264         SMARCA5         SVC*LIGDKRQR         C219         NCF1         0.00         o.00         same           O6037         PPL         C*TLKPIPVEALC*DFEGEQGLISR         C408         NCF1         0.00         same           O60437         PPL         FTPL KPIPVPTDPEALALADSLG         C449         NCF2         0.00         same           O60437         PPL         FQBEC*PDLER         C694         NCF1         0.00         same           O60716-1         CTNND1         SNAAYLQHLC*YR         C394         NCF2         0.00         same           O60716-1         CTNND1         SNAAYLQHLC*YR         C394         NCF2         0.00         same           O60716-1         CTNND1         SNAAYLQHLC*YR         C499         NOX01	O60264	SMARCA5	SVC*LIGDKEQR	C259	NCF1	19.51		same	
COMPART         SMARCA3         SVC*UGENREQR         C259         NCP2         0.00         same           COMPAGE         SMARCA5         VUDUEDVC*MWR         C259         NCN1         0.00         0.00         same           COMPAGE         SMARCA5         VUDUEDVC*MWR         C1265         NCF1         0.00         0.00         same           COMPAGE         PPL         C*DLENQLK         C1265         NCF2         0.00         0.00         same           COMPAGE         PPL         C*DLENQLK         C1265         NCF2         0.00         0.00         same           COMPAGE         PPL         C*DLENQLK         C1265         NCF1         0.00         same           COMPAGE         PPL         ENPLOYPEDFEALALADSLG         C449         NCF1         0.00         same           COMPAGE         PPL         FQHC*PUERYTPEDEALALADSLG         C449         NCF1         0.00         same           COMPAGE         PPL         FQHC*PUERYTR         C694         NCF2         0.00         same           COMPAGE         PPL         FQHC*PUERYTR         C394         NCF1         0.00         same           COMPAGE         PPL         FQHC*PUERYTR         C3	060264	SMARCAS	SVC*LICDK	C250	NCF2	100.00	100.00	samo	
D00341         SMARAA5         SVC-LILLINEQR         CL20         NCL2         0.00         same           060364         SMARCA5         SUC-LILLINEQR         C510         NCF1         0.00         same           060364         SMARCA5         SUC-LILLINEQR         C510         NCF1         0.00         same           060437         PPL         C*DLENQLK         C1265         NCF1         0.00         same           060437         PPL         ETPLKPIPVEALC*DFECEQGLISR         C408         NCF1         0.00         same           060437         PPL         ETPLKPIPVEALC*DFECEQGLISR         C408         NCF1         0.00         same           060437         PPL         EQRTR         C409         NCF1         0.00         same           060437         PPL         FQBRC*PDLER         C694         NCF1         0.00         same           060716-1         CTNND1         SNAAYLQHC*YN         C394         NCF1         1.02         same           060716-1         CTNND1         SNAAYLQHC*YN         C394         NCF1         0.00         same           060716-1         CTNND1         SNAAYLQHC*YN         C394         NCF1         0.00         same </td <td>000204</td> <td>GMADGAS</td> <td>SVO LIGDK</td> <td>C255</td> <td>NOF 2</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	000204	GMADGAS	SVO LIGDK	C255	NOF 2	100.00	100.00	same	
060264         SMARCA5         SVC*LIGDKEQR         C259         NOX01         0.00         same           060264         SMARCA5         SVCFLIGDKEQR         C519         NOX01         0.00         same           060264         SMARCA5         VLDILEDVCHWR         C1265         NCF1         0.00         same           060437         PPL         CTPLKTHVPLALC*DFECEQGLISR         C408         NCF2         0.00         same           060437         PPL         ETPLKTHVPLALC*DFECEQGLISR         C409         NCF2         0.00         same           060437         PPL         ETPLKTHVPLALC*DFECEQGLISR         C409         NCF2         0.00         same           060437         PPL         ETPLKTHVPTDPEALALADSLG         C409         NCF2         0.00         same           060437         PPL         SQVR         SQVR         C409         NCF2         0.00         same           060437         PPL         FQBHC*PDLER         C604         NCF2         0.00         same           060437         PPL         FQBHC*PDLER         C409         NCF2         0.00         same           060716-1         CTNND1         SNAANLQHLC*YR         C394         NOX01         0	060264	SMARCA5	SVC*LIGDKEQR	C259	NCF2	0.00	0.00	same	
O60264         SMARCA5         VLDLEDYC*MWR         C519         NCF1         0.00         same           060437         PPL         C*DLETYQLK         C1265         NCF2         0.00         same           060437         PPL         C*DLETYQLKCOPFEGEQGLISR         C408         NCF2         0.00         same           060437         PPL         ETPLKFIPVEALC*DFEGEQGLISR         C449         NCF2         0.00         same           060437         PPL         ETPLKFIPVEALC*DFEGEQGLISR         C449         NCF2         0.00         same           060437         PPL         FQEHC*PDLER         C694         NCF1         0.00         same           060437         PPL         FQEHC*PDLER         C694         NCF1         1.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         1.02         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         0.00         6.35         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C494         NCF2         0.00         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*CALK         C449	O60264	SMARCA5	SVC*LIGDKEQR	C259	NOXO1	0.00	0.00	same	
Op00437         PPL         C*DLEIYQLK         C1265         NCF1         0.00         same           O60437         PPL         C*DLEIYQLK         C1265         NCF1         0.00         0.00         same           O60437         PPL         ETPLKPIPVEALC*DFEGEQGLISR         C408         NCF1         0.00         0.00         same           O60437         PPL         ETPLKPIPVEALC*DFEGEQGLISR         C409         NCF1         0.00         same           O60437         PPL         LIAPA/C*PVIPPTDFALALADSLG         C449         NCF1         0.00         same           O60437         PPL         FQEHC*PDLER         C694         NCF2         0.00         same           O60137         PPL         FQEHC*PDLER         C694         NCF2         1.00         0.00         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         3.11         6.52         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         0.00         3.47         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C450         NCF1         9.00         same           O60716-1         CTNND1 <td>O60264</td> <td>SMARCA5</td> <td>VLDILEDYC*MWR</td> <td>C519</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	O60264	SMARCA5	VLDILEDYC*MWR	C519	NCF1	0.00	0.00	same	
Openal PL         C*DELEYQLK         C1285         NCF1         0.00         same           060437         PPL         ETPLKPIPVEALC*DFEGEGLISR         C408         NCF1         0.00         same           060437         PPL         ETPLKPIPVEALC*DFEGEGLISR         C408         NCF2         0.00         same           060437         PPL         ETPLKPIPVEALC*DFEGEGLISR         C409         NCF2         0.00         same           060437         PPL         ELAPAC*FVIPPTDEALALADSLG         C449         NCF2         0.00         same           060437         PPL         FQEHCPIDER         C604         NCF2         0.00         same           060437         PPL         FQEHCPIDER         C604         NCF2         0.00         same           060437         PPL         FQEHCPIDER         C604         NCF2         1.6.02         same           060437         PPL         FQEHCHPIDER         C604         NCF2         1.3.3         same           060437         PPL         FQEHCHPIDER         C304         NCO1         0.00         same           060716-1         CTNND1         SNAAXPLQHLC*YR         C394         NCO1         0.00         same	060437	PPI	C*DI FIVOLK	C1265	NCF1	0.00		samo	
OB0437         PFL         C-JUENTORA         COMPACTOR         CL255         NCF2         0.00         0.00         same           060437         PPL         LIAPAVC*FVIPTDEALALADSLG         C448         NCF1         0.00         same           060437         PPL         LIAPAVC*FVIPTDEALALADSLG         C449         NCF1         0.00         same           060437         PPL         SQYR         C449         NCF2         0.00         same           060437         PPL         FQEHC*PDLER         C694         NCF1         0.00         same           060437         PPL         FQEHC*PDLER         C694         NCF2         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         3.11         6.32         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCK72         3.33         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C450         NCG72         7.36         same           060716-1         CTNND1         NCF0CVPALVR         C450         NCG21         5.35         9.00         same           060716-1         CTNND1         EVHLGAC*GALK	000437		C*DI DIVOLV	C1205	NOPI	0.00	0.00	same	
O60437         PPL         ETPLKPIPVEALC*DFEGRQGLISR         C408         NCF1         0.00         same           O60437         PPL         LIAPAVC*FVIPPTDPEALALADSLG         C449         NCF1         0.00         same           O60437         PPL         LIAPAVC*FVIPPTDPEALALADSLG         C449         NCF1         0.00         same           O60437         PPL         LOVT         C449         NCF2         0.00         same           O60437         PPL         FQEHC*PDLER         C604         NCF2         0.00         same           O60437         PPL         FQEHC*PDLER         C604         NCF2         3.11         6.92         same           O60716-1         CTINNDI         SNAAAYLQHLC*YR         C394         NCF2         3.11         6.92         same           O60716-1         CTINNDI         SNAAAYLQHLC*YR         C394         NCX01         0.00         same           O60716-1         CTINNDI         EVHLGAC*GALK         C429         NCV1         0.00         same           O60716-1         CTINNDI         EVHLGAC*GALK         C429         NCX01         0.00         same           O60716-1         CTINNDI         NCPGQPAIVR         C460         <	060437	PPL	C*DLEIYQLK	C1265	NCF2	0.00	0.00	same	
O60437         PPL         ETPLKPIPVEALC*DFEGEQGLISR SQVR         C408         NCF2         0.00         same           060437         PPL         LAPAVC*FVIPPTPEALALADSLG SQVR         C449         NCF2         0.00         same           060437         PPL         FQBHC*PIDER         C694         NCF1         0.00         same           060437         PPL         FQBHC*PDLER         C694         NCF2         0.00         same           060437         PPL         FQBHC*PDLER         C694         NCF2         0.00         same           060716-1         CTNNDI         SNAAAYLQHLC*YR         C394         NCF2         0.00         same           060716-1         CTNNDI         SNAAAYLQHLC*YR         C394         NCF2         0.00         same           060716-1         CTNNDI         SVHLGAC*GALK         C429         NCP1         0.00         same           060716-1         CTNNDI         EVHLGAC*GALK         C429         NCVC2         0.00         same           060716-1         CTNNDI         EVHLGAC*GALK         C439         NCVC2         0.00         same           060716-1         CTNNDI         EVHLGAC*GALK         C450         NCV2         7.36	O60437	PPL	ETPLKPIPVEALC*DFEGEQGLISR	C408	NCF1	0.00	0.00	same	
Construct         LIAPAVC*FVIPPTDPEALALADSLG         C449         NCF1         0.00         same           060437         PPL         SQVR         C449         NCF2         0.00         same           060437         PPL         FQEHC*PDLER         C604         NCF1         0.00         same           060437         PPL         FQEHC*PDLER         C604         NCF1         12.92         13.39         same           060716-1         CTNND1         SNAAAVLQHLC*YR         C394         NCF1         12.92         13.39         same           060716-1         CTNND1         SNAAAVLQHLC*YR         C394         NCP1         12.92         13.39         same           060716-1         CTNND1         SNAAAVLQHLC*YR         C394         NCP2         0.00         6.35         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCX01         0.00         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCX01         0.00         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCX01         0.00         same           060716-1         CTNND1         EVEDC*KPR         C516 <td>O60437</td> <td>PPL</td> <td>ETPLKPIPVEALC*DFEGEQGLISR</td> <td>C408</td> <td>NCF2</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	O60437	PPL	ETPLKPIPVEALC*DFEGEQGLISR	C408	NCF2	0.00	0.00	same	
O60437         PPL         SQN C         CHAPACCYNPTDTACALALADSLG         C449         NCF1         0.00         same           O60437         PPL         SQVR         C449         NCF1         0.00         same           O60437         PPL         FQEHC*PDLER         C694         NCF2         0.00         same           O60437         PPL         FQEHC*PDLER         C694         NCF2         3.11         6.92         same           O60716-1         CTINND1         SNAAAVLQHLC*YR         C394         NCF2         3.11         6.92         same           O60716-1         CTINND1         SNAAAVLQHLC*YR         C394         NCF2         0.00         same           O60716-1         CTINND1         EVHLGAC*GALK         C429         NCF1         0.00         same           O60716-1         CTINND1         EVHLGAC*GALK         C429         NCF2         0.00         same           O60716-1         CTINND1         EVHLGAC*GALK         C429         NCF1         0.00         same           O60716-1         CTINND1         EVEDC*KFR         C516         NCF1         9.38         9.78         same           O60716-1         CTINND1         EVEDC*KFR         <			LIAPAVC*EVIPPTDPEALALADSIC			0.00			
Object         State         State           060437         PPL         SCR         Same           060437         PPL         CGEHC*PDLER         C604         NCF2         0.00         same           060437         PPL         CGEHC*PDLER         C604         NCF2         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C304         NCF2         3.11         6.92         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C304         NCF1         1.92         3.39         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C304         NCF2         0.00         6.37         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         0.00         0.00         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         7.36         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCK1         0.00         0.00         same           060716-1         CTNND1         EVHECA*GALK         C430         NCF1         0.38         9.78         same           060716-1	O60437	PPL	COVD	C449	NCF1	0.00		same	
Oc60437         PPL         LIAPAV C*T VIPPI DPEALALADSLG         C449         NCF2         0.00         same           060437         PPL         FQERC*PDLER         C694         NCF2         0.00         same           060437         PPL         FQERC*PDLER         C694         NCF2         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         1.1         6.92         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         2.92         1.3         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         0.00         6.35         same           060716-1         CTNND1         SVHLGAC*GALK         C429         NCK01         0.00         same           060716-1         CTNND1         NCPCVPAINR         C450         NCF2         0.00         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCF1         9.88         9.78         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCF2         0.00         same           060716-1         CTNND1         HEWESVLTNTAGC*L			SQIR						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	060427	DDI	LIAPAVC*FVIPPTDPEALALADSLG	C140	NCE2	0.00		60 m 0	
O60437         PPL         FQEHC*PDLER         C6044         NCF1         0.00         same           O60437         PPL         FQEHC*PDLER         C6044         NCF1         12.92         13.39         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         12.92         13.39         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF2         3.01         6.00         6.35         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF1         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCS1         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCS0         0.00         same           O60716-1         CTNND1         EVHEDC*KPR         C516         NCF1         9.38         9.78         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF1         0.00         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCY01         0.00         same	000437	TTL	SQYR	0449	NOF 2	0.00		same	
Orbit         PFL         FQEHC*PDLER         C694         NCF2         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         12.92         13.39         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCK1         10.692         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCF1         0.00         3.47         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         0.00         0.00         same           060716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         0.00         same           060716-1         CTNND1         NC*DGVFALVR         C450         NCF2         7.36         same           060716-1         CTNND1         NC*DGVFALVR         C450         NCF2         7.36         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCK1         8.15         9.00         same           060716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         same           060716-1         CTNND1         HEWESVLTNTAGC*	O60437	PPL	FOEHC*PDLEB	C694	NCF1	0.00	0.00	same	
Obulay         PPL         PQLPC PULER         C094         NCP2         0.00         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         12.92         13.39         same           060716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCK01         0.00         6.35         same           060716-1         CTNND1         EVHIGAC*GALK         C429         NCF1         0.00         3.47         same           060716-1         CTNND1         EVHIGAC*GALK         C429         NCF2         0.00         same           060716-1         CTNND1         EVHIGAC*GALK         C429         NCCF2         7.36         same           060716-1         CTNND1         EVHIGAC*GALK         C429         NCC72         7.36         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCK01         8.15         9.00         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCK01         6.00         same           060716-1         CTNND1         HEWESVLTAGC*LR         C533         NCF1         0.00         same           060716-1         CTNND1         HEWESVLTAGC*	000437		FQEIIO I DIEIL	0034	NOPI	0.00	0.00	same	
O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NCF1         12.92         13.39         same           O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NOX01         0.00         6.35         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF1         0.00         6.37         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         7.36         same           O60716-1         CTNND1         DC*BCVPALVR         C450         NOX01         8.15         9.00         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         same           O60	060437	PPL	FQEHC"PDLER	0694	NCF2	0.00		same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	O60716-1	CTNND1	SNAAAYLQHLC*YR	C394	NCF1	12.92	13.39	same	
O60716-1         CTNND1         SNAAAYLQHLC*YR         C394         NOX01         0.00         6.35         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF1         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NOX01         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NOX01         0.00         same           O60716-1         CTNND1         EVNEDC*KPR         C516         NCF2         7.36         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.86         15.71         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.86         15.71         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF2         0.00         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF2         0.00         same           O60716-1         CTNND1         LVEC*VC*LLR         C579;C581         NCP1         0.00         same           O60716-1         CTNN	O60716-1	CTNND1	SNAAAYLQHLC*YR	C394	NCF2	3.11	6.92	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	060716-1	CTNND1	SNAAAYLOHLC*YB	C394	NOXO1	0.00	6 35	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	000710-1	CTINIDI		C100	NODI	0.00	0.00	Same	
O60716-1         CTNND1         EVHLGAC*GALK         C429         NCF2         0.00         0.00         same           O60716-1         CTNND1         EVHLGAC*GALK         C429         NCK72         7.36         same           O60716-1         CTNND1         NC*DGVPALVR         C450         NCK72         7.36         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF1         9.38         9.78         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         0.00         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCK01         6.09         8.25         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NCF2         0.00         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOK01         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         same           O60716-1         CTNND1         LVENC*VC*LR	060716-1	CINNDI	EVHLGAC*GALK	6429	NOFI	0.00	3.47	same	
O60716-1         CTNND1         EVHLGAC*CALK         C429         NOX01         0.00         same           O60716-1         CTNND1         NC*DGVPALVR         C450         NOX01         8.15         9.00         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF2         0.00         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOX01         0.00         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOX01         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOX01         0.00         same           O60	O60716-1	C'I'NND1	EVHLGAC*GALK	C429	NCF2	0.00	0.00	same	
O60716-1         CTNND1         NC*DGVPALVR         C450         NCF2         7.36         same           O60716-1         CTNND1         EPNEDC*KPR         C450         NOXO1         8.15         9.00         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF1         9.38         9.78         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NOXO1         0.00         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOXO1         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         o.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOXO1         0.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOXO1         0.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         1.82         same           O60716-1         CTNND1<	O60716-1	CTNND1	EVHLGAC*GALK	C429	NOXO1	0.00	0.00	same	
000101         CTNND1         NC*DCVPALVR         C450         NOXC1         8.15         9.00         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCF1         9.38         9.78         same           060716-1         CTNND1         EPNEDC*KPR         C516         NCF1         9.38         9.78         same           060716-1         CTNND1         EPNEDC*KPR         C516         NOX01         6.09         8.25         same           060716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF2         0.00         same           060716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NOX01         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF1         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           060716-1         CTNND1         TPALEASGAIQNLC*AGR         C682         NCF1         10.00         same	060716 1	CTNND1	NC*DGVPALVB	C450	NCF2		7 36	samo	
Obd/16-1         C INND1         NC-DG YFALVR         C 430         NOXO1         8.15         9.00         same           O60716-1         C TNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         C TNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         C TNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         0.00         same           O60716-1         C TNND1         HEWESVLTNTAGC*LR         C533         NOX01         0.00         same           O60716-1         C TNND1         IVENC*VC*LLR         C579;C581         NOC1         0.00         same           O60716-1         C TNND1         IVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           O60716-1         C TNND1         IVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           O60716-1         C TNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOX01         0.00         same           O60716-1         C TNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.00         same<	000710-1	CTINIDI	NC*DCVDALVD	C450	NOVA	0.15	1.50	same	
O60716-1         CTNND1         EPNEDC*KPR         C516         NCP1         9.38         9.78         same           O60716-1         CTNND1         EPNEDC*KPR         C516         NOX01         6.09         8.25         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NCF1         0.00         0.00         same           O60716-1         CTNND1         HEWESVLTNTAGC*LR         C533         NOK01         0.00         same           O60716-1         CTNND1         LVENC*VC*LR         C579;C581         NOK01         0.00         same           O60716-1         CTNND1         LVENC*VC*LR         C579;C581         NOK01         0.00         same           O60716-1         CTNND1         LVENC*VC*LR         C579;C581         NOK01         0.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOK01         0.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOC1         3.75         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOC1         3.75         0.00         same           O60716-1	060716-1	CINNDI	NC DGVFALVR	0450	NOXOI	8.15	9.00	same	
O60716-1         CTNND1         EPNEDC*KPR         C516         NCF2         5.66         15.71         same           O60716-1         CTNND1         HEPNEDC*KPR         C516         NOX01         6.09         8.25         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NCF1         0.00         same           O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOX01         0.00         same           O60716-1         CTNND1         LVENC*VC*LR         C579;C581         NCF2         0.00         0.00         same           O60716-1         CTNND1         LVENC*VC*LR         C579;C581         NOX01         0.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOX01         0.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOX01         3.75         0.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOX01         3.75         0.00         same	060716-1	CTNNDI	EPNEDC*KPR	C516	NCF1	9.38	9.78	same	
060716-1         CTNND1         EPNEDC*KPR         C516         NOXO1         6.09         8.25         same           060716-1         CTNND1         HIEWESVLITTAGC*LR         C533         NCF1         0.00         same           060716-1         CTNND1         HIEWESVLITTAGC*LR         C533         NCF2         0.00         same           060716-1         CTNND1         HEWESVLITTAGC*LR         C579;C581         NCF1         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF1         0.00         same           060716-1         CTNND1         VENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           060716-1         CTNND1         YENC*VC*LLR         C579;C581         NOX01         0.00         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         0.00         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCP1         3.43         same           060716-1         CTNN	O60716-1	CTNND1	EPNEDC*KPR	C516	NCF2	5.66	15.71	same	
Control I         Cranple         Display intervent         Costs         NCP1         0.00         Same           060716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NCP1         0.00         same           060716-1         CTND1         HIEWESVLTNTAGC*LR         C533         NCP1         0.00         same           060716-1         CTND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         1.62         0.00         same           060716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOX01         0.00         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF2         4.71         1.82         same           060716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF2         1.01         90         same           060716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF2         1.1         8.3         same           0607513 </td <td>O60716-1</td> <td>CTNND1</td> <td>EPNEDC*KPB</td> <td>C516</td> <td>NOXO1</td> <td>6.09</td> <td>8 25</td> <td>same</td> <td></td>	O60716-1	CTNND1	EPNEDC*KPB	C516	NOXO1	6.09	8 25	same	
OG0716-1         CINND1         HIEWESVLINTAGC*LR         C533         NCF1         0.00         0.00         same           O60716-1         CTND1         HIEWESVLINTAGC*LR         C533         NCF2         0.00         0.00         same           O60716-1         CTND1         HIEWESVLINTAGC*LR         C579;C581         NCF1         0.00         same           O60716-1         CTND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         same           O60716-1         CTND1         LVENC*VC*LR         C579;C581         NCF1         100.00         same           O60716-1         CTND1         LVENC*VC*LR         C579;C581         NCF1         100.00         same           O60716-1         CTND1         LVENC*VC*LR         C579;C581         NCF1         100.00         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         3.83         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         3.843         same           O60716-1         CT	000710-1	CTINIDI		CERR	NODI	0.00	0.20	Same	
O60716-1         CTNND1         HIEWESVLINTAGC*LR         C533         NCF2         0.00         same           O60716-1         CTNND1         HIEWESVLINTAGC*LR         C533         NCF1         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF2         0.00         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF1         100.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NCK1         100.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         1.82         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         3.75         0.00         same           O60716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         3.000         same	000710-1	CINNDI	HIEWESVLINIAGC'LK	0000	NOFI	0.00	0.00	same	
O60716-1         CTNND1         HIEWESVLTNTAGC*LR         C533         NOXO1         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCF1         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NCY1         1.62         0.00         same           O60716-1         CTNND1         LVENC*VC*LLR         C579;C581         NOXO1         1.62         0.00         same           O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOXO1         0.00         same           O60716-1         CTNND1         TPALLEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPALLEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPALLEASAGAIQNLC*AGR         C692         NCY1         3.75         0.00         same           O60716-1         CTNND1         TPALLEASAGAIQNLC*AGR         C692         NCY1         3.75         0.00         same           O60716-1         DNAJC13         VIHALSENELC*VR         C2082         NCF1         0.00	O60716-1	C'I'NND1	HIEWESVLTNTAGC*LR	C533	NCF2	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	O60716-1	CTNND1	HIEWESVLTNTAGC*LR	C533	NOXO1		0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	O60716-1	CTNND1	LVENC*VC*LLR	C579:C581	NCF1	0.00	0.00	same	
Control         Same           060716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOXO1         0.00         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         0.00         same           060716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOCF1         1.82         same           060716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NOCF1         1.84         same           060716-1         CTND1         TPAILEASAGAIQNLC*AGR         C692         NOCF1         0.00         same           075165         DNAJC13         VIHALSENELC*VR         C2082         NCF1<	060716 1	CTNND1	IVENC*VC*LLB	C570-C581	NCF2	0.00	0.00	samo	
Observer         Construction         Construction <td>000710-1</td> <td>CTINIDI</td> <td>LVENC*VC*LLD</td> <td>GF70 GF01</td> <td>NOVOI</td> <td>1.00</td> <td>0.00</td> <td>Same</td> <td></td>	000710-1	CTINIDI	LVENC*VC*LLD	GF70 GF01	NOVOI	1.00	0.00	Same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	000/10-1	GINNDI	LVENU" VU"LLK	C579;C581	NOXOI	1.62	0.00	same	
O60716-1         CTNND1         YQEAAPNVANNTGPHAASC*FGAK         C618         NOXO1         0.00         0.00         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF2         4.71         1.82         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOXO1         3.75         0.00         same           O60822-1         DKC1         TTHYTPLAC*GSNPLKR         C74         NCF1         0.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         0.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         0.00         same           O75179-1         ANKRD17         FC*ELLIGR         C1336         NCF2         0.00         same           O75330-1	O60716-1	CTNND1	YQEAAPNVANNTGPHAASC*FGAK	C618	NCF1		100.00	same	
O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF1         5.92         3.75         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NCF2         4.71         1.82         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOCF2         4.71         1.82         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOX01         3.75         0.00         same           O60832-1         DKC1         TTHYTPLAC*GSNPLKR         C74         NCF1         0.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NOX01         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NOX01         100.00         same           O75179-1         ANKRD17         FC*ELLIGR         C1336         NCF2         0.00         same           O75323-1         GBAS         IC*QEVLPK         C93         NCF2         0.00         same           O75330-1	O60716-1	CTNND1	YQEAAPNVANNTGPHAASC*FGAK	C618	NOXO1	0.00	0.00	same	
Octorio-1       CTNND1       THALLANGALQNLC*AGR       C692       NCF1       0.32       0.11       1.32       same         O60716-1       CTNND1       TPAILEASAGAIQNLC*AGR       C692       NOX01       3.75       0.00       same         O60716-1       CTNND1       TPAILEASAGAIQNLC*AGR       C692       NOX01       3.75       0.00       same         O60832-1       DKC1       TTHYTPLAC*GSNPLKR       C74       NCF1       0.00       same         O75131       CPNE3       EALAQC*VLAEIPQQVVGYFNTYK       C506       NCF1       38.43       same         O75165       DNAJC13       VIHALSENELC*VR       C2082       NCF2       100.00       same         O75165       DNAJC13       VIHALSENELC*VR       C2082       NOCF1       0.00       same         O75165       DNAJC13       VIHALSENELC*VR       C2082       NOCF1       0.00       same         O75179-1       ANKRD17       FC*ELLIGR       C1336       NCF2       0.00       same         O75323-1       MIPSNAP2       IC*QEVLPK       C93       NCF2       0.00       same         O75330-1       HMMR       LLEYIEEISC*ASDQVEK       C242       NCF1       0.00       same	060716 1	CTNND1	TPAILEASACAIONI C*ACB	C602	NCF1	5.02	3 75	samo	
Odof 16-1         CTNND1         TFAILEASAGAIQNLC*AGR         C092         NCP2         4.71         1.82         same           O60716-1         CTNND1         TPAILEASAGAIQNLC*AGR         C692         NOXO1         3.75         0.00         same           O60736-1         CTNND1         TTHYTPLAC*GSNPLKR         C74         NCF1         0.00         same           O60832-1         DKC1         TTHYTPLAC*GSNPLKR         C74         NCF1         0.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NOXO1         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NOXO1         100.00         same           O75179-1         ANKRD17         FC*ELIGR         C1336         NCF2         0.00         0.00         same           O75323-1         GBAS         IC*QEVLPK         C93         NCF2         0.00         5.67         same           O75330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         same           O75367-1         H2AFY	000710-1	CTNND1	TDAILEASACAIONI C*ACD	C602	NCEO	4.71	1.00	Same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	060716-1	CINNDI	TRAILEASAGAIQNLO AGR	0092	NCF2	4.71	1.82	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	O60716-1	CTNND1	TPAILEASAGAIQNLC*AGR	C692	NOXO1	3.75	0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	O60832-1	DKC1	TTHYTPLAC*GSNPLKR	C74	NCF1	0.00		same	
075165       DNAJC13       VIHALSENELC*VR       C2082       NCF1       0.00       same         075165       DNAJC13       VIHALSENELC*VR       C2082       NCF2       100.00       same         075165       DNAJC13       VIHALSENELC*VR       C2082       NCF2       100.00       same         075165       DNAJC13       VIHALSENELC*VR       C2082       NOCF1       0.00       same         075165       DNAJC13       VIHALSENELC*VR       C2082       NOXO1       100.00       same         075179-1       ANKRD17       FC*ELLIGR       C1336       NCF2       0.00       0.00       same         075323-1       GBAS       IC*QEVLPK       C93       NCF2       0.00       5.67       same         075330-1       HMMR       LLEYIEEISC*ASDQVEK       C242       NCF1       0.00       same         075330-1       HMMR       LLEYIEEISC*ASDQVEK       C242       NCF2       0.00       same         075367-1       H2AFY       NC*LALADDKK       C297       NOX01       0.00       same         07533-1       SF3B1       VQENC*IDLVGR       C1035       NCF1       0.00       0.00       same         075533-1       SF3B1	075131	CPNE3	EALAQC*VLAEIPOOVVGVENTVK	C506	NCF1	38 43		same	
Orbits         DNAJC13         VIHALSENELC*VR         C2082         NCF1         0.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCF2         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCC7         100.00         same           O75165         DNAJC13         VIHALSENELC*VR         C2082         NCV1         100.00         same           O75179-1         ANKRD17         FC*ELLIGR         C1336         NCF1         0.00         0.00         same           O75179-1         ANKRD17         FC*ELLIGR         C1336         NCF2         0.00         5.67         same           O75323-1         GBAS         IC*QEVLPK         C93         NCF2         0.00         same           O75330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         same           O75367-1         H2AFY         NC*LALADDKK         C297         NCF1         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         N	075165	DNATCHO	VIIIALCENEL CAND	C0000	NODI	00.40	0.00	Same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	070100	DINAJU13	VIIIALSENELU'VA	02082	NOFT		0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	075165	DNAJC13	VIHALSENELC*VR	C2082	NCF2		100.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	O75165	DNAJC13	VIHALSENELC*VR	C2082	NOXO1		100.00	same	
C15112 I. MIRRD11       FC*ELLIGR       C1336       NCF1       0.00       same         O75179-1       ANKD17       FC*ELLIGR       C1336       NCF2       0.00       same         O75179-1       GBAS       IC*QEVLPK       C93       NCF2       0.00       5.67       same         O75323-1       MMR       LLEYIEEISC*ASDQVEK       C242       NCF2       0.00       same         O75330-1       HMMR       LLEYIEEISC*ASDQVEK       C242       NCF2       0.00       same         O75330-1       HMR       LLEYIEEISC*ASDQVEK       C242       NCF2       0.00       same         O75367-1       H2AFY       NC*LALADDKK       C297       NCF1       0.00       0.00       same         O753361-1       H2AFY       NC*LALADDKK       C297       NCF1       0.00       same         O753351       SF3B1       VQENC*IDLVGR       C1035       NCF1       12.49       9.99       same         O75533-1       SF3B1       IC*FELLELK       C1059       NCF1       0.00       0.00       same         O75533-1       SF3B1       VAIGPC*R       C1044       NCF1       0.00       0.00       same         O75533-1       SF3B1	075179-1	ANKRD17	FC*ELLIGB	C1336	NCF1	0.00	0.00	samo	
Orbit/s-1         ANKRD17         FC*ELLIGK         C133b         NCF2         0.00         0.00         same           075323-1         GBAS NIPSNAP2         IC*QEVLPK         C93         NCF2         0.00         5.67         same           075330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         same           075330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         same           075367-1         H2AFY         NC*LALADDKK         C297         NCF1         0.00         same           075367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           075333-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           075533-1         SF3B1         IC*FELLELK         C1059         NCF1         0.00         0.00         same           075533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           075533-1         SF3B1         VAIGPC*R         C1059         NCF2         0.00         0.00         same           075533-1	075170-1	ANIZDD17	EC*ELLICD	C1000	NCDO	0.00	0.00	same	
O75323-1         GBAS NIPSNAP2         IC*QEVLPK         C93         NCF2         0.00         5.67         same           075330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         0.00         same           075330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF2         0.00         same           075330-1         HMR         LLEYIEEISC*ASDQVEK         C242         NCF2         0.00         same           075367-1         H2AFY         NC*LALADDKK         C297         NCK1         0.00         same           075337-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           075533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         0.00         same           075533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           075533-1         SF3B1         VAIGPC*R         C1059         NCF2         0.00         0.00         same           075533-1         SF3B1         VAIGPC*R         C1044         NCF1         0.00         0.00         same	0/01/9-1	ANKKD1/	rt Elligh	01330	NCF2	0.00	0.00	same	
OT533-1         NIPSNAP2         IC QEVEN         C35         NCP2         0.00         5.07         same           O75330-1         HMMR         LLEYIEISC*ASDQVEK         C242         NCF1         0.00         same           O75330-1         HMMR         LLEYIEISC*ASDQVEK         C242         NCF2         0.00         same           O753367-1         H2AFY         NC*LALADDKK         C297         NCF1         0.00         same           O753367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           O753367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1044         NCF1         0.00         0.00         same	075322 1	GBAS	IC*OFVLPK	Cos	NCE2	0.00	5.67	69.000	
O75330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF1         0.00         0.00         same           O75330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF2         0.00         same           O75330-1         HMMR         LLEYIEEISC*ASDQVEK         C242         NCF2         0.00         same           O75336-1         H2AFY         NC*LALADDKK         C297         NCK1         0.00         same           O75336-1         H2AFY         NC*LALADDKK         C297         NOXO1         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1059         NCF2         0.00         0.00         same	010020-1	NIPSNAP2	10 QEVERN	095	INCF 2	0.00	0.07	same	
Ortsold 1         HMMR         LLEYHEISC/ASDQVEK         C242         NOT1         0.00         Same           075330-1         HMMR         LLEYHEISC/ASDQVEK         C242         NCF2         0.00         same           0753367-1         H2AFY         NC*LALADDKK         C297         NCF1         0.00         same           0753367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           0753367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           075337-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           075533-1         SF3B1         IC*FELLELK         C1059         NCF1         0.00         0.00         same           075533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           075533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         0.00         same	075330-1	HMMB	LLEYIEEISC*ASDOVEK	C242	NCF1	0.00	0.00	same	
O75330-1         HMIMIN         LDE HEELSC ASDQVER         C242         NCF2         0.00         same           O75367-1         H2AFY         NC*LALADDKK         C297         NCF1         0.00         0.00         same           O75367-1         H2AFY         NC*LALADDKK         C297         NCK1         0.00         same           O75367-1         H2AFY         NC*LALADDKK         C297         NOX01         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         0.00         same	075220 1	UMMD	LIEVIEEISC*ASDOVEV	C242	NCED	0.00	0.00	Same	
Of536/-1         HZAFY         NC*LALADDKK         C297         NCF1         0.00         0.00         same           O75367-1         H2AFY         NC*LALADDKK         C297         NOXO1         0.00         same           O753367-1         H2AFY         NC*LALADDKK         C297         NOXO1         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         0.00         same	01000-1	111VIIVIR	NOT ALADDING ASDAVER	0242	NOF2	0.00	0.00	same	
O75387-1         H2AFY         NC*LALADDKK         C297         NOXO1         0.00         same           O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF2         0.00         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF2         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         same	075367-1	H2AFY	NU*LALADDKK	C297	NCF1	0.00	0.00	same	
O75533-1         SF3B1         VQENC*IDLVGR         C1035         NCF1         12.49         9.99         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         same           O75533-1         SF3B1         IC*FELLELK         C1059         NCF2         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         same	O75367-1	H2AFY	NC*LALADDKK	C297	NOXO1	0.00		same	
O75533-1         SF3B1         IC*FELLELLK         C1059         NCF1         0.00         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF2         0.00         same           O75533-1         SF3B1         IC*FELLELLK         C1059         NCF2         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         same	O75533-1	SF3B1	VOENC*IDLVGR	C1035	NCF1	12.49	9,99	same	
O75533-1         SF3B1         IC*FELLELIK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELIK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         IC*FELLELIK         C1059         NCF1         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         0.00         same	075532 1	SE3D1	IC*FELLELLK	C1050	NCEL	0.00	0.00	camo	
O75533-1         SF3B1         IC*FELLELLK         C1059         NCF2         0.00         0.00         same           O75533-1         SF3B1         VAIGPC*R         C1244         NCF1         0.00         0.00         same	070000-1	OF OD 1	IO FELELLIN	C1059	NCDO	0.00	0.00	same	
O75533-1 SF3B1 VAIGPC*R C1244 NCF1 0.00 0.00 same	075533-1	SF3B1	IC*FELLELLK	C1059	NCF2	0.00	0.00	same	
Continued on port page	O75533-1	SF3B1	VAIGPC*R	C1244	NCF1	0.00	0.00	same	
			Continued	on nort -	0.00				

Table 2A.2 –	continued from	n previous page
	commada mom	provious pugo

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
O75533-1	SF3B1	MLQYC*LQGLFHPAR	C1250	NCF1	0.00		same	
O75533-1	SF3B1	MLQYC*LQGLFHPAR	C1250	NCF1	0.00	0.00	same	
O75533-1	SF3B1	VKPYLPQIC*GTVLWR	C933	NCF1	0.00	0.00	same	
O75534	CSDE1	LLTSYGFIQC*SER	C42	NCF1	0.00	0.00	same	
O75534	CSDE1	QRPGQQVATC*VR	C506	NCF1	0.00	0.00	same	
O75643-1	SNRNP200	DILC*GAADEVLAVLK	C133	NCF1	0.00	0.00	same	
O75643-1	SNRNP200	DILC*GAADEVLAVLK	C133	NCF2	0.00	0.00	same	
O75643-1	SNRNP200	DILC*GAADEVLAVLK	C133	NOXO1	0.00	0.00	same	
O75643-1	SNRNP200	AALETDENLLLC*APTGAGK	C502	NCF1	0.00	0.00	same	
O75643-1	SNRNP200	TNVALMC*MLR	C516	NCF2	100.00		same	
O75643-1	SNRNP200	LATYGITVAELTGDHQLC*K	C576	NCF1	0.00	0.00	same	
O75683	SURF6	KAEEATEAQEVVEATPEGAC*TEPR	C189	NCF1	0.00	0.00	same	
O76021	RSL1D1	EINDC*IGGTVLNISK	C197	NOXO1	100.00	100.00	same	
076021	RSL1D1	SGSC*SAIR	C211	NCF1	14.54	18.27	same	
076021	RSL1D1	SGSC*SAIR	C211	NOXO1	0.00	3.21	same	
076021	RSL1D1	AVDALLTHC*K	C47	NCF1	0.00	0.00	same	
076021	RSL1D1	KAVDALLTHC*K	C47	NCF1	0.00	0.00	same	
076021	RSL1D1	AVDALLTHC*K	C47	NCF2	0.00	0.00	same	
076021	RSLIDI	AVDALLTHC*K	C47	NOXO1	0.00	0.00	same	
095218-1	ZRANB2	VSDGDWIC*PDKK	C15	NCF1	0.00		same	
095218-1	ZRANB2	C*GNVNFAR	C20	NCFI	23.92	28.65	same	
095218-1	ZRANB2	TC*SNVNWAR	C74	NCF1	0.00	0.00	same	
095361-1	TRIM16	EAELQC*TQLDLER	C178	NCF2		100.00	same	
095372	LYPLA2	DLAILQC*HGELDPMVPVR	C171	NCFI	14.93	10.17	same	
095372	LYPLA2	DLAILQC*HGELDPMVPVR	C171 C210	NCF2	5.03	6.15	same	
095372	LYPLA2	TYPGVMHSSC*PQEMAAVK	C213	NCFI	0.00	4.30	same	
095372	LYPLA2	YIC*PHAPR	C56	NCFI	12.00	10.48	same	
095372	LYPLA2	YIC*PHAPR	C56	NCF2	0.00	0.00	same	
095372	LYPLA2	YIC*PHAPR	C56	NOXOI	0.00	0.00	same	
095373	IP07	VLTGVAGEDAEC*HAAK	C736	NCFI	0.00	0.00	same	
095373	IP07	VLTGVAGEDAEC*HAAK	C736	NCF2	0.00	0.00	same	
095373	IP07	VLTGVAGEDAEC*HAAK	C736	NOXOI	0.00		same	
O95373	IP07	GIDQC*IPLFVEAALER	C757	NCF2		100.00	same	
O95391	SLU7	YSYC*TGEAGK	C455	NCF1	0.00		same	
095551-1	TDP2	C*GGLPNNIVDVWEFLGKPK	C273	NCF2	0.00		same	
095573	ACSL3	LLLC*GGAPLSATTQR	C450	NCFI		0.00	same	
095573	ACSL3	LLLC*GGAPLSATTQR	C450	NCF2	0.00	0.00	same	
095573	ACSL3	LLLC*GGAPLSATTQR	C450	NOXOI	0.00	0.00	same	
095573	ACSL3	VGAPLVC*C*EIK	C503;C504	NCFI	0.00	0.00	same	
095573	ACSL3	VGAPLVC*C*EIK	C503;C504	NCF2	0.00		same	
095573	ACSL3	VGAPLVC*C*EIK	C503;C504	NOXOI	0.00	0.00	same	
095782	AP2A1	QSAALC*LLR OGAALC*LLD	0171	NCF2	0.00	0.00	same	
D00220 1	APZAI	QSAALC"LLR DDVELSVDG*ILGONGISDLVV	C171 C2002	NOXOI	0.00	0.00	same	
P00338-1	LDHA	DDVFLSVPC*ILGQNGISDLVK	C293	NOFI	0.00		same	
P00390	GSR	LPVMTMIPDVDC*LLWAIGR	C328	NCFI	0.00	0.00	same	
P00390	GSR	LPVMTMIPDVDC*LLWAIGR	C328	NCF2	0.00	0.00	same	
P00390	GSR	GIYAVGDVC*GK GIYAVGDVC*GK	C377	NCFI	100.00		same	
P00390	GSR	GIYAVGDVC*GK	C377	NCF2	100.00		same	
P00390	GSR	GIYAVGDVC*GK	C377	NOXOI	100.00		same	
P00505	GOT2 COT2	NLDKEYLPIGGLAEFC*K	C106	NCFI	0.00	0.00	same	
P00505	GOT2 COT2	NLDKEYLPIGGLAEFC*K	C106	NCF2	0.00	0.00	same	
P00505	GOT2 COT2	VGAF I MVC*K	C295	NCFI	0.00	0.00	same	
P00505	GOT2 COT2	VGAF I MVC*K	C295	NOF2	0.00	0.00	same	
P00505	GO12 ECED	VGAF I MVU <sup>*</sup> K TDI I SSI SATSNINSTVA C*IDD	C295	NOXOI	0.00	0.00	same	LIDID
P00533-1	EGFL	TPLLSSLSATSNINSTVAC IDA	C1049	NCFI	17.74	97.45	same	
P00533-1 D00522 1	EGFL	TPLLSSLSATSNINSTVAC IDA	C1049	NOF2	30.38	37.45	same	
F00555-1	EGFL	IFLESSESATSINIST VACTUR	C1049	NOXOI	40.92	39.10	same	LIFID
F00555-1	EGFL	ESNNDAL C*NVESIOWD	C1058	NOT	09.10	68 50	same	DIGILIEID
F00555-1	EGFL	FSNNFALC'NVESIQWR	C157	NCE2	02.30	70.97	same	DISULFID
F00555-1	EGFL	FSNNFALC'NVESIQWR	C157	NOF2	08.09	10.87	same	DISULFID
1 00555-1	EGFR	FSIGHTALC INVESTOWIC	0157	NOAOI	92.99	90.11	same	DISULFID.
P00533-1	EGFR	IIC*AQQC*SGR	C215;C219	NCF1	95.46	95.79	same	DISULFID,
								DISCHIE
P00533-1	FCFR	UC*AOOC*SCB	C215-C210	NCF2	100.00	100.00	samo	DISULFID;
1 00000-1	LGFI	ne Aqqe San	0210,0213	NOF 2	100.00	100.00	same	DISULFID
								DISULFID
P00533-1	EGFR	IIC*AQQC*SGR	C215;C219	NOXO1	100.00	100.00	same	DISULFID,
								DISCHIE
P00533-1	EGEB	ESDC*LVC*B	C248.C251	NCF1	100.00	100.00	same	DISULFID;
1 00000-1	LOIR	ESEC EVO R	0240,0201	11011	100.00	100.00	Same	DISULFID
								DISULFID
P00533-1	EGFR	ESDC*LVC*R	C248;C251	NCF2	100.00	100.00	same	DISULFID,
P00533-1	EGFR	ESDC*LVC*R	C248:C251	NOXO1	100.00	100.00	same	DISULFID;
								DISULFID
P00533-1	EGFR	FRDEATC*K	C260	NCF1	71.13	67.21	same	DISULFID
P00533-1	EGFR	FRDEATC*K	C260	NCF2	77.61	80.09	same	DISULFID
P00533-1	EGFB	FRDEATC*K	C260	NOX01	93 19	95.05	same	DISULFID
P00533-1	EGFR	DTC*PPLMLYNPTTYOMDVNPECK	C264	NOX01	100.00	100.00	same	DISULFID
P00533-1	EGFB	YSFGATC*VK	C291	NCF2	62 65	63.82	same	DISULFID
P00533-1	EGFR	YSFGATC*VK	C291	NOXO1	85.47	87.63	same	DISULFID
P00533-1	EGFR	NYVVTDHGSC*VR	C307	NCF1	62.64	60.65	same	DISULFID
P00533-1	EGFR	NYVVTDHGSC*VR	C307	NCF2	71.66	73.77	same	DISULFID
P00533-1	EGFR	NYVVTDHGSC*VR	C307	NOXO1	91.53	92.76	same	DISULFID
P00533-1	EGFR	AC*GADSYEMEEDGVR	C311	NCF1	88.95		same	DISULFID
P00533-1	EGFR	AC*GADSYEMEEDGVR	C311	NCF2	100.00	90.49	same	DISULFID
		Continued	on nort -	2				
		Commuea	. οπ πεχι [	Jage				

ANXA1	C*LTAIVK C*LTAIVK	C263	NCF2	0.00	0.00	same
ANXAI	C*ATSKPAFFAFK	C203	NCEI	0.01 0.24	12.00	same
ANXAI	C*ATSKPAFFAFK	C270	NCF2	0.04	13.99	same
ANXAI	C*ATSKPAFFAFK	C270	NOXO1	0.00	0.00	same
ANXAI	UVALC*CCN	C210	NCF1	19.46	11.08	same
ANXAI	IIVALC*CCN	C343	NCF2	0.65	13 70	same
ANXAI	IIVALC*CCN	C343	NOXO1	9.00	0.00	same
ANAAI	ILVALO GGIV	0343	NOXOI	0.00	0.00	same
GAPDH	IISNASC*TTNC*LAPLAK	C152;C156	NCF1	0.00	0.00	same
GAPDH	IISNASC*TTNC*LAPLAK	C152;C156	NCF2	0.00	0.00	same
GAPDH	IISNASC*TTNC*LAPLAK	C152;C156	NOXO1		9.69	same
GAPDH	VPTANVSVVDLTC*R	C247	NCF1	27.86	19.60	same
GAPDH	VPTANVSVVDLTC*R	C247	NCF2	21.09	21.07	same
HLA-A	AYLDGTC*VEWLB	C188	NCF1	100.00	100.00	same
HLA-A	AYLDGTC*VEWLR	C188	NCF2	100.00	100.00	same
HLA-A	AYLDGTC*VEWLR	C188	NOXO1	100.00	100.00	same
RPN1	VAC*ITEQVLTLVNKR	C477	NCF2	0.00		same
RPN1	TEGSDLC*DR	C545	NCF1	0.00	0.00	same
RPN1	LKTEGSDLC*DR	C545	NCF1	28.76		same
RPN1	TEGSDLC*DR	C545	NCF2	0.00	0.00	same
RPN1	TEGSDLC*DR	C545	NOXO1	0.00	0.00	same
ATP1A1	IISANGC*K	C211	NCF1	0.00	0.00	same
ATP1A1	IISANGC*K	C211	NCF2	0.00	0.00	same
ATP1A1	IISANGC*K	C211	NOXO1	0.00	0.00	same
ATP1A1	NIAFFSTNC*VEGTAR	C249	NCF1	0.00	0.00	same
ATP1A1	NIAFFSTNC*VEGTAR	C249	NCF2	4.97	0.00	same
ATP1A1	NIAFFSTNC*VEGTAR	C249	NOXO1	0.00	0.00	same
ATP1A1	IAGLC*NR	C428	NCF1	0.00	0.00	same
ATP1A1	IAGLC*NR	C428	NCF2	0.00	0.00	same
ATP1A1	IAGLC*NR	C428	NOXO1	0.00	0.00	same
ATP1A1	C*IELC*C*GSVK	C459;C463;	NCF1	0.00	0.00	same
		C464			0.00	
ATP1A1	C*IELC*C*GSVK	C459;C463;	NOXO1	0.00		same
ATP1A1	C*SSILLHGK	C518	NCF1	11.27		same
ATP1A1	C*SSILLHGK	C518	NCF2	0.00	0.00	same
ATP1A1	AC*VVHGSDLK	C663	NCF1	2 45	1 78	same
ATP1A1	AC*VVHGSDLK	C663	NCF2	0.00	0.00	same
ATP1A1	AC*VVHGSDLK	C663	NOXO1	0.00	0.00	same
ATP1A1	LUVEGC*QR	C705	NCF1	2.21	8.92	same
ATP1A1	LIIVEGC*QR	C705	NOXO1	21.09		same
S100A8	LLETEC*PQYIR	C42	NCF1	0.00	0.00	same
S100A8	LLETEC*PQYIR	C42	NCF2	0.00	0.00	same
	Cont	inued on next r	age			
	Cont	mada on novi p	-48C			
		168				

<b>Table 2A.2</b> –	continued from	previous page	
ice	Positions	Bait (-) CAT	

C311

C311

C311

C311

C337

C337

C337

C470

C470

C506; C510;

C515

C506;C510;

C515

C506;C510;

C515

C539

C539

C539

C775

C775

C775

C950

C950

C950

C367

C367

C367

C367

C339

C339

C263

C263

NCF2

NOXO1

NOXO1

NOXO1

NCF1

NCF2

NOXO1

NCF2

NOXO1

NCF1

NCF1

NCF2

NOXO1

NCF1

NOXO1

NCF1

NCF2

79.82

96.31

100.00

90.57

62.71

76.33

83.63

100.00

82.93

100.00

100.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

25.17

9.32

7.99

9.26

0.00

0.00

Accession

P00533-1

P02533

P02533

P02533

P02533

P04075

P04075

P04083

P04083

P04083

P04083 P04083 P04083 P04083

P04083

P04083

P04406-1

P04406-1

P04406-1

P04406-1

P04406-1

P04439 P04439

P04439

P04843 P04843 P04843 P04843 P04843 P05023 P05023 P05023 P05023P05023 P05023 P05109

P05109

Protein

EGFR

EGFR

EGFB

EGFR

KRT14

KRT14

KRT14

KRT14

ALDOA

ALDOA

ANXA1

ANXA1

Sequence AC\*GADSYEMEEDGVRK

AC\*GADSYEMEEDGVR

VC\*NGIGIGEFK

VC\*NGIGIGEFK

VC\*NGIGIGEFK

NLC\*YANTINWK

NLC\*YANTINWK

C\*NLLEGEPR

C\*NLLEGEPR

C\*NLLEGEPR

C\*WMIDADSRPK C\*WMIDADSRPK

C\*WMIDADSRPK

ALANSLAC\*QGK

C\*LTAIVK

C\*LTAIVK

AC\*GADSYEMEEDGVRK

AC\*GADSYEMEEDGVRK

ATGQVC\*HALC\*SPEGC\*WGPEPR

ATGQVC\*HALC\*SPEGC\*WGPEPR

ATGQVC\*HALC\*SPEGC\*WGPEPR

EILDEAYVMASVDNPHVC\*R

EILDEAYVMASVDNPHVC\*R

EILDEAYVMASVDNPHVC\*R

YC\*MQLAQIQEMIGSVEEQLAQLR YC\*MQLAQIQEMIGSVEEQLAQLR

YC\*MQLAQIQEMIGSVEEQLAQLR

YC\*MQLAQIQEMIGSVEEQLAQLR ALANSLAC\*QGK

(+) CAT

84.63

100.00

100.00

94.61

62.20

73.40

83.45

100.00

100.00

100.00

100.00

100.00

88.35

100.00

100.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

21.02

90.16

15.36

1.87

0.00

Different

same

Function

DISULFID

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DISULFID

DISULFID

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Table 2A.2 –	continued from	previous	page
	D	D. 1/	

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P05120	SERPINB2	YYSSEPQAVDFLEC*AEEAR	C161	NCF1	0.00	0.00	same	DISULFID
P05120	SERPINB2	YYSSEPOAVDFLEC*AEEAB	C161	NCF2	0.00	0.00	same	DISULFID
D05120	SEDDIND2	VVSSEDOAVDELEC*AEEAD	C161	NOVOI	0.00	0.00	same	DISULFID
F03120	SERFIND2	I I SSEF QAV DELEC 'AEEAR	C101	NOXOI	0.00		same	DISULFID
P05120	SERPINB2	ITNC*ILFFGR	C405	NCF1	0.00	0.00	same	DISULFID
P05120	SERPINB2	ITNC*ILFFGR	C405	NCF2	2.77	2.07	same	DISULFID
P05120	SERPINB2	ITNC*ILFFGR	C405	NOXO1	0.00	0.00	same	DISULFID
P05141	SLC25A5	GTDIMYTGTLDC*WR	C257	NCF1	0.00	0.00	same	
P05141	SLC25A5	CTDIMVTCTI DC*WP	C257	NCE2	0.00	0.00	same	
F 05141	SLC25A5		0257	NOF 2	0.00	0.00	same	
P05141	SLC25A5	GTDIMYTGTLDC*WR	C257	NOXOI	0.00	0.00	same	
P05165-1	PCCA	MADEAVC*VGPAPTSK	C111	NCF1	6.45	5.34	same	
P05165-1	PCCA	MADEAVC*VGPAPTSK	C111	NCF2	100.00		same	
P05165 1	PCCA	MADEAVC*VGPAPTSK	C111	NCF2	12.16	11.00	samo	
DOF105-1	DCCA	MADEAUG*VGDADTGK	0111	NOVOI	12.10	11.50	same	
P05165-1	FUCA	MADEAVC VGFAFISK	CIII	NOXOI		0.00	same	
P05165-1	PCCA	MADEAVC*VGPAPTSK	C111	NOXO1	6.97	4.82	same	
P05165-1	PCCA	C*LAAEDVVFIGPDTHAIQAMGDK	C155	NCF1	0.00		same	
P05165-1	PCCA	C*LAAEDVVEIGPDTHAIOAMGDK	C155	NCF2	0.00	6.40	same	
1 00100 1		C*LAAEDVVEICDDTHAIOAMCDVIE	0100		0.00	0.10	ounio	
P05165-1	PCCA	C LAAEDV VFIGFDI HAIQAMGDKIE	C155	NCF2	6.10	14.48	same	
		SK						
P05165-1	PCCA	C*LAAEDVVFIGPDTHAIQAMGDK	C155	NOXO1	0.00	0.00	same	
Dovior -	DOC!	C*LAAEDVVFIGPDTHAIQAMGDKIE	~ ~ ~ ~		<b>z</b>			
P05165-1	PCCA	SK	C155	NOXOI	5.60	0.00	same	
DOFICE 1	DOOA	LOVEUDVERCHECKIEGI DI VOEMID	Caca	NODI	0.71	F 00		
F03103-1	FUCA	LQVERFVIECIIGLDLVQEMIK	0303	NOFI	3.71	5.20	same	
P05165-1	PCCA	LQVEHPVTEC*ITGLDLVQEMIR	C363	NCF2	100.00		same	
P05165-1	PCCA	LQVEHPVTEC*ITGLDLVQEMIR	C363	NCF2	0.00	2.71	same	
P05165-1	PCCA	LOVEHPVTEC*ITGLDLVOEMIB	C363	NOXO1	1.81	2 23	same	
DOF165 1	PCCA	INCWAVEC*P	C208	NOE1	14.65	4.49	same	
P05165-1	FUCA	INGWAVEC'R	0398	NOFI	14.05	4.48	same	
P05165-1	PCCA	INGWAVEC*R	C398	NCF2	4.33	8.73	same	
P05165-1	PCCA	INGWAVEC*R	C398	NOXO1	1.71	3.75	same	
P05165-1	PCCA	TVOC*LSB	C616	NCF1	15.88	16.86	same	
DOF105-1	DCCA	TVQO LDI	Colo	NOPI	10.00	10.00	same	
P05165-1	PCCA	TVQC*LSR	C616	NCF2	22.49	22.02	same	
P05165-1	PCCA	TVQC*LSR	C616	NOXO1	15.34	12.14	same	
P05165-1	PCCA	SVHC*QAGDTVGEGDLLVELE	C712	NCF2	0.00	0.00	same	
D05165 1	PCCA	SVHC*OACDTVCECDLLVELE	C712	NOVOI	0.00	0.00	00000	
F05105-1	DDLDO	A CALA DOT DUTING A CODEV	0712	NOXOI	0.00	0.00	same	
P05388	RPLP0	AGAIAPC*EVTVPAQNTGLGPEK	C119	NCF1	0.00		same	
			CEE2.CEEE.					DISULFID
P05556-1	ITGB1	FC*EC*DNFNC*DR	C553;C555;	NOXO1	100.00		same	DISULFID
1 00000 1	11001	TO DO DININO DIN	C560		100.00		ounio	DISULFID
								DISCHTID
								DISULFID
P05556-1	ITGB1	SNGLIC*GGNGVC*K	C568; C574	NCF1		100.00	same	DISULFID
								DISULFID
								DISULTID.
P05556-1	ITGB1	SNGLIC*GGNGVC*K	C568;C574	NOXO1	86.45		same	DISULFID
								DISULFID
DOFFEC 1	IMODI	C*DDI EALV	CCA	NODI	100.00	100.00		DIGULDID
P05556-1	ITGBI	C*DDLEALK	C64	NCFI	100.00	100.00	same	DISULFID
P05556-1	ITGB1	C*DDLEALK	C64	NOXO1	100.00	100.00	same	DISULFID
P05556-1	ITGB1	C*DDLEALKK	C64	NOXO1	100.00	100.00	same	DISULFID
D06722 1	ENO1	SC*NC*LLK	C227.C220	NOE1	0.00	0.00		
P00733-1	ENOI	NO LEEK	0331,0333	NOPI	0.00	0.00	same	
P06733-1	ENOI	VNQIGSVTESLQAC*K	C357	NCFI		0.00	same	
P07204	THBD	HIGTDC*DSGK	C480	NOXO1	100.00	100.00	same	DISULFID
P07339	CTSD	AIGAVPLIQGEYMIPC*EK	C329	NCF2	100.00	100.00	same	DISULFID
D07255	ANYAO	CI CTDEDELIEUC*ED	C122	NOE1	11 66	E 96		D100111D
r 07355	ANAAA		0133	NOFT	11.00	5.80	same	
P07355	ANXA2	GLGTDEDSLIEHC*SR	C133	NCF2	6.26	11.42	same	
P07355	ANXA2	GLGTDEDSLIEIIC*SR	C133	NOXO1	4.57	1.12	same	
P07355	ANXA2	MSTVHEILC*K	C9	NCF1	16.00	16.74	same	
D07255	ANXA9	MSTVHEIL C*K	CO	NCE2	20.52	17.64	como	
r 07355	ANAAA	MSTVIELC K	09	NOF 2	20.52	17.04	same	
P07355	ANXA2	MSTVHEILC*K	C9	NOXOI	6.17	6.06	same	
P07737	PFN1	C*YEMASHLR	C128	NCF1	0.00	0.00	same	
P07737	PFN1	C*YEMASHLR	C128	NCF2	0.00	0.00	same	
D07727	DEN1	C*VEMASULD	C128	NOVOI	0.00		00000	
F0//3/	F F IN I	C'IEMASHLK	0128	NOAOI	0.00		same	
P07900	HSP90AA1	VFIMDNC*EELIPEYLNFIR	C374	NCF1	0.00	0.00	same	
P08238	HSP90AB1	VFIMDSC*DELIPEYLNFIR	C366	NCF1	0.00	0.00	same	
P08238	HSP90AB1	VFIMDSC*DELIPEYLNFIR	C366	NCF2	0.00	0.00	same	
P08238	HSP00AB1	C*I FI FSFI AFDKENVKK	C412	NCF1	0.00	0.00	samo	
D00200	HCD00AD1	O*I ELECELAEDKENVKK	C412	NCEO	0.00	0.00	Same	
P08238	HSP90AB1	C"LELF SELAEDKEN Y KK	0412	NCF2	0.00	0.00	same	
P08240 1	SRPR	NVA A DI AVOI C*ESVANK	C363	NCF1	0.00	0.00	samo	
	SRPRA		0000	11011	0.00	0.00	Same	
	SRPR		<i>a</i>					
P08240-1	SBDDA	NVAADIAVQLC*ESVANKLEGK	C363	NCF1	0.00	3.16	same	
D09574	OVOI	DVC*TELD	C1071	NODI	0.00	0.00		
P08574	CYCI	DVC*TFLR	C271	NCFI	0.00	0.00	same	
P08574			C271	NCF2	0.00	0.00	same	
	CYC1	DVC*TFLR				0.00	same	
P08574	CYC1 CYC1	DVC*TFLR DVC*TFLR	C271	NOXO1	0.00	0.00		
P08574 P08670	CYC1 CYC1 VIM	DVC*TFLR DVC*TFLR OVOSITC*FVDALK	C271 C328	NOXO1 NCE2	0.00	100.00	samo	
P08574 P08670 P08670	CYC1 CYC1 VIM	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK	C271 C328	NOXO1 NCF2	0.00	100.00	same	
P08574 P08670 P08670	CYC1 CYC1 VIM VIM	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK	C271 C328 C328	NOXO1 NCF2 NOXO1	$0.00 \\ 100.00 \\ 100.00$	100.00 100.00	same same	
P08574 P08670 P08670	CYC1 CYC1 VIM VIM RPS17	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK	C271 C328 C328	NOXO1 NCF2 NOXO1	0.00 100.00 100.00	100.00 100.00	same	
P08574 P08670 P08670 P08708	CYC1 CYC1 VIM VIM RPS17 RPS17L	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK	C271 C328 C328 C35	NOXO1 NCF2 NOXO1 NCF1	$0.00 \\ 100.00 \\ 100.00 \\ 0.00$	100.00 100.00 0.00	same same	
P08574 P08670 P08670 P08708	CYC1 CYC1 VIM VIM RPS17 RPS17L RPS17	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK	C271 C328 C328 C35	NOXO1 NCF2 NOXO1 NCF1	0.00 100.00 100.00 0.00	100.00 100.00 0.00	same same same	
P08574 P08670 P08670 P08708 P08708	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK	C271 C328 C328 C35 C35	NOXO1 NCF2 NOXO1 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00	100.00 100.00 0.00	same same same same	
P08574 P08670 P08670 P08708 P08708	CYC1 CYC1 VIM RPS17 RPS171 RPS171 RPS171 RPS171	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK	C271 C328 C328 C35 C35	NOXO1 NCF2 NOXO1 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00	100.00 100.00 0.00	same same same	
P08574 P08670 P08670 P08708 P08708 P08708	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17L RPS17	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK	C271 C328 C328 C35 C35 C35	NOXO1 NCF2 NOXO1 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00	100.00 100.00 0.00	same same same same	
P08574 P08670 P08670 P08708 P08708 P08708	CYC1 CYC1 VIM RPS17 RPS171 RPS171 RPS171 RPS171 RPS171	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK	C271 C328 C328 C35 C35 C35	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1	0.00 100.00 100.00 0.00 0.00 0.00	100.00 100.00 0.00	same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08708 P08865	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17L RPS17L RPS17L RPS17L RPS14	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK	C271 C328 C328 C35 C35 C35 C35 C163	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1	0.00 100.00 100.00 0.00 0.00 0.00 0.00	100.00 100.00 0.00	same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865	CYC1 CYC1 VIM RPS17 RPS171 RPS17 RPS171 RPS171 RPS171 RPS171 RPS172 RPS172 RPS172	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK VVDIAIPC*NNK	C271 C328 C328 C35 C35 C35 C35 C163 C163	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2	$\begin{array}{c} 0.00 \\ 100.00 \\ 100.00 \\ 0.00 \\ 0.00 \\ 0.00 \\ 0.00 \\ 100.00 \\ 100.00 \end{array}$	100.00 100.00 0.00	same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08708 P08865 P08865	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17L RPS17L RPS17L RPSA RPSA	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK	C271 C328 C328 C35 C35 C35 C35 C163 C163	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00 0.00 0.00	100.00 100.00 0.00	same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865 P08865 P09651-1	CYC1 CYC1 VIM RPS17 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPSA RPSA HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR	C271 C328 C328 C35 C35 C35 C35 C163 C163 C163 C175	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NCF1	$\begin{array}{c} 0.00\\ 100.00\\ 100.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 100.00\\ 10.93\\ \end{array}$	100.00 100.00 0.00 100.00 100.00 17.21	same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08708 P08865 P08865 P09651-1 P09651-1	CYC1 CYC1 VIM RPS17 RPS171 RPS177 RPS171 RPS171 RPS171 RPS171 RPSA RPSA HNRNPA1 HNRNPA1	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR	C271 C328 C328 C35 C35 C35 C163 C163 C163 C175 C175	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00 0.00 100.00 10.00 10.93 2.38	100.00 100.00 0.00	same same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865 P09851-1 P09651-1 P09651-1	CYC1 CYC1 VIM RPS17 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPSA RPSA HNRNPA1 HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR	C271 C328 C328 C35 C35 C35 C163 C163 C163 C175 C175	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF1 NCF2 NCF1 NCF2 NOXO1	0.00 100.00 100.00 0.00 0.00 0.00 0.00 100.00 10.93 2.38 6.51	100.00 100.00 0.00 100.00 17.21 11.91 1.07	same same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865 P09651-1 P09651-1 P09651-1	CYC1 CYC1 VIM RPS17 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPS4 HNRNPA1 HNRNPA1 HNRNPA1	DVC*TFLR DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR	C271 C328 C328 C35 C35 C35 C163 C163 C163 C175 C175 C175 C175 C175	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NCF1 NCF2 NCF2 NOXO1	0.00 100.00 100.00 0.00 0.00 0.00 100.00 100.00 10.93 2.38 6.51 0.00	100.00 100.00 0.00 100.00 17.21 11.91 1.07	same same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08708 P08865 P09865- P09651-1 P09651-1 P09651-1	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17L RPS17L RPS17L RPS17L RPSA RPSA HNRNPA1 HNRNPA1 HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR SHFEQWGTLTDC*VVMR	C271 C328 C328 C35 C35 C35 C163 C163 C163 C175 C175 C175 C175 C175 C43	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NCF1 NCF2 NOXO1 NCF1	0.00 100.00 100.00 0.00 0.00 0.00 100.00 10.93 2.38 6.51 0.00	100.00 100.00 0.00 100.00 17.21 11.91 1.07	same same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865 P098651-1 P09651-1 P09651-1 P09651-1	CYC1 CYC1 VIM NIM RPS17 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPS171 RPS3 HNRNPA1 HNRNPA1 HNRNPA1 HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR SHFEQWGTLTDC*VVMR SHFEQWGTLTDC*VVMR	C271 C328 C328 C35 C35 C35 C163 C163 C175 C175 C175 C175 C175 C43 C43	NOXO1 NCF2 NOXO1 NCF1 NCF2 NCF2 NCF1 NCF2 NOXO1 NCF1 NCF1	0.00 100.00 100.00 0.00 0.00 0.00 100.00 10.93 2.38 6.51 0.00 6.20	100.00 100.00 0.00 100.00 17.21 11.91 1.07 3.64	same same same same same same same same	
P08574 P08670 P08708 P08708 P08708 P08708 P08865 P08651-1 P09651-1 P09651-1 P09651-1	CYC1 CYC1 VIM RPS17 RPS17L RPS17L RPS17L RPS17L RPS17L RPSA RPSA HNRNPA1 HNRNPA1 HNRNPA1 HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR SHFEQWGTLTDC*VVMR SHFEQWGTLTDC*VVMR	C271 C328 C328 C35 C35 C35 C163 C163 C163 C175 C175 C175 C175 C43 C43 C43	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF1 NCF2	0.00 100.00 100.00 0.00 0.00 0.00 100.00 100.00 10.93 2.38 6.51 0.00 6.20 0.00	100.00 100.00 0.00 17.21 11.91 1.07 3.64 0.00	same same same same same same same same	
P08574 P08670 P08670 P08708 P08708 P08708 P08865 P08865 P09851-1 P09651-1 P09651-1 P09651-1 P09651-1 P09651-1	CYC1 CYC1 VIM VIM RPS17 RPS17 RPS17 RPS17 RPS17 RPS17 RPS17 RPS17 RPS17 RPS17 RPS3 HNRNPA1 HNRNPA1 HNRNPA1 HNRNPA1	DVC*TFLR QVQSLTC*EVDALK QVQSLTC*EVDALK VC*EEIAIIPSKK VC*EEIAIIPSKK VC*EEIAIIPSKK YVDIAIPC*NNK YVDIAIPC*NNK YHTVNGHNC*EVR YHTVNGHNC*EVR YHTVNGHNC*EVR SHFEQWGTLTDC*VVMR SHFEQWGTLTDC*VVMR SHFEQWGTLTDC*VVMR SHFEQWGTLTDC*VVMR	C271 C328 C328 C35 C35 C35 C163 C163 C175 C175 C175 C175 C43 C43 C43 C43	NOXO1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF2 NOXO1 NCF1 NCF1 NCF1 NCF1 NCF1 NCF2	$\begin{array}{c} 0.00\\ 100.00\\ 100.00\\ 0.00\\ 0.00\\ 0.00\\ 10.00\\ 10.93\\ 2.38\\ 6.51\\ 0.00\\ 6.20\\ 0.00\\ 0.00\\ 0.00\\ \end{array}$	100.00 100.00 0.00 100.00 17.21 11.91 1.07 3.64 0.00 0.00	same same same same same same same same	

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P09758	TACSTD2	TLVRPSEHALVDNDGLYDPDC*DPEG	C108	NCF1		100.00	same	DISULFID
		R TIVDSEILAIVONDCIVDDDC*DDEC						
P09758	TACSTD2	B	C108	NOXO1	100.00		same	DISULFID
P09758	TACSTD2	MTVC*SPDGPGGR	C44	NCF1	85.49	86.63	same	
P09758	TACSTD2	MTVC*SPDGPGGR	C44	NCF2	100.00	100.00	same	
P09758	TACSTD2	MTVC*SPDGPGGR	C44	NOXO1	100.00	100.00	same	
P09758	TACSTD2	ALGSGMAVDC*STLTSK	C66	NCF1	90.85	93.61	same	
P09758	TACSTD2	ALGSGMAVDC*STLTSK	C66	NCF2	65.88		same	
P09758	TACSTD2	ALGSGMAVDC*STLTSK	C66	NOXO1	78.49		same	
P09874	PARP1	WYHPGC*FVK	C162	NCF1	0.00	0.00	same	
P09874	PARP1	VC*STNDLK	C256	NCF1	0.00	0.00	same	
P09874	PARP1	VC*STNDLK	C256	NCF2	0.00	0.00	same	
P09874	PARP1	VADGMVFGALLPC*EEC*SGQLVFK	C295;C298	NCF1	0.00	0.00	same	
P09874	PARPI	SDAYYC*TGDVTAWTK	C311	NCF1	0.00	0.00	same	
P09874	PARPI	ASLC*ISTK	C429	NCF1	0.00	0.00	same	
P0DMV8	HSPAIB USDA1A	C*QEVISWLDANTLAEKDEFEHK	C574	NCF1	12.27		same	
	HSPA1R	FLEOVC*NPUSCI VOCACCPCPCCF						
P0DMV8	HSPAIA	GAOGPK	C603	NCF1	0.00	0.00	same	
Dioros i			<b>CT0</b>	NOR				MOD RES;
P10599-1	TXN	C*MPTFQFFK	C73	NCF1	15.33		same	DISULFID
								MOD DEC
P10599-1	TXN	C*MPTFQFFK	C73	NCF1	10.82	8.43	same	MOD_RES;
								DISOLFID
P10599-1	TXN	C*MPTEOFEK	C:73	NCE2	8 4 8	12 35	same	MOD_RES;
1 10055-1	1711	O MILLI WILL	010	11012	0.40	12.00	Same	DISULFID
P10809	HSPD1	C*EFQDAYVLLSEK	C237	NCF1	0.00	0.00	same	
P10809	HSPD1	C*EFQDAYVLLSEK	C237	NCF2	6.80	0.00	same	
P10809	HSPD1	C*EFQDAYVLLSEK	C237	NOXO1	0.00	0.00	same	
P10809	HSPD1	C*IPALDSLTPANEDQK	C447	NCF2	0.00		same	
P10809	HSPD1	C*IPALDSLTPANEDQK	C447	NOXO1		24.70	same	
P11142-1	HSPA8	VC*NPIITK	C603	NCF1	0.00	0.00	same	
P11142-1	HSPA8	VC*NPIITK	C603	NCF2	0.00		same	
P11171-1	EPB41	VSLLDDTVYEC*VVEK	C224	NCF1		100.00	same	
P11279	LAMP1	C*NAEEHVR	C338	NCF2	100.00	100.00	same	DISULFID
P11279	LAMP1	C*NAEEHVR	C338	NOXO1	100.00	100.00	same	DISULFID
P11388-1	TOP2A	SFGSTC*QLSEK	C392	NCF1	0.00		same	
P11498	PC	ADFAQAC*QDAGVR	C131	NCF1	18.00	18.61	same	
P11498	PC	ADFAQAC*QDAGVR	C131	NCF2	18.57	19.24	same	
P11498	PC	ADFAQAC*QDAGVR	C131	NOXO1	9.47	8.51	same	
P11498	PC	INGC*AIQC*R	C372;C376	NCF1	2.84	4.06	same	
P11498	PC	INGC*AIQC*R	C372;C376	NCF2	6.09	6.41	same	
P11498	PC	AC*TELCID	C372;C376	NOXOI	1.98	1.83	same	
P11498	PC	AC*TELGIR	C56	NCED	10.49	12.13	same	
F11498	PC	AC*TELCIR	C56	NOY 01	2.84	5 21	same	
P11498	PC	FLVEC*PWB	C622	NCE1	13 /0	12.85	same	
P11498	PC	FLYEC*PWB	C622	NCF2	10.16	11.21	same	
P11498	PC	FLYEC*PWR	C622	NOXO1	5 35	3.61	same	
P11498	$\overline{PC}$	AGTHILC*IK	C739	NCF1	9.98	10.40	same	
P11498	$\mathbf{PC}$	AGTHILC*IK	C739	NCF2	10.49	12.40	same	
P11498	PC	AGTHILC*IK	C739	NOXO1	7.68	6.75	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NCF1	7.12		same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NCF1	10.86	10.16	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NCF1	14.16	5.70	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NCF2	16.47	9.85	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NCF2	13.54	9.14	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NOXO1	7.87	7.97	same	
P11498	PC	DMAGLLKPTAC*TMLVSSLR	C752	NOXO1	3.24	2.81	same	
F11498	PC	GLYAAFDC*TATMK CLYAAFDC*TATMK	C850	NCFI	17.83	14.04	same	
F11498 D11409	PC	GLYAAFDU" TATMK CLYAAFDC*TATMK	0850	NOF2	18.88	20.26	same	
1 11490 P11409	PC	GLVA AFDC*TATMK	C850	NOXOI	7.06	6 70	same	
P12277	CKB	FC*TGLTOIETLEK	C254	NCF1	1.00	0.79	same	
P13010	XBCC5	C*FSVLGFC*K	C339.C346	NCF1	0.00	0.00	same	
P13010	XRCC5	C*FSVLGFC*K	C339:C346	NCF2	0.00	5.00	same	
P13010	XRCC5	LFQC*LLHR	C493	NCF1	0.00	4.63	same	
P13639	EEF2	TFC*QLILDPIFK	C290	NCF1	0.00	0.00	same	
P13639	EEF2	STLTDSLVC*K	C41	NCF1	0.00	0.00	same	
P13639	EEF2	STLTDSLVC*K	C41	NCF2	0.00	0.00	same	
P13639	EEF2	STLTDSLVC*K	C41	NOXO1	0.00	0.00	same	
P13639	EEF2	YVEPIEDVPC*GNIVGLVGVDQFLVK	C466	NCF1	6.30	7.62	same	
P13639	EEF2	DLEEDHAC*IPIK	C567	NCF2	100.00		same	
P13639	EEF2	DLEEDHAC*IPIK	C567	NOXO1		100.00	same	
P13639	EEF2	ETVSEESNVLC*LSK	C591	NCF1		0.00	same	
P13639	EEF2	IWC*FGPDGTGPNILTDITK	C651	NCF1	0.00		same	
P13639	EEF2	EGALC*EENMR	C693	NCF1	0.00	0.00	same	
P13639	EEF2	EGALC*EENMR	C693	NCF2	0.00	0.00	same	
P13639	EEF2	EGALC*EENMR	C693	NOXO1	0.00	0.00	same	
P13639	EEF2	C*LYASVLTAQPR C*LYASVLTAODD	C728	NCF1	0.00	0.00	same	
P13639	EEF2	UTLYASVETAQPK	0728	NOXOI		0.00	same	
P13639	EEF2	B	C751	NCF1		0.00	same	
P13645	KBT10	AETEC*ONTEYOOLUDIK	C427	NCF1	100.00	100.00	samo	
P13645	KBT10	AETEC*ONTEYOOLLDIK	C427	NCF2	100.00	100.00	same	
P13646	KRT13	AGLENTVAETEC*B	C354	NCF1	19 46	19.95	same	
- 10010		Continue	on nort -	2000	10.10	10.00	Same	
		Continued	on next ]	bage				

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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P13646	KRT13	AGLENTVAETEC*R	C354	NCF2	19.04		same	
P13646	KRT13	AGLENTVAETEC*R	C354	NOXO1	25.07	32.94	same	
P13646	KRT13	SEMEC*QNQEYK	C383	NCF1	0.00	0.00	same	
P13646	KRT13	SEMEC*QNQEYK	C383	NCF2	0.00	0.00	same	
P13646	KRT13	SEMEC*QNQEYK	C383	NOXO1	0.00	0.00	same	
P13647	KRT5	KQC*ANLQNAIADAEQR	C407	NCF1	0.00	0.00	same	
P13647	KRT5	QC*ANLQNAIADAEQR	C407	NCF1	3.13	1.32	same	
P13647	KRT5	KQC*ANLQNAIADAEQR	C407	NCF2	0.00	0.00	same	
P13647	KRT5	QC*ANLQNAIADAEQR	C407	NCF2	8.77	10.39	same	
P13647	KRT5	KQC*ANLONAIADAEOR	C407	NOXO1	0.00		same	
P13647	KRT5	OC*ANLONAIADAEOR	C407	NOXO1	5.54	8.32	same	
P13647	KBT5	VSLAGAC*GVGGYGSB	C55	NCF1	15 77	13 32	same	
P13647	KBT5	VSLAGAC*GVGGYGSB	C55	NCF2	21.21	27.97	same	
P13647	KBT5	VSLAGAC*GVGGYGSB	C55	NOXOI	21.21	20.34	same	
P13804 1	ETEA	TIVACNALC*TVK	C155	NCE1	0.00	0.00	same	
D12804-1	ETEA	TIVACNALC*TVK	C155	NCE2	0.00	0.00	same	
D12004-1	ETFA	TIVACNALC*TVK	CISS	NOV01	0.00	0.00	same	
F 13604-1	CDFO	TTTAGNALO TVK	C155	NOADI	100.00	100.00	same	DIGULEID
P13987	CD59	FEHC*NFNDVTTR FEHC*NFNDVTTR	C70	NCFI	100.00	100.00	same	DISULFID
P13987	CD59	FEHC*NFNDVTTR	C70	NCF2	100.00	100.00	same	DISULFID
P13987	CD59	FEHC*NFNDV11R	C70	NOXOI	100.00	100.00	same	DISULFID
P14174	MIF	LLC*GLLAER	C81	NCFI	0.00	0.00	same	
P14598	NCF1	C*PHLLDFFK	C111	NCF2	100.00		same	
P14598	NCF1	C*PHLLDFFK	C111	NOXO1	100.00	100.00	same	
P14598	NCF1	SESGWWFC*QMK	C196	NCF1	4.20	4.25	same	
P14598	NCF1	SESGWWFC*QMK	C196	NCF1	9.60	8.98	same	
P14618	PKM	C*DENILWLDYK	C152	NCF1	100.00	100.00	same	
P14618	PKM	C*DENILWLDYK	C152	NCF2	100.00	100.00	same	
P14618	PKM	AGKPVIC*ATQMLESMIK	C326	NCF1		0.00	same	
P14618	PKM	AGKPVIC*ATQMLESMIK	C326	NCF2		63.06	same	
P14618	PKM	AGKPVIC*ATQMLESMIK	C326	NOXO1	0.00		same	
P14618	PKM	C*C*SGAIIVLTK	C423:C424	NCF1	0.00	0.00	same	
P14618	PKM	C*C*SGAUVLTK	C423:C424	NCF2	0.00	0.00	same	
P14618	PKM	C*C*SGAUVLTK	C423.C424	NOXO1	0.00	0.00	same	
P14618	PKM	GIFPVLC*K	C474	NCF1	0.00	0.00	same	
P14618	PKM	GIFPVLC*K	C474	NCF2	0.00	0.00	same	
P14618	PKM	GIFPVLC*K	C474	NOXOI	0.00	0.00	same	
D14619	DVM	NTCHC*TICDASD	C414	NCEI	10.00	8.07	same	
D14610	DVM	NTGHC TIGLASIC	C49	NOVOI	12.20	10.07	same	
D14670 1	CNDDD	C*ILODOD	C10	NCEI	10.08	10.97	same	
F14076-1	CNDDD	C'ILQDGR C*ILODGD	C19	NCFI	0.00	0.00	same	
P14678-1	SNRPB	C*ILQDGR C*ILQDGR	C19 C10	NCF2	0.00	0.00	same	
P14678-1	SNRPB	C*ILQDGR	C19	NOXOI	0.00	0.00	same	
P14866	HNRNPL	VFNVFC*LYGNVEK	C404	NCFI	0.00	0.00	same	
P14866	HNRNPL	VFNVFC*LYGNVEK	C404	NCF2	0.00		same	
P14866	HNRNPL	VFNVFC*LYGNVEK	C404	NOXOI	0.00		same	
P14866	HNRNPL	LC*FSTAQHAS	C581	NCF2	69.08	65.97	same	
P14923	JUP	C*TTSILHNLSHHR	C204	NCF1	8.06		same	
P14923	JUP	C*TTSILHNLSHHR	C204	NCF2	16.83	21.68	same	
P14923	JUP	C*TTSILHNLSHHR	C204	NOXO1	0.00	2.61	same	
P14923	JUP	VLSVC*PSNKPAIVEAGGMQALGK	C341	NCF1	0.00	0.00	same	
P14923	JUP	VLSVC*PSNKPAIVEAGGMQALGK	C341	NCF2	0.00	0.00	same	
P14923	JUP	VLSVC*PSNKPAIVEAGGMQALGK	C341	NOXO1	7.42	3.23	same	
D14002	IIID	ILVNQLSVDDVNVLTC*ATGTLSNLT	C110 C100	NODI		0.00		
P14923	JUP	C*NNSK	C410;C420	NCFI		0.00	same	
P14923	JUP	C*NNSK	C410;C420	NOXO1	0.00		same	
P14923	JUP	AGDKDDITEPAVC*ALR	C457	NCF1	10.00	9.70	same	
P14923	JUP	AGDKDDITEPAVC*ALR	C457	NCF2	11.79	11.63	same	
P14923	JUP	AGDKDDITEPAVC*ALR	C457	NOXO1	9.56	7.45	same	
P14923	JUP	GIMEEDEAC*GR	C49	NCF1	13.73	11.62	same	
P14923	JUP	GIMEEDEAC*GB	C49	NCF2	22.24	22.74	same	
P14923	JUP	GIMEEDEAC*GB	C49	NOXO1		36.28	same	
P14923	JUP	NLALC*PANHAPLOEAAVIPR	C511	NCF1	5.76	8.58	same	
P14923	JUP	NLALC*PANHAPLOEAAVIPR	C511	NCF2	11.02	9.57	same	
P14923	JUP	NLALC*PANHAPLOEAAVIPR	C511	NOXOI	7.56	8.83	same	
	0.01	VAAGVLC*ELAODKEAADAIDAECAS	0011			0.00	Samo	
P14923	JUP	A DI MEI I UCD	C609	NCF1	29.03		same	
D1 (000	IIID	VAAGVLC*ELAQDKEAADAIDAEGAS	Geog	NOVOI		10.10		
P14923	JUP	APLMELLHSR	C609	NOXOI		10.19	same	
P14923	JUP	EAMC*PGVSGEDSSLLLATQVEGQAT NLOB	C90	NCF2	20.47	13.25	same	
P1/023	IIIP	EAMC*PGVSGEDSSLLLATQVEGQAT	C90	NOXO1	7 30	0.00	62700	
F14925	JUF	NLQR	C90	NOAUI	10.00	0.00	same	
F 101/U-3	GSPTT	LEGGIONK	0465	NCFI	12.28	10.66	same	
P15170-3	GSPTI	LESGSIC*K	C465	NCF2	13.93	11.48	same	
P15170-3	GSPT1	GIEEEEILPGFILC*DPNNLC*HSGR	C519;C525	NCF1	0.00	0.00	same	
P15170-3	GSPT1	LKGIEEEEILPGFILC*DPNNLC*HS GB	C519; C525	NCF1	0.00	0.00	same	
P15311	EZB	EGILSDEIYC*PPETAVLLGSYAVQA	C117	NCF1	0.00	0.00	same	
1 10011	15211	K ECH SDEIVC*BBETAVI I CSVAVOA	0117	INCL I	0.00	0.00	saille	
P15311	EZR	K	C117	NCF2	0.00		same	
P15311	EZR	ILQLC*MGNHELYMR	C284	NCF1	0.00	0.00	same	
P15311	EZR	ILQLC*MGNHELYMR	C284	NCF2	0.00	0.00	same	
P15880	RPS2	IGKPHTVPC*K	C182	NCF1	2.34	4.34	same	
P15880	BPS2	IGKPHTVPC*K	C182	NOXOI	2.04	0.00	same	
P15880	RPS2	C*GSVLVR	C188	NCF1	0.00	0.00	same	
P15880	RPS2	C*GSVLVR	C188	NCF2	0.00	0.00	same	
- 10000	02	Continue	on nort		5.00	0.00	Same	
		Continiied	on next h	ыяе				

Table 2A.2 – continued	from	previous	page
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P15880	RPS2	C*GSVLVR	C188	NOXO1	0.00	0.00	same	
P15880	RPS2	LLMMAGIDDC*YTSAR	C222	NCF1	0.00	0.00	same	
P15880	RPS2	LLMMAGIDDC*YTSAR	C222	NCF2		0.00	same	
P15880	RPS2	LLMMAGIDDC*YTSAR	C222	NOXO1	0.00		same	
P15880	RPS2	GC*TATLGNFAK	C229	NCF1	3.75	1.95	same	
P15880	RPS2	GC*TATLGNFAK	C229	NCF2	0.00	0.00	same	
P15880	RPS2	GC*TATLGNFAK	C229	NOXO1	0.60	0.36	same	
P15924-1	DSP	ELDEC*FAQANDQMEILDSLIR	C110	NOXO1	0.00	0.00	same	
P15924-1	DSP	QMGQPC*DAYQK	C135	NOXO1	0.00		same	
P15924-1	DSP	LLEAQAC*TGGIIHPTTGQK	C2656	NCF1		0.00	same	
P15924-1	DSP	LLEAQAC*TGGIIHPTTGQK	C2656	NCF2	0.00		same	
P15924-1	DSP	MSC*NGGSHPR	C3	NOXO1	0.00	0.00	same	
P16144-2	ITGB4	VPSVELTNLYPYC*DYEMK	C1190	NOXO1	0.00	0.00	same	
P16144-2	ITGB4	C*ERPLQGYSVEYQLLNGGELHR	C1483	NCF1	0.00	0.00	same	
P16144-2	ITGB4	C*ERPLQGYSVEYQLLNGGELHR	C1483	NCF2	0.00	0.00	same	
P16144-2	ITGB4	C*ERPLQGYSVEYQLLNGGELHR	C1483	NOXO1	0.00	0.00	same	
D10144.0	ITTCD 4	RPNGDIVGYLVTC*EMAQGGGPATAF	C1 600	NODO	0.00	0.00		
P10144-2	IIGB4	R	C1608	NCF2	0.00	0.00	same	
		DDNCDIVCVIVTC*EMAOCCCDATAE						
P16144-2	ITGB4	RENGDIVGILVIC EMAQGGGFAIAF	C1608	NOXO1	0.00	0.00	same	
		R						
P16144-2	ITGB4	ISGNLDAPEGGFDAILQTAVC*TR	C245	NOXO1	100.00	100.00	same	DISULFID
P16144-2	ITGB4	C*HLDTTGTYTQYR	C288	NCF1	100.00	100.00	same	DISULFID
P16144-2	ITGB4	C*HLDTTGTYTOYR	C288	NCF2	100.00	100.00	same	DISULFID
P16144-2	ITGB4	C*HLDTTGTYTOYR	C288	NOXO1	100.00	100.00	same	DISULFID
P16144-2	ITGB4	ALEHVDGTHVC*OLPEDOK	C424	NCF2		100.00	same	DISULFID
P16144-2	ITGB4	ALEHVDGTHVC*OLPEDOK	C424	NOXO1	100.00	100.00	same	DISULFID
P16144-2	ITGB4	EGEDKPC*SGB	C512	NCE1	100.00	60.63	same	DISULFID
P16144-2	ITGB4	EGEDKPC*SGB	C512	NCF2	02 71	83 71	samo	DISULFID
P16144-2	ITCB4	EGEDKPC*SCB	C512	NOX01	100.00	100.00	same	DISULFID
D16144-2	ITCP4	TSCELC*NDP	C551	NCEI	100.00	77.02	same	DISULFID
D16144-2	ITCD4	TSGFLC NDR	CEEL	NCE2	100.00	100.00	same	DISULFID
F 10144-2 D16144-2	IIGB4	TSGFLC NDR TSCFL C*NDR	CEEL	NOF2	100.00	100.00	same	DISULFID
F10144-2	IIGD4	I SGFLC INDR	0351	NOAOI	100.00	100.00	same	DISULFID
P16144-2	ITGB4	C*NTQAELLAAGC*QR	C61;C72	NCF1	100.00	100.00	same	DISULFID;
								DISULFID
D10144.0	INCIDA		Ge1 G 20	NODO	100.00	100.00		DISULFID;
P16144-2	ITGB4	C*NTQAELLAAGC*QR	C61;C72	NCF2	100.00	100.00	same	DISULFID
								DIGULDID
P16144-2	ITGB4	C*NTQAELLAAGC*QR	C61;C72	NOXO1	100.00	100.00	same	DISULFID;
								DISULFID
								DISULFID:
P16144-2	ITGB4	TC*EEC*NFK	C648;C651	NCF2	100.00	100.00	same	DISULFID
P16144-2	ITGB4	TC*EEC*NFK	C648:C651	NOXO1	100.00	100.00	same	DISULFID;
1 10111 2	11001		0010,0001		100.00	100.00	buille	DISULFID
P16144-2	ITGB4	LC*TENLLKPDTB	C828	NCF1	0.00	0.00	same	
P16144-2	ITGB4	LC*TENLLKPDTB	C828	NCF2	0.00	0.00	same	
P16144-2	ITCB4	LC*TENLLKPDTB	C828	NOX01	0.00	0.00	same	
D16501 1	FED	LC TENEERIDIN LCVC*TOD	C628	NCE2	0.00	100.00	same	
P16591-1	FER	LIGVCTIQR	C627	NCF2	0.00	100.00	same	
P16591-1	FER	NC*LVGENNVLK	C690	NCFI	0.00	0.00	same	
P16591-1	FER	NC*LVGENNVLK	C690	NCF2	0.00	0.00	same	
P16591-1	FER	NC*LVGENNVLK	C690	NOXO1	0.00	0.00	same	
P16615	ATP2A2	TGTLTTNQMSVC*R	C364	NCF1	0.00	0.00	same	
P16615	ATP2A2	TGTLTTNQMSVC*R	C364	NCF2	0.00	0.00	same	
P16615	ATP2A2	TGTLTTNQMSVC*R	C364	NOXO1	0.00	0.00	same	
P16615	ATP2A2	VGEATETALTC*LVEK	C447	NCF1	0.00	0.00	same	
P16615	ATP2A2	VGEATETALTC*LVEK	C447	NCF2	0.00	0.00	same	
P16615	ATP2A2	VGEATETALTC*LVEK	C447	NOXO1	0.00	0.00	same	
P16615	ATP2A2	ANAC*NSVIK	C471	NCF1	0.00	0.00	same	
P16615	ATP2A2	ANAC*NSVIK	C471	NCF2	0.00	0.00	same	
P16615	ATP2A2	ANAC*NSVIK	C471	NOXO1	0.00	0.00	same	
P16615	ATP2A2	C*LALATHDNPLRR	C560	NOXO1	19.32		same	
P16615	ATP2A2	DAC*LNAR	C669	NCF1	0.00	0.00	same	
P16615	ATP2A2	DAC*LNAR	C669	NCF2	0.00	0.00	same	
P16615	ATP2A2	DAC*LNAR	C669	NOXO1	0.00	0.00	same	
P17844	DDX5	ELAQQVQQVAAEYC*R	C191	NCF1	0.00	0.00	same	
P17844	DDX5	ELAQQVQQVAAEYC*R	C191	NCF2	0.00	0.00	same	
P17844	DDX5	ELAQQVQQVAAEYC*R	C191	NOXO1	0.00	0.00	same	
P17844	DDX5	LIDFLEC*GK	C234	NCF1	2.31	0.00	same	
P17844	DDX5	LIDFLEC*GK	C234	NCF2	0.00	0.00	same	
P17844	DDX5	LIDFLEC*GK	C234	NOXO1	0.00	0.00	same	
P17987	TCP1	IC*DDELILIK	C357	NCF1	0.00	0.00	same	
P18124	RPL7	YGIIC*MEDLIHEIYTVGK	C186	NCF1	0.00		same	
P18583-5	SON	ANAAAMC*AK	C2070	NCF1	0.00	0.00	same	
P18583-5	SON	ANAAAMC*AK	C2070	NCF2	0.00	0.00	same	
P18583-5	SON	ANAAAMC*AK	C2070	NOXOI	0.00	0.00	same	
P18583-5	SON	C*VSVQTDPTDEIPTKK	C92	NCF1	0.00	0.00	same	
P18583-5	SON	C*VSVOTDPTDEIPTKK	C92	NCF2	5.00	0.00	same	
P18583-5	SON	C*VSVOTDPTDEIPTKK	C92	NOXOI		0.00	same	
P19012	KBT15	AGLENSLAETEC*P	C355	NCF1		25.00	same	
P19012	KRT1¤	ACLENSLAETEC*R	C355	NCE2	20.02	20.00	same	
P10012	KRT1¤	AGLENSLAETEC R	C355	NOT 2	20.00 21.60	99.10	same	
F 19012 D10019	KDT15	C*EMELONOEVK	C399	NOAUI	31.02	20.18	same	
P19012 D10010	KRI15	U EMEAQNQEYK C*EMEAONOENY	0380	NCFI	0.00	0.00	same	
F 19012	KRT15 KDT15	C *EMEAQNQEYK C*EMEAQNOEYK	C380	NOF2	0.00	0.00	same	
F19012	KRT15	O"EMEAQNQEYK DALNGCINK	C380	NOXO1	0.00	0.00	same	
F19338	NCL	EALNSU"NK	C543	NCF1	21.76		same	
P19338	NCL	EALNSC*NKR	C543	NCF1	100.00		same	
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P19338	NCL	EALNSC*NK	C543	NOXO1	86.65		same	
P10878	NCE2	AMEC*VWK	C165	NCE2	12.21	14.17	samo	
F 19070	NOF 2	AMEC VWK	C105	NOF2	12.21	14.17	same	
P19878	NCF2	GLVPC*NYLEPVELR	C291	NCF2	19.69	21.09	same	
P19878	NCF2	IC*FNIGC*MYTILK	C40;C45	NCF2	0.00	0.00	same	
P19878	NCF2	VEVEDC*ATTDLESTR	C514	NCF2	2.13	6.24	same	
D10979	NCE2	VEVEDC*ATTDI ESTER	C514	NCE2	10.25	21.09	como	
F19878	NOF 2	VEVEDUALIDLESIKK	0514	NCF2	19.25	21.08	same	
P19878	NCF2	VFVEDC*ATTDLESTR	C514	NOXO1	0.00	0.00	same	
P20700	LMNB1	C*QSLTEDLEFR	C198	NCF1	0.00		same	
P20700	LMNB1	C*OSI TEDI FEB	C108	NCE2	0.00	0.00	samo	
D00700	LIMNDI		C100	NOVOI	0.00	0.00	Same	
P20700	LMNBI	C*QSLTEDLEFR	C198	NOXOI	0.00		same	
P21333	FLNA	IVGPSGAAVPC*K	C1018	NOXO1	100.00	100.00	same	
P21333	FLNA	AHVVPC*FDASK	C1157	NOXO1	100.00	100.00	same	
D01222	FLNA	C*SCPCLER	C1165	NCEL	26.40		00000	
F 21333	DINA	C SGI GLER	01105	NGEO	20.40	1 - 44	same	
P21333	FLNA	C*SGPGLER	C1165	NCF2	11.40	17.44	same	
D01000	ET NA	LQVEPAVDTSGVQC*YGPGIEGQ0	GVF CLOCO	NODI	0.14	F7 4 F		
P21333	FLINA	R	C1260	NCFI	8.14	1.45	same	
		-•						
D01000	TT N A	LQVEPAVDTSGVQC*YGPGIEGQ0	GVF CLOCO	NCEO	0.00	0.00		
P21333	FLNA	R	C1260	NCF2	0.00	0.00	same	
		-•						
Dataaa	<b>TT 31</b>	ALGALVDSC*APGLC*PDWDSWD	ASK GOOT GOLD	NOR				
P21333	FLNA	PVTNAR	C205;C210	NCF1	0.00	0.00	same	
		I VINAL						
P21333	FLNA	ATC*APOHGAPGPGPADASK	C2543	NCF1	0.00	0.00	same	
D01222	FLNA	ATC*ADOUCADCDADASK	C2510	NCE2	0.00	0.00	Same	
P21333	FLNA	ATC APQHGAPGPGPADASK	C2543	NCF2	0.00	0.00	same	
P21333	FLNA	C*SYQPTMEGVHTVHVTFAGVPII	PR C444	NCF1	16.22	7.08	same	
P21333	FLNA	C*SYQPTMEGVHTVHVTFAGVPI	PR C444	NCF2	0.00	0.00	same	
P91333	FLNA	SPVTVTVCOAC*NPSAC*B	C478-C483	NCE1	0.00	0.00	samo	
F 21333	FLINA	SFITVIVGQAC NI SAC N	0478,0483	NOFT	0.00	0.00	same	
P21333	FLNA	SPYTVTVGQAC*NPSAC*R	C478;C483	NCF2	0.00		same	
P21333	FLNA	SPYTVTVGQAC*NPSAC*R	C478;C483	NOXO1	0.00	0.00	same	
D01222	FINA	VCTEC*CNOK	C574	NCEI	21.02	16.07		
F 21333	I LINA	VGILC GNQK	0574	NOFI	21.02	10.97	same	
P21333	FLNA	VGTEC*GNQK	C574	NCF2	15.37	15.46	same	
P21333	FLNA	YWPOEAGEYAVHVLC*NSEDIR	C649	NCF2		0.00	same	
D01222	FLNA	VOVODNECC*DVEALVK	0717	NCEL	0.00	5.00		
F 21333	FLINA	VQVQDNEGCFVEALVK	0/17	NOFI	0.90	5.29	same	
P21333	FLNA	VQVQDNEGC*PVEALVK	C717	NCF2	0.00	0.00	same	
P21333	FLNA	C*APGVVGPAEADIDEDIIB	C810	NCF1	5.26	5 63	same	
D01000	TH NA		C010	NGDO	0.20	0.00	Same	
P21333	FLNA	C*APGVVGPAEADIDFDIIR	0810	NCF2	0.00	0.00	same	
P21796	VDAC1	YQIDPDAC*FSAK	C232	NCF1	0.00		same	
P21796	VDAC1	VOIDPDAC*FSAK	C232	NCE2	0.00	0.00	same	
Do1500	VENCI	NOIDDDAG*DGAN	C202	NOVOI	0.00	0.00	Same	
P21796	VDACI	YQIDPDAC*FSAK	C232	NOXOI	0.00		same	
P21964-1	COMT	YLPDTLLLEEC*GLLR	C207	NCF1	0.00		same	
P22314	UBA1	VCFFC*HNB	C179	NCF1	0.00	0.00	samo	
1 22014 Deerse	CDAI		0115	NOPI	0.00	0.00	same	
P22528	SPRRIB	TKEPC*HPK	C41	NCF2	59.90		same	
P22528	SPRR1B	TKEPC*HPK	C41	NOXO1	56.40		same	
D22528	SPRR1B	VPEPC*HPK	C49	NCEL	0.00	0.00	00,000	
1 22528	SPREAD		043	NOPI	0.00	0.00	same	
P22528	SPRRIB	VPEPC*HPK	C49	NCF2	0.00		same	
P22528	SPRR1B	VPEPC*HPK	C49	NOXO1	0.00	0.00	same	
D22528	SDDD1D	VDEDC*ODK	057	NOVOI	25 77	24 55	00,000	
1 22020	STRICTS	VI LI O QI K	051	NOAOI	20.11	24.00	same	
P22626	HNRNPA-	ITDC*WWR	C50	NCF1	0.00	0.00	samo	
r 22020	2B1	LIDC VVMIL	0.50	NOFT	0.00	0.00	same	
	HNRNPA-							
P22626	0D1	LTDC*VVMR	C50	NCF1	7.90	1.77	same	
	2B1							
Doococ	HNRNPA-		CT-0	NCEO	0.00	0.00		
P22626	2B1	LIDC*VVMR	C50	NCF2	0.00	0.00	same	
	UNDNDA							
P22626	IIIIIIIA-	LTDC*VVMR	C50	NCF2	2.21	7.20	same	
	2B1							
Deces	HNRNPA-		<b>CF</b> 0	NOTO				
P22626	2B1	LTDC*VVMR	C50	NOXOI	0.00	0.00	same	
	UNDNDA							
P22626	HNRNPA-	LTDC*VVMB	C50	NOXO1	0.00	0.00	same	
	2B1		000		0.00	0.00	Same	
P22695	UQCRC2	NALANPLYC*PDYR	C192	NCF2	0.00	0.00	same	
P22605	UCCBCS	NALANPLYC*PDVP	C102	NOVOI	0.00	0.00	69700	
1 22095	0QCRC2	NALANFLIC FDIN	0192	NOAOI	0.00	0.00	same	
P23284	PPIB	DVIIADC*GK	C202	NCF2	100.00		same	MOD_RES
P23284	PPIB	DVIIADC*GK	C202	NOXO1	15.27		same	MOD RES
Baaaac :	<b>DD</b>	A GALLOUND						
P23396-1	RPS3	AC*YGVLR	C119	NCF1	4.44	4.87	same	
P23396-1	RPS3	AC*YGVLR	C119	NCF2		23.00	same	
D00006 1	BDCo	CLC*ALAOAESI P	C07	NCEL	0.00	0.00		
r 20090-1	111 33	GLO AIAQAESER	097	INCF I	0.00	0.00	same	
P23396-1	RPS3	GLC*AIAQAESLR	C97	NCF2	0.00	0.00	same	
P23396-1	RPS3	GLC*AIAQAESLR	C97	NOXO1	0.00	0.00	same	
P23526 1	AHOV	SKEDNLYGC*B	C105	NCEI	0.00	0.00	same	
1 20020-1	ATTOT		0193	NOPI	0.00	0.00	same	
P23526-1	AHCY	SKFDNLYGC*R	C195	NCF2	0.00	0.00	same	
P23526-1	AHCY	SKFDNLYGC*R	C195	NOXO1	0.00	0.00	same	
P2263/ 1	ATPOP4	FCDFCC*TVMEI P	C19.4	NOVOI	0.00	0.00	69700	
1 20004-1	AIT 2D4	EGDIGU IVMEER	024	NOADI	0.00	0.00	same	
P25398	RPS12	LVEALC*AEHQINLIK	C69	NCF1	0.00	0.00	same	
P25398	RPS12	LGEWVGLC*K	C92	NCF1	0.00	0.00	same	
P26006	ITCA?	SETVITC*ATCP	C004	NCEL	100.00	100.00	22000	DISULEID
1 20000	IIGAS	SETVERO ATGR	0904	NOFI	100.00	100.00	same	DISULFID
P26006	ITGA3	SETVLTC*ATGR	C904	NCF2		100.00	same	DISULFID
P26006	ITGA3	SETVLTC*ATGR	C904	NOXO1	100.00	100.00	same	DISULFID
D26269	UDAED	VC*DPDSVUP	CARA	NCET	0.00	0.00		
1 20308	UZAFZ	IC DEDSIGN	0404	INCEL	0.00	0.00	same	
P26368	U2AF2	YC*DPDSYHR	C464	NCF2		0.00	same	
P26368	U2AF2	YC*DPDSYHR	C464	NOXO1	0.00		same	
D07005	DDI 10	MISCHACADD	CIOF	NODI	0.00		Same	
P27635	RPL10	ML5C"AGADR	C105	NCF1	0.00		same	
P27635	RPL10	MLSC*AGADR	C105	NCF1	3.75	4.47	same	
P27635	<b>BPI.10</b>	MLSC*AGADB	C105	NCF2	25 48	31.80	same	
Dorcor		MI COM A CADD	0105	NOVOI	20.40	0.00	Same	
P27635	RPL10	MLSU"AGADR	C105	NOXOI	7.55	0.00	same	
DOTEOF	D D T 1 0	VDEFPLC*GHMVSDEYEQLSSEAL	EA CIO	MODI		0.00		
P27635	RPL10	AB	C49	NCF1		0.00	same	

Table $2A.2$ – continu	ed from	previous	page
	Positions	Bait	(-) CAT
*NK	C543	NOXO1	86.65

	. • 1	C	•	
Table 2A.2 -	- continued	from	previous	page

PF864         IDFA         DELVDIGIC*K         CH2         NCFL         6.00         man         DUDLED           P27665         AFEXL         IC*WNYDGLR         C65         NCF1         0.00         0.06         man         DUDLED           P27695         AFEXL         IC*WNYDGLR         C65         NCF2         0.00         0.06         man         DUDLED           P27695         AFEXL         IC*WNYDGLR         C65         NCF2         0.00         0.00         man         DUDLED           P27675         AARA         C*SLAPERDYLEX         C655         NCOX01         100.00         man         DUDLED           P27616         MAR4         C*SLAPERDYLEX         C655         NCOX01         100.00         0.00         man         DUDLED         <	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P27005         APEX1         IC*SWNVDGLR         C65         NCF1         0.00         0.00         mar.         MOD_PERT           P27005         APEX1         IC*SWNVDGLR         C65         NCF2         0.00         0.00         mar.         MOD_PERT           P27005         APEX1         IC*SWNVDGLR         C65         NOX01         0.00         0.00         mar.         MOD_PERT           P27005         APEX1         IC*SWNVDGLR         C65         NOX01         0.00         0.00         mar.         MOD_PERT           P27007         CALR         C*KDAEEDSVLKK         C163         NCF1         0.00         0.00         mar.         MOD_PERT           P28017         PERLA         RUNNSUNCK         C173         NCF1         0.00         0.00         mar.         METAL           P28000         FML         C*TEALQWTLK         C131         NCF1         0.00         0.00         mar.         METAL           P28001         FML         C*TEALQWTLK         C141         NCF1         0.00         0.00         mar.         METAL           P28001         FML         C*TEALQWTLK         C141         NCF1         0.00         mar.         METAL	P27694	RPA1	DSLVDIIGIC*K	C323	NCF1	0.00		same	
Description         Description         Description         Description         Description           P27005         APEXI         ICTSINVIDGLR         C65         NOK01         0.00         same         MOD_HER           P27005         APEXI         ICTSINVIDGLR         C65         NOK01         0.00         same         MOD_HER           P27015         ALAR         CTELEDETTILITUTEDETTEXK         C163         NCF1         0.00         same           P28015         SILVAC         VSCTQKLIKKK         C723         NCT1         0.00         same           P28017         EPILA3         NILVASSLICCK         C733         NCT1         0.00         same           P28017         EPILA3         NILVASSLICCK         C134         NCT1         0.00         same           P28001         FPIL2         CTOCRASLATK         C17         NCP1         0.01         <	P27695	APEX1	IC*SWNVDGLR	C65	NCF1	0.00	0.00	same	MOD_RES
P27695         AFEX1         ICTSWNYDGLR         C65         NCP2         0.00         0.00         same         MOD_DID MOD_DID MOD_DID MOD_DID           P27695         AFEX1         ICTSWNYDGLR         C65         NCX01         0.00         same         MOD_DID           P27875         CARR         CYRDEPTIDT_TUNREDTYTEVK         C635         NCX01         10.000         same           P27814         MARA         CYRDEPTIDT_TUNREDTYTEVK         C635         NCX01         10.000         same           P28171         EFMAA         NUNNSLICYK         C633         NCCP1         0.00         same           P28171         EFMAA         NUNNSLICYK         C733         NCCP1         0.00         same         METAL           P28380         PML         CTEAINWENCK         C133         NCCP1         0.00         same         METAL           P28380         PML         PTEAINWENCK         C133         NCCP1         0.00         same         METAL           P28380         PML         PTEAINWENCK         C144         NCP1         0.00         same         METAL           P28360         TFNC         MAPWWENAGCT-PASSIC/PYCGR         C19         NCP2         0.00         same									DISULFID
Particle         Construction          Past	P27605	APEY1	IC*SWNVDCLB	C65	NCF2	0.00	0.00	samo	MOD_RES
P97005         APFX1         ICPSWAVIGLR         C65         NGX01         0.00         same         MOD_BES           P97005         CALR         C'KDBEFTHLTEUNEPDATVEVK         C163         NCP1         0.00         same           P97057         CALR         C'KDBEFTHLTEUNEPDATVEVK         C163         NCP1         0.00         same           P90054         SL00A2         YSC-GEDERTR         C22         NCX01         0.00         same           P90054         SL00A2         YSC-GEDERTR         C22         NCX01         0.00         same           P90054         SL00A2         YSC-GEDERTR         C22         NCX01         0.00         same           P90051         BFL2         ELCTARATORY         C151         NCX01         0.00         same           P90051         BFL2         ELCTARATORY         C121         NCX01         0.00         same           P90051         BFL2         ELCTARATORY         C17         NCP1         0.40         same           P90051         NFL2         ELCTARATORY         C17         NCP1         0.40         same           P90051         NFL2         C41         NCV1         0.00         same	1 21035	AI EAT	10 SWIWDGIII	005	NOF 2	0.00	0.00	same	DISULFID
F2.000         AFEAL         C. SWADLALK         COS         AVAUL         0.00         0.00         0.00         SBRE         DISULADI           P27707         CARR         CKENDETHATLINGUENTERN         CIBS         NCP1         0.00         some           P27817-1         MAPA         C'SLAREINELER         CIBS         NCP1         0.00         some           P27817-1         MAPA         C'SLAREINELER         CIBS         NCP1         0.00         some           P38177         EPILA2         NUMYSENLYCK         C'SS         NCP1         0.00         some           P38177         EPILA2         NUMYSENLYCK         C'SS         NCP1         0.00         some           P38000         PML         C'TEARAWERK         CISS         NCP1         0.00         some           P38000-1         PL12         ELGTAQSCOPVDGR         CI44         NCP1         0.00         some           P38000-1         PL12         ELGTAQSCOPVDGR         CI44         NCP1         0.00         some           P38001-1         PL12         ELGTAQSCOPVDGR         CI44         NCP1         0.00         some           P38001         PL12         CTTOREVATSNLAPK         CIF	DOTCOF	A DEX 1		Cler	NOVOI	0.00	0.00		MOD_RES
P2757         CALR         C'KDEDETTILITURUPENT VEVK         C163         NCF1         0.00         mame           P2761-1         NUMA         VESCREDINTEXK         C023         NUXCI         0.00         0.00         mame           P2801-1         NUMA         VESCREDINTEXK         C023         NUXCI         0.00         0.00         mame           P2801-7         NUMA         VESCREDINTEXK         C153         NUXCI         0.00         0.00         mame           P2801-7         NUMA         VESCREDINTEXK         C153         NUXCI         0.00         0.00         mame           P2801-7         NULA         TETLATASTOCK         C151         NUXCI         0.00         0.00         mame           P2800-1         RUL         TETLATASTOCK/NUNGR         C141         NUCP         0.00         mame         P2800           P2800-1         RUL2         CTATASTOCK/NUNGR         C141         NUCP         0.00         mame         P2800           P2800-1         RUL2         CTATASTOCK/NUNGR         C141         NUCP         0.00         mame         P800           P3000-1         RUL2         CTATASTOCK/NUNGR         C141         NUCP         0.00         mame	F27095	AFEAI	IC SWINDGLR	005	NOXOI	0.00	0.00	same	DISULFID
P278.4.1         MAP4         C*SLPAEEDSVLER         C685         NC72         100.00         100.00         same           P278.4.1         MAP4         C*SLPAEEDSVLER         C685         NC71         100.00         100.00         same           P2817         PENA         NUNNNIVC*R         C753         NC41         100.00         0.00         same           P2817         PENA         NUNNNIVC*R         C753         NC41         10.00         0.00         same           P2817         PENA         NUNNNIVC*R         C753         NC41         0.00         0.00         same           P2800         PAL         C*PEANBORTVEA         C753         NC41         0.00         0.00         same           P2800         PAL         C*PEANBORTVEA         C74         NC41         0.00         same           P2800         PAL         C*PEANBORTVEAR         C17         NC42         0.00         same           P2800         PAL         PELOS         PELOS         NC47         0.00         same           P2800         PAL         C*PEANBORTVEAR         C19         NC47         0.00         same           P2800         PEL2         PELOSCOPCONCARSALAL	P27797	CALR	C*KDDEFTHLYTLIVRPDNTYEVK	C163	NCF1		0.00	same	
P17816.1         MAP4         C'SLPAEEDSYLEK         CG3         NXX11         100.00         mane           P3644         YENGEDETLEK         C23         NXX11         10.00         name           P3817         EPHA2         NILLYSNILVC*K         C733         NCT21         0.00         0.00         name           P3817         EPHA2         NILLYSNILVC*K         C733         NCX11         0.10         0.00         name           P3817         EPHA2         NILLNSNILVC*K         C733         NCX11         0.00         0.00         name           P3817         EPHA2         NILLNSNILVC*K         C733         NCX11         0.00         0.00         name           P38500         FAL         CTELTAQUECTVDER         C141         NCX11         0.00         0.00         came           P38500         FAL         CTEGEVGATSALAFK         C17         NCX21         0.00         0.00         came           P39501         FPL12         ELICTAQUECTVNDR         C141         NCX11         0.00         0.00         came           P39505         TSPO         MAPPWVMAGPTLAPELCCPVCSR         C19         NCX11         0.00         came           P39506         TSP	P27816-1	MAP4	C*SLPAEEDSVLEK	C635	NCF2	100.00	100.00	same	
P2803         SIDDA2         VSCP_QRUDPKE         C22         NXX01         0.00         same           P28037         EFILA2         NULNENNLVCK         CT53         NXC1         0.00         same           P28037         EFILA2         NULNENNLVCK         CT53         NXC1         0.00         same           P28030         FUL         CTFLAUQWTLK         CT53         NXC1         0.00         0.00         same           P28030         FUL         CTFLAUQWTLK         CT53         NXC1         0.00         0.00         same           P28030         FUL         CTFLAUQWTCWTORG         C14         NCF1         0.00         0.00         same           P280401         FP112         ELICAQEVGCTWTORG         C14         NCF3         0.00         same           P30531         TFD5         MAPFWVDAMCFTLAFELCCTVGSR         C19         NCG1         0.00         same           P30533         TFD5         MAPFWVDAMCFTLAFELCCTVGSR         C19         NCG1         0.00         same           P30534         TFD5         MAPFWVDAMCFTLAFELCCTVGSR         C13         NCA01         0.00         same           P30535         TFD5         MAPFWVDAMCFTLAFELCCTVGSR	P27816-1	MAP4	C*SLPAEEDSVLEK	C635	NOXO1	100.00	100.00	same	
P3837         EPILA2         NILVENEXC'R         C753         NCP1         0.00         0.00         ease           P3807         EPILA2         NILVENEXC'R         C753         NCP1         0.00         0.00         ease           P3807         EPILA2         CYFEAHQWFLK         C763         NCK01         0.00         0.00         ease           P38000         PML         CYFEAHQWFLK         C364         NCF1         0.00         0.00         ease           P30000-1         RF1.2         EPILCTAQSVCCYNDGR         C141         NCF2         0.00         0.00         ease           P30000-1         RF1.2         EPILCTAQSVCCYNDGR         C141         NCP2         0.00         0.00         ease           P3000-1         RF1.2         EPILCTAQSVCCYNDGR         C17         NCP2         0.00         0.00         ease         DISULPTD           P3000-1         RF1.2         EPILCTAQSVCCYNDGR         C19         NCP1         2.47         0.00         ease         DISULPTD           P30563         TSPO         MAPPWYTAMGFTLAPSLCCYTVGSR         C19         NCP1         0.00         ease         DISULPTD           P30564         RTP4         MIRCYACYSVSQAQR         C13<	P29034	S100A2	YSC*QEGDKFK	C22	NOXO1	0.00	0.00	same	
P3817         PFHAD         NILL SENIAVCK         CT33         NCP3         0.00         came           P38500         PAL         CTFARHQWFLK         C131         NCP1         0.00         came         METAL           P38500         PAL         CTFARHQWFLK         C131         NCP1         0.00         came         METAL           P38500         PAL         CTFARHQWFLK         C131         NCP1         0.00         came         METAL           P38000-1         PPL12         ELLCTAQSUCCHVDER         C141         NCP1         0.00         came           P30000-1         PPL12         ELLCTAQSUCCHVDER         C141         NCP2         0.00         0.00         came           P30000-1         RPL12         ELLCTAQSUCCHVDER         C141         NCP1         0.00         came         DISULPED           P30001-1         CPL3A         VCCTARTNTCHVER         C153         NCP1         0.00         came         DISULPED           P30010         FDLA         VCCTARTNTCHVER         C19         NCP1         0.00         came         DISULPED           P30036         TSPO         MAPPWVPAMOTLAPLCCPVCSK         C19         NCP1         0.00         came         DISULPED <td>P29317</td> <td>EPHA2</td> <td>NILVNSNLVC*K</td> <td>C753</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P29317	EPHA2	NILVNSNLVC*K	C753	NCF1	0.00	0.00	same	
P3837         PFHAD         NULNENU/CYC         CT53         NOXO1         0.30         0.00         same           P3850         PAL         TTENTC'R         C304         NOXO1         0.00         came           P3850         PAL         TTENTC'R         C304         NOXO1         0.00         came           P3850         PAL         CTDISAE[QQR         C327         NCF1         0.00         0.00         same           P3800-1         RFL12         ELLCTAQVCC-WNDGR         C141         NOXO1         0.00         0.00         same           P3800-1         RFL12         ELLCTAQVCC-WNDGR         C141         NOXO1         0.00         same           P3800-1         RFL13         CLCTAQVCC-WNDGR         C19         NCF1         2.17         0.00         same           P38030         TSPO         MAPPWVPAMACFLAFELCCTVGSR         C19         NC71         0.00         same           P38030         SIDA11         CTESLAVCK         C38         NCA1         0.00         same           P38040         SIDA11         CTESLAVCK         C38         NCA1         0.00         same           P38040         RTL2         MRCVACYSYSQAQK         C141	P29317	EPHA2	NILVNSNLVC*K	C753	NCF2	0.00	0.00	same	
P28500         PML         CPEAHQMPLK         COID         NGC10         0.00         some         METAL           P28500         PML         CDEARDAGR         C227         NCT1         0.00         some         METAL           P2000-1         RF12         ELGTAGSVCC*NVDCR         C141         NCF1         0.00         some           P2000-1         RF12         ELGTAGSVCC*NVDCR         C141         NCF2         0.00         some           P2000-1         RF12         ELGTAGSVCC*NVDCR         C141         NCF2         0.00         some           P2000-1         RF12         CTCCEVCATSNLCCTVNK         C15         NCF2         0.00         some           P2003-1         TEPO         NAPPWVPANGCTLAPELGC*FVGR         C13         NCF1         2.47         0.00         some           P2003-1         TEPO         NAPPWVPANGCK         C13         NCF1         0.00         some         DISULPU           P2003-1         TEPO         NAPPWVPANGCK         C13         NCF1         0.00         some         DISULPU           P2004         SIDAL         CYTCCEVANTAGK         C13         NCF1         0.00         some         DISULPU           P2004	P29317	EPHA2	NILVNSNLVC*K	C753	NOXO1	9.21	0.00	same	
22300         FAIL         TPLILENT-T         C.347         NUMPI         0.00         same           22300         FRL12         ELGTAGSVGC*NVDGR         C.141         NCF1         0.00         same           P0000-1         RFL12         ELGTAGSVGC*NVDGR         C.141         NCF2         0.00         0.00         same           P0000-1         RFL12         ELGTAGSVGC*NVDGR         C.141         NCF1         0.00         0.00         same           P0000-1         RFL12         ELGTAGSVGC*NVDGR         C.141         NCF2         0.00         0.00         same           P0000-1         RFL12         ELGTAGSVGC*NVDGR         C.14         NCF2         0.00         0.00         same           P0001         TPO         MAPPWVPAMGPTLAPSLGC*VGSR         C.19         NCF1         0.00         same           P00361         TSPO         MAPPWVPAMGPTLAPSLGC*VGSR         C.13         NCF1         0.00         same           P10301         CYELLAVEQK         C.13         NCF1         0.00         same         DISULPD           P10301         CYELLAVEQK         C.13         NCF1         0.00         same         DISULPD           P10301         SD14A         NCF	P29590	PML	C*FEAHQWFLK	C151	NCF1	0.00	0.00	same	METAL
500000         FORD         CT1         NCF1         0.000         same           500000-1         RFL12         ELICTAQSVCC*NVDCR         CT41         NCK21         0.000         same           500000-1         RFL12         ELICTAQSVCC*NVDCR         CT41         NCK21         0.000         same           500000-1         RFL12         ELICTAQSVCC*NVDCR         CT41         NCK21         0.000         same           500000-1         RFL21         ELICTAQSVCC*NVDCR         CT41         NCK21         0.000         same           500000-1         RFL2         ELICTAQSVCC*NVDCR         CT41         NCK21         0.000         same           500000-1         RFC0         MAPPWVPAMGPTLAPSLCC*VGSR         CT9         NCK71         0.000         same           500361         TSPO         MAPPWVPAMGPTLAPSLCC*VGSR         CT3         NCK71         0.000         same           510361         CTESLAVEQK         CT31         NCK71         0.000         same         DISULPID           511369         S100411         CTESLAVEQK         CT31         NCK71         0.000         same           512300         CTT2         ICTVENDAVEQK         CT34         NCK71         0.000	P29590	PML	TPTLTSIYC*R G*DISA BIOOD	C204	NOXOI	0.00	0.00	same	
Pages         PL12         PLIC/PAGNOC:*NUCCR         Cit11         NCP2         0.000         same           P3006-1         RFL12         PLIC/PAGNOC:*NUCCR         Cit11         NCP2         0.000         same           P3006-1         RFL12         PCTGGRVGTANSALAPK         Cit1         NCS2         0.000         same           P3006-1         RFL12         PLIGTAGSVGC*NVDCR         Cit1         NCS2         0.000         same           P3056         TSPO         MAPPWVPAMGTLAPSLGC*VGSR         C19         NCS2         0.00         same           P40568         TSPO         MAPPWVPAMGTLAPSLGC*VGSR         C19         NCS2         0.00         same           P40568         TSPO         MAPPWVPAMGTLAPSLGC*VGSR         C13         NCS2         0.00         same           P40569         SH0A1         C'TESLAFQK         C13         NCS2         0.00         same           P40869         SH0A11         C'TESLAFQK         C13         NCS2         0.00         same           P40869         SH0A11         C'TESLAFQK         C134         NCS1         0.00         same           P40869         RTL9         MIPCVAC*SYSQAQR         C134         NCS21         0.00	P29590 D20050 1	PML DDI 19	C"DISAEIQQR FILCTAOSVCC*NVDCD	C227	NCF1	0.00	0.00	same	
1908.00         PE121         PE1CHTAGSV8C:*WDCR         C141         NOX01         0.00         same           9200.01         PD123         VDC*TANTNTC*NK         C85.C02         NOX01         0.00         same           9200.01         PD133         VDC*TANTNTC*NK         C85.C02         NOX01         0.00         same           9200.01         FSPO         MAPPWVPAGGTLAPSLGC*VGSR         C19         NCP1         2.47         0.00         same           9200.01         SD1A         VCSTARGC*VGSR         C19         NOX01         0.00         same           9200.01         SD1A         VCSTQECC*GK         C13         NOX01         0.00         same           9200.01         SD1A1         CTESLAVPQK         C13         NOX01         0.00         same           9200.01         RTL0         MEPCVC*SVSQAQK         C134         NCP1         0.00         same           92200         RTL0         MEPCVC*SVSQAQK         C134         NCP1         0.00         same           92200         RTL0         MEPCVC*SVSQAQK         C134         NCP1         0.00         same           92200         RTL0         TTCSHVQNMIK         C74         NCP1         0.00	P30050-1	RPL12 DDL19	EILGIAQSVGC*NVDGR	C141	NCFI	0.00	0.00	same	
P300251         RPF12         CPTCGEVCATEALAPEC         C17         NCP2         0.00         same         DISULFID           P30011         PDIA3         VDC*TANTNTC*NK         C65,C92         NOX01         100.00         same         DISULFID           P30536         TSPO         MAPPWVPAMCFTLAPSLGC*PVGSR         C19         NCF1         2.47         0.00         same           P30536         TSPO         MAPPWVPAMCFTLAPSLGC*PVGSR         C19         NCF1         2.47         0.00         same           P31040         S100A11         C*IESLAPFQK         C13         NCF1         0.66         2.25         same         DISULFID           P31040         S100A11         C*IESLAPFQK         C13         NCF1         0.66         2.25         same         DISULFID           P31040         S100A11         C*IESLAPFQK         C13         NCF1         0.60         same         DISULFID           P32806         RP1.9         MRFQVAC*SVSQACK         C134         NCF1         0.60         same         DISULFID           P32806         RP1.9         MRFQVAC*SVSQACK         C134         NCF1         0.00         same           P32807         RCTP1         MRFGVAC*SVSQACK         C1	P30050-1	RPL12	EILGTAOSVGC*NVDGR	C141	NOYO1	0.00	0.00	same	
DADDON         DESCRIPTION         CLU         DESCRIPTION         DESCRIPTION <thdescription< th="">         DESCRIPTION         DESCRIP</thdescription<>	P30050-1	RPL12	C*TGGEVGATSALAPK	C17	NCE2	0.00	0.00	same	
Pauloi         PDASS         VDCTANTNUCTAR         CSB.C02         NOXOI         100.00         same           PAUSS         TSPO         MAPPWVPAMCFTLAPSLGCTVGSR         C19         NCF2         0.00         same           PAUSS         TSPO         MAPPWVPAMCFTLAPSLGCTVGSR         C19         NCF2         0.00         same           PAUSS         TSPO         MAPPWVPAMCFTLAPSLGCTVGSR         C19         NCF2         0.00         same           PAUSS         SDRA         VGTVLAPGCTCK         C13         NCF2         0.00         same           PAUSS         SDRA         VGTVLAPGCTCK         C13         NCF2         0.00         same         DISULFD           PAUSS         SDRA         VGTVLAPGK         C134         NCF1         0.00         same         DISULFD           P22600         RPL9         MRPGVAC78VSQAQK         C134         NCF1         0.00         same         DISULFD           P2360         RPL9         TG*SHVQNMIK         C74         NCF1         0.00         same           P3340         CSTP2         LCTVQNSPGEAR         C150         NCK1         0.00         same           P3341         KDELR2         SC*AGISCK         C29	1 30030-1			011	NOF 2	0.00	0.00	same	DISULFID:
Passas         TSPO         MAPPWPAMGFTLAPSLGCPVGSR         C10         NCF1         2.47         0.00         same           Passas         TSPO         MAPPWPAMGFTLAPSLGCPVGSR         C19         NOX01         0.00         same           Passas         TSPO         MAPPWPAMGFTLAPSLGCPVGSR         C13         NOX01         0.00         same           Passas         DISULPID         C13         NOX01         0.00         same           Passas         DISULPID         C13         NOX01         0.00         same           Passas         DISULPID         C13         NOX01         0.00         same           Passas         NP19         MURGACSVSQAQK         C13         NOX01         0.00         same           Passas         PLP         MURGACSVSQAQK         C14         NOX01         0.00         same           Passas         TCSINVAMIK         C74         NOF1         0.00         same           Passas         TCSINVAMIK         C74         NOX01         0.00         same           Passas         TCSINVAMIK         C74         NOX1         0.00         same           Passas         TCSINVAMIK         C74         NOX1         0.00	P30101	PDIA3	VDC*TANTNTC*NK	C85;C92	NOXO1	100.00		same	DISULFID
P30536         TSPO         MAPPWYNAMGPTLAPSLGC*PVGSR         C10         NCP2         0.00         same           P30536         TSPO         MAPPWYNAMGPTLAPSLGC*PVGSR         C10         NOX01         0.00         same           P31040         SDBA         VCSVLQECPCK         C33         NCP1         0.00         same           P31040         S100A11         CTISSLAWPGK         C13         NOX01         0.00         same           P31049         S100A11         CTISSLAWPGK         C13         NOX01         0.00         same           P32989         RPJ-9         MIPCVAC*SVSQAQK         C134         NCP1         0.00         same           P32989         RPJ-9         MIPCVAC*SVSQAQK         C134         NCP1         0.00         same           P32989         RPJ-9         MIPCVAC*SVSQAQK         C14         NCP1         0.00         same           P32989         RPJ-9         TIC*SHVQNHK         C74         NCA01         0.00         same           P32980         RPJ-9         TIC*SHVQNHK         C74         NCA01         0.00         same           P32400         CSTF2         LC*VQNSPQEAR         C150         NCX01         0.00         same	P30536	TSPO	MAPPWVPAMGETLAPSLGC*FVGSB	C19	NCF1	2.47	0.00	same	
P3058         TSPO         MAPPWVPAMGPTLAPSIGC*PVGSR         C10         NOXO1         0.00         same           P31040         SIDAA         VGSULQECC*GK         C13         NCP1         0.60         2.25         same         DISULFD           P31949         SIO0A11         C*IISLIAVYCK         C13         NCP1         0.60         2.25         same         DISULFD           P32969         RF14         MRPCVAC*SVSQAQK         C134         NCP1         0.00         same         DISULFD           P32969         RF14         MRPCVAC*SVSQAQK         C134         NCP1         0.00         same           P32969         RF14         MRPCVAC*SVSQAQK         C134         NCX1         0.00         same           P32969         RF14         MTC*SHYQMNIK         C74         NCX01         0.00         same           P32400         CSTF2         LC*VQNSPQEAR         C150         NCR2         0.00         same           P3241         KDELRS         SC*AGISK         C29         NCX01         0.00         same           P33240         CSTF2         LC*VQNSPQEAR         C150         NCR2         0.00         same           P33241         KDELRS         SC*A	P30536	TSPO	MAPPWVPAMGFTLAPSLGC*FVGSB	C19	NCF2	0.00	0.00	same	
P31340         SDIA         VGSVL0GCCGK         CS36         NCF1         0.00         same           P31349         S100A11         C'HESLAWFQK         C13         NCF2         0.00         same         DISULFD           P31349         S100A11         C'HESLAWFQK         C13         NCR2         0.00         same         DISULFD           P31349         S100A11         C'HESLAWFQK         C13         NCR2         0.00         same         DISULFD           P32809         RF14         MRPCVAC*SYSQAQK         C134         NCR2         0.00         same           P32809         RF14         MRPCVAC*SYSQAQK         C134         NCR1         0.00         same           P32809         RF14         MRPCVAC*SYSQAQK         C134         NCR1         0.00         same           P32400         CSTF2         LC'VQNSPGEAR         C150         NCF1         0.00         same           P3340         CSTF2         LC'VQNSPGEAR         C150         NCC1         1.00         same           P3347-1         KDELR2         SC*AGISGK         C29         NCF1         1.04         same           P3487-1         SIMT2         MREVC*DEVK         C241         NCC2	P30536	TSPO	MAPPWVPAMGFTLAPSLGC*FVGSR	C19	NOX01	0.00	0.00	same	
P31349       S100A11       C*TESLAVFQK       C13       NCF1       4.66       2.25       same       DBULFD         P31349       S100A11       C*TESLAVFQK       C13       NCX01       0.00       0.00       same       DBULFD         P31349       S100A11       C*TESLAVFQK       C13       NCX01       0.00       same       DBULFD         P32890       RPL3       MRPCVAC*SVSQAQK       C134       NCX1       0.00       same         P32890       RPL3       MRPCVAC*SVSQAQK       C134       NCX01       0.00       same         P32890       RPL3       TIC*SHVQNIK       C74       NCK01       0.00       same         P32806       RPL4       TIC*SHVQNIK       C74       NCK01       0.00       same         P33401       KDELR2       SC*AGISGK       C29       NCF1       1.38       11.91       same         P33471       KDELR2       SC*AGISGK       C29       NCK1       0.00       same         P348571       SIMT2       MREVC*DEVK       C241       NCX01       0.00       same         P348571       SIMT2       MREVC*DEVK       C241       NCX01       0.00       same         P348571 <t< td=""><td>P31040</td><td>SDHA</td><td>VGSVLQEGC*GK</td><td>C536</td><td>NCF1</td><td>0.00</td><td></td><td>same</td><td></td></t<>	P31040	SDHA	VGSVLQEGC*GK	C536	NCF1	0.00		same	
P     Pi1949     S100A11     C*TESLAVYGX     C13     NGP2     O     O     S100A11     C*TESLAVYGX     C13     NGP1     O     O     Same     DISULFID     Pi2969     RP10     MRPCVAC*SVSQAQK     C13     NGP1     O     O     Same     DISULFID     Same     DISULFID     Same     DISULFID     Same     DISULFID     Same     Same     Same     DISULFID     Same     Same	P31949	S100A11	C*IESLIAVFQK	C13	NCF1	4.66	2.25	same	DISULFID
P31349       S100A11       C*TESLIAVPQK       C13       NCX01       0.00       same         P32969       RPL9       MRPGVAC*SVSQAQK       C134       NCP1       0.00       same         P32969       RPL9       MRPGVAC*SVSQAQK       C134       NCP2       0.00       o.00       same         P32969       RPL9       TIC*SIVQNMIK       C74       NCP1       0.00       0.00       same         P32969       RPL9       TIC*SIVQNMIK       C74       NCP1       0.00       0.00       same         P32840       CSTP2       LC*VQNSPQEAR       C150       NCP1       0.00       same         P33471       KDELR       SC*AGISCK       C29       NCK01       0.00       same         P33471       KDELR       SC*AGISCK       C29       NCK01       0.00       same         P34871-1       SHM72       MREVCPDEVK       C241       NCP1       0.00       same         P34871-1       SHM72       MREVCPDEVK       C241       NCP1       0.00       same         P34871-1       SHM72       MACCPLEVEK       C441       NCP1       0.00       same         P34871-1       SHM72       MACEPLDPUNAXK       C29	P31949	S100A11	C*IESLIAVFQK	C13	NCF2	0.60	2.97	same	DISULFID
P2999         RFL9         MRFQXAC*SVSQAQK         C134         NCF1         0.00         same           P29969         RFL9         MRPGVAC*SVSQAQK         C134         NCC2         0.00         same           P29969         RFL9         MRPGVAC*SVSQAQK         C134         NCC1         0.00         same           P29969         RFL9         TIC*SIVQMMIK         C74         NCC1         0.00         same           P32969         RFL9         TIC*SIVQMMIK         C74         NCNC1         0.00         same           P3340         CSTF2         LC*QNSPQEAR         C150         NCF1         0.00         same           P33471         KDELR2         SC*AGISGK         C29         NCR1         1.13         same           P34871         SHM72         MREVCPDEVK         C241         NCF2         0.00         same           P34871         SHM72         MREVCPEVK         C241         NCF2         0.00         same           P34871         SHM72         MREVCPEVK         C241         NCF2         0.00         same           P34871         SHM72         MREVCPEVK         C241         NCK1         0.00         same           P34871	P31949	S100A11	C*IESLIAVFQK	C13	NOXO1	0.00	0.00	same	DISULFID
P22969         RPL9         MRPGVAC*SV8QAQK         C134         NCP2         0.00         same           P22969         RPL9         TIC*SWQAMK         C74         NCP1         0.00         0.00         same           P22969         RPL9         TIC*SWQAMK         C74         NCP1         0.00         0.00         same           P32969         RPL9         TIC*SWQAPK         C150         NCP1         0.00         0.00         same           P33404         CSTF2         LC*QNSPQEAR         C150         NCV1         0.00         same           P33471         KDELR2         SC*AGISGK         C29         NCP2         1.1.91         same           P343471         KDELR2         SC*AGISGK         C29         NCP1         11.58         same           P34571         KDELR2         SC*AGISGK         C29         NCP1         10.00         same           P34571         KDELR2         SC*AGISGK         C241         NCX01         0.00         same           P34571         SHM72         MREVC*DEVK         C241         NCX01         0.00         same           P35221         CTNNA1         AAGEFADDPC*SVKR         C116         NCP1         10.00 <td>P32969</td> <td>RPL9</td> <td>MRPGVAC*SVSQAQK</td> <td>C134</td> <td>NCF1</td> <td></td> <td>0.00</td> <td>same</td> <td></td>	P32969	RPL9	MRPGVAC*SVSQAQK	C134	NCF1		0.00	same	
P22000         RPL9         MRPCVAC*SVSQAQK         C134         NOXOI         0.00         same           P22000         RPL9         TIC*SHQNNIK         C74         NCF1         0.00         0.00         same           P32000         RP19         TIC*SHQNNIK         C74         NCF1         0.00         0.00         same           P33240         CSTF2         LC*VQNSPQEAR         C150         NCF1         0.00         same           P33470         CSTF2         LC*VQNSPQEAR         C150         NCK1         0.00         same           P33471         KDELR2         SC*AGISGK         C29         NCF1         1.88         11.91         same           P34871-1         SIMT2         MREVC*DEVK         C241         NCF2         0.00         same           P34897-1         SIMT2         MREVC*DEVK         C241         NCK1         0	P32969	RPL9	MRPGVAC*SVSQAQK	C134	NCF2	0.00		same	
P22660         RPL9         TICTSHUQNMIK         C74         NCF1         0.00         same           P22660         RPL9         TICTSHUQNMIK         C74         NCF2         0.00         0.00         same           P22660         RPL9         TICTSHUQNMIK         C74         NCF2         0.00         0.00         same           P32600         RCF1         TICTSHUQNMIK         C74         NCF2         0.00         same           P33401         CSTF2         LC*VQNSPGEAR         C150         NCK1         1.58         11.91         same           P3347-1         KDELR2         SC*AGISGK         C29         NCF1         1.1.58         1.91         same           P3487-1         SHM72         MREVC*DEVK         C24         NCX01         8.56         5.92         same           P3487-1         SHM72         MREVC*DEVK         C24         NCX01         0.00         same           P34897-1         SHM72         MREVC*DEVK         C241         NCY1         0.00         same           P34221         CTNA1         AAGEFADDPC*SSVKR         C116         NCF1         100.00         same           P35221         CTNA1         MAGEFADPC*SSVKR	P32969	RPL9	MRPGVAC*SVSQAQK	C134	NOXO1	0.00		same	
P22660         RPL9         TIC'SHQNMIK         C74         NCF2         0.00         same           P32600         CTTP         LC'VONSPGAR         C150         NCF1         0.00         0.00         same           P33200         CSTP2         LC'VONSPGAR         C150         NCF1         0.00         0.00         same           P33401         CSTP2         LC'VONSPGAR         C150         NCS01         0.00         same           P33471         KDELR2         SC'AGISGK         C29         NCF1         1.08         11.01         same           P33471         KDELR2         SC'AGISGK         C29         NCF2         7.94         3.83         same           P34571         SIMT2         MREVC'DEVK         C241         NCF2         0.00         same           P34571         SIMT2         MREVC'DEVK         C241         NCF2         0.00         same           P35221         CTNNA1         AAGEFADPC'SSVKR         C116         NCF1         0.00         same           P35221         CTNA1         AAGEFADPC'SSVKR         C218         NCF1         0.00         same           P35221         CTNA1         NVFLYTASQAC'LQHPDVAYK         C228	P32969	RPL9	TIC*SHVQNMIK	C74	NCF1	0.00	0.00	same	
P#2969       RPI.9       TIC'SHVQNMIK       C74       NOXOI       0.00       same         P33240       CSTF2       LC'VQNSPGEAR       C150       NCSP1       0.00       same         P33240       CSTF2       LC'VQNSPGEAR       C150       NCSP1       0.00       same         P33471       KDELR2       SC'AGISGK       C29       NCF1       11.38       same         P33471       KDELR2       SC'AGISGK       C29       NCS1       8.56       5.92       same         P34571       SIMT2       MREVC'DEVK       C241       NCF1       0.00       same         P34571       SIMT2       MREVC'DEVK       C241       NCS01       0.00       same         P34571       SIMT2       MREVC'DEVK       C241       NCS01       0.00       same         P34521       CTNA1       AALEALGSC'LNKK       C91       NOX01       0.00       same         P35221       CTNA1       AALEALGSC'LNKK       C241       NCS1       0.00       same         P35221       CTNA1       NVPILYTASQAC'LQHPDVAYK       C228       NCF1       0.00       same         P35221       CTNA1       NVPILYTASQAC'LQHPDVAYK       C228       NCF1       <	P32969	RPL9	TIC*SHVQNMIK	C74	NCF2	0.00	0.00	same	
P33240       CSTP2       LC*VQNSPQEAR       C150       NCF2       0.00       same         P33240       CSTP2       LC*VQNSPQEAR       C150       NKCF2       0.00       same         P33240       CSTP2       CVQNSPQEAR       C150       NKCF2       1.58       same         P33471       KDELR2       SC*AGISGK       C29       NKCF1       0.00       same         P34871.1       KDELR2       SC*AGISGK       C241       NCF2       0.00       o.00       same         P34871.1       SHMT2       MEEVC*DEVK       C241       NCF1       0.00       o.00       same         P34871.3       SHMT2       ALGEALGSC*LNNK       C91       NOXO1       0.00       o.00       same         P35221       CTNNA1       AAGEFADDPC*SSVKR       C116       NCF2       10.00       10.00       same         P35221       CTNA1       AAGEFADDPC*SSVKR       C128       NCF1       0.00       same         P35221       CTNA1       AAGEFADDPC*SSVKR       C148       NCF1       0.00       same         P35221       CTNA1       LEVANAC*SISNNEGVK       C438       NCF1       0.00       same         P35221       CTNA1	P32969	RPL9	TIC*SHVQNMIK	C74	NOXO1	0.00	0.00	same	
F33240       CSTP2       LC-VQNSFQEAR       C100       NOP2       0.00       same         F33240       CSTP2       LC-VQNSFQEAR       C20       NOP1       11.58       11.98       same         F33241-1       KDELR2       SC*AGISGK       C29       NOK01       8.56       5.92       same         F3347-1       KDELR2       SC*AGISGK       C29       NOK01       0.00       same         F3487-1       SHMT2       MEEVC*DEVK       C241       NOC1       0.00       same         F3487-1       SHMT2       MEEVC*DEVK       C241       NOX01       0.00       same         F35221       CTNNA1       AAAGEFADDC*SSVKR       C116       NOF1       100.00       100.00       same         F35221       CTNNA1       NPH1YTASQAC*UQHPDVAAYK       C228       NOC71       0.00       same         F35221       CTNNA1       NPH1YTASQAC*UQHPDVAAYK       C228       NOC71       0.00       same         F35221       CTNNA1       NPH1YTASQAC*UQHPDVAAYK       C228       NOC71       0.00       same         F35221       CTNNA1       NPH1YTASQAC*UQHPDVAAYK       C428       NOX01       15.22       9.74       same         F35221 </td <td>P33240</td> <td>CSTF2</td> <td>LC*VQNSPQEAR</td> <td>C150</td> <td>NCFI</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P33240	CSTF2	LC*VQNSPQEAR	C150	NCFI	0.00	0.00	same	
Paszai         Contral         D. V. QNNP (PAR)         C. 100         NORD         0.00         same           Passaid-1         KDELR2         SC*AGISGK         C29         NOCT2         7.34         3.83           Passaid-1         KDELR2         SC*AGISGK         C29         NOCT2         7.34         3.83           Passaid-1         KDELR2         SC*AGISGK         C29         NOX01         0.00         same           Passaid-1         KDELR2         SC*AGISGK         C241         NCF1         0.00         0.00         same           Passaid-1         SIMT2         MREVC*DEVK         C241         NOCT2         1.00         0.00         same           Passaid         CTNNA1         AAAGEFADDPC*SSVKR         C116         NCF1         10.00         100.00         same           Passaid         CTNNA1         AAAGEFADDPC*SSVKR         C116         NCF1         0.00         same           Passaid         CTNNA1         AAAGEFADDPC*SSVKR         C128         NCF1         0.00         same           Passaid         CTNNA1         LEVANLAC*SISNEEGVK         C438         NCF1         0.00         same           Passaid         CTNNA1         LEVANLAC*SISNEEGVK <td>P33240</td> <td>CSTF2</td> <td>LC*VQNSPQEAR</td> <td>C150</td> <td>NCF2</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P33240	CSTF2	LC*VQNSPQEAR	C150	NCF2	0.00	0.00	same	
Fashiri         LDELR2         Sch AGERA         C20         NCF2         Link         Link         Lambda           Pasheri         KDELR2         SCh AGERA         C20         NCXD1         5.56         5.52         same           Pasheri         SHMT2         MREVCPDEVK         C241         NCF1         0.00         same           Pasheri         SHMT2         MREVCPDEVK         C241         NCF2         0.00         same           Pasheri         SHMT2         MREVCPDEVK         C241         NCF1         0.00         same           Pasheri         SHMT2         MREVCPDEVK         C241         NCF1         0.00         same           Pasteri         CTINNA1         AAAGERADDPC*SSVKR         C116         NCF1         0.00         same           Pasteri         CTINNA1         NVPHLYTASQAC*LQHPDVAYK         C228         NCF1         0.00         same           Pasteri         CTINNA1         NVPHLYTASQAC*LQHPDVAYK         C228         NCF1         0.00         same           Pasteri         CTINNA1         LEVANLAC*SISNNEEGVK         C438         NCF1         0.00         same           Pasteri         CTINNA1         LEVANLAC*SISNNEEGVK         C448	P33240 D22047 1	KDELD9	EC*VQNSPQEAR SC*ACISCIZ	C150	NOXOI	0.00	11.01	same	
1 NDELR2       SC AGISCR       C29       NOX1       1.76       5.92       same         P34897-1       SHMT2       MREVC*DEVK       C241       NCF1       0.00       same         P34897-1       SHMT2       MREVC*DEVK       C241       NCF2       0.00       0.00       same         P34897-1       SHMT2       ALEALGSC*LNNK       C241       NCF1       0.00       0.00       same         P35221       CTINA1       AAGEFADDPC*SSVKR       C116       NCF2       100.00       100.00       same         P35221       CTINA1       AAGEFADDPC*SSVKR       C128       NCF2       0.00       0.00       same         P35221       CTINA1       NVPHLYTASQAC*LQHPDVAYK       C228       NCF2       0.00       0.00       same         P35221       CTINA1       LEVANLAC*SISNEEGVK       C438       NCF1       4.47       0.00       same         P35221       CTINA1       LEVANLAC*SISNEEGVK       C438       NCF1       0.00       same         P35221       CTINA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00       same         P35221       CTINA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00	P33947-1	KDELR2	SC*ACISCK	C29	NCF1	7.04	2 82	same	
P34897-1         SHMT2         MREVCYDEVK         C241         NCP1         0.00         same           P34897-1         SHMT2         MREVCYDEVK         C241         NCP2         0.00         same           P34897-1         SHMT2         MREVCYDEVK         C241         NCP2         0.00         same           P34897-1         SHMT2         MREVCYDEVK         C241         NCP1         0.00         same           P35221         CTINA1         AAAGEFADDPC*SSVKR         C116         NCP1         100.00         100.00         same           P35221         CTINA1         NVPILYTASQAC*LQHPDVAAYK         C228         NCP1         0.00         same           P35221         CTINA1         NVPILYTASQAC*LQHPDVAAYK         C228         NCP1         4.47         0.00         same           P35221         CTINA1         LEVANLAC*SISNNEECVK         C438         NCP1         4.47         0.00         same           P35221         CTINA1         LEVANLAC*SISNNEECVK         C438         NCP1         0.00         same           P35221         CTINA1         SAGLEALC*PQVINAALALAAKPQ         C461         NCP2         0.00         same           P35221         CTINA1         SAGLAC	P33047-1	KDELR2	SC*AGISGK	C29	NOX01	8.56	5.00	same	
P34897-1         SHMT2         MHEVC*DEVK         C241         NCF2         0.00         same           P34897-1         SHMT2         ALEALGSC*LNNK         C21         NOXO1         0.00         same           P35221         CTNNA1         AAAGEFADDPC*SSVKR         C116         NCF1         100.00         same           P35221         CTNNA1         AAAGEFADDPC*SSVKR         C116         NCF1         100.00         same           P35221         CTNNA1         AVAGEFADDPC*SSVKR         C116         NCF2         10.00         0.00         same           P35221         CTNNA1         NVPILYTASQAC*LQHPDVAAYK         C228         NCF1         0.00         same           P35221         CTNNA1         LIEVANLAC*SISINNEGGVK         C438         NCF1         4.47         0.00         same           P35221         CTNNA1         LIEVANLAC*SISINNEGGVK         C438         NCF1         0.00         same           P35221         CTNNA1         MSASQLEALC*PQVINAALALAKPQ         C461         NCF1         0.00         same           P35221         CTNNA1         MSASQLEALC*PQVINAALALAKPQ         C461         NCF1         0.00         same           P35221         CTNNA1         C*CAL	P34897-1	SHMT2	MBEVC*DEVK	C241	NCF1	0.00	0.32	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	P34897-1	SHMT2	MREVC*DEVK	C241	NCF2	0.00	0.00	same	
P34897-1         SHMT2         AÅLEÅLGSC*LNNK         C01         NOXO1         0.00         same           P35221         CTNNA1         AAAGEFADDPC*SSVKR         C116         NCF1         100.00         same           P35221         CTNNA1         NAAGEFADDPC*SSVKR         C116         NCF2         100.00         same           P35221         CTNNA1         NVPHLYTASQAC*LQHPDVAAYK         C228         NCF1         0.00         same           P35221         CTNNA1         NVPHLYTASQAC*LQHPDVAAYK         C228         NOK10         0.00         same           P35221         CTNNA1         LIEVANLAC*SISNNEEGVK         C438         NCF1         4.47         0.00         same           P35221         CTNNA1         LIEVANLAC*SISNNEEGVK         C438         NCF1         0.00         same           P35221         CTNNA1         MSASQLEALC*PQVINAALAAKPQ         C461         NCF2         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NCF1         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NCS1         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHHR         C213	P34897-1	SHMT2	MREVC*DEVK	C241	NOXO1	0.00	0.00	same	
P35221       CTNNA1       AAAGEFADDPC*SSVKR       C116       NCF1       100.00       same         P35221       CTNNA1       AAAGEFADDPC*SSVKR       C116       NCF1       100.00       same         P35221       CTNNA1       NVPHLYTASQAC*LQHPDVAAYK       C228       NCF1       0.00       0.00       same         P35221       CTNNA1       NVPHLYTASQAC*LQHPDVAAYK       C228       NCS1       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NCS1       4.47       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NCS1       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NCS1       0.00       same         P35221       CTNNA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NCK1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF1       0.00       same         P35222       CTNNB1       CTAGTLHNLSHHR       C213       NCF1       0.00       same         P35222 <t< td=""><td>P34897-1</td><td>SHMT2</td><td>AALEALGSC*LNNK</td><td>C91</td><td>NOXO1</td><td>0.00</td><td></td><td>same</td><td></td></t<>	P34897-1	SHMT2	AALEALGSC*LNNK	C91	NOXO1	0.00		same	
P35221       CTNNA1       AAAGEFADDPC*SSVKR       C116       NCF2       100.00       100.00       same         P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF2       0.00       0.00       same         P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF2       0.00       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF1       4.47       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF1       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF1       0.00       same         P35221       CTNNA1       MSASQLEALC*PQVINAALALAKRQ       C461       NCF2       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NCF1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       same         P35222       CTNNB1       GCDREDITEPAIC*ALR       C466       NCF2       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       same	P35221	CTNNA1	AAAGEFADDPC*SSVKR	C116	NCF1	100.00	100.00	same	
P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF1       0.00       0.00       same         P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF2       0.00       0.00       same         P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF1       4.47       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF1       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCP1       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCP1       0.00       same         P35221       CTNNA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NCP1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHR       C213       NCF1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHR       C313       NCP1       0.00       same         P3522	P35221	CTNNA1	AAAGEFADDPC*SSVKR	C116	NCF2	100.00	100.00	same	
P35221       CTNNA1       NVPILYTASQAC*LQHPDVAAYK       C228       NCF2       0.00       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF1       4.47       0.00       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NCF2       38.42       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C438       NOX01       15.22       9.74       same         P35221       CTNNA1       LIEVANLAC*SISNEEGVK       C461       NCF2       0.00       0.00       same         P35221       CTNNA1       SKSQLEALC*PQVINAALALAAKPQ       C461       NCF2       0.00       0.00       same         P35221       CTNNA1       SKSQLEALC*PQVINAALALAKPQ       C461       NCF2       0.00       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NOX01       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCA01       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCA01	P35221	CTNNA1	NVPILYTASQAC*LQHPDVAAYK	C228	NCF1	0.00	0.00	same	
P35221         CTINNA1         NVPILYTASQAC*LQHPDVAAYK         C228         NOXO1         0.00         0.00         same           P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NCF1         4.47         0.00         same           P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NOXO1         5.22         9.74         same           P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NOXO1         0.00         same           P35221         CTINNA1         MSASQLEALC*PQVINAALALAAKPQ         C461         NCF1         0.00         0.00         same           P35221         CTINNA1         C*ULALQEK         C526         NOXO1         0.00         same           P35221         CTINNI         C*TAGTLHNLSHHR         C133         NCF1         0.00         0.00         same           P35222         CTINNI         C*TAGTLHNLSHHR         C133         NOXO1         0.00         same           P35222         CTINNI         AGDREDITEPAIC*ALR         C466         NCF1         0.00         same           P35222         CTINNI         AGDREDITEPAIC*ALR         C466         NOXO1         0.00         same	P35221	CTNNA1	NVPILYTASQAC*LQHPDVAAYK	C228	NCF2	0.00	0.00	same	
P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NCF1         4.47         0.00         same           P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NOCO1         15.22         9.74         same           P35221         CTINNA1         LIEVANLAC*SISNNEEGVK         C438         NOCO1         15.22         9.74         same           P35221         CTINNA1         MSASQLEALC*PQVINAALALAAKPQ         C461         NCF1         0.00         same           P35221         CTINNA1         C*VIALQEK         C526         NOCO1         0.00         same           P35221         CTINNA1         C*VIALQEK         C526         NOCO1         0.00         same           P35222         CTINNB1         C*TAGTLHNLSHHR         C213         NCF2         0.00         0.00         same           P35222         CTINNB1         AGDREDITEPAIC*ALR         C466         NCF2         0.00         0.00         same           P35222         CTINNB1         AGDREDITEPAIC*ALR         C466         NCF2         0.00         0.00         same           P35222         CTINNB1         AGDREDITEPAIC*ALR         C466         NCF1         0.00         0.00	P35221	CTNNA1	NVPILYTASQAC*LQHPDVAAYK	C228	NOXO1	0.00	0.00	same	
P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NCF2       38.42       same         P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NOXO1       15.22       9.74       same         P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NOXO1       0.00       same         P35221       CTNNA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NOXO1       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       0.00       same         P35222       CTNNB1       C*TAGTLHINLSHHR       C213       NCK2       0.00       0.00       same         P35222       CTNNB1       AGDREDITPPAIC*ALR       C466       NCF1       0.00       0.00       same         P35222       CTNNB1       AGDREDITPAIC*ALR       C466       NCK01       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00	P35221	CTNNA1	LIEVANLAC*SISNNEEGVK	C438	NCF1	4.47	0.00	same	
P35221       CTNNA1       LIEVANLAC*SISNNEEGVK       C438       NOX01       15.22       9.74       same         P35221       CTNNA1       MSASQLEALC*PQVINAALALAAKPQ       C461       NCF1       0.00       same         P35221       CTNNA1       C*VIALQEK       C461       NCF2       0.00       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NCF1       0.00       0.00       same         P35221       CTNNA1       C*VIALQEK       C526       NOX01       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHR       C213       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       <	P35221	CTNNA1	LIEVANLAC*SISNNEEGVK	C438	NCF2	38.42		same	
P35221         CTNNA1         MSASQUEALC*PQVINAALALAARPQ SK         C461         NCF1         0.00         0.00         same           P35221         CTNNA1         MSASQUEALC*PQVINAALALAARPQ SK         C461         NCF2         0.00         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NCF1         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NCS1         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHHR         C213         NCF1         0.00         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHHR         C213         NCK2         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCF1         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCS1         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NCF1         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NCF1         0.00         same           P35222	P35221	C'I'NNA1	LIEVANLAC*SISNNEEGVK	C438	NOXO1	15.22	9.74	same	
MassQLEALC*PQVINAALALAAKPQ         MassQLEALC*PQVINAALALAAKPQ         MassQLEALC*PQVINAALALAAKPQ           P35221         CTNNA1         C*VIALQEK         C526         NCF1         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NOX01         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NOX01         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHIR         C213         NCF2         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCF2         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCF2         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCF2         0.00         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NCF1         0.00         0.00         same           P3522         CTNNB1         NLALC*PANHAPLR         C520         NCF1         0.00         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR	P35221	CTNNA1	MSASQLEALC*PQVINAALALAAKPQ SK	C461	NCF1	0.00	0.00	same	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			MSASOLEALC*POVINAALALAAKPO						
P35221         CTNNA1         C*VIALQEK         C526         NCF1         0.00         same           P35221         CTNNA1         C*VIALQEK         C526         NOX01         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHHR         C213         NCF1         0.00         0.00         same           P35222         CTNNB1         C*TAGTLHNLSHHR         C213         NCF2         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NCF1         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NOX01         0.00         0.00         same           P35222         CTNNB1         AGDREDITEPAIC*ALR         C466         NOX01         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NCF2         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NOX01         0.00         same           P35222         CTNNB1         NLALC*PANHAPLR         C520         NOX01         0.00         same           P35224         R         TL <t< td=""><td>P35221</td><td>CTNNA1</td><td>SK</td><td>C461</td><td>NCF2</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	P35221	CTNNA1	SK	C461	NCF2	0.00	0.00	same	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	P35221	CTNNA1	C*VIALQEK	C526	NCF1	0.00	0.00	same	
P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF1       0.00       0.00       same         P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCCP2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCCP2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCV1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCV1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCV1       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCV1       0.00       same         P35579.1       MYH9       ADFC*IIHYAGK       C661       NCF1       0.	P35221	CTNNA1	C*VIALQEK	C526	NOXO1	0.00		same	
P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C213       NOXO1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLAC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35579-1       MYH9       ADFC*IHPVEDGIMDAANFEQFLQE       C25       NCF1       0.00       same         P35579-1       MYH9       CTIPNHEK       C671 <t< td=""><td>P35222</td><td>CTNNB1</td><td>C*TAGTLHNLSHHR</td><td>C213</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	P35222	CTNNB1	C*TAGTLHNLSHHR	C213	NCF1	0.00	0.00	same	
P35222       CTNNB1       C*TAGTLHNLSHHR       C213       NOXO1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF2       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35224       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35579-1       MYH9       ADFC*IIHYAGK       C569       NCF1       0.00       0.00       same         P35579-1       MYH9       C*IIPNHEK       C67	P35222	CTNNB1	C*TAGTLHNLSHHR	C213	NCF2	0.00	0.00	same	
P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NCF1       0.00       0.00       same         P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NOK01       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOX01       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOX01       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOX01       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOX01       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOX01       0.00       same         P3527       MYH9       ADFC*IHPVEDGIMDAANFEQFLQE       C25       NCF1       0.00       same         P35579-1       MYH9       C*IIPNHEK       C6671       NCF2       24.35       16.36	P35222	CTNNB1	C*TAGTLHNLSHHR	C213	NOXO1	0.00	0.00	same	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	P35222	CTNNB1	AGDREDITEPAIC*ALR	C466	NCF1	0.00	0.00	same	
P35222       CTNNB1       AGDREDITEPAIC*ALR       C466       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35224       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35268       RPL22       FTLDC*THPVEDGIMDAANFEQFLQE       C25       NCF1       0.00       same         P35579-1       MYH9       ADFC*IIPNHEK       C671       NCF2       24.35       16.36       same         P35579-1       MYH9       C*IIPNHEK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       KQELEEIC*HDLEAR       C917	P35222	CTNNB1	AGDREDITEPAIC*ALR	C466	NCF2	0.00	0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	P35222	CTNNB1	AGDREDITEPAIC*ALR	C466	NOXO1	0.00	0.00	same	
P35222       CTNNB1       NLALC*PANHAPLR       C520       NCF2       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35222       CTNNB1       NLALC*PANHAPLR       C520       NOXO1       0.00       0.00       same         P35228       RPL22       FTLDC*THPVEDGIMDAANFEQFLQE R       C25       NCF1       0.00       0.00       same         P35579-1       MYH9       ADFC*IIHYAGK       C569       NCF1       0.00       0.00       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF2       24.35       16.36       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOXO1       0.00       same         P355606       COPB2       TFEVC*DLPVR       C56	P35222	CTNNB1	NLALC*PANHAPLR	C520	NCF1	0.00	0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	P35222	CTNNB1	NLALC*PANHAPLR	C520	NCF2	0.00	0.00	same	
P35268         RPL22         F1DDC*THPVEDGIMDAANFEQFLQE         C25         NCF1         0.00         same           P35579-1         MYH9         ADFC*IIHYAGK         C569         NCF1         0.00         0.00         same           P35579-1         MYH9         C*IIPNHEK         C671         NCF1         0.00         8.78         same           P35579-1         MYH9         C*IIPNHEK         C671         NCF2         24.35         16.36         same           P35579-1         MYH9         VEDMAELTC*LNEASVLHNLK         C91         NCF1         0.00         same           P35579-1         MYH9         VEDMAELTC*LNEASVLHNLK         C91         NCF2         0.00         0.00         same           P35579-1         MYH9         VEDMAELTC*LNEASVLHNLK         C91         NCF1         100.00         same           P35579-1         MYH9         KQELEEIC*HDLEAR         C917         NCF1         100.00         same           P35579-1         MYH9         C4QHLQAEK         C931         NOXO1         0.00         same           P35606         COPB2         TFEVC*DLPVR         C56         NCF1         0.00         same           P35606         COPB2         TFEV	P35222	C'I'NNB1	NLALC*PANHAPLR	C520	NOXO1	0.00	0.00	same	
Normalize       Normalize         P35579-1       MYH9       C*IIPNHEK       C569       NCF1       0.00       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF2       24.35       16.36       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF2       24.35       16.36       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       100.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       same         P35579-1       MYH9       CQHLQAEK       C917       NCF1       100.00       same         P355606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35608       RT2       QC*KNVQDAIADAEQR       C417       NOX01       0.00       same	P35268	RPL22	FILDC*THPVEDGIMDAANFEQFLQE B	C25	NCF1	0.00		same	
P35579-1       MYH9       ADFC*IIHYAGK       C569       NCF1       0.00       0.00       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF1       0.00       8.78       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF1       0.00       8.78       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       100.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       100.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C917       NCF1       100.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOXO1       0.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOXO1       0.00       same         P35506       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same									
P35579-1       MYH9       C*IIPNHEK       C671       NCF1       0.00       8.78       same         P35579-1       MYH9       C*IIPNHEK       C671       NCF1       0.00       8.78       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       100.00       same         P35579-1       MYH9       C&QELEQIC*HDLEAR       C917       NCF1       100.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOX01       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF2       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35658-1       NUP214       TSC*KDDEAVVQAPR       C1003       NCF1       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NOX01       0.00       same         P35908       KRT2<	P35579-1	MYH9	ADFC*IIHYAGK	C569	NCF1	0.00	0.00	same	
P35579-1       MYH9       C*IIPNHEK       C671       NCF2       24.35       16.36       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       VEDMAELTC*LNEASVLHNLK       C91       NCF1       100.00       same         P35579-1       MYH9       KQELEEIC*HDLEAR       C917       NCF1       100.00       same         P35579-1       MYH9       C2QHLQAEK       C931       NOXO1       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35608       KRT2       QC*KNVQDAIADAEQR       C417       NCF1       0.00       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NOXO1       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NOXO1       0.00       same         P35578       RP	P35579-1	MYH9	C*IIPNHEK	C671	NCF1	0.00	8.78	same	
P3503/9-1       MTH9       VEDMAELIC*LNEASVLHNLK       C91       NCF1       0.00       0.00       same         P35579-1       MYH9       VEDMAELIC*LNEASVLHNLK       C91       NCF2       0.00       0.00       same         P35579-1       MYH9       KQELEEIC*HDLEAR       C917       NCF1       100.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOXO1       0.00       same         P355606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35606       COPB2       TFEVC*DLPVR       C56       NCF1       0.00       same         P35658-1       NUP214       TSC*KDDEAVVQAPR       C1003       NCF1       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NCF1       0.00       o.00       same         P350578       RPL4       YAIC*SALAASALPALVMSK       C125       NCF1       0.00       same         P36578       RPL4       YAIC*SALAASALPALVMSK       C125       NCF1       1.17       2.05       same	P35579-1	MYH9	U"IIPNHEK MEDMARI DOM NEACMUNING	C671	NCF2	24.35	16.36	same	
P35579-1       MYH9       KQELENCENDERVERIVER       C91       NCF2       0.00       5.00       same         P35579-1       MYH9       KQELELIC*HDLEAR       C917       NCF1       100.00       same         P35579-1       MYH9       C*QHLQAEK       C931       NOXO1       0.00       same         P35578-1       NUP214       TSC*KDDEAVVQAPR       C1003       NCF1       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NCF1       0.00       same         P35908       KRT2       QC*KNVQDAIADAEQR       C417       NOXO1       0.00       same         P35578       RPL4       YAIC*SALAASALPALVMSK       C125       NCF1       1.17       2.05       same	F 30079-1	MYH9	VEDMAELIU"LNEASVLHNLK VEDMAELTONINEASVLUNUZ	C91	NCF1	0.00	0.00	same	
P35075-1         MTH9         RQELEERC TIDLEAR         C917         NCF1         100.00         same           P35579-1         MYH9         C*QHLQAEK         C931         NOXO1         0.00         same           P35606         COPB2         TFEVC*DLPVR         C56         NCF1         0.00         same           P35606         COPB2         TFEVC*DLPVR         C56         NCF2         0.00         same           P35608         KRT2         QC*KNVQDAIADAEQR         C1003         NCF1         0.00         0.00         same           P35908         KRT2         QC*KNVQDAIADAEQR         C417         NCF1         0.00         0.00         same           P35908         RP14         YAIC*SALAASALPALVMSK         C125         NCF1         0.00         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         1.17         2.05         same           Continued on next page	F 30079-1 D25570-1	MYH9 MYH0	VEDMAELI U"LNEASVLHNLK KOFI FFIC*UDI FAD	C91	NOF2	0.00	100.00	same	
1 500 of 1         MARK         C 931         NOAO1         0.00         same           P35606         COPB2         TFEVC*DLPVR         C56         NCF1         0.00         same           P35608         KRT2         QC*KNVQDAIADAEQR         C1003         NCF1         0.00         same           P35908         KRT2         QC*KNVQDAIADAEQR         C417         NOXO1         0.00         same           P36578         RPL4         YAIC*SALAASALPALWMSK         C125         NCF1         0.10         same           P36578         RPL4         YAIC*SALAASALPALWMSK         C125         NCF1         1.17         2.05         same           P36578         RPL4         YAIC*SALAASALPALWMSK         C125         NCF1         1.17         2.05         same	r 30079-1 P35570-1	MVH0	C*OHLOAEK	C917	NOVOI		100.00	same	
10000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         1000         10000         10000         10000         10000         10000         10000	1 33379-1 P35606	COPR9	TFEVC*DLPVB	C56	NCF1	0.00	0.00	same	
P35658-1         NUP214         TSC*KDDEAVVQAPR         C1003         NCF1         0.00         0.00         same           P35098         KRT2         QC*KNVQDAIADAEQR         C417         NCF1         0.00         0.00         same           P35908         KRT2         QC*KNVQDAIADAEQR         C417         NCF1         0.00         0.00         same           P35978         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         0.00         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         1.17         2.05         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         1.17         2.05         same	P35606	COPB2	TFEVC*DLPVR	C56	NCF2	0.00	0.00	same	
P35908         KRT2         QC*KNVQDAIADAEQR         C417         NCF1         0.00         0.00         same           P35908         KRT2         QC*KNVQDAIADAEQR         C417         NOC01         0.00         0.00         same           P35908         KRT2         QC*KNVQDAIADAEQR         C417         NOC01         0.00         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         0.00         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         1.17         2.05         same           P36578         RPL4         YAIC*SALAASALPALVMSK         C125         NCF1         1.17         2.05         same           Continued on next page         Continued on next page         Not page         Same         Same         Same	P35658-1	NUP214	TSC*KDDEAVVOAPR	C1003	NCF1	0.00	0.00	same	
P35908 KRT2 QC*KNVQDAIADAEQR C417 NOXO1 0.00 0.00 same P36578 RPL4 YAIC*SALAASALPALVMSK C125 NCF1 0.00 same P36578 RPL4 YAIC*SALAASALPALVMSK C125 NCF1 1.17 2.05 same Continued on next page	P35908	KRT2	QC*KNVQDAIADAEQR	C417	NCF1	0.00	0.00	same	
P36578 RPL4 YAIC*SALAASALPALVMSK C125 NCF1 0.00 same P36578 RPL4 YAIC*SALAASALPALVMSK C125 NCF1 1.17 2.05 same Continued on next page	P35908	KRT2	QC*KNVQDAIADAEQR	C417	NOXO1	0.00	0.00	same	
P36578 RPL4 YAIC*SALAASALPALVMSK C125 NCF1 1.17 2.05 same Continued on next page	P36578	RPL4	YAIC*SALAASALPALVMSK	C125	NCF1	0.00		same	
Continued on next page	P36578	RPL4	YAIC*SALAASALPALVMSK	C125	NCF1	1.17	2.05	same	
			Continued	on next	page				

Table 2A.2 – conti	nued from	previous	page
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P36578	RPL4	YAIC*SALAASALPALVMSK	C125	NCF2	0.00	0.00	same	
P36578	RPL4	GPC*IIYNEDNGIIK	C208	NCF1	0.00	0.00	same	
P36578	RPL4	BCPC*IIVNEDNCIIK	C208	NCF1	0.00	6.05	samo	
D26579	DDI 4	CPC*IIVNEDNCIIK	C208	NCE9	0.00	0.00	same	
F 30378	DDI 4	GPC*HVNEDNGHK	C208	NOF2	0.00	0.00	same	
P36578	RPL4	GPUTITINEDNGIIK	C208	NOXOI		0.00	same	
P36578	RPL4	FC*IWTESAFR	C250	NCF1	0.00	0.00	same	
P36578	RPL4	FC*IWTESAFR	C250	NCF2	0.00	0.00	same	
P36578	RPL4	SGQGAFGNMC*R	C96	NCF1	0.00		same	
P36578	RPL4	SGQGAFGNMC*R	C96	NCF1	7.62	8.90	same	
P36578	BPL4	SGOGAEGNMC*B	C96	NCF2	16.24	19.36	same	
P36578	RPL4	SCOCAECNMC*B	C96	NOXOI	0.00	0.00	samo	
P 30378	TACIN9	NMAC*VOD	C104	NOADI	0.00	0.00	same	
P37802	TAGLN2	NMAC'VQR	C124	NCFI	9.47	8.90	same	
P37802	TAGLN2	NMAC <sup>*</sup> VQR	C124	NCF1	15.20	15.86	same	
P37802	TAGLN2	NMAC*VQR	C124	NCF2	13.06	13.58	same	
P37802	TAGLN2	NMAC*VQR	C124	NCF2	18.91	21.22	same	
P37802	TAGLN2	NMAC*VOR	C124	NOXO1	12.79	3.39	same	
P37802	TAGLN2	NMAC*VOB	C124	NOXO1	19.55	11.23	same	
D27802	TACINO	DOTVI C*ELINAL VEECOA BVK	C62	NCEL	1.97	2.95	same	
D27002	TAGLN2	DGTVLC*ELINALVDECOADVKK	C03	NCEO	1.27	0.00	same	
P37802	TAGLN2	DGIVLC'ELINALIFEGQAFVKK	003	NCF2	0.00	0.00	same	
P38398	BRCAI	IDLLASDPHEALIC*K	C442	NCF1	0.00	0.00	same	
P38398	BRCA1	IDLLASDPHEALIC*K	C442	NCF2	0.00	0.00	same	
P39023	RPL3	TVFAEHISDEC*K	C114	NCF1	0.00	0.00	same	
P39023	RPL3	TVFAEHISDEC*KR	C114	NCF1	0.00	0.00	same	
P39023	RPL3	TVFAEHISDEC*K	C114	NCF2		0.00	same	
D20022	DDI 2	TVEAFUISDEC*KP	C114	NCE2		0.00	same	
F 39023	RFL3	I V FAERISDEC ' KR	C114 C052	NGF2	0.00	0.00	same	
P39023	RPL3	VACTIGAWHPAR	0253	NCF2	0.00	10.08	same	
P40429	RPL13A	C*EGINISGNFYR	C38	NCF1	0.00	0.00	same	
P40429	RPL13A	C*EGINISGNFYR	C38	NCF2	0.00	0.00	same	
P40429	RPL13A	C*EGINISGNFYR	C38	NOXO1	0.00	0.00	same	
P40926	MDH2	THPLISOC*TPK	C212	NCF1	0.00	0.00	same	
P40026	MDH2	TIPLISOC*TPK	C212	NCF2	0.00	0.00	samo	
D40026	MDH2	TUDUSOC*TDV	C212	NOVOI	0.00	0.00	same	
F40920	MDH2	IIIFLI5QC IFK	0212	NOADI	0.00	0.00	same	
P40926	MDH2	EGVVEC*SFVK	C275	NCFI	0.00	0.00	same	
P40926	MDH2	EGVVEC*SFVK	C275	NCF2	0.00	0.00	same	
P40926	MDH2	EGVVEC*SFVK	C275	NOXO1	0.00	0.00	same	
P40926	MDH2	SQETEC*TYFSTPLLLGK	C285	NCF1	0.00	0.00	same	
P40926	MDH2	SQETEC*TYFSTPLLLGK	C285	NCF2	0.00	0.00	same	
P40926	MDH2	SOFTEC*TYFSTPLLLCK	C285	NOXO1	0.00	0.00	same	
P40026	MDH2	CVI CPEOI PDC*I K	C200	NCEI	0.00	0.00	same	
F 40920	MDH2	GILGIEQLIDC LK	C89	NGEO	0.00	9.17	same	
P40926	MDH2	GYLGPEQLPDC*LK	C89	NCF2	0.00	0.00	same	
P40926	MDH2	GYLGPEQLPDC*LK	C89	NOXO1	0.00	0.00	same	
P40926	MDH2	GC*DVVVIPAGVPR	C93	NCF1	0.00	0.00	same	
P40926	MDH2	GC*DVVVIPAGVPR	C93	NCF2	0.00	0.00	same	
P40926	MDH2	GC*DVVVIPAGVPR	C93	NOXO1	0.00	0.00	same	
P42166	TMPO	GGTLEGGEVC*K	C684	NCF1	0.00	0.00	same	
D49167	TMPO	EMEDVEASTDTCISASC*D	C262	NCE1	0.00	0.00	same	
D 40107	TMDO	EMPT TEASTT TOISASO IL	C303	NOPI	10.00	0.00	same	
P42167	TMPO	EMFPYEASIPIGISASC*R	C363	NCFI	10.81	0.00	same	
P42167	TMPO	EMFPYEASTPTGISASC*R	C363	NCF2	0.00		same	
P42677	RPS27	LTEGC*SFR	C77	NCF1	13.04	10.71	same	
P42677	RPS27	LTEGC*SFR	C77	NCF2	10.31	13.15	same	
P42677	RPS27	LTEGC*SFR	C77	NOXO1	6.96	11.89	same	
P45880	VDAC2	WNTDNTLGTEIAIEDOIC*OGLK	C103	NOXO1	0.00		same	
P45880	VDAC2	SC*SGVEESTSGSSNTDTGK	C47	NOXOI	0.00	0.00	samo	
D45074 1	USDE	VC*ASEVDDV	C 929	NCEI	0.00	0.00	same	
F43974-1	USFS	VCASERFFR	0000	NOFI	0.00		same	
P45974-1	USP5	VC*ASERPPK	C838	NCF2	0.00		same	
P45974-1	$USP_5$	VC*ASEKPPK	C838	NOXO1	0.00	0.00	same	
P46060	RANGAP1	SSAC*FTLQELK	C141	NCF1	0.00	0.00	same	
P46060	RANGAP1	LNNC*GMGIGGGK	C152	NCF1	0.00	0.00	same	
P46060	RANGAP1	ILAAALTEC*HR	C169	NCF1	0.00	0.00	same	
P46060	RANGAP1	ALAPLLIAEVTKPNSALESC*SEAB	C573	NCF1	0.00	0.00	same	
D46087	NOP2	VIIDADC*SCTCVISK	C462	NCEL	0.00	0.00	same	
D46087	NOD2	VIIDADC*SCTCVISK	C403	NOVOI	0.00	0.00	same	
F40087	NOF2	VLLDAFC'SGIGVISK	C405	NOADI	0.00		same	
P46736	BRCC3	VLYTC*FQSIQAQK	C172	NCFI	0.00	0.00	same	
P46736	BRCC3	VLYTC*FQSIQAQK	C172	NCF2	0.00		same	
P46736	BRCC3	VC*LESAVELPK	C228	NCF1	0.00		same	
P46736	BRCC3	ILC*QEEQDAYRR	C240	NCF1	0.00	0.00	same	
P46776	RPL27A	NOSEC*PTVNLDK	C70	NCF1	0.00	0.00	same	
P46776	BPL27A	NOSEC*PTVNLDK	C70	NCF2		0.00	same	
D46776	DDI 97A	NOSEC*PTVNI DK	C70	NOYOI	0.00	0.00	same	
D40770	DDIE	VOLTNVA A AVO*TOLLI A D	C100	NOADI	100.00	100.00	same	
P46777	RPL5	VGLINYAAAYC*IGLLLAR	C100	NCF2	100.00	100.00	same	
P46777	RPL5	VGLTNYAAAYC*TGLLLAR	C100	NOXO1	100.00	100.00	same	
P46777	RPL5	DIIC*QIAYAR	C62	NCF1	21.78	24.06	same	
P46777	RPL5	DIIC*QIAYAR	C62	NCF2	0.00		same	
P46777	RPL5	IEGDMIVC*AAYAHELPK	C76	NCF1	0.00		same	
P46777	RPL5	IEGDMIVC*AAYAHELPK	C76	NCF2		0.00	same	
P46777	BDIE	IECOMIVC*AAVAUELOV	076	NOVOI		0.00	Same -	
D46770	DDI 00	NC*SSELIK	C10	NODI	0.01	4.00	same	
F40//9	nrl28	NO SELIN	013	NOFT	9.01	4.08	same	
P46779	RPL28	NC*SSFLIK	C13	NCF2	9.05	0.00	same	
P46779	RPL28	NC*SSFLIK	C13	NOXO1	11.29	14.40	same	
P46782	RPS5	VNQAIWLLC*TGAR	C155	NCF1	0.00	0.00	same	
P46782	RPS5	VNQAIWLLC*TGAR	C155	NCF2	0.00	0.00	same	
P46782	BPSS	VNOAIWLLC*TGAB	C155	NOYOI	0.00	0.00	samo	
D46700	DDCF	TIAEC'SI ADELINIA AZ	C100	NODI	1.10	0.00	same	
r 40782	nP50	TIALO LADELINAAK	0172	NOFT	1.10	0.00	same	
P46782	RPS5	TIAEC*LADELINAAK	C172	NCF2	0.00	0.00	same	
P46782	RPS5	TIAEC*LADELINAAK	C172	NOXO1	0.00	0.00	same	
P46782	RPS5	AQC*PIVER	C66	NCF1	0.00		same	
P46782	RPS5	AQC*PIVER	C66	NCF2	0.00	0.00	same	
		Continued	on nort -	0.000				
		Continued	. on next t	bage				

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Table	2A.2	- continued	from	previous	page

PERFER         RPS         Adjestivation         Cold         NORCI         0.00         0.00         0.00         0.00           PERFORMENT         CERT         NCC1         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th>Accession</th> <th>Protein</th> <th>Sequence</th> <th>Positions</th> <th>Bait</th> <th>(-) CAT</th> <th>(+) CAT</th> <th>Different</th> <th>Function</th>	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
PH9677         STTAA         EGSPULACE/LWKK         CORF         NCP1         0.00         same           P46077         STTAA         EGSPULACE/LWKK         CMA         0.00         amount           P48078         CMISI         VVPISCE/CK         CMA         CMA         0.00         amount           P48080         CMISI         VVPISCE/CK         CMA         CMA         0.00         amount           P48090         CMISI         VVVILCE/CRR         CMA         CMA         0.00         0.00         amount           P48090         CMISI         VVVALCE/CRR         CMISI         VVALCE/CRR         CMA         0.00         0.00         amount           P48090         CMISI         VVALCE/CRR         CMA         CMA         0.00         amount           P48097         RF144         AMA         CMA <td>P46782</td> <td>RPS5</td> <td>AQC*PIVER</td> <td>C66</td> <td>NOXO1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P46782	RPS5	AQC*PIVER	C66	NOXO1	0.00	0.00	same	
Piest         STTAA         COST VLINCTIANYR         COST         NCP2         0.00         mame           PASSO         COLD         VVPISCT-K         COST         NCP2         0.00.0         mame           PASSO         COLD         VVPISCT-K         COASCIST         NCP2         0.00.0         mame           PASSO         COLD         VVPISCT-K         COASCIST         NCP2         0.00.0         mame           PASSO         COLD         VVPISCT-K         COASCIST         NCAC-COAR         0.00.0         mame           PASSO         COLD         VVPISCT-K         COASCIST         NCAC-COAR         0.00.0         mame           PASSO         COLD         VVCAC-COAR         COASCIST         NCAC-COAR         0.00.0         mame           PASSO         COLD         VVCAC-COAR         COASCIST         NCCAC-COAR         0.00.0         mame           PASSO         COLD         VVCAC-COAR         COARCAR         COAR         0.00.0         mame           PASSO         COLD         VCCAC-COAR         COARCAR         COAR         0.00.0         mame           PASSO         COLD         VCCAC-COAR         COARCAR         COAR         NCP2         0.00.0 <td>P46977</td> <td>STT3A</td> <td>EGSPVLLNC*LMYK</td> <td>C637</td> <td>NCF1</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	P46977	STT3A	EGSPVLLNC*LMYK	C637	NCF1	0.00		same	
Partner         SERIE VILINC'IMAR         Cost of the View of	P46077	STT2A	ECSPULI NC*LMVK	C627	NCE2	0.00		same	
Figure         NUMBER         CLART         NUMBER         NUMBER </td <td>F40977</td> <td>STISA</td> <td>EGSFVLLNC*LNIK</td> <td>C037</td> <td>NOF2</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	F40977	STISA	EGSFVLLNC*LNIK	C037	NOF2	0.00		same	
PASSO         CDISI         VVPDSCTVK         CD44C18         NCP1         0.0.00         0.0.00         mame           PASSO         CDISI         VVVACVGRN         CD44C18         NCP1         0.0.00         mame           PASSO         CDISI         VVALCVGRN         CD12         NCP1         0.0.00         mame           PASSO         CDISI         VEGCCVLTR         CD28         NCP1         0.0.00         mame           PASSO         CDISI         VEGCCVLTR         CD28         NCP1         0.0.0         mame           PASSO         MCPA         QCASLQALADADEQR         CM2         NCP1         1.7.43         mame           PASSO         PASSO         PASSO         NCP1         1.7.44         mame         mame           PASSO         PASSO         NCP1         1.7.44         mame         mame           PASSO	P46977	STT3A	EGSPVLLNC*LMYK	C637	NOXOI	0.00	0.00	same	
PASS00         CDIS1         VVTPSCT*K         CIASCIS         NCF2         N00.00         100.00         name           PASS00         CDIS1         TVVALC*GQR         CL62         NCF2         100.00         0.00         same           PASS00         CDIS1         TVVALC*GQR         CL62         NCF2         100.00         0.00         same           PASS00         CDIS1         TVVALC*GQR         CL62         NCF2         100.00         100.00         same           PASS00         CDIS1         VVALC*GQR         C208         NCF2         100.00         same           PASS00         CDIS1         VEGCC*LTK         C208         NCF2         0.00         same           PASS08         NTFA         QC*ASLQAALADAEQR         CL62         NCF1         0.00         same           PASS08         NCF2         GCA2         NCF2         0.00         6.00         same           PASS08         NCF4         QC*ASLQAALADAEQR         CA22         NCF1         0.00         6.00         same           PASS07         RF14         ACGSNC*AR         CR3         NCF1         0.00         same           PASS07         RAASLQAALADAEQR         CL62	P48509	CD151	VVPDSC*C*K	C184;C185	NCF1	100.00	100.00	same	
PASS09 CDI31 VVDUSCUCK COLOR CLASS NOX01 100.00 100.00 annee PASS09 CDI31 VVALCUCAGR CLI2 NOX01 0.00 0.00 annee PASS09 CDI31 VVALCUCAGR CLI2 NOX01 0.00 annee PASS09 CDI31 VVALCUCAGR CLI2 NOX01 0.00 annee PASS09 CDI31 VVALUE PASS0 CDI3 VVALUE PA	P48509	CD151	VVPDSC*C*K	C184;C185	NCF2	100.00	100.00	same	
P4809         CD151         TVVALC"GR         CD2         NCF1         0.00         0.00         same           P4809         CD151         TVVALC"GR         CD2         NCF1         100.00         100.00         same           P4809         CD151         VEGC"LTK         CD28         NCF1         100.00         same           P4809         CD151         VEGC"LTK         CD28         NCF1         100.00         same           P4809         NRTN         QC*ASLQAALADAPQR         CD28         NCF2         10.00         0.00         same           P4808         NRTN         QC*ASLQAALADAPQR         CO22         NCF2         10.00         10.00         same           P4808         NRTN         QC*ASLQAALADAPQR         CA22         NCF1         10.00         same           P48097         NFL43         ACGVCYPCRR         C46.C49         NCF1         15.26         same           P40077         NFL43         ATGGNSC*AR         CS3         NCF1         10.00         same           P40077         NFL43         ATGGNSC*AR         CS3         NCF1         10.00         same           P40077         NFL43         ATGGNSC*AR         CS3         NCF	P48509	CD151	VVPDSC*C*K	C184:C185	NOXO1	100.00	100.00	same	
Discos         Chips         NC/P3         D.00         D.00         Annue           Passos         Chis         IVVALC*CGR         C.02         NOX1         D.00         Annue           Passos         Chis         IVVALC*CGR         C.02         NOX1         D.00         D.00         Annue           Passos         Chis         VEGCC*LTK         C.268         NCP2         D.00         D.00         same           Passos         Chis         VEGCC*LTK         C.268         NCP2         D.00         annue           Passos         RITTA         QC*ASLQAMADAEQR         C.402         NCP1         D.00         annue           Passos         KITTA         QC*ASLQAMADAEQR         C.402         NCP1         D.00         annue           Passos         NUTLA         C.432         NCP1         D.00         annue         annue	P48509	CD151	TVVALC*GOB	C192	NCF1	0.00	0.00	same	
Passog         CEDIS         TVVALC*GGR         CD22         NXX01         0.00         base           Passog         CD151         VEGGC*LTK         C208         NCP1         100.00         100.00         ename           Passog         CD151         VEGGC*LTK         C208         NCP1         100.00         100.00         ename           Passog         CD151         VEGGC*LTK         C208         NCP1         100.00         ename           Passog         CD151         VEGGC*LTK         C208         NCP1         11.00         100.00         ename           Passog         CD151         VEGGC*LTK         C208         NCP1         11.40         NCP1         11.40         NCP1         11.41         NCP1         10.00         ename           Passog         RF144         SACGSMC*AK         CS3         NCP2         13.00         0.00         ename           Passog         RF144         SACGSMC*AK         CS3         NCP2         0.00         6.00         ename           Passog         RF144	D 405000	CD151	TVVALC*COD	C102	NCE9	0.00	0.00	same	
PASSO         CODE         TVALL*CUP         CD2         AUX01         L00         Aux02         Aux02           PASSO         CD151         VKGGCUTK         C208         NCK21         L00.00         L60.00         same           PASSO         CD151         VKGGCUTK         C208         NCK21         L00.00         L60.00         same           PASSO         CD151         VKGGCUTK         C208         NCK21         L00.00         L60.00         same           PASSO         CD151         VKGGCUTK         C208         NCP1         L14         same           PASSO         QC*ASLQAALDAEQR         C402         NCP1         L14         same         same           PASSO         NETAS         ACCOMMANA         C46         NCP1         L14         same           PASSO         NETAS         ACCOSMC*AK         C38         NCP1         L31         L30         same           PASSO         NETAS         ACCOSMC*AK         C38         NCP1         L31         L30         same           PASSO         NALALPECR         CL443         NCP1         L30         Same         same           PASSO         NALALPECR         CL443         NCP1	P48509	CD151	I V VALC*GQR	0192	NCF2	0.00	0.00	same	
P4550         CD151         VECGC*1/TK         CD38         NCP         100.00         100.00         #####           P4569         CD151         VECGC*1/TK         C308         NCP1         0.00         #####           P4568         NTRGC         QC*ASLQAALADARQR         C402         NCP1         0.00         #####           P4568         NTRGC         QC*ASLQAALADARQR         C402         NCP1         0.00         ####           P4568         NTRGC         QC*ASLQAALADARQR         C402         NCP1         17.45         ####           P45607         NTRGC         QC*ASLQAALADARQR         C402         NCP1         17.45         ####           P4507         NF134         SACGSVCYPGR         C46.C49         NCP1         1.00         #####           P4507         NF134         ATGGSMC*AK         C53         NCP2         1.31         1.3.96         #####           P4507         NF134         ATGGSMC*AK         C33         NCP1         0.00         ######         NCP1         0.00         ####################################	P48509	CD151	TVVALC*GQR	C192	NOXOI	0.00		same	
P45509 CD101 VECGCUTXK CD88 NCF2 100.00 100.00 anne P45608 KRT6A QC-ASLQAALADAEQR CL02 NCF1 0.00 anne P45668 KRT6Q QC-ASLQAALADAEQR CL02 NCF2 0.00 0.00 anne P45668 KRT6Q QC-ASLQAALADAEQR CL02 NOCOL 0.00 0.00 anne P45668 KRT6Q QC-ASLQAALADAEQR CL02 NOCOL 0.00 0.00 anne P45668 KRT6Q QC-ASLQAALADAEQR CL02 NOCOL 0.00 0.00 anne P4567 QC-ASLQAALADAEQR CL02 NOCOL 0.00 0.00 anne P4567 RF1A4 ACCSMC'AK CS3 NCF1 0.00 17.6 anne P4577 RF1A4 ACCSMC'AK CS3 NCF1 0.00 7.6 anne P4577 RF1A4 ACCSMC'AK CS3 NCF1 0.00 0.00 anne P45877 FASN AALQEELQLC'K C1141 NCF1 0.00 0.78 anne P45877 FASN AALQEELQLC'K C144 NCF1 0.00 0.78 anne P45877 FASN AALQEELQLC'K C144 NCF1 0.00 0.78 anne P45877 FASN AALQEELQLC'K C144 NCF1 0.00 0.00 anne P45877 FASN C1615PFGTC'K C1712 NCF1 0.00 0.00 anne P45879 FASN C1615PFGTC'K C1712 NCF1 0.00 0.00 anne P45879 FASN C1617FFTCHC C2773 NCF1 0.00 0.00 anne P45879 FASN C1617FFTCHC C1250 NCF1 0.00 0.00 anne P45879 FASN C1617FFTCHC C1250 NCF1 0.00 0.00 anne P45979 FASN C1617FFTCHC C1250 NCF1 0.00 0.00 anne P45979 FASN C1617FFTCHC C1250 NCF1 0.00 0.00 anne P45979 FASN FASN C1617FFTCHC C1250 NCF1 0.00 0.00 anne P45979 FASN FASN FAST FAST FAST FAST FAST FAST FAST FAST	P48509	CD151	VEGGC*LTK	C208	NCF1	100.00	100.00	same	
P48509         CD151         VEGGCUTK         C208         NOX(1)         100.00         100.00         same           P48608         KRT64         QC*ASLQAALADAEQR         C402         NCF1         0.00         same           P48608         KRT64         QC*ASLQAALADAEQR         C402         NCF1         0.00         0.00         same           P48608         KRT64         QC*ASLQAALADAEQR         C402         NCF1         17.45         same           P48608         KRT64         QC*ASLQAALADAEQR         C46(C49         NCF1         17.45         same           P48077         RP1.34         SACGXCPYCR         C36(C49         NCF1         31.45         1.69         same           P49077         RP1.34         AXGGSMC*AK         C38         NC71         0.00         same           P49377         RAS         SFYGGT1FLC*R         C1143         NCF1         0.00         same           P49377         FASS         SFYGGT1FLC*R         C123         NCF1         0.00         same           P49377         FASS         LAMCGSMC*AK         C38         NCF1         0.00         same           P49377         FASS         LAMCGSMC*AK         C38         NC	P48509	CD151	VEGGC*LTK	C208	NCF2	100.00	100.00	same	
Number         REFIGE PASSES         QC*ASLQAALADABQR         C402         NCF1         0.00         same           PASSES         RETAG RETAG         QC*ASLQAALADABQR         C402         NCF2         0.00         0.00         same           PASSES         RETAG         QC*ASLQAALADABQR         C402         NCF1         0.00         0.00         same           PASSES         RETAG         QC*ASLQAALADABQR         C402         NCF1         1.7.45         same           PASSES         RETAG         CAGCS/NCPC2         1.5.00         1.7.86         same           PASSES         RETAG         C465.49         NCF2         1.5.00         same           PASSES         RETAG         C465.40         NCF2         1.5.1         1.2.06         same           PASSES         RANK         ACGSMC*AK         C58         NCF1         0.00         c.0.0         same           PASSES         PASS         ALAREPELIC/C*K         C1111         NCF1         0.00         same         same           PASSES         PASSE         ALAREPELIC/C*K         C1215         NCF1         0.00         same           PASSES         PASSE         ALAREPELIC/C*K         C1215         NCF1 </td <td>P48509</td> <td>CD151</td> <td>VEGGC*LTK</td> <td>C208</td> <td>NOXO1</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	P48509	CD151	VEGGC*LTK	C208	NOXO1	100.00	100.00	same	
P46668         TERTS         QC*ASEQAALADAEQR         C402         NCP1         0.00         same           P46668         TERGO         QC*ASEQAALADAEQR         C402         NCP1         0.00         0.00         same           P46668         TERGO         QC*ASEQAALADAEQR         C402         NCP1         17.46         same           P46668         TERGA         QC*ASEQAALADAEQR         C402         NCP1         17.86         same           P46670         TERGA         QC*ASEQAALADAEQR         C402         NCP1         17.86         same           P46977         TFLA4         AXCGSMC*AK         C58         NCP1         2.48         6.6.         same           P46977         TFLA4         AXCGSMC*AK         C58         NCP1         3.08         same           P48377         FASN         SYCGCCTR         C1431         NCP1         3.08         same           P48377         FASN         WYCSSELFCTR         C1432         NCP1         0.00         same           P48377         FASN         MYCSSELFCTK         C123         NCP1         0.00         same           P48377         FASN         LSITTYTCQCCTR         C277         NCP1         0.00 <td>1 10000</td> <td>KRT6C</td> <td></td> <td></td> <td></td> <td>100100</td> <td>100100</td> <td>buille</td> <td></td>	1 10000	KRT6C				100100	100100	buille	
P4806S         NKTPA RUTPA         QC*ASLQAALADAEQR         C.G02         NCF2         0.00         same           P4806S         KUTPC         QC*ASLQAALADAEQR         C.G02         NCK01         0.00         same           P4806S         KUTPC         QC*ASLQAALADAEQR         C.G02         NCK01         0.00         6.61         same           P48077         RFL44         SAC*GVC*PCR         C.G64,C49         NCF2         18.06         17.45         same           P49077         RFL44         SAC*GVC*PCR         C.G46,C49         NCF2         18.06         17.45         same           P49077         RFL44         AVGCSMC*AK         C.S3         NCF2         8.13         12.06         same           P49077         RFL44         AVGCSMC*AK         C.S3         NCK71         0.00         same           P49077         RFL45         AALQEELQC*TR         C.G124         NCF1         0.00         same           P49377         FASS         LGMLSFEDTC*K         C.G123         NCF1         0.00         same           P49372         FASS         LGMLSFEDTC*K         C.G124         NCF1         0.00         same           P493837         FASS         LGMLSFEDTC*	P48668	KILLOO	QC*ASLQAAIADAEQR	C402	NCF1	0.00		same	
P4868 NETCO P4868 NETCO P4868 NETCO P4868 NETCO P4867 NETCO P4867 NETCO P4867 NETCO P4867 NETCO P4867 NETCO P4868 NETCO P4867 NETCO P4868 NETCO P4868		KRI6A							
1.0000         KRTAA         QC TASLQALIADAEQR         Class         NOXCI         0.000         same           P48608         KRTAA         QC TASLQALIADAEQR         Claic         NOXCI         0.00         same           P4807         RFL4         SAC'GVCTPGR         Claic         NOXCI         0.00         0.00         same           P4807         RFL4         SAC'GVCTPGR         Claic         NOXCI         0.00         same           P4807         RFL4         AYGGSNC*AK         CS3         NCR1         0.46         same           P4807         RFL4         AYGGSNC*AK         CS3         NCR1         0.40         same           P4807         RFL4         AYGGSNC*AK         CS3         NCR1         0.40         same           P4807         RFL4         AYGGSNC*AK         CS3         NCR1         0.40         same           P4837         FASN         MURSPECTCR         Claid         NCR1         0.40         same           P4837         FASN         LSHFYCLQC*TR         C2273         NCR2         0.40         same           P48387         FASN         LSHFYCLQC*TR         C2273         NCR2         0.40         same	P48668	KR16C	OC*ASLOAAIADAEOB	C402	NCF2	0.00	0.00	same	
Passas         KETTOC         QC*ARLQANADARQR         C402         NCK01         0.00         0.00         same           P49307         RFLA         SACCYUCTOR         C46.C49         NCP1         17.45         same           P49307         RFLA         SACCYUCTOR         C46.C49         NCP1         18.09         same           P49307         RFLA         AVGCSMC*AK         C83         NCP1         0.00         same           P49307         RFLA         AVGCSMC*AK         C83         NCP1         0.00         1.00           P49307         RFLA         AVGCSMC*AK         C141         NCP1         0.00         0.00         same           P49337         FASS         ALQEELQC*K         C1141         NCP1         0.00         same           P4337         FASS         ALGESTEC*K         C123         NCP1         0.00         same           P4337         FASS         LSIPTVCLQC*TR         C143         NCP1         0.00         same           P4337         FASS         LSIPTVCLQC*TR         C132         NCP1         0.00         same           P4337         FASS         LSIPTVCLQC*TR         C143         NCP1         0.00         same	1 40000	KRT6A	de uppdimmpupdit	0402	1101 2	0.00	0.00	Same	
PASSA         KETGA         QC*ASLANALADAQUE         Coluz         NOAD         0.00         same           PASSAT         RELAL         SACTOVC*RG         C48-C38         NCE1         17.45         T.85         same           PASSAT         RELAL         ANTGOSNC*AK         C68         NCE1         10.00         same           PASSAT         RELAL         ANTGOSNC*AK         C68         NCE1         2.48         6.61         same           PASSAT         RELAL         ANTGOSNC*AK         C68         NCE1         3.6.08         same           PASSAT         RELAL         ANTGOSNC*AK         C63         NCE1         3.6.08         same           PASSAT         FASN         ANTGOSNC*AK         C1443         NCE1         3.6.08         same           PASSAT         FASN         SFYGSTLFLC*R         C1443         NCE1         3.6.08         same           PASSAT         FASN         LGMLSPECTK         C143         NCE1         3.6.08         same           PASSAT         FASN         LGMLSPECTK         C143         NCE1         3.6.08         same           PASSAT         FASN         LGMLSPECTK         C143         NCE1         3.6.08	D 40000	KRT6C		Guos	NOVOI	0.00	0.00		
P48907         THILAS         SACCVCYPCR         C46,C49         NCF1         17.45         same           P48907         RFLAS         SACCVCYPCR         C46,C49         NCF2         15.69         17.86         same           P48907         RFLAS         ACGSNCARK         CSS         NCF1         0.09         6.75         same           P48907         RFLAS         AVGCSNCARK         CSS         NCF2         0.00         6.00         same           P48907         RFLAS         AVGCSNCARK         CSS         NCK2         0.00         same           P48907         RFLAS         AVGCSNCARK         CSS         NCK2         0.00         same           P48937         RFLAS         AVGCSNCARK         CS14         NCF1         0.00         same           P48377         FASN         WCTSSLK         CC144         NCF1         0.00         same           P48377         FASN         LGMLSPECTC*R         C212         NCF1         0.00         same           P48377         FASN         LGMLSPECTC*R         C212         NCF1         0.00         0.00         same           P48372         FASN         LGMLSPECTC*R         C110         NCF2	P48668	KRT6A	QC*ASLQAAIADAEQR	C402	NOXOI	0.00	0.00	same	
physion         RL-14         AXC*GVC*PCR         CdB:CdD         NCP2         18:09         Same           Pageor         RL-14         AYGGSNC*AK         CBS         NCF1         2.48         6.61         same           Pageor         RL-14         AYGGSNC*AK         CBS         NCF1         0.00         10.00         same           Pageor         RL-14         AYGGSNC*AK         CBS         NCF1         0.00         6.00         same           Pageor         RL-14         AYGGSNC*AK         CBS         NCF1         0.00         6.00         same           Pageor         RL-14         AYGGSNC*AK         CBS         NCF1         0.00         0.00         same           Pageor         RL-14         NCGTLPLC*R         C143         NCF1         0.00         same           Pageor         RL-15         NCF1         0.00         0.00         same         same           Pageor         RL-14         NCF1         0.00         0.00         same         same           Pageor         RL-15         NCF1         0.00         0.00         same         DSULFID           Pageor         CHANNER         CCHANTERPESTR         CHAN         CHAN	P40207	RPL34	SAC*CVC*PCB	C46:C49	NCF1	17.45		samo	
Passon         Passon<	D 40007	DDL 94	SAC GVO I GIL	C40,049	NCEO	10.00	17.00	same	
P19207         RUL13         AUGUSALCAR         CS3         NUC11         0.00         manne           P19207         RPL34         AUGGSMC/AK         CS3         NUC1         0.00         same           P19207         RPL34         AUGGSMC/AK         CS3         NUC1         0.00         6.76         same           P19207         RPL34         AUGGSMC/AK         CS3         NUC1         0.00         6.76         same           P19207         RPL34         AUGGSMC/AK         CS3         NUC1         0.00         0.00         same           P19207         RPL34         AUGUSMC/AK         CS3         NUC1         0.00         0.00         same           P19217         FASN         LGMLSPEGTC/K         C212         NUC1         0.00         same           P19207         PASN         LGMLSPEGTC/K         C213         NUC1         0.00         same           P19207         PASN         LGMLSPEGTC/K         C213         NUC1         0.00         same           P19202         LANDY         LGMLSPEGTC/K         C121         NUC1         0.00         same           P19202         LANDY         LGMUSTNK         C112         NUC1         <	P49207	RPL34	SACTGVCTPGR	C46;C49	NCF2	18.09	17.80	same	
P49207         RPL34         AVGCSMC*AK         CB3         NCF1         2.4.8         6.6.1         same           P49207         RL34         AUGCSMC*AK         CB3         NCF1         2.1.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3         12.3 </td <td>P49207</td> <td>RPL34</td> <td>AYGGSMC*AK</td> <td>C83</td> <td>NCF1</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	P49207	RPL34	AYGGSMC*AK	C83	NCF1	0.00		same	
P49207         RPL34         AYGGSMC*AK         C83         NOKP2         8.13         12.96         same           P49207         FR154         AYGGSMC*AK         C34         NOK01         0.00         6.78         same           P4937         FASN         AYGSTLC*R         C154         NCF1         0.00         c.78         same           P4937         FASN         LGMLSPEGTC*K         C121         NCF1         0.00         same           P4937         FASN         LGMLSPEGTC*K         C212         NCF2         0.00         same           P4937         FASN         LGMLSPEGTC*K         C212         NCF2         0.00         same           P4937         FASN         LGMLSPEGTC*K         C212         NCF2         0.00         same           P4937         FASN         LGMLSPECTR         C132         NCF1         0.00         same         DULFID           P49384         C7GLACGC*FYREPESTLR         C133         NCF1         0.00         same         Same           P49792         RANBP2         CFALPEEAGHK         C1243         NCF1         0.00         same           P49792         RANBP2         CFALPEEAGHK         C1242         NCF1 </td <td>P49207</td> <td>RPL34</td> <td>AYGGSMC*AK</td> <td>C83</td> <td>NCF1</td> <td>2.48</td> <td>6.61</td> <td>same</td> <td></td>	P49207	RPL34	AYGGSMC*AK	C83	NCF1	2.48	6.61	same	
P49207         RPL34         AYGGSMC*AK         CS3         NOX01         0.00         6.00         same           P4327         FASN         AALQEELQLC'K         C1403         NCF1         30.60         same           P4327         FASN         SFVGSTLLC'R         C1403         NCF1         30.60         same           P4327         FASN         LGMLSPEGTC'K         C212         NCF1         0.00         6.00         same           P4327         FASN         LGMLSPEGTC'K         C212         NCF1         0.00         same           P4327         FASN         LGMLSPEGTC'K         C212         NCF1         0.00         same           P43267         FASN         LGMLSPEGTC'K         C213         NCF1         0.00         same           P43367         RCT3         AC"TILLG         C1243         NCF1         0.00         same           P43761         RBM25         CGUNTSWK         C132         NCF1         0.00         same           P4370         RANBP2         CYANFYSPDMK         C1243         NCF1         0.00         same           P4370         RANBP2         CYANFYSPDMK         C1242         NCF2         0.00         same	P49207	RPL34	AYGGSMC*AK	C83	NCF2	8.13	12.96	same	
P19327         TAR.M         XALQEELQLC'K         C1141         NCP1         0.00         6.78         same           P4327         PANN         WVC*SLL         C1448         NCP1         0.00         6.00         same           P4327         PANN         WVC*SLL         C1548         NCP1         0.00         0.00         same           P4327         PANN         WVC*SLL         C1548         NCP1         0.00         0.00         same           P4327         PANN         LSIPTYCLQC*TR         C2273         NCP1         0.00         0.00         same           P43387         FANN         LSIPTYCLQC*TR         C2273         NCP1         0.00         0.00         same           P439561         RSM25         LQAFCPC*EVKEPESTLR         C132         NCP1         0.00         0.00         same           P497501         RANBP2         CTAFUENDERK         C1248         NCP1         0.00         same           P49752         RANBP2         CAFECTEVKEPESTLR         C1248         NCP1         0.00         same           P49792         RANBP2         CAFECTEVK         C1248         NCP1         0.00         same           P49792         RANBP2<	P49207	BPL34	AYGGSMC*AK	C83	NOXO1	0.00	0.00	same	
Participation         Control of the second state         Display of the second state         Display of the second state           Participation         Califier         Califier         Califier         Califier         State           Parine         Califier         Califier	D40207	EACN	ALOFFICIC*V	C1141	NOE1	0.00	6.79	same	
P39327         PARS         SFT GS 1.P.L.".         Cl 1403         NCP1         39.18         same           P49327         PARN         LGMLSPECTC*K         C212         NCF1         0.00         same           P49327         PARN         LGMLSPECTC*K         C212         NCF2         0.00         same           P49327         PARN         LSHTYGLQC*TR         C2273         NCF2         0.00         same           P49327         PARN         LSHTYGLQC*TR         C2273         NCF2         0.00         same           P49327         PARN         LSHTYGLQC*TR         C2273         NCF1         0.00         same           P49327         PARN         LSHTYGLQC*TR         C132         NCF1         0.00         same           P49750         NUP153         C*GQCHKYQGCR         C21         NCF1         0.00         same           P49792         RANBP2         TGEDEEFFC*NR         C1246         NCF1         0.00         same           P49792         RANBP2         TGEDEEFFC*NR         C1246         NCF1         0.00         same           P49792         RANBP2         TC*HTNEPBAK         C1246         NCF1         0.00         same	F49327	FASIN	AALQEELQLC'K	C1141	NOFI	0.00	0.78	same	
P43327         FARM         WVC*SSLA         Cl-148         NCP1         0.00         same           P43327         FARM         LGLISPECTCYK         C212         NCP1         0.00         0.00         same           P43327         FARM         LSIPTYGLQC*TR         C2273         NCP1         0.00         0.00         same           P43328         FARM         LSIPTYGLQC*TR         C2273         NCP1         0.00         0.00         same           P43561         RUB22         CCULSWK         C110         NCP1         0.00         0.00         same           P407561         RUD22         CCULSWK         C110         NCP1         0.00         0.00         same           P40752         RANBP2         C*ANTYSPDMK         C1243         NCP1         0.00         same           P40792         RANBP2         C*ANTYSPDMK         C1243         NCP1         0.00         same           P40792         RANBP2         C*ANTYSPDMK         C1243         NCP1         0.00         same           P40792         RANBP2         C*ANTYSPDMK         C1240         NCP1         0.00         same           P40792         RANBP2         CYANTYPDADGER         C	P49327	FASN	SFYGSTLFLC*R	C1403	NCF1	36.08		same	
P49327         FASN         LGMLSPECTC'K         C212         NCF1         0.00         same           P43327         FASN         LSHPYGLQC'TR         C2273         NCF2         0.00         oame           P43327         FASN         LSHPYGLQC'TR         C2273         NCF2         0.00         oame           P43355         CCT3         ACTTLLR         C327         NCF1         0.00         oame           P43756-1         RBM25         CCULVEWK         C110         NCF1         0.00         same           P49760         NUP153         C"RQFIRTEVKRPESTLR         C132         NCF1         0.00         same           P49790         NUP153         C"RQFIRTEVKRPESTLR         C1243         NCF1         0.00         same           P49792         RANBP2         C'ANTNSPDMK         C1243         NCF2         0.00         same           P49792         RANBP2         C'AFFEAQSILK         C1246         NCF1         0.00         same           P49792         RANBP2         VEMETAC*DEADGR         C2407         NCF1         0.00         same           P49792         RANBP2         VEMETAC*DEADGR         C2407         NCF1         0.00         same	P49327	FASN	WVC*SSLR	C1548	NCF1	0.00		same	
P49327         FASN         LGMLSPECTC*K         C212         NCF2         0.00         same           P43327         FASN         LSIPTYGLQC*TR         C2273         NCF1         0.00         came           P43327         FASN         LSIPTYGLQC*TR         C2273         NCF2         0.00         came           P43751         FASN         LSIPTYGLQC*TR         C10         NCF1         0.00         came           P497561         RBM25         C4QCGRKC*EYKEPESTLR         C132         NCF1         0.00         came           P49732         RANBP2         TGEEDEEFFC*NR         C1148         NCF1         0.00         came           P49732         RANBP2         CTEQGPLEYPUQGR         C1248         NCF1         0.00         same           P49732         RANBP2         CYELEAGSLK         C1246         NCF1         0.00         same           P49732         RANBP2         VWLWTAC*DEADGER         C2407         NCF1         0.00         same           P49732         RANBP2         VWLWTAC*DEADGER         C2407         NCF1         0.00         same           P49732         RANBP2         VWLWTAC*DEADGER         C2407         NCF1         0.00         same	P49327	FASN	LGMLSPEGTC*K	C212	NCF1	0.00	0.00	same	
P43927         FASN         LSPTYGLQC*TR         C2273         NCF1         0.00         same           P43964         CCT         AC*TILLR         C372         NCF2         0.00         same           P43964-1         CCT         AC*TILLR         C372         NCF2         0.00         same           P439765-1         RAME         C372         NCF1         0.00         same           P439709         NUP133         C*GUVLSW         C*GENEEPESTER         C110         NCF2         0.00         same           P43970         NUP133         C*GENEEPESTERCNR         C116         0.00         same           P43972         RANBP2         C*ANUTSPDMK         C1243         NCF1         0.00         same           P43972         RANBP2         C*KEEAQSIK         C1240         NCF1         0.00         same           P43972         RANBP2         CVKUVTAC*DFADGER         C2407         NCP1         0.00         same           P43972         RANBP2         VWLWTAC*DFADGER         C2407         NCP1         0.00         same           P43972         RANBP2         C*RTPTSVK         C3669         NCF1         0.00         same           P49792	P49327	FASN	LGMLSPEGTC*K	C212	NCF2	0.00		same	
Page27         FASN         LEIPTYGLQCTR         C2273         NCF2         0.00         same           P49368-1         CCT3         ACTTILLR         C372         NCF1         0.00         same           P49365-1         RBM25         CGUISWK         C110         NCF2         100.00         same           P49750-1         RBM25         CGUISWK         C112         NCF1         0.00         same           P49700         NUP13         CHRCPETFYKEPESTLR         C132         NCF1         0.00         same           P49792         RANBP2         IC^ANIFYSPEDMK         C1243         NCF2         0.00         same           P49792         RANBP2         IC^ANIFYSPEDMK         C1243         NCF2         0.00         same           P49792         RANBP2         CCANUTAC*DEADCER         C2407         NCF1         0.00         same           P49792         RANBP2         VWWTAC*DFADCER         C2407         NCF2         0.00         same           P49792         RANBP2         VWWTAC*DFADCER         C2407         NCF1         0.00         same           P49792         RANBP2         VWWTAC*DFADADER         C2407         NCF1         0.00         same     <	P40327	FASN	LSIPTVCLOC*TB	C2273	NCE1	0.00	0.00	samo	
Partial         Description         Later TLAC         Carbon         Construction         Same         DISULFID           PartStein         RBM25         CCULVEWK         C110         NCF1         0.00         same           PartStein         RBM25         CCULVEWK         C110         NCF1         0.00         same           PartStein         RABP2         TCEEDEEEFFC*NR         C123         NCF1         0.00         same           PartStein         RABP2         TCEEDEEEFFC*NR         C1106         NCF1         0.00         0.00         same           PartStein         RABP2         CCAPUNERPUMK         C1243         NCF1         0.00         0.00         same           PartStein         RABP2         CCAPUNERPUMK         C2407         NCF1         0.00         same           PartStein         RABP2         VUNWTAC*DEADGER         C2407         NCF2         0.00         same           PartStein         RABP2         VUNWTAC*DEADGER         C2407         NCF2         0.00         same           PartStein         RABP2         VUNWTAC*DEADGER         C2407         NCF2         0.00         same           PartStein         RABP2         CCAPUNTAC*DEADGER         <	D 40007	DACN		C2213	NCEO	0.00	0.00	same	
P4398-1         CC13         AC"ILLR         C372         NCF1         0.00         same         DISULFID           P43756-1         BM23         C'HQULSWENKEPESTLR         C12         NCF1         0.00         same           P43790         NUP133         C'HQCPUKFYQQGR         C21         NCF1         0.00         same           P43792         RANBP2         C'ANTYISPDMK         C1243         NCF2         0.00         same           P43792         RANBP2         C'ANTYISPDMK         C1243         NCF1         0.00         same           P43792         RANBP2         C'KTEEAQSHK         C1206         NCF1         0.00         same           P43792         RANBP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P43792         RANBP2         VWLWTAC*DFADGER         C2407         NCF2         0.00         same           P43792         RANBP2         VWLWTAC*DFADCER         C2407         NCF1         0.00         same           P43792         RANBP2         VWLWTAC*DFADCER         C2407         NCF2         0.00         same           P43792         RANBP2         VWLWTAC*DFADDEK         C2406         NCF1         0.0	P49327	FASIN	LSIPTYGLQC*TR	02273	NCF2	0.00		same	
P49756-1 RBM25 C*GLVLSWK C110 NCF2 10.00 same P49756-1 RBM25 LQAFGC*EYXEPESTLR C132 NCF1 0.00 0.00 same P49790 NANPP2 TGEEDEEFFC*NR C1146 NCF1 0.00 0.00 same P49792 NANP2 TGEEDEEFFC*NR C1243 NCF1 0.00 0.00 same P49792 RANP2 C*APHYISPDMK C1243 NCF2 0.00 same P49792 RANP2 C*APHYISPDMK C1243 NCF2 0.00 same P49792 RANP2 EGQWDC*SVC*L/R NCF1 0.00 0.00 same P49792 RANP2 EGQWDC*SVC*L/R NCF1 0.00 0.00 same P49792 RANP2 EGQWDC*SVC*L/R NCF1 0.00 0.00 same P49792 RANP2 EGQWDC*SVC*L/R C2407 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DFADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DFADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VVLWTAC*DFADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VC*NNVTK C2569 NCF1 0.00 0.00 same P49792 RANP2 VC*NNVTK C2982 NOK01 0.00 0.00 same P49792 RANP2 VC*NNVTK C3032 NCF1 10.00 100.00 same P49792 RANP2 VC*NNVTK C332 NCF1 100.00 100.00 same P49792 RANP2 VC*NNVTK C332 NCF1 0.00 0.00 same P49792 RANP2 VC*NNVTK C332 NCF1 0.00 0.00 same P49792 RANP2 VTQAIGSC*LEK C336 NCF1 0.00 0.00 same P49792 RANP2 VTQAIGSC*LEK C336 NCF1 0.00 0.00 same P49792 RANP2 VTQAIGSC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELR C75 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELR C75 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELR C34 NCX01 0.00 same P49959 NRE11 TLHTC*LELR C34 NCX01 0.00 same P4995	P49368-1	CCT3	AC*TILLR	C372	NCF1	0.00	0.00	same	DISULFID
P49750 NUP133 C*RQCFUTYKEPESTLR C132 NCF1 0.00 0.00 same P49790 NUP133 C*RQCFUTYKQQGR C21 NCF1 8.94 same P49792 RANP2 TGEDEEFFC*RR C1106 NCF1 0.00 0.00 same P49792 RANP2 C*RFEAQSILK C1246 NCF1 0.00 0.00 same P49792 RANP2 C*RFEAQSILK C1246 NCF1 0.00 0.00 same P49792 RANP2 C*RFEAQSILK C1266 NCF2 0.00 same P49792 RANP2 C*RFEAQSILK C1266 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DPADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DPADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DPADGER C2407 NCF1 0.00 0.00 same P49792 RANP2 VWLWTAC*DFADGER C3650 NCF1 0.00 0.00 same P49792 RANP2 VVC*NVTK C3850 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3850 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3860 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3860 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3862 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3862 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3862 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C3860 NCF1 0.00 0.00 same P49792 RANP2 VC*ANVTK C386 NCF1 0.00 0.00 same P49792 RANP2 VVPDVC*QGDTK C336 NCF1 0.00 0.00 same P49792 RANP2 VVPDVC*QGDTK C326 NOXOI 0.00 0.00 same P49792 RANP2 VVPDVC*QGDTK C326 NOXOI 0.00 same P49950 MREIIA P49950 M	P49756-1	RBM25	C*GLVLSWK	C110	NCF2		100.00	same	
pp:pp:pp         C21         NCP1         State         same           Pd9792         RANPP2         IC*ANHYISPDMK         C1243         NCF1         0.00         same           Pd9792         RANPP2         IC*ANHYISPDMK         C1243         NCF2         0.00         same           Pd9792         RANP2         IC*ANHYISPDMK         C1243         NCF1         0.00         same           Pd9792         RANP2         CVKFEAQSILK         C1206         NCF1         0.00         same           Pd9792         RANP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           Pd9792         RANP2         VC*INPUTK         C2659         NCF1         0.00         same           Pd9792	P49756-1	RBM25	LOAFGEC*EYKEPESTLR	C132	NCF1	0.00	0.00	same	
Party         FAMP2         TGEDEEEFFC*NR         Clid6         NCF1         0.00         0.00         same           P49792         RANPP2         IC*ANHYSPDMK         Cla43         NCF1         0.00         same           P49792         RANPP2         IC*ANHYSPDMK         Cla43         NCF2         0.00         same           P49792         RANP2         C*NFEFAGSULK         Cla96         NCF1         0.00         same           P49792         RANP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANP2         UKLPFTFC*YK         C2659         NCF1         0.00         same           P49792         RANP2         C*ANPTTK         C2892         NCF1         0.00         same           P49792         RANP2         C*ANPTTK         C2892         NCF1         0.00         same           P49792         RANP2         VC*ANPTTK         C2892         NCC1         0.00         same <td>P40700</td> <td>NUP153</td> <td>C*HOGPIKPYOOGB</td> <td>C:21</td> <td>NCF1</td> <td></td> <td>8.04</td> <td>samo</td> <td></td>	P40700	NUP153	C*HOGPIKPYOOGB	C:21	NCF1		8.04	samo	
Pairso         CLANET:         CLANET: <thclanet:< th=""> <thclanet:< th=""> <thcl< td=""><td>D 40700</td><td>DANDDO</td><td>TOFFDFFFFC*ND</td><td>C1106</td><td>NOPI</td><td>0.00</td><td>0.94</td><td>same</td><td></td></thcl<></thclanet:<></thclanet:<>	D 40700	DANDDO	TOFFDFFFFC*ND	C1106	NOPI	0.00	0.94	same	
P49792       RANBP2       IC*ANTYSPEMK       C1243       NCF1       0.00       same         P49792       RANBP2       CCANTYSPEMK       C1246       NCF1       0.00       same         P49792       RANBP2       CWENTAC*DFADGER       C1266       NCF1       0.00       same         P49792       RANBP2       VWLWTAC*DFADGER       C2407       NCF1       0.00       same         P49792       RANBP2       VWLWTAC*DFADGER       C2407       NCF1       0.00       same         P49792       RANBP2       UVLWTAC*DFADGER       C2407       NCF1       0.00       same         P49792       RANBP2       UVLWTAC*DFADGER       C2407       NCF1       0.00       same         P49792       RANBP2       UCPTFFC*YK       C2659       NCF1       0.00       same         P49792       RANBP2       UCPANHUTK       C2982       NCF1       100.00       same         P49792       RANBP2       UCPANHUTK       C3982       NCF1       0.00       same         P49792       RANBP2       UCANHUTK       C3982       NCF1       0.00       same         P49792       RANBP2       UCANTK       C3932       NCF1       0.00	P49792	RANDF2	IGEEDEEEFFCING	C1190	NCFI	0.00	0.00	same	
P49792 RANBP2 IC*ANHYISPDMK C1243 NCF2 0.00 same P49792 RANBP2 EGQWDC*SVC*LVR C1266 NCF2 0.00 same C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C1612;C1615 C16	P49792	RANBP2	IC*ANHYISPDMK	C1243	NCF1	0.00	0.00	same	
P49792 RANBP2 C*KFEEAQSILK C1296 NCF1 0.00 same P49792 RANBP2 VWIWTAC*DEADGER C2407 NCF1 0.00 0.00 same P49792 RANBP2 VWIWTAC*DEADGER C2407 NCF1 0.00 0.00 same P49792 RANBP2 VWIWTAC*DEADGER C2407 NCF1 0.00 0.00 same P49792 RANBP2 VVIWTAC*DEADGER C2407 NCF1 0.00 0.00 same P49792 RANBP2 CF1VFC*YK C2659 NCF1 0.00 0.00 same P49792 RANBP2 CF1VWEK C2710 NCF1 0.00 0.00 same P49792 RANBP2 CC*NFLTADNEK C2669 NCF1 0.00 0.00 same P49792 RANBP2 CC*NFLTADNEK C2689 NCF1 0.00 0.00 same P49792 RANBP2 CC*NFLTADNEK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANHVITK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANHVITK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANHVITK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*QCQNLK C3032 NCF1 0.00 0.00 same P49792 RANBP2 VC*QCQNLK C3030 NCF1 0.00 0.00 same P49792 RANBP2 VTPFC*YKK C336 NCF1 0.00 0.00 same P49792 RANBP2 VTPFC*QQNLK C3040 NCF1 0.00 0.00 same P49999 MRE11A VTQAIQSFC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11A TLHTC*LELR C75 NCF1 0.00 0.00 same P49959 MRE11A TLHTC*LELR C75 NCF1 0.00 0.00 same P50479-1 PDLIM4 C*GHGINGTIVK C288 NCF1 100.00 100.00 same P50479-1 PDLIM4 C*GHGINGTIVK C288 NCF1 100.00 100.00 same P50914 RPL14 ALVDCPC*TQVR C42 NCF1 10.00 100.00 same P50914 RPL14 ALVDCPC*TQVR C42 NCF1 10.00 100.00 same P50914 RPL14 C*MQLTDFLK C54 NCF1 0.00 same P50914 RPL14 RPL14 C*MQLTDFLK C54 NCF1 0.00 same P50914 RPL14 RPL14 C*MQ	P49792	RANBP2	IC*ANHYISPDMK	C1243	NCF2	0.00		same	
P49792         RANBP2         EQQWDC*SVC*LVR         NCF1         0.00         same           C1612;C1015         C1612;C1015         C1612;C1015         C1612;C1015         Same           P49792         RANBP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P4792         RANBP2         UKLWTAC*DFADGER         C2407         NCF1         0.00         same           P4792         RANBP2         UKLWTAC*DFADGER         C2407         NCF1         0.00         same           P4792         RANBP2         UKLWTAC*DFADGER         C2407         NCF1         0.00         same           P4792         RANBP2         UKLWTNC*NEK         C2068         NCF1         10.00         same           P4792         RANBP2         VC*ANHVTK         C2982         NCF1         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NC71         10.00         same           P49792         RANBP2         EVADC*FKK         C306         NC71         0.00         same           P49792         RANBP2         VTQAIQSFC*LEK         C366         NOX01         0.00         same           P49959         MR	P49792	RANBP2	C*KFEEAQSILK	C1296	NCF2	0.00		same	
P49792         RANBP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANBP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANBP2         LKLPPTFEC*YK         C2659         NCF1         0.00         same           P49792         RANBP2         LPPTFFC*YK         C2659         NCF1         0.00         same           P49792         RANBP2         C*RPLEETADNEK         C2666         NCF1         0.00         same           P49792         RANBP2         VC*ANRVTK         C2982         NCP1         10.00         0.00         same           P49792         RANBP2         VC*ANRVTK         C2982         NCX01         0.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCP1         100.00         same           P49792         RANBP2         EVADC*FKK         C3040         NCP1         0.00         same           P49792         RANBP2         VEDZYCQGGDTK         C312         NCP2         0.00         same           P49792         RANBP1         VTQAIQSFC*LEK         C336         NCF1         0.00	P49792	RANBP2	EGOWDC*SVC*LVR		NCF1	0.00	0.00	same	
P49792         RANBP2         VWLWTAC*DFADGER         C2407         NCF1         0.00         same           P49792         RANBP2         VWLWTAC*DFADGER         C2407         NCF2         0.00         0.00         same           P49792         RANBP2         LKPPTFC*YK         C2659         NCF1         0.00         0.00         same           P49792         RANBP2         LKPPTFC*YK         C2659         NCF1         0.00         0.00         same           P49792         RANBP2         C*RPLEENTADNEK         C2666         NCF1         0.00         0.00         same           P49792         RANBP2         VC*ANIVITK         C2982         NCF1         10.00         10.00         same           P49792         RANBP2         VC*ANIVITK         C2982         NCK01         0.00         same           P49792         RANBP2         VC*ANIVITK         C3032         NCP2         100.00         100.00         same           P49792         RANBP2         VEADC*FKK         C3032         NCP1         0.00         same           P49792         RANBP2         VEDC*CQQLMK         C326         NCP1         0.00         same           P49792         RANBP11	1 10102	101110112	200.000 010 010	C1612:C1615		0.00	0.00	buille	
P49792 RANBP2 VWLWTAC*DFADGER C2407 NCF1 0.00 same P49792 RANBP2 LKLPPTFC*YK C2659 NCF1 0.00 0.00 same P49792 RANBP2 LKLPPTFC*YK C2659 NCF1 0.00 0.00 same P49792 RANBP2 C*RPLEENTADNEK C2670 NCF1 0.00 0.00 same P49792 RANBP2 C*RPLEENTADNEK C2671 NCF1 0.00 0.00 same P49792 RANBP2 C*ANWVTK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANWVTK C2982 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANWVTK C2982 NCF1 100.00 100.00 same P49792 RANBP2 VC*ANWVTK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 00.00 0.00 same P49792 RANBP2 VC*ANWVTK C3028 NCF1 0.00 0.00 same P49792 RANBP2 EVADC*FKK C3032 NCF2 0.00 same P49792 RANBP2 VTPDVC*QGDITK C3122 NCF2 0.00 same P49792 RANBP2 VTQAIQSFC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11 VTQAIQSFC*LEK C336 NCF1 0.00 same P49959 MRE11 TLHTC*LELLR C75 NCF1 0.00 same P49959 MRE11 TLHTC*LELLR C75 NCF1 0.00 same P40959 MRE11 TLHTC*LELLR C75 NCF1 0.00 same P40959 MRE11 TLHTC*LELLR C75 NCF1 0.00 same P40959 MRE11 TLHTC*LELLR C75 NCF1 0.00 same P40951 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 76.70 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.00 same P50414 RPL14 ALVDGFC*TQVR C42 NCF1 100.00 100.00 same P50414 RPL14 ALVDGFC*TQVR C42 NCF2 100.00 100.00 same P50414 RPL14 ALVDGFC*TQVR C42 NCF2 100.00 100.00 same P50414 RPL14 ALVDGFC*TQVR C42 NCF2 100.00 100.00 same P50414 RPL14 C*MQLTDFLK C54 NCF2 100.00 100.00 same P5095 ANXA11 GVGTDEAC*LELLASR C294 NCF1 0.00 sam				01012,01010					
P49792       RANBP2       VWLWIAC"DFADGER       C2407       NCP1       0.00       same         P49792       RANBP2       LKLPFTFC"YK       C2659       NCP1       0.00       o.000       same         P49792       RANBP2       LKLPFTFC"YK       C2659       NCP1       0.00       0.000       same         P49792       RANBP2       C"RPLEETTADNEK       C2659       NCP1       0.00       0.00       same         P49792       RANBP2       C"RPLEETTADNEK       C2682       NCP1       0.00       0.00       same         P49792       RANBP2       C"ANHYTK       C2982       NCP1       100.00       0.00       same         P49792       RANBP2       VC*ANHYTK       C2982       NCP1       100.00       same         P49792       RANBP2       EVADC*FKK       C3032       NCP1       100.00       same         P49792       RANBP2       UPDFVC*QGDITK       C312       NCP2       0.00       same         P49792       RANBP2       VPAINGYC*QGGDITK       C336       NOX01       100.00       same         P49959       MRE11A       THTC*LELR       C75       NCF1       0.00       same         P49509       <	B	D I M D D O		C10.10.5	MODA				
P49792 RANBP2 VULWTAC*DFADGER C2407 NCF2 0.00 0.00 same P49792 RANBP2 LKLPPTFFC*YK C2659 NCF1 0.00 0.00 same P49792 RANBP2 LEFTADNEK C2696 NCF1 0.00 0.00 same P49792 RANBP2 C*RPLEENTADNEK C2696 NCF1 0.00 0.00 same P49792 RANBP2 C*RPLEENTADNEK C2696 NCF1 0.00 0.00 same P49792 RANBP2 VC*ANHVITK C2982 NCF1 19.00 15.66 same P49792 RANBP2 VC*ANHVITK C2982 NCF1 19.00 100.00 same P49792 RANBP2 VC*ANHVITK C3032 NCF1 100.00 100.00 same P49792 RANBP2 VC*ANHVITK C3032 NCF1 100.00 100.00 same P49792 RANBP2 VC*ANHVITK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 0.00 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C304 NCF2 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C306 NCF1 0.00 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C3122 NCF2 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C3122 NCF2 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C36 NCF1 0.00 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C36 NCF1 0.00 same P49959 MRE11 VTQAIQSFC*LEK C36 NCF1 0.00 same P49959 MRE11 CTQAIQSFC*LEK C36 NCF1 0.00 same P49959 MRE11 CTQAIQSFC*LEK C36 NCF1 0.00 same P49959 MRE11 CTQAIQSFC*LEK C258 NCF1 76.70 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 100.00 100.00 same P50414 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 10.00 same P50914 RPL14 C*MQLTPFLK C54 NCF1 12.25 0.00 same P50914 RPL14 C*MQLTPFLK C54 NCF1 12.25 0.00 same P50914 RPL14 C*MQLTPFLK C54 NCF1 12.25 0.00 same P50914 RPL14 C*MQLTPFLK C54 NCF1 10.00 same P50914 RPL14 C*MQLTPFLK C54 NCF1 0.00 same P50914 RPL14 C*MQLTPFLK C36 NCOI 0.00 same P50914 RPL14 C*MQLTPFLK C36 NCOI 0.00 same P50914 RPL14 C*MQLTPFLK C36 NCCF1 0.00 same P50914 RPL14 C*MQLTPFLK C36 NCC	P49792	RANBP2	VWLWTAC*DFADGER	C2407	NCF1		0.00	same	
P49792 RAMBP2 LKLPPTFC*YK C2659 NCF1 0.00 0.00 same P49792 RAMBP2 C*RPLEENTADNEK C2696 NCF1 0.00 0.00 same P49792 RAMBP2 C*RPLEENTADNEK C2696 NCF1 0.00 0.00 same P49792 RAMBP2 VC*ANHVITK C2982 NOCI 0.00 0.00 same P49792 RAMBP2 VC*ANHVITK C2982 NOCI 0.00 0.00 same P49792 RAMBP2 VC*ANHVITK C3032 NCF1 10.00 100.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 00.00 0.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 0.00 0.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 0.00 0.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 0.00 same P49792 RAMBP2 EVADC*FKK C3032 NCF1 0.00 same P49792 RAMBP2 VIPDFVC*QGDITK C3122 NCF2 0.00 same P49959 MRE11A VTQAIQSFC*LEK C336 NCF1 0.00 same P49959 MRE11A VTQAIQSFC*LEK C336 NCF1 0.00 same P49959 MRE11A VTQAIQSFC*LEK C336 NOXO1 0.00 same P49959 MRE11A VTQAIQSFC*LEK C38 NCF1 0.00 same P50479.1 PDLIM4 C*GIGIVGTIVK C288 NCF1 76.70 same P50479.1 PDLIM4 C*GIGIVGTIVK C288 NCF1 100.00 100.00 same P50479.1 PDLIM4 C*GIGIVGTIVK C288 NCF1 100.00 100.00 same P50479.1 PDLIM4 C*GIGIVGTIVK C42 NCF1 0.00 same P50479.1 RFL14 ALVDCPC*TQVR C42 NCF1 0.00 same P50404 RFL14 ALVDCPC*TQVR C42 NCF1 0.00 same P50404 RFL14 C*MQLTDFILK C54 NCF1 0.00 same P50404 RFL14 RFL14 C*MQLTDFILK C54 NCF1 0.00 same P50404 RFL14 RFL14 RFL14 C*MQLTDFILK C54 NCF1 0.00 same P50404 RFL14 RFL14 RFL14 RFL14 RFL14 RFL14 RFL14	P49792	RANBP2	VWLWTAC*DFADGER	C2407	NCF2	0.00	0.00	same	
P49792       RANBP2       LPPTFFC*YK       C2659       NCF1       0.00       0.00       same         P49792       RANBP2       C*RPLEENTADEKK       C2696       NCF1       0.00       0.00       same         P49792       RANBP2       C*RVIVTK       C2982       NCF1       10.00       0.00       same         P49792       RANBP2       VC*ANIVITK       C2982       NCK1       100.00       same         P49792       RANBP2       EVADC*FKK       C3032       NCF1       100.00       same         P49792       RANBP2       EVADC*FKK       C3032       NCK1       100.00       same         P49792       RANBP2       TFEEC*QQLMK       C3040       NCF1       0.00       same         P49792       RANBP2       VTPACYC*GGGDTK       C3122       NCF2       0.00       same         P49793       MRE11A       VTQAIQSFC*LEK       C336       NCF1       0.00       same         P49959       MRE11A       THTC*LELLR       C75       NCF1       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF2       0.00       same         P50414       RFL14       ALVDGPC*TQVR <td< td=""><td>P49792</td><td>RANBP2</td><td>LKLPPTFFC*YK</td><td>C2659</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></td<>	P49792	RANBP2	LKLPPTFFC*YK	C2659	NCF1	0.00	0.00	same	
P49792         RANBP2         C*RPLEENTADNEK         C2006         NCF1         0.00         0.00         same           P49792         RANBP2         CC*NPUEENTADNEK         C2110         NCF1         0.00         0.00         same           P49792         RANBP2         VC*ANHVITK         C2982         NOK01         0.00         0.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCF1         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCF2         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCF1         0.00         same           P49792         RANBP2         UPDFVC*QGGDITK         C3122         NCF2         0.00         same           P49792         RANBP2         VIPDFVC*QGGDITK         C336         NCF1         0.00         same           P49959         MRE11A         VTQAIQSFC*LEK         C336         NOX01         0.00         same           P49959         MRE11A         THTC*LELR         C75         NCF1         0.00         same           P500179-1         PDLIM4         C*GHGIVGTIVK         C288	P49792	RANBP2	LPPTFFC*YK	C2659	NCF1	0.00	0.00	same	
P48792         RANBP2         DCMINUME         C2710         NCF1         0.00         0.00         same           P48792         RANBP2         DC*INWUTK         C2982         NCK1         10.00         0.00         same           P48792         RANBP2         VC*ANIWUTK         C2982         NCK1         100.00         100.00         same           P48792         RANBP2         EVADC*FKK         C3032         NCK1         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCK1         0.00         0.00         same           P49792         RANBP2         TFEEC*QQLMK         C3040         NCF1         0.00         0.00         same           P49792         RANBP2         TFEEC*QQLMK         C336         NCF1         0.00         0.00         same           P49794         RANBP2         TFEEC*QQLMK         C336         NCF1         0.00         same           P49795         MRE11         VTQAIQSFC*LEK         C336         NCF1         0.00         same           P49959         MRE11         THTC*LELLR         C75         NCF1         0.00         same           P50479-1         PDLIM4	P40702	BANBP2	C*BPLEENTADNEK	C2696	NCEL	0.00	0.00	same	
Payny2       RANBP2       ECTIV WEK       C2710       NCP1       0.00       0.00       same         Payny2       RANBP2       VC*ANHVITK       C2982       NCX01       0.00       0.00       same         Payny2       RANBP2       VC*ANHVITK       C2982       NCX01       0.00       0.00       same         Payny2       RANBP2       EVADC*FKK       C3032       NCF1       100.00       100.00       same         Payny2       RANBP2       EVADC*FKK       C3032       NCF2       100.00       100.00       same         Payny2       RANBP2       EVADC*FKK       C3032       NCF1       0.00       same         Payny2       RANBP2       VTPCVC*QGGDITK       C3122       NCF2       0.00       same         Payny3       MRE11       VTQAIQSFC*LEK       C336       NOX01       0.00       same         Payns9       MRE11       TLHTC*LELLR       C75       NCF1       0.00       same         P50479-1       PDLIM4       C*GRGIVGTIVK       C258       NCF2       0.00       same         P50479-1       PDLIM4       C*GRGIVGTIVK       C258       NC72       100.00       same         P50414       RPL14	F49792	DANDDO	DOWNNER	C2090	NCFI	0.00	0.00	same	
P49792 RANBP2 VC*ANHVITK C2982 NCF1 19.90 15.66 same P49792 RANBP2 VC*ANHVITK C2982 NCK01 0.00 0.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 0.00 100.00 same P49792 RANBP2 EVADC*FKK C3040 NCF1 0.00 0.00 same P49792 RANBP2 VIPDFVC*QGDITK C3122 NCF2 0.00 same P49792 RANBP2 VIPDFVC*QGDITK C3122 NCF2 0.00 same P49792 RANBP2 VIPDFVC*QGDITK C3122 NCF2 0.00 same P49793 MRE11A VTQAIQSFC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11A VTQAIQSFC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11A VTQAIQSFC*LEK C336 NCS1 0.00 same P49959 MRE11A VTQAIQSFC*LEK C356 NCF1 0.00 same P49959 MRE11A VTQAIQSFC*LEK C356 NCF1 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C428 NCF2 0.00 same P50914 RPL14 ALVDCPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDCPC*TQVR C42 NCF1 0.00 same P50914 RPL14 C*MQLTDFLIK C54 NCF1 0.00 same P50914 RPL14 C*MQCTDFLIK C54 NCF1 0.00 same P50914 RPL14 C*MQCTDFLIK C54 NCF1 0.00 same P50914 RPL14 C*MQCTDFLIK C54 NCF2 0.00 same P50914 RPL14 C54 NCF1 0.00 0.00 same P51091-1 HNRPA3 YHTINGHNC*EVK C196 NCX01 0.00 0.00 same P51091-1 HNRPA3 WTITDC*VVMR C64	P49792	RANBP2	EC*IIV WEK	C2710	NCFI	0.00	0.00	same	
P49792 RANBP2 VC*ANHVITK C2982 NOX01 0.00 0.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RANBP2 EVADC*FKK C3032 NCF1 100.00 100.00 same P49792 RANBP2 TFEEC*QQNLMK C3042 NCF2 0.00 same P49792 RANBP2 TFEEC*QQNLMK C3122 NCF1 0.00 0.00 same P49792 RANBP2 VIPDFVC*QGGDITK C3122 NCF1 0.00 0.00 same MRE11 VTQAIQSFC*LEK C336 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELLR C75 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELLR C75 NCF1 0.00 0.00 same P49959 MRE11 TLHTC*LELLR C75 NCF1 0.00 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 76.70 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 0.00 100.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 0.00 100.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 0.00 100.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 0.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 0.00 same P50914 RPL14 C*MQUTDFILK C54 NCF1 0.00 same P50995 ANXA11 GVGTDEAC*LIELASR C294 NCF2 0.00 same P50995 ANXA11 GVGTDEAC*LIELASR C294 NCF2 0.00 same P51499 RABTA AQAWC*YSK C143 NCNO1 0.00 same P51499 RABTA AQAWC*YSK C143 NCNO1 0.00 same P51490 RABTA AQAWC*YSK C143 NCNO1 0.00 same P51491 RABTA AQAWC*YSK C143 NCNO1 0.00 same P51491 RABTA AQAWC*YSK C143 NCNO1 0.00 same P51491 RABTA AQAWC*YSK C146 NCNO1 0.00 same P51491	P49792	RANBP2	VC*ANHVITK	C2982	NCF1	19.90	15.66	same	
P49792         RANBP2         EVADC*FKK         C3032         NCF1         100.00         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCK2         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCK2         100.00         same           P49792         RANBP2         VIPDFVC*QGDITK         C3122         NCF2         0.00         same           P4959         MRE11A         VTQAIQSFC*LEK         C336         NCF1         0.00         same           P4959         MRE11A         VTQAIQSFC*LEK         C336         NOXOI         0.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C258         NCF2         0.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C258         NCF2         0.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C258         NCF2         0.00         same           P50414         RPL14         AlVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         AlVDGPC*TQVR         C42         NCF1 <t< td=""><td>P49792</td><td>RANBP2</td><td>VC*ANHVITK</td><td>C2982</td><td>NOXO1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	P49792	RANBP2	VC*ANHVITK	C2982	NOXO1	0.00	0.00	same	
P49792         RANBP2         EVADC*FKK         C3032         NCP2         100.00         same           P49792         RANBP2         EVADC*FKK         C3032         NCN1         100.00         same           P49792         RANBP2         EVADC*FKK         C3040         NCF1         0.00         same           P49792         RANBP2         VIPDFVC*QGGDITK         C3122         NCF2         0.00         same           P49599         MRE11A         VTQAIQSFC*LEK         C336         NCF1         0.00         same           P4959         MRE11A         VTQAIQSFC*LEK         C336         NOXO1         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         76.70         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF2         0.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C258         NCF1         100.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C258         NCO1         100.00         same           P50479-1         PDLIM4         C*GHGIVGTVK         C242         NCF2         0.00         same	P49792	RANBP2	EVADC*FKK	C3032	NCF1	100.00	100.00	same	
13:55       RANBP5       EVADC*FKK       C3032       NOX01       100.00       same         P49792       RANBP2       VFDECVQQNLMK       C3030       NOX01       100.00       same         P49792       RANBP2       VFDEVC*QGGDITK       C3122       NCF2       0.00       0.00       same         P49792       RANBP2       VFDEVC*QGGDITK       C3122       NCF2       0.00       same         P49959       MRE11A       VTQAIQSFC*LEK       C336       NCF1       0.00       same         P49959       MRE11A       VTQAIQSFC*LEK       C336       NOX01       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF1       76.70       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NOX01       100.00       same         P50147       PDLIM4       C*GHGIVGTIVK       C258       NOX01       100.00       same         P50149       PDLIM4       C*GHGIVGTIVK       C258       NOX01       100.00       same         P5014       RPL14       ALVDCPC*TQVR       C42       NCF1       100.00       same         P50914       RPL14       C*MQLTDFILK       C54 <td< td=""><td>P40702</td><td>BANBP2</td><td>EVADC*EKK</td><td>C3032</td><td>NCF2</td><td>100.00</td><td>100.00</td><td>samo</td><td></td></td<>	P40702	BANBP2	EVADC*EKK	C3032	NCF2	100.00	100.00	samo	
P49792       RANBP2       EVADO TARK       C302       NOAOI       100.00       same         P49792       RANBP2       VIPDFVC*QGGDITK       C3040       NCF1       0.00       same         P49959       MRE11A       VTQAIQSFC*LEK       C336       NCF1       0.00       same         P49959       MRE11       VTQAIQSFC*LEK       C336       NOXO1       0.00       same         P49959       MRE11       TLHTC*LELLR       C375       NCF1       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF2       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF2       0.00       same         P50914       RPL14       ALNDPC*TQVR       C42       NCF1       100.00       100.00       same         P50914       RPL14       ALNDPC*TQVR       C42       NCF1       100.00       same         P50914       RPL14       C*MQUTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQUTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQUTDFILK       C54       NCF2       9.	D 40700	DANDD9	EVADO FRR	C2022	NOVOI	100.00	100.00	same	
P49792 RANBP2 TPEEC*QQNLMK C3040 NCF1 0.00 0.00 same P49752 RANBP2 VIPPVC*QGOTTK C3122 NCF2 0.00 same P49959 MRE11A MRE11A P49959 MRE11A P49959 MRE11A P49959 MRE11A P49959 MRE11A P49959 NRE11A P49959 NRE11A P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF1 0.00 0.00 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.000 same P50479-1 PDLIM4 C*GHGIVGTIVK C258 NCF2 0.000 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 100.00 100.00 same P50914 RPL14 ALVDGPC*TQVR C42 NCF1 0.00 same P50914 RPL14 C*MQLTDFILK C54 NCF1 0.00 same P50915 ANXA11 GVCTDEAC*LIELASR C294 NCF1 0.00 same P50995 ANXA11 GVCTDEAC*LIELASR C294 NCF1 0.00 same P50995 ANXA11 GVCTDEAC*LIELASR C294 NCF1 0.00 same P50995 ANXA11 GVCTDEAC*LIELASR C294 NCF1 0.00 same P51149 RABTA AQAWC*YSK C143 NOXOI 0.00 0.00 same P51149 RABTA AQAWC*YSK C143 NOXOI 0.00 same P51149 RABTA AQAWC*YSK C122 NCF1 0.00 same P51149 RABTA AQAWC*YSK C124 NCF1 0.00 0.00 same P51149 RABTA AQAWC*YSK C124 NCF1 0.00 0.00 same P51991-1 HNNPA3 WHTINGHNC*EVK C196 NOXOI 0.00 same P51991-1 HNNPA3 WGTLTDC*VWR C64 NCF1 0.00 0.00 same P51991-1 HNNPA3	P49792	RANDF2	EVADOFKK	C3032	NOXOI		100.00	same	
P49792       RANBP2       VIPDFVC*QGGDITK       C3122       NCF2       0.00       same         P49959       MRE11       VTQAIQSFC*LEK       C336       NCF1       0.00       same         P49959       MRE11       VTQAIQSFC*LEK       C336       NOXO1       0.00       same         P49959       MRE11       TLHTC*LELLR       C75       NCF1       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF1       76.70       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCK1       100.00       100.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCK1       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF2       0.00       same         P50914       RPL14       C*MQLTDFILK	P49792	RANBP2	TFEEC*QQNLMK	C3040	NCF1	0.00	0.00	same	
P49959         MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A C*GHGIVGTIVK         C336 C336         NCF1         0.00         same           P49959         MRE11A MRE11A MRE11 MRE11A P50479-1         TLHTC*LELLR C*GHGIVGTIVK         C258         NCF1         0.00         same           P50479-1         PDLIM4 PDLIM4         C*GHGIVGTIVK         C258         NCF2         0.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         0.00         same           P50995         ANXA11         GVGTDEAC*LIELLASR         C294         NCF1         0.00         same           P50995         ANXA11        GVGTDEAC*L	P49792	RANBP2	VIPDFVC*QGGDITK	C3122	NCF2	0.00		same	
P49999         MRE11 MRE11A MRE11A         VTQAIQSFC*LEK         C336         NCF1         0.00         0.00         same           P49959         MRE11A MRE11A         TLHTC*LELLR         C336         NOX01         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOX01         100.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOX01         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         10.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         9.42         2.04         same           P50995         ANXA11         GVGTDEAC*LIELASR         C294	D 40050	MRE11A		Class	NODI	0.00	0.00		
P49959         MREIA MRE11 MRE11 MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A MRE11A P50479-1         TLHTC*LELLR PLL         C336         NOXO1         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         76.70         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOXO1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF2         100.00         same           P50914         RPL14         C*GMQLTDFILK         C54         NCF1         12.25         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         12.25         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         9.42         12.04         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         0.00         same           P50915         ANXA11         GVGTDEAC*LIELASR         C294         NCF2         0.00         same           P5	P49959	MRE11	VIQAIQSFC*LEK	0330	NCFI	0.00	0.00	same	
P49959         MRE11 MRE11A MRE11         VTQAIQSFC*LEK         C336         NOXO1         0.00         same           P49959         MRE11 MRE11         TLHTC*LELLR         C75         NCF1         0.00         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF2         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOXO1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         10.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         10.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50915         ANXA11         GVGTDEAC*LIEILASR         C294         NCF2         0.00         same           P50995         ANXA11         GVGTDEAC*LIEILASR         C294         NCF2         0.		MRE11A							
MRE11 MRE11 MRE11 A         TLHTC*LELLR         C75         NCF1         0.00         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         76.70         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         100.00         100.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOX01         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         0.00         same           P50995         ANXA11         GVGTDEAC*LIEILASR         C294         NCF2         0.00         same           P50995         ANXA11         FN4C*SR         C384         NCF2         0.00	P49959	MDE11	VTQAIQSFC*LEK	C336	NOXO1		0.00	same	
P49959         MRE11A MRE11         TLHTC*LELLR         C75         NCF1         0.00         0.00         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF1         76.70         same           P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NCF2         0.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50995         ANXA11         GVGTDEAC*LIEIASR         C294         NCF1         0.00         same           P510995         ANXA11         GVGTDEAC*LIEIASR         C294		MDELLA							
MRE11         MRE11 <th< td=""><td>P49959</td><td>MREIIA</td><td>TLHTC*LELLB</td><td>C75</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></th<>	P49959	MREIIA	TLHTC*LELLB	C75	NCF1	0.00	0.00	same	
P50479-1       PDLIM4       C*CHGIVGTIVK       C258       NCF1       76.70       same         P50479-1       PDLIM4       C*CHGIVGTIVK       C258       NOX01       100.00       100.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NOX01       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NOX01       100.00       100.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF2       9.42       12.04       same         P50914       RPL14       C*MQLTDFILK       C54       NCF2       0.00       same       same         P50915       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       FNAVLC*SR       C384       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NCC92       0.00 <td< td=""><td></td><td>MREII</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		MREII							
P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NCF2       0.00       same         P50479-1       PDLIM4       C*GHGIVGTIVK       C258       NOX01       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF1       100.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.05       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NOX01       2.77       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       same         P50995       ANXA11       FN4UC*SR       C143       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NCY1       0.00       same         P51610-4       HCFC1       LVYGGM	P50479-1	PDLIM4	C*GHGIVGTIVK	C258	NCF1	76.70		same	
P50479-1         PDLIM4         C*GHGIVGTIVK         C258         NOX01         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NOX01         100.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         9.42         12.04         same           P50914         RPL14         C*MQLTDFILK         C54         NOX01         2.77         same           P50915         ANXA11         GVGTDEAC*LIEILASR         C294         NCF2         0.00         same           P50995         ANXA11         GVGTDEAC*LIEILASR         C244         NCF2         0.00         same           P51149         RAB7A         AQAWC*YSK         C143         NOX01         0.00         same           P51610-4         HCFC1         LVYGGMSGC*R         C227         NCF1 <td< td=""><td>P50479-1</td><td>PDLIM4</td><td>C*GHGIVGTIVK</td><td>C258</td><td>NCF2</td><td></td><td>0.00</td><td>same</td><td></td></td<>	P50479-1	PDLIM4	C*GHGIVGTIVK	C258	NCF2		0.00	same	
P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF2         100.00         100.00         same           P50914         RPL14         ALVDGPC*TQVR         C42         NCF1         100.00         100.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         10.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         12.25         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         9.42         12.04         same           P50914         RPL14         C*MQLTDFILK         C54         NCF1         0.00         same           P5095         ANXA11         GVGTDEAC*LIEILASR         C294         NCF1         0.00         same           P5095         ANXA11         FNAUC*SR         C143         NCF2         0.00         same           P51149         RAB7A         AQAWC*YSK         C143         NCK1         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R	P50479-1	PDLIM4	C*GHGIVGTIVK	C258	NOXO1	100.00	100.00	same	
100514       H.H. H. H.B.G. C. YUR       C42       NCF1       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NCF2       100.00       100.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF2       9.42       12.04       same         P50915       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       GVGTDEAC*LEILASR       C384       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       same         P51610-4       <	P50014	BPL14	ALVDGPC*TOVB	C42	NCF1	100.00	100.00	samo	
10.0010       100.00       100.00       100.00       same         P50914       RPL14       ALVDGPC*TQVR       C42       NOXO1       100.00       100.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       .00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       .00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       .00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       .00       same         P50995       ANXA11       FNAVC*SR       C384       NCF2       0.00       .00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVYGGMSGC*R       C227       NCF2       0.00       same         P51610-4       HCFC1       AG	P50014	RPL14	ALVDGPC*TOVB	C42	NCF2	100.00	100.00	same	
P50914       RPL14       C*MQITDFILK       C42       NCF1       100.00       same         P50914       RPL14       C*MQITDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQITDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQITDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQITDFILK       C54       NCF1       0.00       0.00       same         P50915       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NCF2       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF2       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOXO1       0.00       same         P51610-4	F 50914	DDL14	ALVDGIC IQVI	042	NOF 2	100.00	100.00	same	
P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       12.25       0.00       same         P50914       RPL14       C*MQLTDFILK       C54       NCF1       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       FNAVLC*SR       C143       NCF2       0.00       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAIN	P50914	RPL14	ALVDGPC IQVR	042	NOXOI	100.00	100.00	same	
P50914         RPL14         C*MQLTDFILK         C54         NCF1         12.25         0.00         same           P50914         RPL14         C*MQLTDFILK         C54         NCF2         9.42         12.04         same           P50914         RPL14         C*MQLTDFILK         C54         NOXO1         2.77         same           P50995         ANXA11         GVGTDEAC*LIEILASR         C294         NCF1         0.00         0.00         same           P50995         ANXA11         GVGTDEAC*LIEILASR         C294         NCF2         0.00         0.00         same           P50995         ANXA11         FNAVLC*SR         C384         NCF2         0.00         same           P51149         RAB7A         AQAWC*YSK         C143         NOXO1         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF1         0.00         0.00         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOXO1         0.00         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOXO1         0.00         same           P51610-4         HCFC1         AGHC*AVAINT	P50914	RPL14	C*MQLTDFILK	C54	NCF1	0.00		same	
P50914       RPL14       C*MQLTDFILK       C54       NCF2       9.42       12.04       same         P50914       RPL14       C*MQLTDFILK       C54       NOXO1       2.77       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       FNAVLC*SR       C294       NCF2       23.44       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF2       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51891-1       HNRNPA3 <td< td=""><td>P50914</td><td>RPL14</td><td>C*MQLTDFILK</td><td>C54</td><td>NCF1</td><td>12.25</td><td>0.00</td><td>same</td><td></td></td<>	P50914	RPL14	C*MQLTDFILK	C54	NCF1	12.25	0.00	same	
P50914       RPL14       C*MQLTDFILK       C54       NOX01       2.77       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       FNAVLC*SR       C384       NCF2       23.44       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF2       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR <td>P50914</td> <td>RPL14</td> <td>C*MQLTDFILK</td> <td>C54</td> <td>NCF2</td> <td>9.42</td> <td>12.04</td> <td>same</td> <td></td>	P50914	RPL14	C*MQLTDFILK	C54	NCF2	9.42	12.04	same	
100314       INT.       GWGTDEAC*LIEILASR       C294       NCF1       0.00       same         P50995       ANXA11       GVGTDEAC*LIEILASR       C294       NCF1       0.00       same         P50995       ANXA11       FNAVLC*SR       C294       NCF2       0.00       same         P50995       ANXA11       FNAVLC*SR       C384       NCF2       23.44       same         P51149       RAB7A       AQAWC*YSK       C143       NOC01       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOX01       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00	P50914	BPL14	C*MOLTDFILK	C54	NOXO1	2 77		same	
P30935       ANXA11       GVGTDEAC*LIELLASR       C294       NCF1       0.00       same         P50995       ANXA11       GVGTDEAC*LIELLASR       C294       NCF2       0.00       0.00       same         P50995       ANXA11       FNAVLC*SR       C384       NCF2       23.44       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51891-1       HNRNPA3       YHTINGHNC*EVK       C196       NOCF1	DEOOOE	ANX A11	CVCTDEAC*LIEU ASP	C204	NCEI	0.00	0.00	same	
P50995       ANAAH       GVGTDEACTHELLASK       C294       NCF2       0.00       0.00       same         P50995       ANAAH       FNAVLC*SR       C384       NCF2       2.3.44       same         P51149       RAB7A       AQAWC*YSK       C143       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NCF2       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NCF1       0.00       6.55       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P516810-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51858       HDGF       C*GDLVFAK       C12       NCF1       0.00       same         P51991-1       HNRNPA3       YHTINGHNC*EVK	1 00000 DE000E	ANVATI	CVCTDEAC*I IEILAON	C234	NOPI	0.00	0.00	same	
P50095       ANXA11       FNAVLC*SR       C384       NCF2       23.44       same         P51149       RAB7A       AQAWC*YSK       C143       NCF2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOXO1       0.00       same         P51810-4       HCFC1       AGHC*AVAINTR       C326       NOXO1       0.00       same         P5191-1       HNRNPA3       YHTINGHNC*EVK       C196       NCF1       0.00       same         P51991-1       HNRNPA3       WGTLTDC*VVMR       <	P 50995	ANAAII	GVG1DEAC"LIEILASR	C294	NCF2	0.00	0.00	same	
P51149       RAB7A       AQAWC*YSK       C143       NCP2       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       0.00       same         P51149       RAB7A       AQAWC*YSK       C143       NOXO1       0.00       0.00       same         P51610-4       HCFC1       LVIYGGMSGC*R       C227       NCF1       0.00       6.55       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51610-4       HCFC1       AGHC*AVAINTR       C326       NOX01       0.00       same         P51858       HDGF       C*GDLVFAK       C12       NCF1       0.00       0.00       same         P51991-1       HNRNPA3       YHTINGHNC*EVK       C196       NOX01       0.00       same         P51991-1       HNRNPA3       WGTLTDC*VVMR       C64       NCF1       0.00       same         P51991-1       HNRNPA3       WGTLTDC*VVMR       C64       NCF1       0.00       same         P51991-1       HNRNPA3       WGTLTDC	P50995	ANXA11	FNAVLC*SR	C384	NCF2	23.44		same	
P51149         RAB7A         AQAWC*YSK         C143         NOXO1         0.00         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF1         0.00         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF1         0.00         0.00         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOX01         0.00         6.55         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOX01         0.00         same           P51810-1         HNRNPA3         YHTINGHNC*EVK         C196         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR	P51149	RAB7A	AQAWC*YSK	C143	NCF2	0.00		same	
P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF1         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF2         0.00         same           P51610-4         HCFC1         LVIYGGMSGC*R         C227         NCF2         0.00         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NCF1         0.00         6.55         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOX01         0.00         same           P51610-4         HCFC1         AGHC*AVAINTR         C326         NOX01         0.00         same           P51858         HDGF         C*GDLVFAK         C12         NCF1         0.00         same           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOX01         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00	P51149	RAB7A	AQAWC*YSK	C143	NOXO1	0.00	0.00	same	
Normal         Difference         Differenc         Differenc <td>P51610-4</td> <td>HCFC1</td> <td>LVIYGGMSGC*B</td> <td>C227</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P51610-4	HCFC1	LVIYGGMSGC*B	C227	NCF1	0.00	0.00	same	
P51610-4     HCFC1     AGHC*AVAINTR     C326     NCF1     0.00     6.55     same       P51610-4     HCFC1     AGHC*AVAINTR     C326     NOX01     0.00     6.55     same       P51610-4     HCFC1     AGHC*AVAINTR     C326     NOX01     0.00     same       P51610-4     HCFC1     AGHC*AVAINTR     C326     NOX01     0.00     same       P51891-1     HNRNPA3     YHTINGHNC*EVK     C196     NCF1     0.00     0.00     same       P51991-1     HNRNPA3     WGTLTDC*VVMR     C64     NCF1     0.00     same       P51991-1     HNRNPA3     WGTLTDC*VVMR     C64     NCF2     0.00     same	D51610 4	HCFC1	LVIVCCMSCC*P	C221	NCE2	0.00	0.00	Same	
P31610-4         HCFC1         AGHC"AVAINTR         C326         NCF1         0.00         6.55         same           P51610-4         HCFC1         AGHC"AVAINTR         C326         NOXO1         0.00         same           P51610-4         HCFC1         AGHC"AVAINTR         C326         NOXO1         0.00         same           P51610-4         HCFC1         AGHC"AVAINTR         C326         NOXO1         0.00         same           P51858         HDGF         C*GDLVFAK         C12         NCF1         0.00         0.00         same           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOXO1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same	r 01010-4	HCDC	LVII GGMBGU'R	0227	INCF2	0.00		same	
P51610-4         HCFC1         AGHC*AVAINTR         C326         NOXO1         0.00         same           P51858         HDGF         C*GDLVFAK         C12         NCF1         0.00         0.00         same         DISULFID           P51891-1         HNRNPA3         YHTINGHNC*EVK         C196         NCF1         0.00         0.00         same           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOXO1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same	P51610-4	HCFC1	AGHC*AVAINTR	C326	NCF1	0.00	6.55	same	
P51858         HDGF         C*GDLVFAK         C12         NCF1         0.00         0.00         same         DISULFID           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NCF1         0.00         0.00         same           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOXO1         0.00         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same	P51610-4	HCFC1	AGHC*AVAINTR	C326	NOXO1	0.00		same	
P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NCF1         0.00         0.00         same           P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOXO1         0.00         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same	P51858	HDGF	C*GDLVFAK	C12	NCF1	0.00	0.00	same	DISULFID
P51991-1         HNRNPA3         YHTINGHNC*EVK         C196         NOX01         0.00         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF1         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same           P51991-1         HNRNPA3         WGTLTDC*VVMR         C64         NCF2         0.00         same	P51991-1	HNRNPA3	YHTINGHNC*EVK	C196	NCF1	0.00	0.00	same	
P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF1 0.00 0.00 same P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF1 0.00 0.00 same P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF2 0.00 same Continued on next page	P51001 1	HNRNDAS	VHTINGHNC*EVK	C106	NOVOI	0.00	0.00	samo	
P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF1 0.00 same P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF1 0.00 0.00 same P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF2 0.00 same Continued on next page	DE1001 1	TIMD NDA 9		0190	NODI	0.00	0.00	same	
P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF1 0.00 0.00 same P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF2 0.00 same Continued on peyt page	L91881-1	HINKNPA3	WGILIDU VVMK	C64	NOF1	0.00	0.07	same	
P51991-1 HNRNPA3 WGTLTDC*VVMR C64 NCF2 0.00 same Continued on next page	P51991-1	HNRNPA3	WGTLTDC*VVMR	C64	NCF1	0.00	0.00	same	
Continued on next page	P51991-1	HNRNPA3	WGTLTDC*VVMR	C64	NCF2	0.00		same	
			Con	tinued on novt n	are				

Table 2A.2 – continued	l from	previous	page
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P51991-1	HNRNPA3	WGTLTDC*VVMR	C64	NOXO1	0.00	0.00	same	
P52272	HNRNPM	GC*AVVEFK	C114	NCF1	0.00	0.00	same	
P52272	HNRNPM	GC*AVVEFK	C114	NCF2	0.00	0.00	same	
P52272	HNRNPM	GC*AVVEFK	C114	NOXO1	0.00		same	
P52272	HNRNPM	AC*QIFVR	C653	NCF1	0.00	0.00	same	
P52272	HNRNPM	AC*QIFVR	C653	NCF2		0.00	same	
P52272	HNRNPM	AC*QIFVR	C653	NOXO1	0.00		same	
P52272	HNRNPM	DKFNEC*GHVLYADIK	C676	NCF1	0.00	0.00	same	
P52294	KPNA1	NAVWALSNLC*R	C240	NCF1	0.00	0.00	same	
P52294	KPNA1	NAVWALSNLC*R	C240	NCF2	0.00		same	
P52597	HNRNPF	GLPFGC*TK	C122	NCF1	0.00	0.00	same	
P52597	HNRNPF	GLPFGC*TK	C122	NCF2	0.00	0.00	same	
P52597	HNRNPF	GLPFGC*TK	C122	NOX01	0.00	0.00	same	
P52597	HNRNPF	DLSYC*LSGMYDHB	C267	NCF1	0.00	0.00	same	
P52597	HNRNPF	DLSYC*LSGMYDHB	C267	NCF1	0.00	0.00	same	
P52907	CAPZAI	ESC*DSALB	C124	NCF1	0.00	0.00	same	
P52007	CAPZAI	ESC*DSALB	C124	NOXOI	0.00	0.00	samo	
P52048 1	NUP08	ISEAC*SLAOOSCDHB	C1347	NCE1	0.00	0.00	same	
P52048-1	NUP08	ISEAC SLAQQSGDIR	C1347	NCF1	0.00	0.00	same	
DE0048 1	NUPOS	DVC*FULLK	C1402	NCE1	0.00		same	
F 02946-1 DF 4977	DMC1	C*DADIGETCI CTDED	C2492	NCF1	100.00	100.00	same	
F 04277	PMSI	C*DADHSF15L51FER	C243	NCFI	100.00	100.00	same	
P54277	PMSI	C*DADHSFISLSIPER	C243	NCF2	100.00	100.00	same	
P54277	PMSI	C*DADHSFTSLSTPER	C243	NOXOI	100.00	100.00	same	DIGULDID
P54709	ATP1B3	EVTVEC*K	C250	NCFI		100.00	same	DISULFID
P54709	ATP1B3	EVTVEC*K	C250	NCF2		91.41	same	DISULFID
P54709	ATP1B3	EVTVEC*K	C250	NOXO1	87.55	87.95	same	DISULFID
P55010	EIF5	LC*'TFILK	C138	NCF1	0.00	0.00	same	
P55010	EIF5	FVLC*PEC*ENPETDLHVNPK	C99;C102	NCF1	100.00		same	
P55010	EIF5	FVLC*PEC*ENPETDLHVNPK	C99;C102	NOXO1	100.00	100.00	same	
P55265-1	ADAR	LTEC*QLK	C499	NCF1	0.00	0.00	same	
P55265-1	ADAR	LTEC*QLK	C499	NCF2		0.00	same	
P55265-1	ADAR	LTEC*QLK	C499	NOXO1	0.00	0.00	same	
P55265-1	ADAR	SPVTTLLEC*MHK	C622	NCF1	0.00	0.00	same	
P55265-1	ADAR	SPVTTLLEC*MHK	C622	NCF2	0.00	0.00	same	
P55265-1	ADAR	LGNSC*EFR	C630	NOXO1		100.00	same	
P55265-1	ADAR	GETVNDC*HAEIISB	C909	NCF1	0.00		same	
1002001	NHP2L1		0000		0.00		buille	
P55769	SNU13	LLDLVQQSC*NYK	C30	NCF1	0.00	0.00	same	
P55769	SNU13	LLDLVQQSC*NYK	C30	NCF2	0.00	0.00	same	
P55769	NHP2L1 SNU13	LLDLVQQSC*NYK	C30	NOXO1	0.00		same	
P57088	TMEM33	LC*LQSIAFISR	C232	NCF1	0.00	0.00	same	
P57088	TMEM33	LC*LQSIAFISR	C232	NCF2	0.00	0.00	same	
P57088	TMEM33	LC*LQSIAFISR	C232	NOXO1		0.00	same	
P57737-3		IVWVC*DGR	C691	NCF1	0.00	0.00	same	
	CORO7-PAM16 CORO7							
P57737-3	CODOR DANGA	C*LLVSGFDSQSER	C695	NCF1	0.00	0.00	same	
	CORO7-PAMI6							
	CORO7							
P60709	ACTB	MDDDIA ALVVDNGSGMC*K	C17	NCF1	10.76	0.00	same	
P60866	RPS20	VC*ADLIB	C36	NCF1	10.70	6.08	samo	
De0866	DDS20	VC*ADLIR	C36	NCE9	10.57	0.08	same	
P60866	DDS20	VC*ADLIR	C30	NOYO1	12.05	0.00	same	
P00800	RF 520	VC ADLIN	C30	NOADI	7.02	0.00	same	
P60903	S100A10	DLDQC*RDGK	C62	NCFI	7.60	0.12	same	
P60903	S100A10	DLDQC*RDGK	C62	NCF2	12.02	0.00	same	
P60903	S100A10	DLDQC*RDGK	C62	NOXOI	0.00	0.00	same	
P61011-1	SRP54	TC*LIC*ADTFR	C133;C136	NCF1	0.00	0.00	same	
P61247	RPS3A	LFC*VGFTK	C139	NCF1	0.00	0.00	same	
P61247	RPS3A	LFC*VGFTK	C139	NCF2	0.00	0.00	same	
P61247	RPS3A	LFC*VGFTK	C139	NOXO1	0.00	0.00	same	
P61247	RPS3A	NC*LTNFHGMDLTR	C96	NCF1	0.00	0.00	same	
P61247	RPS3A	NC*LTNFHGMDLTR	C96	NCF2		0.00	same	
P61247	RPS3A	NC*LTNFHGMDLTR	C96	NOXO1	0.00	0.00	same	
P61513	RPL37A	YTC*SFC*GK	C39:C42	NCF1	0.00	0.00	same	
P61513	RPL37A	YTC*SFC*GK	C39:C42	NCF2	0.00	0.00	same	
P61513	BPL37A	YTC*SFC*GK	$C39 \cdot C42$	NOXOI	0.00	0.00	same	
P61513	BPL37A	AVGIWHC*GSC*MK	C57:C60	NCF1	0.00	0.00	same	
P61513	RPL37A	AVCIWHC*CSC*MK	C57;C60	NCF2	0.00	0.00	samo	
P61586	BHOA	ICAECVMEC*SAK	C150	NCE1	0.00	0.00	same	
F01580	DUOA	IGAFGI MEC'SAK	C159	NCFI	0.00	0.00	same	
r 01080	RHOA DUCA	IGAFGINEU SAK	0159	NOF2	0.00	0.00	same	
F 01080	RHUA	IGAFGY MEU"SAK	0159	NOXOI	0.00	0.00	same	ND DDG
P61586	RHOA	LVIVGDGAC*GK	C16	NCF1	14.03	9.86	same	NP_BIND
P61586	RHOA	LVIVGDGAC*GK	C16	NCF2	9.35	0.00	same	NP_BIND
P61586	RHOA	LVIVGDGAC*GK	C16	NOXO1	0.00	0.00	same	NP_BIND
P61978	HNRNPK	IIPT'LEEGLQLPSPTATSQLPLESDA	C132	NCF2	0.00	0.00	same	
P61078	HNRNDV	VECTENYQHYK IIPTLEEGLQLPSPTATSQLPLESDA	C139	NOYO1	0.00		same	
1 01310	TIMUTER	VEC*LNYQHYK	0132	NOAUI	0.00		same	
P62195-1	PSMC5	AVAHHTDC*TFIR	C209	NCF1	0.00	0.00	same	
P62241	RPS8	NC*IVLIDSTPYR	C100	NCF2	64.41		same	
P62241	RPS8	NC*IVLIDSTPYR	C100	NOXO1		19.54	same	
P62241	RPS8	LDVGNFSWGSEC*C*TR	C71:C72	NCF1	0.00	0.00	same	
P62244	RPS15A	QVLIRPC*SK	C30	NCF1	4.31	8,26	same	
P62244	RPS15A	OVLIBPC*SK	C30	NOXO1		41.72	same	
P62263	RPS14	C*KELGITALHIK	C85	NCF1	0.00	0.00	same	
	*** UIT	<u> </u>	000		5.00	5.00	Same	
		Continued	on next p	Jage				

<b>Table 2A.2</b> – co	ntinued from	previous	page	

PH2230         RF314         C*KELGTFALINE         CS         NCF2         0.00         0.00         0.00         0.00           P0230         RTF31         C*KELGTFALINE         CS         NCF1         7.7         0.00         0.00         0.00           P0230         RTF31         NCF1         7.7         0.00         0.00         0.00         0.00           P0230         RTF31         NCF1         7.7         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P#2250         NFS14         C_FKELOTTALINE         C55         NONCO         0.00         0.00         comme           P#2250         NFS14         NASEVALSPC*LATEREDEVIDAGE         C116         XCP1         0.00         7.33         means           P#2250         NFS11         NASEVALSPC*LATEREDEVIDAGE         C118         XCP1         0.00         7.33         means           P#2250         NFS11         NASEVALSPC*LATEREDEVIDAGE         C118         XCP1         0.00         0.00         means           P#2250         NFS11         VUCEDVITYGEC*PELSK         C121         XCP2         0.00         0.00         means         LIPTD           P#2250         NFS11         CYPFICATENER         C00         XCP2         0.00         0.00         means         LIPTD           P#2250         NFS11         CYPFICATENER         C60         NCP1         0.00         means         LIPTD           P#2350         SNRPD         CYPFICATENER         C60         NCP2         0.00         means         LIPTD           P#2351         SNRPD         NTGVLINCER         C60         NCP2         1.00         1.00         means           P#2351         SNRPD         CYNFILICEN	P62263	RPS14	C*KELGITALHIK	C85	NCF2	0.00	0.00	same	
PP2280         PP232         Chi PP320         Chi PP3200 <thchi pp3200<="" th=""> <thchi p<="" td=""><td>P62263</td><td>RPS14</td><td>C*KELGITALHIK</td><td>C85</td><td>NOXO1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></thchi></thchi>	P62263	RPS14	C*KELGITALHIK	C85	NOXO1	0.00	0.00	same	
Processe	P62266	B D S 2 3	ITAFVPNDGC*LNFIEENDEVLVAGF	C90	NCF1	7 73	14 37	63700	
P22280         RF211         NUMPURSPETR         CL16         NCF0         0.00         7.39         Amment           P02280         RF211         DVGCDVTVCEC*RPLSK         CL31         NCF1         1.00         0.00         6.37         Amment           P02280         RF311         DVGCDVTVCEC*RPLSK         CL31         NCF2         1.00         0.00         Amment           P02280         RF311         C*PTCRVSR         CC31         NCF2         0.00         0.00         Amment           P02280         RF311         C*PTCRVSR         C60         NCF2         0.00         0.00         Amment           P02280         SNRPP         C*NNUXIR         C60         NCF2         0.00         0.00         Amment           P02380         SNRPP         C*NNUXIR         C64         NCC7         0.00         0.00         Amment           P02380         SNRPP         C*NNUXIR         C64         NCC7         0.00         0.00         Amment           P02381         SNRPP         NNUXINK         C63         NCF2         0.00         0.00         Amment           P02381         SNRPP         NNUXINK         C63         NCF2         0.00         0.00	1 02200	101 525	GR	030	NOPT	1.15	14.07	same	
P22280         RF=11         NMSWIESPUTR         Cliff         NOX01         0.00         0.00         0.00         came           P02280         RF=11         DVQ[GDNTYUGC4*PF18K         Cliff         NOX01         0.00         0.00         came           P02280         RF=11         DVQ[GDNTYUGC4*PF18K         Cliff         NOX01         0.00         0.00         came           P02280         RF=11         CYENTONIN         Cliff         NOX01         0.00         came         LIPD           P02300         SINET         C'NNVLTIR         Cd4         NCT         0.00         came         LIPD           P02300         SINET         C'NNVLTIR         Cd4         NCT         4.00         0.00         came           P02300         SINET         C'NNVLTIR         Cd4         NCT         4.46         0.00         came           P02300         SINET         C'NNVLNIK         Cd3         NCT         4.46         1.12         came           P02310         SINETP         IC'NNVLNIK         Cd3         NCT         4.46         1.01         came         came           P02316         SINETP         IC'NNVLNIK         Cd3         NCT         4.46	P62280	RPS11	NMSVHLSPC*FR	C116	NCF1	0.00	7.39	same	
PH2280         IPE11         DVG[CDIVTVCEC*PERSK         Clai         NCF0         1.455         Lab         Ausset           PH2280         RF911         C*PFCRVSR         Clai         NCF1         0.00         6.87         annet           PH2280         RF911         C*PFCRVSR         Clai         NCF1         0.00         6.87         annet           PH2280         RF911         C*PFCRVSR         Clai         NCF1         0.00         6.87         annet           PH2280         RSNPP         C*NVLVIR         C66         NCF2         0.00         annet           PH2280         SNRPP         C*NVLVIR         C66         NCF2         0.00         annet           PH2280         SNRPP         C*NVLVIR         C64         NCF2         0.00         annet           PH2381         SNRPP1         NCTVUNCTR         C44         NCF2         0.00         annet           PH2381         SNRPP1         NCTVUNCTR         C43         NCF2         0.00         annet           PH2381         SNRPP1         NCTVUNCTR         C43         NCF2         0.00         annet           PH2381         SNRPP1         NCTVUNCTR         C43         NCF2	P62280	RPS11	NMSVHLSPC*FR	C116	NOXO1	0.00	0.00	same	
P2230         IF111         DVGIDD/TVGCP/IDESK         Clai         NCP         0.00         0.60         0.67         assault           P2230         BF111         C*PTGNVSIR         C60         NCP1         0.00         6.67         assault         LIPID           P2230         BF111         C*PTGNVSIR         C60         NCP1         0.00         6.67         assault         LIPID           P2230         BF111         C*PTGNVSIR         C66         NCP1         0.00         6.00         assault         LIPID           P2230         SNRPP         C*NNTVER         C66         NCP1         0.00         6.00         assault         LIPID           P2310         SNRPD         NNTVENK         C64         NCP1         0.00         0.00         assault         assault         LIPID           P0310         SNRPD         NNTVENK         C64         NCP1         0.00         0.00         assault	P62280	RPS11	DVQIGDIVTVGEC*RPLSK	C131	NCF1	14.95	11.46	same	
P2230         RP311         DVQLDNY/VECCPEPISK         C131         NCXC01         0.00         0.00         same         LTPD           P02306         SNRP         C*NVLVIR         C66         NCF2         0.00         0.00         same         LPPD           P02306         SNRP         C*NVLVIR         C66         NCF2         0.00         0.00         same           P02306         SNRP         C*NVLVIR         C66         NCF1         0.00         same           P02306         SNRPD         C*NVLVIR         C66         NCF1         4.46         1.21         same           P02316         SNRPD         NNTQVLNCTR         C64         NCF1         4.46         1.21         same           P02316         SNRPD         IC*NMLENK         C63         NCF1         4.46         1.21         same           P02316         SNRPD         IC*NMLENK         C63         NCF2         0.00         same         same           P02316         SNRPD2         IC*NMLENK         C63         NCF2         0.00         same         same           P02316         SNRPD2         IC*NMLENK         C637         NCP2         0.00         same         same	P62280	RPS11	DVQIGDIVTVGEC*RPLSK	C131	NCF2	0.00	0.00	same	
P22200         BPS11         CPPPTONNER         COO         NCP         0.00         6.00         same         LIPPD           P22306         SINPF         C'NNIVIR         C66         NCP1         0.00         same         LIPPD           P22306         SINPF         C'NNIVIR         C66         NCP1         0.00         same         same           P22306         SINPFD         C'NNIVIR         C66         NCP1         0.00         same           P22316         SINPFD         NTGVLINCTR         C66         NCP2         0.00         same           P23316         SINPFD         NTGVLINCTR         C46         NCP1         0.00         same           P23316         SINPFD         HC'NNVLENVK         C63         NCP1         0.46         1.00         same           P23316         SINPFD         HC'NNVLENVK         C63         NCP1         0.00         same         same           P23316         SINPFD         HC'NNVLENVK         C63         NCP1         0.00         same         same           P23316         SINPFD         HC'NNVLENVK         C33         NCP1         0.00         same           P23316         SINPFD         HC'NN	P62280	RPS11	DVQIGDIVTVGEC*RPLSK	C131	NOXO1	0.00	0.00	same	
PP2280         INTEL         CPPTENNER         CO0         NCP1         0.00         const         LIPD           PP2386         SNIPP         CYNNLYIR         C66         NCX1         0.00         const         ELPD           PP2386         SNIPP         CYNNLYIR         C66         NCX1         0.00         const         ENT           PP2386         SNIPP2         CYNNLYIR         C66         NCX1         0.00         const           PP2316         SNIPP2         CYNNLYIR         C66         NCX1         0.00         const           PP2316         SNIPP2         CYNNLENVE         CA         NCC1         4.00         1.12         state           PP2316         SNIPP2         HCYNNLENVK         C63         NCC2         1.00         0.00         const           PP2316         SNIPP2         HCYNNLENVK         C63         NCC2         0.00         const         const           PP2316         SNIPP2         HCYNNLENVK         C63         NCC2         0.00         const         const           PP2316         SNIPP3         HCYNNLENVK         C132         NCC2         0.00         const         const           PP2317         HCYA	P62280	RPS11	C*PFTGNVSIR	C60	NCF1	0.00	6.87	same	LIPID
PE3300         SINPP         CYNNLYIR         CS         NCP         0.00         0.00         same           PE3306         SINPP         CYNNLYIR         C66         NCPJ         0.00         same           PE3316         SINPP         NYTQVINC'R         C66         NCPJ         0.00         same           PE3316         SINPP         NYTQVINC'R         C66         NCPJ         0.00         same           PE3316         SINPP         HCYNVIENVR         C63         NCPI         1.4.4         1.01         same           PE3316         SINPP         HCYNVIENVR         C63         NCPI         1.4.46         1.031         same           PE3316         SINPP         HCYNVIENVR         C63         NCPI         1.00         0.00         same           PE3316         SINPP         HCYNVIENVR         C32         NCPI         1.00         0.00         same           PE3316         SINPP         HCYNVIENVR         C32         NCPI         0.00         same         same           PE3316         SINPP         HCYNVIENVR         C32         NCPI         0.00         same           PE3316         SINP         HCYNVIENVR         C32	P62280	RPS11	C*PFTGNVSIR	C60	NCF2	0.00	0.00	same	LIPID
PE3308         SNRPP         CYNNULNER         COS         NCC1         4.6.0         same           PE3316         SNRP12         NNTQVLINCYR         C46         NCC1         4.5.8         4.3.6         same           PE3316         SNRP12         NNTQVLINCYR         C46         NCC1         4.5.8         4.3.6         same           PE3316         SNRP12         NNTQVLINCYR         C46         NCC1         4.5.6         1.3.6           PE3316         SNRP12         HCYNNVLENVK         C46         NCC1         4.4.6         1.0.2         same           PE3316         SNRP12         HCYNVLENVK         C46         NCC1         4.6.6         1.0.0         same           PE3316         SNRP12         HCYNVLENVK         C43         NCC1         4.0.6         1.0.0         same           PE3316         SNRP13         HCRANULENVK         C43         NCC1         4.0.0         same         same           PE3316         SNRP13         HCRACHINTCREFERTORGEVCR         C40         NCC1         4.0.0         same         same           PE3316         SNRP13         VLTRACHINTCREFERTORGEVCR         C30         NCC2         0.0.0         same           PE3	P62306	SNRPF	C*NNVLYIR	C66	NCF1	0.00	0.00	same	
PE2306         SNRPP         CNNVLVII         CNNVLVII <thcnnvlvii< th=""> <thcnnvlviin< th="">         C</thcnnvlviin<></thcnnvlvii<>	P62306	SNRPF	C*NNVLYIR	C66	NCF2	0.00		same	
PH2316         SNILPLA         NATAULENTIN         Cd         NCP         SC3	P62306	SNRPF	C*NNVLYIR	C66	NOXO1	0.00	0.00	same	
PERSIDE         SNRPP         REALIZED         REALIZED <threalized< th=""> <threalized< th=""> <thre< td=""><td>P62316</td><td>SNRPD2</td><td>NNTQVLINC*R</td><td>C46</td><td>NCF1</td><td>8.63</td><td>8.36</td><td>same</td><td></td></thre<></threalized<></threalized<>	P62316	SNRPD2	NNTQVLINC*R	C46	NCF1	8.63	8.36	same	
PERSIDE         SINUPLE         NUME         Case         NUMP         0.00         same           PERSIDE         SINUPED         ICCNMVLENVK         C63         NCF1         1.4.6         10.01         same           PERSIDE         SINUPED         ICCNMVLENVK         C63         NCF2         0.4.6         1.0.0         same           PERSIDE         SINUPED         ICCNMVLENVK         C63         NCF2         0.4.6         1.0.0         same           PERSIDE         SINUPED         ICCNMVLENVK         C63         NCF2         0.00         same           PERSIDE         FILTA         TCTTVATQVNSEDKALAK         C199         NCF2         0.00         same           PERSIDE         FILTA         TCTTVATQVNSEDKALAK         C199         NCF2         0.00         same           PERSIDE         FILTA         TCTTVATQVNSEDKALAK         C192         NCK2         0.00         same           PERSIDE         FILTA         TCTTVATQVNSEDKALAK         C192         NCK2         0.00         same           PERSIDE         FILTA         TCTVATGCANK         C132         NCF1         0.00         same           PERSIDE         FILTA         TCTVATGCANK         C132 <td>P62316</td> <td>SNRPD2</td> <td>NNTQVLINC*R</td> <td>C46</td> <td>NCF2</td> <td></td> <td>0.00</td> <td>same</td> <td></td>	P62316	SNRPD2	NNTQVLINC*R	C46	NCF2		0.00	same	
PE336         SNIP12         HUTNALLENAN         CB3         NUC1         4.46         1.12         mame           PE336         SNIP12         HUTNALLENAN         CB3         NCF2         4.06         1.07         mame           PE336         SNIP12         HUTNALLENAN         CB3         NCF2         4.06         1.07         mame           PE336         SNIP12         HUTNALLENAN         CB3         NCF2         4.08         1.12         mame           PE336         SNIP12         HUTNA         TUTTVAFTQVNEER         C199         NCF2         0.00         mame           PE334         FFTA         CUTTVAFTQVNEER         C199         NCF2         0.00         mame           PE343         FFTA         CUTTVAFTQVNEER         C193         NCA1         0.00         mame           PE343         FFTA         VCTVAVTQVATQVNEER         C18         NCA2         0.00         mame           PE344         FFTA         VCTVAVTQVATQVNEER         C18         NCA2         1.00.00         mame         mame           PE345         FFTA         VCTVAVTQVATQVNEER         C18         NCA2         NCA2         mame         mame           PE345         FF	P62316	SNRPD2	NNTQVLINC*R	C46	NOXOI	0.00		same	
PERSING         SAULED         ILCENANTENNANC         Cols         NCP2         I.A.00         Saune           PERSING         SINUPLOD         ILCENANTENNANC         Cols         NCP2         I.A.00         Saune           PERSING         SINUPLOD         ILCENANTENNANC         Cols         NCP2         I.A.00         0.00         saune           PERSING         SINUPLOD         ILCENANTENNANC         Cols         NCP2         0.00         saune           PERSING         SINUPLOD         ILCENANTENNANC         Cols         NCP2         0.00         saune           PERSING         PERSING         COLS         NCP2         0.00         saune         saune           PERSING         PERSING         COLS         NCP2         0.00         saune         saune           PERSING         PERSING         PERSING         COLS         NCP2         0.00         saune         saune           PERSING         PERSING         PERSING         PERSING         NCP2         0.00         saune         saune           PERSING         PERSING         PERSING         NCP2         0.00         0.00         saune           PERSING         PERSING         PERSING         PERSING	P62316	SNRPD2	HC*NMVLENVK	C63	NCFI	4.06	1.12	same	
PERAID         SAULPLY         LUCASMALENANCE         CAS         NC22         JULDS	P62316	SNRPD2	HC*NMVLENVK	C63	NCFI	14.46	10.91	same	
PERSIDE         NULLEAVEN         Case         Not22         24.08         10.18         mannee           PE2216         SNRED3         ULHARAGENEYC'EFENTGEVEN         C199         NCF2         0.00         samme           PE2216         SNRED3         ULHARAGENEYC'EFENTGEVEN         C199         NCF2         0.00         samme           PE2264         RPLA         TC*TTVAFTQVNSEDK         C199         NCF2         0.00         samme           PE2266         ETF1         VC*TGVEDTLK         C382         NCF2         0.00         samme           PE2265         ETF1         VC*TGVEDTLK         C382         NCF2         0.00         samme           PE2265         ETF1         VC*TGVEDTLK         C382         NCF2         0.00         samme           PE2701         RFSK         ECTPLITER         C41         NCF2         0.00         samme           PE2733         RP56         LNSFPATCC*QK         C12         NCF1         0.00         0.00         samme           PE2733         RP56         LNSFPATCC*QK         C112.C120         NCF1         0.00         no         samme           PE2734         RP54         LNSFPATCC*QK         C112.C120         NCK1	P62316	SNRPD2	HC*NMVLENVK	C63	NCF2	0.00	0.00	same	
PE2110         SNMEP D         POP MAY LEAVE         C 53         A ACD 1         L 1.2         manage           PE2244         RPLTA         TCTTVAFTQVNSEDKGALAK         C199         NCF2         0.00         same           PE2244         RPLTA         TCTTVAFTQVNSEDKGALAK         C199         NCF2         0.00         same           PE2245         ETF1         YCFGVEDTLK         C382         NCF1         0.00         same           PE2365         ETF1         YCFGVEDTLK         C382         NCK1         0.00         same           PE2361         ETF1         YCFGVEDTLK         C382         NOK01         0.00         same           PE2301         RPSA         EDTCNLCMVFTGGANGR         C181         NOK01         0.00         same           PE2301         RPSA         ELNSFATGC*QK         C12         NCF1         17.20         28.69         same           PE2333         RPS6         LINSFATGC*QK         C12420         NCK1         0.00         same           PE2380         RAN         VCENHTVLC*GKK         C12420         NCK1         0.00         same           PE2380         RP1.3         ELGEPVGATIC*GK         C12420         NCK1         0.00	P62316	SNRPD2	HC*NMVLENVK	C63	NCF2	24.08	14.18	same	
P2333         NMCP 1         0.00         0.00         same           P2340         RFLA         CTUVAFGVBERGALAK         C302         NCF1         0.00         0.00         same           P24405         ETF1         YCFGVBEDTLK         C302         NCF1         0.00         0.00         same           P24405         ETF1         YCFGVBEDTLK         C302         NCF1         0.00         same           P2405         ETT1         YCFGVBEDTLK         C302         NCF1         0.00         same           P2405         ETT1         YCFGVBEDTLK         C302         NCF1         0.00         same           P2405         ETT1         YCFGVBEDTLK         C302         NCF1         0.00         same           P2401         RF84         ECTPLIFLR         C41         NCF1         0.00         same           P2771         RF84         LNISFFATGCPQR         C112         NCF1         0.00         0.00         same           P22266         HAN         VCFINFULCCQRK         C112/C120         NCF1         0.00         same           P22289         RP123         ISIGLFVGATINC*ADNTGAK         C22         NCK1         0.00         same	P62316	SNRPD2	HC*NMVLENVK	C63	NOXO1	11.28		same	
Person         Person         CL99         NCP2         0.00         0.000         same           Person         ETT         VCPTGVEDTLK         C392         NCF1         0.00         0.00         same           Person         ETT         VCPGVEDTLK         C392         NCF2         0.00         same           Person         INPSA         PDTCNLCMAVTEGANGR         C181         NCF2         100.00         same           Person         INPSA         PDTCNLCMAVTEGANGR         C181         NCF2         0.00         same           Person         INPSA         PDTCNLCMAVTEGANGR         C181         NCF2         0.00         same           Person         INPSA         ECCPHINERA         C41         NCF2         0.00         same           Person         INPSA         ECCPHINERACGQK         C12         NCF1         0.00         0.00         same           Person         INPSA         ECCPHINERACGQK         C112/C120         NCF2         0.00         0.00         same           Person         INA         VCENNEYALCGNK         C112/C120         NCF1         0.00         same           Person         INA         VCENNEYALCGNK         C112/C120         N	P62318	SNRPD3	VLHEAEGHIVTC*EINTGEVYR	C20	NCFI	0.00	0.00	same	
Person         Person<	P62424	RPL7A	TC*TTVAFTQVNSEDK	C199	NCF2	0.00	0.00	same	
Persons         ETF1         VCPTAUDDILK         CB2         NCL1         0.00         Lame           Persons         ETF1         VCPTAUEDILK         CB2         NCL1         0.00         Lame           Persons         ETF1         VCPTAUEDILK         CB2         NCL1         0.00         Lame           Persons         RPSAK         PDTCNLCMVTGGANLGR         C181         NCR1         0.00         Lame           Persons         RPSAK         ECTLLIFIER         C41         NCP1         0.00         Lame           Persons         RPSAK         ECTLLIFIER         C41         NCP1         0.00         Lame           Persons         RPSA         LINSPATCC7QK         C12         NCP1         0.00         Lame           Persons         RAN         VCPENPTVLC7GNK         C125         NCP1         0.00         Lame           Persons         RAN         VCPENPTVLC7GNK         C125         NCO1         0.00         Lame           Persons         RAN         VCPENPTVLC7GNK         C125         NCX01         1.00         Lame           Persons         RAN         VCPENPTVLC7GNK         C125         NCX01         0.00         Lame <t< td=""><td>P62424</td><td>RPL7A</td><td>TC*TTVAFTQVNSEDKGALAK</td><td>C199</td><td>NCF2</td><td>0.00</td><td></td><td>same</td><td></td></t<>	P62424	RPL7A	TC*TTVAFTQVNSEDKGALAK	C199	NCF2	0.00		same	
PE348         E111         VCPEURDIAN         C322         NCP2         0         0.00         same           P62701         RPSAX         PDTCNLC*MVTGGANLGR         C181         NCXC1         100.00         100.00         same           P62701         RPSAX         PDTCNLC*MVTGGANLGR         C181         NCXC1         100.00         100.00         same           P62701         RPSAX         EC1PLIPTR         C41         NCP2         10.00         100.00         same           P62701         RPSAX         EC1PLIPTR         C41         NCP2         10.00         0.00         same           P62733         RPS6         LINSFPATCC*QK         C12         NCX01         0.00         same           P62268         RAN         VC*ENIPVLC*GNK         C112C120         NCP1         0.00         same           P62289         RP123         SLGLPVGAVINC*ADNTGAK         C28         NCP1         0.00         same           P62289         RP123         SLGLPVGAVINC*ADNTGAK         C28         NCX01         0.00         same           P62289         RP123         SLGLPVGAVINC*ADNTGAK         C28         NCX01         0.00         same           P62289         RP123	P62495	ETFI	YC*FGVEDTLK	C302	NCFI	0.00	0.00	same	
P2349         E111         YCPFUVED/LK         C302         NOA01         0.000         mame           P62701         RP54X         ECUPLIFER         C41         NCP1         0.000         same           P62701         RP54X         ECUPLIFER         C41         NCP1         0.000         same           P62703         RP54X         ECUPLIFER         C41         NCP1         17.0         28.609         same           P62703         RP54X         ECUPLIFER         C41         NCP1         17.0         28.609         same           P62733         RP56         LNISPATICC*QK         C12         NCP1         0.00         0.00         same           P62826         RAN         VC*ENIPVLC4CMK         C12.6120         NCP1         0.00         0.00         same           P62826         RAN         VC*ENIPVLC4CMK         C12.3         NOX01         10.00         same           P62829         RP1.23         ELGLPVGAVINC*ADNTGAK         C28         NOX01         0.00         same           P62829         RP1.23         ELGLPVGAVINC*ADNTGAK         C28         NOX01         0.00         same           P62829         RP1.23         ELGLPVGAVINC*ADNTGAK	P62495	ETFI	YC*FGVEDTLK	C302	NCF2		0.00	same	
P22701         HP33A         PDUCNCENVIGGANLOG         Class         NCP2         100.00         00.00         same           P62701         RP54X         ECUPLIFIER         C41         NCP2         0.00         same           P62701         RP54X         ECUPLIFIER         C41         NCP2         0.00         same           P62703         RP56         LNISPPATCC*QK         C12         NCP1         17.20         28.64         same           P62733         RP56         LNISPPATCC*QK         C12         NCP2         38.64         same           P62733         RP56         LNISPATCC*QK         C12         NCP2         0.00         same           P62329         RAN         VC*ENIPVLC*GNK         C12.52         NOX01         0.00         same           P62329         RP1.23         EGLEPVGAVINC*ADNTGAK         C28         NCP2         0.00         same           P62329         RP1.23         EGLEPVGAVINC*ADNTGAK         C28         NCP2         0.00         same           P62373         GNB1         LFVSGAC*DASAK         C204         NOX01         0.00         same           P62373         GNB1         LFVSGAC*DASAK         C204         NOX01	P62495	ETFI	YC*FGVEDTLK	C302	NOXOI	0.00		same	
P12701         RTP3.X         F121XBLC_ALT_GLAALGR         C.8.1         NOA01         100.00         same           P42701         RFSAX         ECTIPLIFIER         C.11         NCE         0.00         same           P42733         RFS6         LNISFPATCC*QK         C12         NCF1         17.20         28.69         same           P42733         RFS6         LNISFPATCC*QK         C12         NCF2         38.64         same           P42733         RFS6         LNISFPATCC*QK         C12         NCX01         0.00         same           P4238         RAN         VC*ENIPVLC*CONK         C112.120         NCX01         100.00         same           P42389         RPL23         ECADUYR         C122         NCX01         100.00         same           P42389         RPL23         SLGLPVGAVINC*ADNTGAK         C28         NCP1         0.00         same           P42389         RPL33         SLGLPVGAVINC*ADNTGAK         C28         NCP1         0.00         same           P42389         RPL33         SLGLPVGAVINC*ADNTGAK         C24         NCX01         0.00         same           P42389         RPL33         GUPVGAVIASAK         C204         NCX01	P62701	RPS4X	FDTGNLC*MVTGGANLGR	C181	NCF2	100.00	100.00	same	
P22701         HTSM         EC-LPLIFER         CL1         NCP         0.00         0.00         same           P22753         RPS6         LNISFPATICCQK         C12         NCF1         17.00         98.69         same           P22753         RPS6         LNISFPATICCQK         C12         NCF1         17.00         98.69         same           P22826         RAN         VCTENIPIVLCTENK         C112/C120         NCF1         0.00         0.00         same           P22826         RAN         VCTENIPIVLCTENK         C112/C120         NCF1         0.00         0.00         same           P22829         RPL33         ISCGLPVGAVINC*ADNTGAK         C28         NCF1         0.00         1.11         same           P22829         RPL33         ISCGLPVGAVINC*ADNTGAK         C28         NCF2         0.00         same           P22829         RPL33         ISCGLPVGAVINC*ADNTGAK         C28         NCF1         0.00         same           P22829         RPL33         ISCGLPVGAVINC*ADNTGAK         C28         NCF2         0.00         same           P2283         GCB2         LPVGAVTDAADNTGAK         C28         NCF2         0.00         same           P22848 <td>P62701</td> <td>RPS4X</td> <td>FDTGNLC*MVTGGANLGR</td> <td>C181</td> <td>NOXO1</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	P62701	RPS4X	FDTGNLC*MVTGGANLGR	C181	NOXO1	100.00	100.00	same	
P22701         P2384         EC-P_P1HPLA         C41         NCE2         12.0         0.00         same           P62733         RP56         LNISFPATICCVGK         C12         NCF1         0.00         same           P62733         RP56         LNISFPATICCVGK         C12         NCF1         0.00         same           P62826         RAN         VCENNFIVLCTOKK         C122(120         NCF2         0.00         0.00         same           P62826         RAN         VCENNFIVLCTOKK         C122(120         NCF2         0.00         0.00         same           P62826         RAN         VCENNFIVLCTOKK         C122(120         NCF2         1.01         same           P62826         RAN         VCENNFIVLCTOKT         C125         NOXOI         0.00         same           P62827         RFL33         ISICLPVGAVINCADNTGAK         C28         NOXOI         0.00         same           P62873         GNB1         LPVSGACTDASAK         C204         NOXOI         0.00         same           P62873         GNB1         LPVSGACTDASAK         C204         NOXOI         0.00         same           P62873         GNB1         LPVSGACTDASAK         C294         <	P62701	RPS4X	EC*LPLIIFLR	C41	NCF1	0.00	0.00	same	
P2733         RDS         LAMPFAILUCAGE         C12         NCP1         17.20         28.69         same           P6233         RPS         LAMPFAILCAGE         C12         NCP1         38.64         0.00         same           P62326         RAN         VC*ENPIVLC*GNK         C112/C120         NCP1         0.00         0.00         same           P62326         RAN         VC*ENPIVLC*GNK         C112/C120         NCV1         0.00         0.00         same           P62329         RPL23         ISCGLPVGAVINC*ADNTGAK         C28         NCP1         2.00         0.00         same           P6239         RPL23         ISCGLPVGAVINC*ADNTGAK         C28         NCP1         2.00         0.00         same           P6239         RPL3         ISCGLPVGAVINC*ADNTGAK         C28         NCP1         2.00         0.00         same           P62437         GNB1         LPVSGAC*DASAK         C204         NOX01         0.00         same           P62457         GNB1         LPVSGAC*DASAK         C204         NOX01         0.00         same           P62858         RPL30         LVILANNC*PALR         C52         NCP1         0.00         same	P62701	RPS4X	EC*LPLIIFLR	C41	NCF2		0.00	same	
P2733         RD SB         LAMPPAIDC*QR         C12         NCP2         S8.44         same           P6233         RAN         VCENTATOCANK         C1120         NCP1         0.00         0.00         same           P6236         RAN         VCENPIVLC*CNK         C1120         NCP1         0.00         0.00         same           P62329         RPL23         EC*ADLWPR         C112/C120         NCV01         0.00         same           P62829         RPL23         ESCLPVGAVINC*ADNTGAK         C28         NCP1         0.00         same           P62829         RPL23         ESCLPVGAVINC*ADNTGAK         C28         NCP2         0.00         same           P62829         RPL33         ESCLPVGAVINC*ADNTGAK         C28         NCP2         0.00         same           P62829         RPL30         ESCLPVGAVINC*ADNTGAK         C28         NCP2         0.00         same           P62838         RPL30         EVILANC*PALR         C52         NCP1         1.46         5.46         same           P62888         RPL30         EVILANC*PALR         C52         NCP2         1.260         same           P62888         RPL30         TOVHHYSCINPELCTAC*GK         C85 <td>P62753</td> <td>RPS6</td> <td>LNISFPATGC*QK</td> <td>C12</td> <td>NCFI</td> <td>17.20</td> <td>28.69</td> <td>same</td> <td></td>	P62753	RPS6	LNISFPATGC*QK	C12	NCFI	17.20	28.69	same	
P2733         RP35         LNSP PATIC/QR         C12         ODO         0.00         same           P62326         RAN         VC*ENTPL/CGNK         C112(C120         NOXO1         100.00         same           P62329         RLAN         VC*ENTPL/CGNK         C112(C120         NOXO1         100.00         same           P62329         RPL23         ESGLPVGAVINC*DDNTGAK         C22         NOXO1         0.00         same           P62329         RPL23         ESGLPVGAVINC*DDNTGAK         C28         NCF1         0.00         same           P62329         RPL23         ESGLPVGAVINC*DDNTGAK         C28         NOXO1         0.00         same           P62473         GNB1         EVSGACTDASAK         C24         NOXO1         0.00         same           P62475         GNB1         TFVSGACTDASAK         C24         NOXO1         0.00         same           P62485         RPL30         UTLANNC*PALR         C52         NOXO1         0.00         same           P62488         RPL30         UTLANNC*PALR         C52         NOXO1         0.00         same           P62488         RPL30         UTGWINKSONIELGTAC*CK         C85         NOXO1         0.00 <t< td=""><td>P62753</td><td>RPS6</td><td>LNISFPATGC*QK</td><td>C12</td><td>NCF2</td><td>38.64</td><td></td><td>same</td><td></td></t<>	P62753	RPS6	LNISFPATGC*QK	C12	NCF2	38.64		same	
Pd2250         RAN         VC2ENIPVLCPGNR         CIL2(12)         NCF1         0.00         same           Pd2250         RAN         VC2ENIPVLCPGNR         CIL2(12)         NCF1         0.00         same           Pd2250         RAN         VC2ENIPVLCPGNR         CIL2(12)         NCX01         0.00         same           Pd2250         RL23         ISIGLPVGAVINC*ADNTGAK         C28         NCF1         0.00         same           Pd2253         RVL33         ISIGLPVGAVINC*ADNTGAK         C28         NCK1         0.00         same           Pd2253         GNB1         LFVSGAC*DASAK         C204         NCC1         0.00         same           Pd2353         GNB1         LFVSGAC*DASAK         C204         NCC1         1.46         5.46           Pd2358         RPL30         LVILANNC*PALR         C52         NCK1         0.00         same           Pd2858         RPL30         LVILANNC*PALR         C52         NCK1         0.00         same           Pd2858         RPL30         LVILANNC*PALR         C52         NCK1         0.00         same           Pd2858         RPL30         UVLANNC*PALR         C52         NCK1         0.00         same	P62753	RPS6	LNISFPATGC*QK	C12	NOXOI		0.00	same	
P42230         RAN         VC-ENPLVECTOR         C112/120         NCP2         0.00         0.00         same           P62230         RL33         SCADUMYE GGN         C13/C30         0.00         0.00         same           P62329         RL33         ISLGLPVGAVINCTADNTGAK         C23         NOX10         0.00         0.00         same           P62829         RL33         ISLGLPVGAVINCTADNTGAK         C28         NOX01         0.00         same           P62829         RL33         ISLGLPVGAVINCTADNTGAK         C28         NOX01         0.00         same           P62873         GNB1         LFVSGACTDASAK         C204         NOX01         0.00         same           P62873         GNB1         LFVSGACTDASAK         C204         NOX01         0.00         same           P62874         GNB2         TTVSGACTDASAK         C204         NOX01         0.00         same           P62875         GNB1         LFVSGACTDASAK         C244         NOX01         0.00         same           P6288         RPL30         TGVHHYSGNNELGTAC*CK         C85         NCF2         0.00         same           P62888         RPL30         TGVHHYSGNNELGTAC*CK         C85	P62826	RAN	VC*ENIPIVLC*GNK	C112;C120	NCFI	0.00	0.00	same	
P1228         RAN         CURNER/ULCONK         CL12/L20         NXXII         0.00         0.00         same           P0229         RPL23         SIGLIP/GAVINC*ADNTGAK         C125         NXXII         0.00         same           P0239         RPL23         SIGLIP/GAVINC*ADNTGAK         C28         NCF1         0.00         same           P0239         RPL23         SIGLIP/GAVINC*ADNTGAK         C28         NCF2         0.00         same           P02873         GNB1         LFVSGAC*DASAK         C204         NCSC1         0.00         o.00         same           P02885         RPL30         LVILANC*PALR         C52         NCF1         1.46         5.46         same           P02885         RPL30         LVILANC*PALR         C52         NCF1         0.00         same           P02888         RPL30         LVILANC*PALR         C52         NCF1         0.00         same           P02888         RPL30         LVILANC*PALR         C52         NCF1         0.00         same           P02888         RPL30         UVILANC*NK         C91         NCF1         0.00         same           P02808         RPL30         UVTIAIDPCDSDIIR         C92	P62826	RAN	VC*ENIPIVLC*GNK	C112;C120	NCF2	0.00	0.00	same	
P12239         RFL23         EArADAM PR         C125         NOAL         100.00         1.11         same           P1233         BEGLEYGGANCYADNTGAK         C28         NOF12         2.37         0.10         same           P02329         RPL23         ISIGLEYGAVINCYADNTGAK         C28         NOF12         0.00         same           P02873         GNB1         LFVSGACTDASAK         C204         NOX01         0.00         same           P02873         GNB1         LFVSGACTDASAK         C204         NOX01         0.00         same           P02875         GNB1         LFVSGACTDASAK         C204         NOX01         0.00         same           P02888         RPL30         LVILANNCYPALR         C52         NCF1         1.46         5.46         same           P02888         RPL30         LVILANNCYPALR         C52         NOX01         0.00         6.68         same           P02888         RPL30         LVILANNCYPALR         C52         NOX01         0.00         same           P02888         RPL30         UC*TLAIDFOBDIIR         C92         NCF1         4.41         2.72         same           P028010         RPL32         ELEVLLOYNK <t< td=""><td>P62826</td><td>RAN</td><td>VC*ENIPIVLC*GNK</td><td>C112;C120</td><td>NOXOI</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	P62826	RAN	VC*ENIPIVLC*GNK	C112;C120	NOXOI	0.00	0.00	same	
P12239         RFL23         ISUGLPVGAVINC-ADNICAR         C.28         NCP1         0.00         same           P02329         RFL23         ISUGLPVGAVINC-ADNICAR         C.28         NCP1         2.00         o.00         same           P02329         RFL33         ISUGLPVGAVINC-ADNICAR         C.28         NCP1         0.00         o.00         same           P02373         GNB1         LPVSGACDASAK         C.204         NOXO1         0.00         same           P02375         GNB2         TPVSGACDASAK         C.204         NOXO1         0.00         same           P02388         RPL30         LVILANNCPALR         C.52         NCF1         1.46         5.46         same           P02388         RPL30         LVILANNCPALR         C.52         NCF2         0.00         same           P02388         RPL30         TGVHHYSGNNELGTAC*GK         C.85         NCF1         0.41         0.00         same           P02388         RPL30         TGVHHYSGNNELGTAC*GK         C.91         NCF2         0.00         same           P02388         RPL30         UCTLAINDCDSDIIR         C.92         NCG1         0.00         same           P02310         RPL32         EL	P62829	RPL23	EC*ADLWPR	C125	NOXOI	100.00		same	
PD2293         RF123         ISLEPVGAVINCADNICAK         C28         NCX21         0.00         same           PD2293         GNB1         LFVSGACTDASAK         C204         NOXD1         0.00         0.00         same           PD2373         GNB1         LFVSGACTDASAK         C204         NOXD1         0.00         0.00         same           PD2373         GNB1         LFVSGACTDASAK         C204         NOXD1         0.00         same           PD2373         GNB1         LVLANNC*PALR         C52         NCF1         1.46         5.46         same           PD2383         RPL30         LVILANNC*PALR         C52         NCF1         0.00         6.68         same           PD2388         RPL30         LVILANNC*PALR         C52         NCF1         0.00         same           PD2388         RPL30         UCHHNYGGNIELGTAC*GK         C85         NCF2         0.00         same           PD2388         RPL30         VC*TLAIDFGDSDIR         C92         NCF1         4.41         2.72         same           PD2388         RPL30         VC*TLAIDFGDSDIR         C92         NCC1         0.00         same           PD2310         RPL32         ELEVLLMC	P62829	RPL23	ISLGLPVGAVINC*ADNTGAK	C28	NCFI	0.00	1.11	same	
P1223         RP123         ELGLPVGATICCADINTGAR         C28         NOX01         0.00         same           P02873         GNB1         LFVSGACTDASAK         C204         NCP2         0.00         0.00         same           P02873         GNB1         LFVSGACTDASAK         C204         NCP1         0.00         0.00         same           P02873         GNB2         LFVSGACTDASAK         C204         NCP2         0.00         6.66         same           P02888         RP130         LVILANNC*PALR         C52         NCP1         0.00         same           P02888         RP130         TGVHHYSGNNELGTAC*GK         C85         NCP1         0.00         same           P02888         RP130         TGVHHYSGNNELGTAC*GK         C85         NCP1         0.00         same           P02888         RP130         VC*TLAIDPGDSDIR         C92         NCP1         4.11         2.72         same           P02888         RP130         VC*TLAIDPGDSDIR         C92         NCP1         0.00         same           P02810         RP132         ELEVLMC*NK         C91         NCP2         0.00         same           P02910         RP132         ELEVLMC*NK	P62829	RPL23	ISLGLPVGAVINC*ADNTGAK	C28	NCF2	2.37	0.00	same	
P128:3         CMB1         LFVSAACDASAK         C204         NCX21         0.00         same           P02873         GNB3         TFVSGACDASAK         C204         NCX01         0.00         same           P02873         GNB3         TFVSGACDASAK         C204         NCX01         0.00         same           P02873         GNB3         TFVSGACDASAK         C204         NCX01         0.00         same           P02888         RPL30         LMLANNC*PALR         C32         NCC1         1.46         5.46         same           P02888         RPL30         LMUANNC*PALR         C32         NCC1         0.00         6.08         same           P02888         RPL30         TGVHHYSGNNELGTAC*GK         C55         NCC1         4.41         2.72         same           P02888         RPL30         VC*TLAIDPGDSDIIR         C92         NCC1         4.41         2.72         same           P02810         RPL32         ELEVLIMC*NK         C91         NCC1         0.00         same           P02910         RPL32         ELEVLIMC*NK         C91         NCX01         0.00         same           P02910         RPL32         SYC*AEIAHNYSSK         C96	P62829	RPL23	ISLGLPVGAVINC*ADNTGAK	C28	NOXOI	0.00	0.00	same	
P2273       GNB1       LPVSCAC-DASAR       C.204       NOXIO       0.00       0.00       same         P2275       GNB2       LPVSCAC-DASAR       C.204       NOXIO       0.00       5.46       same         P02888       RPL30       LVILANC*PALR       C.22       NOXIO       0.00       6.68       same         P02888       RPL30       TCVHHYSGNNELGTAC*GK       C.55       NCF1       0.00       same         P02888       RPL30       TCVHHYSGNNELGTAC*GK       C.55       NCF2       0.000       same         P02888       RPL30       TCVHHYSGNNELGTAC*GK       C.55       NCF2       0.000       same         P02888       RPL30       C*TTAIDPGDSDIR       C.92       NCF1       4.41       2.72       same         P02888       RPL30       C*TTAIDPGDSDIR       C.92       NCF2       0.00       same         P02910       RPL32       ELEVLLMC*NK       C.91       NCF1       0.00       same         P02910       RPL32       StrC*AEIAINVSSK       C.96       NCF1       0.00       same         P02910       RPL32       StrC*AEIAINVSKK       C.91       NOX01       100.00       same         P02910       RPL32	P62873	GNBI	LFVSGAC*DASAK	C204	NCF2	0.00	0.00	same	
P125/19         CH22         P125/19         CL204         NOAD1         0.00         same           P02888         RPL30         LVILANNC'PALR         C52         NCP1         1.46         5.46         same           P02888         RPL30         LVILANNC'PALR         C52         NCP1         1.200         4.72         same           P02888         RPL30         LVILANNC'PALR         C52         NCP1         1.46         5.46         same           P02888         RPL30         TOVHHYSONNELCTAC*GK         C55         NOX01         0.00         same           P02888         RPL30         TOVHHYSONNELCTAC*GK         C55         NOX01         0.00         same           P02888         RPL30         C*TTAIDPGDSDIR         C92         NCF1         4.41         2.72         same           P02810         RPL32         ELEVLMC*NK         C91         NCF1         0.00         same           P02910         RPL32         ELEVLMC*NK         C91         NCF2         36.98         same           P02910         RPL32         SYC*AEIAHNVSSK         C96         NCF2         0.00         same           P02910         RPL32         SYC*AEIAHNVSSK         C96 <td>P62873</td> <td>GNBI</td> <td>LF VSGAC*DASAK</td> <td>C204</td> <td>NOXOI</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	P62873	GNBI	LF VSGAC*DASAK	C204	NOXOI	0.00	0.00	same	
P22888         RPL30         LVILANNC PALR         C32         NCF1         1.40         5.40         same           P22888         RPL30         LVILANNC PALR         C52         NCF2         1.2.00         4.72         same           P22888         RPL30         LVILANNC PALR         C52         NCF1         1.400         5.40         same           P22888         RPL30         LVILANNC PALR         C52         NCF2         0.00         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         CS5         NCF1         0.00         same           P22888         RPL30         VC*TLAIDFONDEDIR         C62         NCF2         0.00         same           P22810         RPL32         ELEVLMC*NK         C01         NCF1         0.00         same           P22010         RPL32         ELEVLMC*NK         C01         NCF1         0.00         same           P22010         RPL32         ELEVLMC*NK         C01         NCF1         16.22         same           P22010         RPL32         SUC*AEIAHNVSSK         C66         NCF1         16.22         same           P22010         RPL32         SUC*AEIAHNVSSK         C66         NCF1	P62879	GNB2	IFVSGACTDASIK	C204	NOXOI	0.00	F 40	same	
P22888         RPL30         LVILANRC*PALR         C.52         NCF2         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         CS2         NCK01         0.00         6.68         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         CS5         NCF2         0.00         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         CS5         NCK21         0.00         same           P22888         RPL30         VC*TLAIIDFGDSDIIR         C92         NCF1         4.41         2.72         same           P22888         RPL30         VC*TLAIIDFGDSDIIR         C92         NCK01         0.00         same           P22810         RPL32         ELEVLMC*NK         C91         NCF1         0.00         same           P22910         RPL32         ELEVLMC*NK         C96         NCF1         0.00         same           P22910         RPL32         SVC*AEIAHNVSSK         C96         NCF1         10.000         same           P22910         RPL32         SVC*AEIAHNVSSK         C96         NCF1         16.43         5.82         same           P22910         RPL32         SVC*AEIAHNVSSK         C96         NCF1 <td>P02888</td> <td>RPL30</td> <td>LVILANNC*PALR</td> <td>C52</td> <td>NCFI</td> <td>1.40</td> <td>5.46</td> <td>same</td> <td></td>	P02888	RPL30	LVILANNC*PALR	C52	NCFI	1.40	5.46	same	
P22888         RPL30         LVILAARC'FALR         C.32         NOAO1         0.00         6.08         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         C.85         NCK1         0.00         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         C.85         NCK01         0.00         same           P22888         RPL30         TGVHHYSGNNIELGTAC*GK         C.85         NCK1         4.41         2.72         same           P22888         RPL30         VC*TLAIDPGDSDIR         C.92         NCF1         4.41         2.72         same           P62890         RPL32         ELEVLMC*NK         C.91         NCF1         0.00         same           P62910         RPL32         ELEVLMC*NK         C.91         NCF2         0.00         0.00         same           P62910         RPL32         SVC*AEIAHNVSSK         C.96         NCK1         0.00         same         same           P62910         RPL32         SVC*AEIAHNVSSK         C.96         NCK1         1.00         same           P62910         RPL32         SVC*AEIAHNVSSK         C.96         NCK1         1.00         0.00         same           P62910	P02888	RPL30	LVILANNC*PALR	C52	NOF2	12.60	4.72	same	
Pozses         RP130         IGVIIIITSUMNELGTAC*GK         CS5         NCP1         0.00         same           Pozses         RP130         TGVIHITSUMNELGTAC*GK         CS5         NCP2         0.00         same           Pozses         RP130         TGVIHITSUMNELGTAC*GK         CS5         NCP1         4.11         2.72         same           Pozses         RP130         VC*TLAIIDPGDSDIIR         C32         NCP1         4.11         2.72         same           Pozses         RP130         VC*TLAIIDPGDSDIIR         C32         NCP1         0.00         same           Pozses         RP132         ELEVLLMC*NK         C31         NCP1         0.00         same           Pozses         RP132         ELEVLMC*NK         C31         NCP1         0.00         same           Pozses         RP132         ELEVLMC*NK         C31         NCP1         0.00         same           Pozses         RP132         SYC*AEIAHNVSSK         C36         NCP1         10.00         same           Pozses         RUBA2         C*GHTNNLRPK         C115         NCP1         10.42         same           Pozses         UBA52         C*GHTNNLRPK         C157         NCP1	P02888	RPL30	LVILANNC"PALK TOMULYSONNEL OTLOSOK	C52	NOXOI	0.00	0.08	same	
Pozses         RP1230         IOVINITSUMNELGTAC*GK         CS5         NCP2         0.00         same           Pozses         RP1230         VC*TLAHIDPGDSDHR         C32         NCF1         4.41         2.72         same           Pozses         RP130         VC*TLAHIDPGDSDHR         C32         NCF1         4.41         2.72         same           Pozses         RP130         VC*TLAHIDPGDSDHR         C32         NCF1         4.41         2.72         same           Pozses         RP132         ELEVLLMC*NK         C31         NCF1         0.00         same           Pozses         RP132         ELEVLLMC*NK         C31         NCF2         36.98         same           Pozses         RP132         ELEVLLMC*NK         C31         NCF2         0.00         0.00         same           Pozses         RP132         SYC*AEIAHNVSSK         C36         NCF2         0.00         0.00         same           Pozses         RP132         SYC*AEIAHNVSSK         C36         NCF1         0.00         same           Pozses         UBA52         C*GHTNNLRPK         C115         NCF1         16.48         5.82         same           Pozses         C*GHTNNLRPK<	P02888	RPL30	T GVHH Y SGNNIELG TAC*GK	C85	NCFI	0.00	0.00	same	
Pozses         RP130         IOVINTISIANALIGIACIÓN         CS3         NOXC1         0.00         0.00         same           Pozses         RP130         VC*TLAHIDPGDSDIIR         C32         NCF1         4.41         2.72         same           Pozses         RP130         VC*TLAHIDPGDSDIIR         C32         NCF1         4.41         2.72         same           Pozses         RP132         ELEVILMC*NK         C32         NOXO1         0.00         osame           Pozses         RP132         ELEVILMC*NK         C31         NCF1         0.00         same           Pozses         RP132         ELEVILMC*NK         C31         NCF1         0.00         same           Pozses         RP132         SYC*AETAHNVSSK         C36         NCF1         0.00         same           Pozses         RP132         SYC*AETAHNVSSK         C36         NCP1         1.00.00         same           Pozses         UBA52         C*GHTNNLRPK         C115         NCF1         1.6.22         same           Pozses         UBA52         C*GHTNNLRPK         C157         NCF1         1.0.41         7.69         same           Pozses         UBA52         C*GHTNNLRPK <td< td=""><td>P02888</td><td>RPL30</td><td>T GVHH Y SGNNIELG TAC*GK</td><td>C85</td><td>NOF2</td><td>0.00</td><td>0.00</td><td>same</td><td></td></td<>	P02888	RPL30	T GVHH Y SGNNIELG TAC*GK	C85	NOF2	0.00	0.00	same	
P22888       RPL30       VC*TLAIIDFGDSDIR       C32       NCF1       4.41       2.12       same         P62888       RPL30       VC*TLAIIDFGDSDIR       C32       NCF1       0.00       same         P62888       RPL30       VC*TLAIIDFGDSDIR       C32       NCF1       0.00       same         P62910       RPL32       ELEVLLMC*NK       C31       NCF1       0.00       same         P62910       RPL32       ELEVLMC*NK       C31       NOXO1       100.00       same         P62910       RPL32       SVC*AEIAHNVSSK       C36       NCF1       0.00       same         P62910       RPL32       SVC*AEIAHNVSSK       C36       NOX01       0.00       same         P62910       RPL32       SVC*AEIAHNVSK       C36       NOX01       0.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       16.22       same         P63000-1       RAC1       YLEC*SALTQR       C157       NCF1       10.04       17.69       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF	P02888	RPL30	IGVHHYSGNNIELGIAC*GK	C85	NOXOI	0.00	0.00	same	
P22805       RPL30       VC 1LALIDFGDSDIR       C32       NCF2       2.08       4.33       same         P62810       RPL32       ELEVLLMC*NK       C31       NCF1       0.00       0.00       same         P62910       RPL32       ELEVLLMC*NK       C31       NCF2       36.98       same         P62910       RPL32       ELEVLLMC*NK       C31       NOX01       0.00       same         P62910       RPL32       SUC*AEIAHNVSSK       C36       NCF1       0.00       0.00       same         P62910       RPL32       SUC*AEIAHNVSSK       C36       NCF1       16.22       same         P62910       RPL32       SUC*AEIAHNVSSK       C36       NCF1       16.22       same         P62910       RPL32       SUC*AEIAHNVSSK       C36       NCF1       10.04       17.69       same         P62987       UBA52       C*GHTNNLRPK       C157       NCF1       10.04       17.69       same         P63000-1       RAC1       YLEC*SALTQR       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1	P02888	RFL30	VC*TLAHDPGDSDHR	C92	NCFI	4.41	2.72	same	
P2280S       P1230       PC 12 ALDPG DSDIR       C 22       NCA OI       0.00       0.00       same         P62910       RPL32       ELEVLLMC*NK       C91       NCF1       0.00       same         P62910       RPL32       ELEVLLMC*NK       C91       NCF2       36.98       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       0.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       0.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       16.22       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       no.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       17.69       same         P63000-1       RAC1       YLEC*SALTQR       C157       NCF1       10.00       same       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1	F 02000	RFL30	VC*TLAHDPGDSDHR	C92	NOF2	2.08	4.05	same	
P02910       RPL22       ELEVILMC*NK       C91       NCF1       0.00       same         P02910       RPL32       ELEVILMC*NK       C91       NCF2       36.98       same         P02910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       same         P02910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       same         P02910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       same         P02910       RPL32       SYC*AEIAHNVSSK       C96       NCK12       0.00       0.00       same         P02910       RPL32       C*GHTNNLRPK       C115       NCF1       16.22       same         P02987       UBA52       C*GHTNNLRPK       C115       NOX01       6.48       5.82       same         P62987       UBA52       C*GHTNNLRPK       C115       NOX01       0.00       same         P63000-1       RAC1       YLC*SALTQR       C157       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCK01	F 02000	RFL30	ELEVI I MC*NE	C92	NOAUI	0.00	0.00	same	
Pd2910       RPL32       ELEVILMC*NK       C91       NCF2       30:39       same         P62910       RPL32       ELEVILMC*NK       C91       NOXO1       100.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       0.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NOXO1       0.00       0.00       same         P62910       RPL32       C*GHTNNLRPK       C115       NCF1       16.22       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       17.69       same         P62987       UBA52       C*GHTNLRPK       C157       NCF1       10.04       17.69       same         P62987       UBA52       C*GHTNLRPK       C178       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AV	P62010	RFL32	ELEVILMC*NK	C91	NCET	0.00		same	
P62910       RPL52       ELEV LENC NR       C91       NOAU1       100.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF2       0.00       0.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF2       0.00       0.00       same         P62910       RPL32       SYC*AEIAHNVSSK       C96       NCF1       0.00       0.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       16.22       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.00       0.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       17.69       same         P63000-1       RAC1       YLEC*SALTQR       C157       NOX01       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C378       NCF1       0.00       same         P63104-1       AVUC*STLLLQTK       C381       NCF1       0.00       same         P63104-1       AVUC*STLLLQTKK	P62010	RFL32	ELEVILMC*NK	C91	NOF2	30.98	100.00	same	
P22910       RPL32       SYC*AELAHNVSSK       C90       NCF1       0.00       0.00       same         P62910       RPL32       SYC*AELAHNVSSK       C96       NOXO1       0.00       0.00       same         P62910       RPL32       SYC*AELAHNVSSK       C96       NOXO1       0.00       0.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF2       26.12       33.52       same         P62987       UBA52       C*GHTNNLRPK       C115       NOXO1       6.48       5.82       same         P63000-1       RAC1       YLEC*SALTQR       C157       NCF1       10.04       17.69       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NCF1       0.00       same         P63010-1       AP2B1       C*VSTLDLQTK       C391       NCF1       0.00       same         P6	P62010	RFL32	ELEVELMC'NK	C91	NOAUI	0.00	100.00	same	
P62910       RPL22       STC ALLALINVSSK       C96       NCF2       0.00       0.00       same         P62910       RPL32       STC ALLALINVSSK       C96       NCF2       0.00       0.00       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       16.22       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF2       26.12       33.52       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       17.69       same         P63000-1       RAC1       VLEC*SALTQR       C157       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NCF1       0.00       same         P6300-1       RAC1       AVLC*PPVK       C378       NCF1       0.00       same         P63010-1       AP21       C*STLDQTK       C38       NCF1       0.00       same         P63104-1       YWHAZ       DIC*	P62010	DDI 22	SIC ALIANNVSK	C96	NCET	0.00	0.00	same	
P62900       IN D-2       STO ADMAINVPSK       C900       NOAOI       0.000       Same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       16.22       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF2       26.12       33.52       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       16.04       17.69       same         P62987       UBA52       C*GHTNNLRPK       C115       NCF1       10.04       17.69       same         P63000-1       RAC1       YLEC*SALTQR       C157       NCF1       10.04       17.69       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NCF1       0.00       same         P63001-1       AP2B1       C*VSTLDLQTK       C391       NCF1       0.00       same         P63240       RNEL1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       GNB2L1       FSPNSSNPIIVSC*GW	F 02910 D62010	RPI 22	SVC*AFIAHNVSSK	C90	NOVOI	0.00	0.00	same	
102301       ODA32       C (GHTNNLRPK       CH13       NCF1       10.22       same         P62987       UBA52       C*(GHTNNLRPK       CH15       NCF1       10.24       33.52       same         P62987       UBA52       C*(GHTNNLRPK       CH15       NCF1       10.04       17.69       same         P62987       UBA52       C*(GHTNNLRPK       CH57       NCF1       10.04       17.69       same         P63000-1       RAC1       YLEC*SALTQR       C157       NCF1       10.04       17.69       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P6300-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       same         P63104-1       YWHAZ       DIC*NDVLSLEK       C94       NCF1       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1       FSPNSSNPIIVSC*GWD	P62087	UDA52	C*CUTNNI PDV	C115	NCEI	16.22	0.00	same	
P62981       ODA32       C*GHTNNERPK       C115       NOCP2       20.12       50.32       same         P62987       UBA52       C*GHTNNERPK       C115       NOXO1       6.48       5.82       same         P63000-1       RAC1       YLEC*SALTQR       C157       NOXO1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NOXO1       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NOXO1       0.00       same         P63010-1       AP2B1       C*VSTLLDLIQTK       C391       NCF1       0.00       same         P63104-1       YWHAZ       DIC*NDVLSLEK       C94       NCF1       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       RACK1       FSPNSSNPHVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       FSPNSSNPHVSC*GWDK	P62087	UDA52	C*CHTNNI PPK	C115	NCF1	26.12	22 50	same	
Description       Control of MARIA       Chi Discription       Description       Same         P63000-1       RAC1       YLEC*SALTQR       C157       NOX01       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NOX01       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NOX01       0.00       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NOX01       0.00       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NOX01       0.00       same         P6300-1       AP21       C*VSTLDLQTK       C391       NCF1       0.00       same         P6310-1       YWHAZ       DIC*NDVLSLLEK       C94       NCF1       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C168       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       GNB2L1       VWNLANC*K       C182 </td <td>P62987</td> <td>UBA52</td> <td>C*GHTNNLBPK</td> <td>C115</td> <td>NOXOI</td> <td>6.48</td> <td>5.82</td> <td>same</td> <td></td>	P62987	UBA52	C*GHTNNLBPK	C115	NOXOI	6.48	5.82	same	
P63000-1       RAC1       YLEC*SALTQR       C157       NOV1       10.04       11.09       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63001-1       RAC1       AVLC*PPPVK       C178       NOX01       0.00       0.00       same         P63001-1       AP2B1       C*VSTLDLQTK       C391       NCF1       0.00       same         P63104-1       YWHZ       DIC*NDVLSLEK       C94       NCF1       0.00       same         P63204       RPS21       TYAIC*GAIR       C56       NCF1       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       VWNLANC*K	P63000-1	BACI	YLEC*SALTOR	C157	NCF1	10.04	17.60	same	
P6300-1       RAC1       AVLC*PPPVK       C178       NCF1       0.00       0.00       same         P63000-1       RAC1       AVLC*PPPVK       C178       NCF2       0.00       same         P63000-1       RAC1       AVLC*PPVK       C178       NCF2       0.00       same         P6300-1       RAC1       AVLC*PPVK       C178       NCF1       0.00       0.00       same         P6300-1       RAP2B1       C*VSTLDLIQTK       C391       NCF1       0.00       same         P63104-1       YWHAZ       DIC*NDVLSLLEK       C94       NCF1       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       VWNLANC*K       C182       NCF	P63000-1	BACI	YLEC*SALTOR	C157	NOXOI	0.04	0.00	same	
Person 1       INCL	P63000-1	BAC1	AVLC*PPPVK	C178	NCF1	0.00	0.00	same	
P6300-1       RAC1       AVLC*PPPVK       C178       NOXO1       0.00       same         P6300-1       AP2B1       C*VSTLLDLIQTK       C391       NCF1       0.00       same         P63104-1       YWHAZ       DIC*NDVLSLLEK       C94       NCF1       0.00       same         P63200       RPS21       TYAIC*GAIR       C56       NCF1       0.00       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       GNB2L1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       FSPNSSNPIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       VWNLANC*K       C182       NCF1       29.63       same         P63244       GNB2L1       VWNLANC*K       C182       NCF2       43.28       same         P63244       GNB2L1       YWLC*AATGPSIK       C249       NCF1	P63000-1	BAC1	AVLC*PPPVK	C178	NCF2	0.00	0.00	same	
P63010-1       AP2B1       C*VSTLDLIQTK       C391       NCF1       0.00       same         P630104-1       YWHAZ       DIC*NDVLSLLEK       C94       NCF1       0.00       same         P63200       RPS21       TYAIC*GAIR       C56       NCF1       0.00       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       GNB2L1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       RACK1       VWNLANC*K       C182       NCF1       29.63       same         P63244       RACK1       VWNLANC*K       C182       NCF2       43.28       same         P63244       GNB2L1       YWLC*AATGPSIK       C249       NCF1       <	P63000-1	BAC1	AVLC*PPPVK	C178	NOXO1	0.00	0.00	same	
P63104-1       YWHAZ       DIC*NDVLSLLEK       C94       NCF1       0.00       same         P63220       RPS21       TYAIC*GAIR       C56       NCF1       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       GNB2L1 RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       GNB2L1 RACK1       VWNLANC*K       C182       NCF1       29.63       same         P63244       RACK1       VWNLANC*K       C182       NCF2       43.28       same         P63244       GNB2L1 RACK1       YWLC*AATGPSIK       C249       NCF1       45.85       same         P63244       GNB2L1 RACK1       YWLC*AATGPSIK       C249       NCF2	P63010-1	AP2B1	C*VSTLLDLIQTK	C391	NCF1	0.00	0.00	same	
P63220         RPS21         TYAIC*GAIR         C56         NCF1         0.00         0.00         same           P63244         GNB2L1 RACK1         LWNTLGVC*K         C138         NCF1         0.00         same           P63244         GNB2L1 RACK1         LWNTLGVC*K         C138         NCF2         0.00         same           P63244         GNB2L1 RACK1         LWNTLGVC*K         C138         NCF2         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NCF1         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same	P63104-1	YWHAZ	DIC*NDVLSLLEK	C94	NCF1	0.00		same	
P63244       GNB2L1 RACK1       LWNTLGVC*K       C138       NCF1       0.00       same         P63244       GNB2L1 RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1 RACK1       LWNTLGVC*K       C138       NCF2       0.00       same         P63244       GNB2L1 RACK1       FSPNSSNPIIVSC*GWDK       C168       NCF1       0.00       same         P63244       GNB2L1 RACK1       FSPNSSNPIIVSC*GWDK       C168       NOX01       0.00       same         P63244       GNB2L1 RACK1       VWNLANC*K       C182       NCF1       29.63       same         P63244       GNB2L1 RACK1       VWNLANC*K       C182       NCF2       43.28       same         P63244       GNB2L1 RACK1       VWNLANC*K       C182       NCF1       45.85       same         P63244       GNB2L1 RACK1       VWLC*AATGPSIK       C249       NCF1       45.85       same         P63244       RACK1       YWLC*AATGPSIK       C249       NCF2       100.00       same	P63220	BPS21	TYAIC*GAIB	C56	NCF1	0.00	0.00	same	
P63244RACK1LWNTLGVC*KC138NCF10.00sameP63244GNB2L1 RACK1LWNTLGVC*KC138NCF20.00sameP63244GNB2L1 RACK1FSPNSSNPIIVSC*GWDKC168NCF10.000.00sameP63244GNB2L1 RACK1FSPNSSNPIIVSC*GWDKC168NOXO10.00sameP63244RACK1 RACK1FSPNSSNPIIVSC*GWDKC168NOXO10.00sameP63244GNB2L1 RACK1VWNLANC*KC182NCF129.63sameP63244GNB2L1 RACK1VWNLANC*KC182NCF243.28sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF145.85sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF2100.00same		GNB2L1							
P63244         GNB2L1 RACK1         LWNTLGVC*K         C138         NCF2         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NCF1         0.00         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same	P63244	RACK1	LWNTLGVC*K	C138	NCF1		0.00	same	
P63244     RACK1     LWNTLGVC*K     C138     NCF2     0.00     same       P63244     RACK1     FSPNSSNPIIVSC*GWDK     C168     NCF1     0.00     0.00     same       P63244     RACK1     FSPNSSNPIIVSC*GWDK     C168     NOX01     0.00     same       P63244     RACK1     FSPNSSNPIIVSC*GWDK     C168     NOX01     0.00     same       P63244     RACK1     FSPNSSNPIIVSC*GWDK     C168     NOX01     0.00     same       P63244     RACK1     VWNLANC*K     C182     NCF1     29.63     same       P63244     GNB2L1 RACK1     VWNLANC*K     C182     NCF2     43.28     same       P63244     GNB2L1 RACK1     YWLC*AATGPSIK     C249     NCF1     45.85     same       P63244     RACK1     YWLC*AATGPSIK     C249     NCF2     100.00     same	Dece 11	GNB2L1		<b>C</b> 100	NGES				
P63244GNB2L1 RACK1FSPNSSNPIIVSC*GWDKC168NCF10.000.00sameP63244GNB2L1 RACK1FSPNSSNPIIVSC*GWDKC168NOXO10.00sameP63244GNB2L1 RACK1VWNLANC*KC182NCF129.63sameP63244GNB2L1 RACK1VWNLANC*KC182NCF243.28sameP63244GNB2L1 RACK1VWNLANC*KC249NCF145.85sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF2100.00sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF2100.00same	P03244	RACK1	LWNTLGVC*K	C138	NCF2	0.00		same	
P63244         RACK1         FSFNSSNFILVSC*GWDK         C168         NCF1         0.00         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPILVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         FSPNSSNPILVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same	Depot	GNB2L1	FORMENDINGOROWDY	<b>C</b> 1400	NOR	0.00	0.00		
P63244         GNB2L1 RACK1         FSPNSSNPIIVSC*GWDK         C168         NOXO1         0.00         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same	r03244	RACK1	F 5FIN55INFILVSC*GWDK	C168	NCF1	0.00	0.00	same	
P03244RACK1FSFNSSNPHVSC/GWDKC168NOXO10.00sameP63244GNB2L1 RACK1VWNLANC*KC182NCF129.63sameP63244GNB2L1 RACK1VWNLANC*KC182NCF243.28sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF145.85sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF2100.00same	DC2044	GNB2L1	FEDNEENDINGOROWDY	C120	NOVOI	0.00			
P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same           Continued on next page	P63244	RACK1	F5PNSSNPIIVSC*GWDK	C168	NOXO1	0.00		same	
P63244         RACK1         VWNLANC*K         C182         NCF1         29.63         same           P63244         GNB2L1 RACK1         VWNLANC*K         C182         NCF2         43.28         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF1         45.85         same           P63244         GNB2L1 RACK1         YWLC*AATGPSIK         C249         NCF2         100.00         same	DC2044	GNB2L1	VIIINI ANCHIZ	0100	NODI	00.22			
P63244GNB2L1 RACK1VWNLANC*KC182NCF243.28sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF145.85sameP63244GNB2L1 RACK1YWLC*AATGPSIKC249NCF2100.00sameContinued on next page	г 03244	RACK1	V WINLAING**K	C182	INCF I	29.63		same	
P63244     RACK1     VWNLANCYK     C182     NCF2     43.28     same       P63244     GNB2L1 RACK1     YWLC*AATGPSIK     C249     NCF1     45.85     same       P63244     GNB2L1 RACK1     YWLC*AATGPSIK     C249     NCF2     100.00     same       Continued on next page	D62244	GNB2L1	VWNI ANC*K	C100	NCES		12 00		
P63244     GNB2L1 RACK1     YWLC*AATGPSIK     C249     NCF1     45.85     same       P63244     GNB2L1 RACK1     YWLC*AATGPSIK     C249     NCF2     100.00     same	r 03244	RACK1	V WINLAINO 'K	0182	INCF 2		43.28	same	
P63244 RACK1 TWEE AATGPSIK C249 NCF1 45.85 same P63244 RACK1 YWEC*AATGPSIK C249 NCF2 100.00 same Continued on next page	P63244	GNB2L1	VWI C*A ATCPSIK	C240	NCEI		45.95	69700	
P63244 GNB2L1 RACK1 YWLC*AATGPSIK C249 NCF2 100.00 same Continued on next page	1 00244	RACK1	THE ATOM	0249	1001.1		40.00	same	
Continued on next page	P63244	GNB2L1	YWLC*AATGPSIK	C249	NCF2	100.00		same	
Continued on next page	. 00244	RACK1		0243	1101.2	100.00		Jame	
			Continued	l on next r	bage				

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Table	ZA.	.2 –	continued	from	previous	page
Laste			comunaca	TT OTTT	proviouo	pase

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
P63244	GNB2L1	YWLC*AATGPSIK	C249	NOXO1		100.00	same	
	RACKI	NMITGTSQADC*AVLIVAAGVGEFEA						
P68104	EEF1A1	GISK	C111	NCF1		0.00	same	
P68104	EEF1A1	DGNASGTTLLEALDC*ILPPTRPTDK	C234	NCF1	4.70	14.00	same	
		PLR DGNASGTTLLEALDC*ILPPTBPTDK						
P68104	EEF1A1	PLR	C234	NCF2		11.37	same	
P68104	EEF1A1	KDGNASGTTLLEALDC*ILPPTRPTD	C234	NCF2	100.00	100.00	same	
		KPLR KDCNASCTTLLEALDC*ILPPTRPTD						
P68104	EEF1A1	KPLR	C234	NOXO1		100.00	same	
P68104	EEF1A1	SGDAAIVDMVPGKPMC*VESFSDYPP	C411	NCF1	0.00	0.00	same	
1 00101		LGR			0.00	0.00	buillo	
P68104	EEF1A1	SGDAAIVDMVPGKPMC*VESFSDYPP	C411	NCF2	0.00		same	
		LGR						
P68366	TUBA4A	SIQFVDWC*PTGFK SIOFVDWC*PTGFK	C347 C347	NCF1 NCF2	14.22	11.14	same	
P 08500	HOGI	FQSSAVMALQEAC*EAYLVGLFEDTN	0341	NCF2	24.50	0.00	same	
P68431	H3C1	LC*AIHAK	C97;C111	NCF1		0.00	same	
P78344-1	EIF4G2	MC*SLMLSK	C282	NCF1	0.00	0.00	same	
P78344-1 P78344-1	EIF4G2 EIF4G2	MC*SLMLSK MC*SLMLSK	C282	NCF1 NCF2	0.00	0.00	same	
P78344-1	EIF4G2	LC*LELLNVGVESK	C97	NCF1	0.00	0.00	same	
P78344-1	EIF4G2	LC*LELLNVGVESK	C97	NCF2		0.00	same	
P78347	GTF2I	YC*VEEEEK	C80	NCF1	0.00	0.00	same	
P78347	GTF2I	YC*VEEEEK	C80	NOXO1	0.00	0.00	same	
P78527 P78527	PRKDC	LAAVVSAC*K LAAVVSAC*K	C1455 C1455	NCF1 NCF2	0.00	0.00	same	
P83731	RPL24	C*ESAFLSK	C36	NCF1	0.00	0.00	same	
P83731	RPL24	C*ESAFLSK	C36	NCF2	0.00	0.00	same	
P83731	RPL24	C*ESAFLSK	C36	NOXO1	0.00	0.00	same	
P83731	RPL24	VELC*SFSGYK	C6	NCF1	0.00	0.00	same	
P83731 P83731	RPL24 RPL24	VELC*SFSGYK VELC*SESCYK	C6 C6	NOYO1	0.00	0.00	same	
P98175-1	RBM10	INEDWLC*NK	C219	NCF1	0.00	0.00	same	
Q00610-1	CLTC	VIQC*FAETGQVQK	C491	NCF1	0.00	0.00	same	
Q00610-1	CLTC	AHIAQLC*EK	C617	NCF1	0.00	0.00	same	
Q00610-1	CLTC	AHIAQLC*EK IHECC*EEDATHNAI AK	C617 C870	NCF2 NCF1	0.00	0.00	same	
Q00610-1 Q00610-1	CLTC	IHEGC*EEPATHNALAK	C870	NCF2	0.00	0.00	same	
Q00610-1	CLTC	IHEGC*EEPATHNALAK	C870	NOXO1	0.00	0.00	same	
Q00839	HNRNPU	APQC*LGK	C562	NCF1	3.30	3.95	same	
Q00839	HNRNPU	APQC*LGK APOC*LCK	C562	NCF2 NOXO1	5.40	3.32	same	
Q00839 Q00839	HNRNPU	MC*LFAGFOR	C594	NCF1	0.00	4.92	same	
Q00839	HNRNPU	MC*LFAGFQR	C594	NCF1	0.00	0.00	same	
Q00839	HNRNPU	MC*LFAGFQR	C594	NCF2	0.00	0.00	same	
Q00839	HNRNPU	MC*LFAGFQR MC*LFAGFOR	C594	NOXO1	0.00	0.00	same	
Q00839 Q00839	HNRNPU	AVVVC*PK	C607	NCF1	6.27	12.75	same	
Q00839	HNRNPU	KAVVVC*PK	C607	NCF1	7.26	10.14	same	
Q00839	HNRNPU	AVVVC*PK	C607	NCF2	0.00	6.09	same	
Q00839	HNRNPU	KAVVVC*PK	C607	NCF2	12.45	10.80	same	
Q00839 Q00839	HNRNPU	AVVVC*PK KAVVVC*PK	C607	NOXO1	0.00	0.00	same	
Q01780	EXOSC10	LLNC*QEFAVDLEHHSYR	C307	NCF1	27.91	29.85	same	
Q01780	EXOSC10	LYC*NVDSNK	C411	NCF1	0.00	0.00	same	
Q01780	EXOSC10	SFPGFQAFC*ETQGDR	C73	NCF1	0.00	0.00	same	
Q01780 Q01780	EXOSCI0 EXOSCI0	LLQC*MSR LLQC*MSB	C83	NCF1 NCF2	3.31	0.00	same	
Q01780	EXOSC10	VMQYHGC*R	C93	NCF1	0.00	0.00	same	
Q01780	EXOSC10	VMQYHGC*R	C93	NCF1	8.44	9.05	same	
Q01780	EXOSC10	VMQYHGC*R	C93	NOXO1	0.00		same	
Q01813	OCBL	AAC*NLLQK CPLREPC*ALTLAOR	C112 C28	NCF2 NCF1	15.35	22.50	same	
Q01968-1 Q01968-1	OCRL	GPLREPC*ALTLAOR	C28	NCF1 NCF2	100.00	100.00	same	
Q01968-1	OCRL	FQISNNGQVPC*HFSFIPK	C597	NCF1	0.00	0.00	same	
Q01968-1	OCRL	FQISNNGQVPC*HFSFIPK	C597	NCF2	0.00	0.00	same	
Q01968-1	OCRL	C*VQEAEETLLIDIASNSGC*K	C64;C82	NCF1	0.00	0.00	same	
Q02543 Q02543	RPL18A RPL18A	DLTTAGAVTQC*YR DLTTAGAVTOC*YB	C109 C109	NCF1 NCF2	0.00	0.00	same	
Q02543 Q02543	RPL18A	DLTTAGAVTQC*YR	C109	NOXO1	0.00	0.00	same	
Q02543	RPL18A	C*HTPPLYR	C22	NCF1	0.00	0.00	same	
Q02543	RPL18A	C*HTPPLYR C*HTPPLYR	C22	NCF2	0.00	0.00	same	
Q02543 Q03112 3	RPL18A MECOM	C*HTPPLYR C*ECOOTNLDB	C22	NOXO1 NCE1	0.00	0.00	same	
Q03112-3 Q03112-3	MECOM	C*FGQQTNLDR	C986	NCF2	0.00	0.00	same	
Q03701	CEBPZ	ASHLLETLLC*K	C411	NCF1		84.01	same	
Q04695	KRT17	LSGGLGAGSC*R	C40	NCF1	29.00	29.14	same	
Q04695	KRT17	LSGGLGAGSC*R	C40	NCF2	27.77	37.23	same	
Q04095 Q07020	RPL18	GC*GTVLLSGPR	C134	NCF1	22.24	29.82	same	
Q07020	RPL18	GC*GTVLLSGPR	C134	NCF2	30.74		same	
Q08211	DHX9	LQISHEAAAC*ITGLR	C1099	NCF1	0.00	0.00	same	
Q08211	DHX9	NFLYAWC*GK	C12	NCF1	8.41	0.00	same	
		Continued	on next	DAVE				

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Table 2A.2	- continued	from	previous	page

QR0511         D1X30         LAAQC*ALSINR         C342         NCF1         0.00         mane           QR0511         D1X0         LAAQC*ALSINR         C342         NCF1         0.00         comme           QR0511         D1X0         LAAQC*ALSINR         C342         NCF1         0.00         0.00         same           QR0511         D1X0         AACC*NIVTQPR         C438         NCF1         0.00         0.00         same           QR0511         D1X0         AACC*NIVTQPR         C438         NCF1         0.00         0.00         same           QR0511         D1X0         AACC*NIVTQPR         C438         NCF1         0.00         0.00         same           QR0511         D1X0         ACC*VSTR         C469         NCF1         0.00         0.00         same           QR0511         SIX14         D4704TGTALC*FTH         C209         NCF1         0.00         same         0.00         same           QR0641         ANXAK         LEGD1TGPSVEVEPEVPLEC*TPAK         C1090         NCF1         0.00         same         0.00         same           QR0641         ANXAK         LEGD1TGPSVEVEPEVPLEC*TPAK         C1090         NCF1         0.00         same	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Questi         DiXS         LAAQSCALSUR         Cist2         NCF2         0.00         name           Questi         DiXS         LAAQSCALSUR         Cist2         NCF2         0.00         comme           Questi         DiXS         LAACNIVYTQPR         Cist8         NCX0         0.00         essme           Questi         DiXS         LACCNIVYTQPR         Cist8         NCX0         0.00         essme           Questi         DiXS         LACCNIVYTQPR         Cist8         NCX0         0.00         essme           Questi         DIXS         LACCNIVYTQPR         Cist8         NCX0         0.00         essme           Questi         DIXS         LACNAVER         Cist8         NCX0         0.00         essme           Questi         SITT         ADVIGATEDACTING         Cist8         NCX1         0.00         essme           Questi         SITT         ADVIGATEDACTING         Cist8         NCX1         0.00         essme           Questi         SITT         ADVIGATEDACTING         Cist8         NCX1         0.00         essme           Questi         ADVIGATEDACTING         Cist8         NCX1         0.00         essme           Quest	Q08211	DHX9	LAAQSC*ALSLVR	C242	NCF1	0.00	0.00	same	
Q00011         DIRSO         AAAQSC"ALSUR         C222         NIXAO1         0.00         mame           Q00011         DIRSO         AAACC"NIVTCPIN         C438         NIXAO1         0.00         mame           Q00011         DIRSO         AACC"NIVTCPIN         C438         NIXAO1         0.00         mame           Q00011         DIRSO         SCCVSVR         C400         NCD1         0.00         mame           Q00011         DIRSO         SCCVSVR         C400         NCD1         0.00         mame           Q00011         DIRSO         SCCVSVR         C400         NCD1         0.00         mame           Q00013         ANTATCATCDACTPR         C200         NCD2         0.00         mame           Q00001         ANTATCATCDACTPR         C200         NCD2         0.01         mame           Q00001         ANTATCATCDACTPR         C200         NCD2         0.00	008211	DHX0	LAAOSC*ALSIVB	C242	NCF2	0.00	0.00	samo	
000001         DBA30         AAAE/SWINTOPE         Code         NCT1         DD         DD         DD         DD           000011         DBA30         AAAE/SWINTOPE         CdB         NOND         DD         DD         DD         DD           000011         DHA30         AAAE/SWINTOPE         CdB         NOND         DD         D	Q08211	DIIX9	LAAQSC ALSLVR	C242	NOP2	0.00	0.00	same	
Ges11         DIX3         AAEC*NIVTQPR         Class         NCP1         0.00         0.00         same           Ges11         DIX3         AAEC*NIVTQPR         Class         NCP1         0.00         0.00         same           Ges11         DIX3         SC*CVSVR         Class         NCP1         0.00         0.00         same           Ges11         DIX3         SC*CVSVR         Class         NCP1         0.00         0.00         same           Ges11         DIX4         SC*CVSVR         Class         NCP1         0.00         0.00         same           Ges31         ADXISATORYCAPPOPULCYPAL         Class         NCP1         1.01         same           Ges34         SIRTI         ADXIGATORYCAPPOPULCYPAAK         Class         NCP1         1.43         same           Ges34         ADXA         LEGDITGFSVUPUPUELCYPAAK         Class         NCP1         1.53         same         same           Ges34         ADXA         LEGDITGFSVUPUECPPAAK         Class         NCP1         1.53         same         same           Ges34         ADXA         LEGDITGFSVUPUECPPAAK         Class         NCP1         1.53         same         same	Q08211	DHX9	LAAQSC*ALSLVR	C242	NOXOI	0.00	0.00	same	
Q68211         DHX9         AAEC"MUNTQPH         Class         NCP2         0.00         n.me           Q68211         DHX9         ACC"SVN1         C409         NCP1         0.00         0.00         same           Q68211         DHX9         SC"GYNT         C409         NCP1         0.00         0.00         same           Q68211         DHX9         SC"GYNT         C409         NCP2         0.00         0.00         same           Q6831         SERPI         ALVIGATEDAC"ITR         C200         NCP2         0.00         0.00         same           Q6845         SERPI         ALVIGATEDAC"ITR         C200         NCP2         0.00         0.00         same           Q6845         ALRAK         LEGDLIGPSVGVEPTPVELCC"PTAK         C1000         NCP2         1.47         17.12         same           Q6964-1         ALRAK         LEGDLIGPSVGVEPTPVELCC"TAK         C1000         NCP2         1.42         1.00         same           Q6964-1         ALRAK         LEGDLIGPSVGVEPTPVELCC"TAK         C102         NCP2         1.43         1.00         same           Q6964-1         ALRAK         LEGDLIGPSVGVEPTPVELCC"TAK         C114         1.13         1.14         1.1	Q08211	DHX9	AAEC*NIVVTQPR	C438	NCF1	0.00	0.00	same	
ČAŠEJI         DERS         ALEC'RUVYIPQIP         CAS         NOKOI         0.00         name           Q68211         DERS         SC*CYSVR         C499         NOKOI         0.00         name           Q68211         DERS         SC*CYSVR         C499         NOKOI         0.00         name           Q6821         DERS         SC*CYSVR         C499         NOKOI         0.00         name           Q6821         SERPI         ALVACTORACELETTR         C200         NOKOI         0.00         name           Q6864         ANNAK         LEGUICHTSVG VEPPIVELEC'PPAR         C200         NOCOI         2.01         1.5.3         name           Q69664         ANNAK         LEGUICHTSVD VEPPIVELEC'PPAR         C2162         NOCOI         1.4.9         2.0.3         name           Q69664         ANNAK         LEGUICHTSVD VEPPIVELEC'PPAR         C2162         NOCOI         1.4.9         2.0.4         name         0.00         0.00         name	Q08211	DHX9	AAEC*NIVVTOPR	C438	NCF2	0.00	0.00	same	
Clessin         DHX0         SCCVSVA         Comp         NCP1         0.00         name           Q6831         DHX0         SCCVSVA         C469         NCP1         0.00         0.00         name           Q6844         DHX0         SCCVSVA         C469         NCP1         0.00         0.00         name           Q6845         SRP1         AVV[QATGAAC*TPR         C200         NCP1         0.00         0.00         name           Q6845         SRP1         AVV[QATGAAC*TPR         C200         NCP1         0.01         0.00         name           Q6965-1         AIRAK         LEGOLTGPSVCEVPTVELC*TPAK         C1000         NCN01         0.03         0.00         name           Q6966-1         AIRAK         LEGOLTGPSVCEVPTVELC*TPAK         C1020         NCN1         0.01         0.00         name           Q6966-1         AIRAK         LEGOLTGPSVCEVPTVELC*TPAK         C1162         NCN1         2.1.53         name         name           Q6966-1         AIRAK         SCCTONLACVVENC         C2060         NCN21         2.5.9         name         name           Q6966-1         AIRAK         SCCTONLACVVENC         C1704         NC21         0.00         name	008211	DHX9	A A EC*NIVVTOPB	C438	NOX01	0.00	0.00	same	
009811         DEXS         5C*CYSYR         C460         NCP2         0.00         0.00         manage           009814         DEXS         5C*CYSYR         C460         NCP1         0.00         0.00         essme           009815         SSIP1         ELGC/CYSYR         C460         NCP1         0.00         0.00         essme           009815         SSIP1         ELGC/CYSYR         C100         NCP1         0.00         0.00         essme           009805         SSIP1         ELGC/CYSYR         C1000         NCP1         0.00         0.00         essme           009805         ANAK         ELGD/CYSYNEVPVELC*PDAK         C1000         NCP1         1.818         1.83         1.83         essme         essme           009805         ANAK         VEXC*PDVFELC*PDAK         C1020         NCP1         1.818         1.83         essme	000211	DIIXO	C*CVEVD	C460	NOE1	0.00	0.00	same	
Global         DIX0         SC*CVSVII         Class         NCF2         0.00         0.00         ennee           GB0815         SSNP1         AUVIGATCDACTPR         C200         NCF2         0.00         0.00         ennee           GB0815         SSNP1         AUVIGATCDACTPR         C200         NCF2         0.00         0.00         ennee           GB0816         SSNP1         AUVIGATCDACTPR         C200         NCF2         0.00         0.00         ennee           GB0816         SSNP1         AUVIGATCDACTPR         C200         NCF2         0.00         0.00         ennee           GB0806         ARMAK         LEGDUTGPSVCEVPTPVELICCPTDAK         C1000         NCF2         1.42         10.32         ennee           GB0806         ARMAK         LEGDUTGPSVCEVPTPVELICCPTDAK         C102         NCF2         1.42         10.33         ennee         G0006           ARMAK         LEGDUTGPSVCEVPTPVELICCPTDAK         C102         NCF2         1.30         0.75         ennee         G0006         ARMAK         SCCVVELICCVVVK         C102         NCF2         0.00         ennee           G00066         ARMAK         VDVECTVVKCKVK         C1020         NCF2         0.00         enn	Q08211	DHX9	SUGISVR	C469	NCFI	0.00	0.00	same	
QMEAL         DHX9         SC*CYSYR         C449         NOXOL         0.00         0.00         same           QMEAL         SSRP1         ADVACEDAC*TPTR         C300         NCF1         0.00         same           QMEALS         SSRP1         REQC*TTFR         C300         NCF1         0.00         0.00         same           QMEAL         ALKAK         LEGDETGENGUEYPOPUELC*PPARK         C1000         NOXOL         0.33         0.00         same           QMEMAL         ALKAK         LEGDETGENGUEYPOPUELC*PPARK         C1000         NOXOL         0.33         0.00         same           QMEMAL         ALKAK         LEGDETGENGUEYPOPUELC*PPARK         C1020         NOXOL         0.00         same           QMEMAL         ALKAK         VUEC*PPUNHEGFERGK         C2846         NOXOL         0.00         same           QMEMAL         ALKAK         VUEC*PPUNHEGFERGK         C2840         NOTI         1.0.1         0.00         same           QMEMAL         ALKAK         VUEC*PPUNHEGFERGK         C2840         NCF1         0.00         same           QMEMAL         ALKAK         SSCC*DVLLGOWNKK         C300         NCF1         0.00         same           Q12700 <td>Q08211</td> <td>DHX9</td> <td>SC*GYSVR</td> <td>C469</td> <td>NCF2</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	Q08211	DHX9	SC*GYSVR	C469	NCF2	0.00	0.00	same	
Qeesal         SSRP1         ADVTQATGALC*IFR         C200         NCF1         0.00         0.00         same           Qeesal         SSRP1         ADVTQATGAL         Cancer         CC20         NCF2         0.00         0.00         same           Qeesal         ARNAK         LECDUTCPSVGVEVPIVELCCPDAK         C1000         NCF1         22.77         10.42         same           Qeesal         ARNAK         LECDUTCPSVGVEVPIVELCCPDAK         C1000         NCF2         12.47         17.12         same           Qeesal         ARNAK         LECDUTCPSVGVEVPIVELCCPDAK         C2102         NCAD         0.03         0.00         same           Qeesal         ARNAK         LECDUTCPSVVEVPIVELCCPDAK         C2122         NCAD         0.00         same           Qeesal         ARNAK         LECDUTCPSVVEVPIVELCCPDAK         C2122         NCAD         0.00         same           Qeesal         ARNAK         LECDUTCPSVVEVPIVECPTONE         C2122         NCAD         0.00         same           Qeesal         ARNAK         SGCTUNTEPCVVVK         C5502         NCF2         0.00         same           Qeesal         ARNAK         SGCTUNTEPCVVKK         C5502         NCF1         0.00 <td< td=""><td>Q08211</td><td>DHX9</td><td>SC*GYSVR</td><td>C469</td><td>NOXO1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></td<>	Q08211	DHX9	SC*GYSVR	C469	NOXO1	0.00	0.00	same	
Company         Shift           ADVIGATORACTIVE         C200         NCF1         0.00         name           General         ARNAR         LECDITOPSVUVPPWILECPPAR         C100         NCF1         0.00         name           General         ARNAR         LECDITOPSVUVPPWILECPPAR         C100         NCT1         0.00         name           General         ARNAR         LECDITOPSVUVPPWILECPPAR         C100         NCV1         0.03         name           General         ARNAR         LECDITOPSVUVPPWILECPPAR         C2102         NCV1         0.03         name           General         ARNAR         LECDITOPSVUVPPWILECPPAR         C2102         NCV1         0.03         name           General         ARNAR         VECCTPUNIECPECK         C2866         NCP1         21.3         3.2.4.9         name           General         ARNAR         VECCTPUNIECPECK         C2866         NCP1         21.3         3.2.4.9         name           General         ARNAR         SGCTVNLPQVVVR         C5562         NCP1         21.3         3.2.4.9         name           General         ARNAR         SGCTVNLPQVVRVR         C5562         NCP1         21.3         3.2.4.9         name         name <td>008045</td> <td>SSD D1</td> <td>A DVIO ATCDAIC*IEP</td> <td>C200</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>co mo</td> <td></td>	008045	SSD D1	A DVIO ATCDAIC*IEP	C200	NCF1	0.00	0.00	co mo	
Operation         Step1         LL 0.401 rel         Constraint          Constraint <t< td=""><td>000045</td><td>CODD1</td><td>ADVIQATODAIO IFIC</td><td>C200</td><td>NOPI</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	000045	CODD1	ADVIQATODAIO IFIC	C200	NOPI	0.00	0.00	same	
Q698.5         SSRP.1         ELG(2^1)TPR         CUP1         CO         0.00         0.00         enne           Q696661         AIRNAK         LEGDLTCPSYQUEYPTPVELECTPAK         C1900         NCCP2         21.7         13.2         manue           Q696661         AIRNAK         LEGDLTCPSYQUEYPTPVELECTPAK         C1900         NCCP2         21.8         83.8         18.3.8         manue           Q696661         AIRNAK         LEGDLTCPSYQUEYPTPVELECTPAK         C2162         NCCP1         94.3.7         21.50         manue           Q696661         AIRNAK         VEDECTPVNEEPTERGK         C2366         NCP1         29.1.3         23.2.8         enne           Q696661         AIRNAK         VEDECTPVNEEPTERGK         C2466         NCP1         29.1.3         23.2.8         enne           Q696661         AHNAK         SSCCTOVNIPCVNK         C5502         NCP1         29.1.8         1.1.9         enne           Q127802         QTF3C1         LRBAAPEETMNCTSCTPDFFK         C1704         NCP2         0.00         enne           Q127802         QTF3C1         LRBAAPETMAAPETTAR         C2438         NCF1         0.00         enne           Q127802         QTF3C1         LRBAETMAAPETTAR <t< td=""><td>Q08945</td><td>SSRPI</td><td>ADVIQATGDAIC*IFR</td><td>C200</td><td>NCF2</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q08945	SSRPI	ADVIQATGDAIC*IFR	C200	NCF2	0.00	0.00	same	
Q0006-1         AHNAK         LEGDUTCPSVGVEYDVELEC*PLAK         C1000         NCP1         23.77         19.42         same           Q0006-1         AHNAK         LEGDUTCPSVGVEYDVELEC*PLAK         C1000         NCP1         13.47         17.12         same           Q0006-1         AHNAK         LEGDUTCPSVDVEYDVELEC*PLAK         C2102         NCP1         14.59         14.50         same           Q0006-1         AHNAK         LEGDUTCPSVDVEYDVELEC*PLAK         C2102         NCAU         0.00         same           Q0006-1         AHNAK         LEGDUTCPSVDVEVPNECPCBCK         C2206         NCC1         52.9         5.5         same           Q0006-1         AHNAK         VDEC*PDVNIECPCGK         C2206         NCC1         15.5         9.75         same           Q0006-1         AHNAK         SSCC*DVNLPCVVNK         C5502         NCC1         1.81         1.99         same           Q1278-2         GT3501         LBAAAPLEELTVORSC*DPTTK         C176         NCP1         0.00         same           Q1278-2         GT361         LBAAAPLEELTVORG*CPUPNEC         C176         NCP1         0.00         same           Q1278-2         GT361         LBAAPLEELTVORG*CPUPNEC         C760         NCP1	Q08945	SSRP1	ELQC*LTPR	C207	NCF1	0.00	0.00	same	
Q099661         AIRXAK         LEGDITCPSVQUEVPDVELEC*PDAK         C1900         NCXD1         0.03         0.00           Q099661         AIRXAK         LEGDITCPSVQUEVPDVELC*PDAK         C1102         NCXD1         0.00         same           Q099661         AIRXAK         LEGDITCPSVQUEVPDVELC*PDAK         C1102         NCXD1         0.00         same           Q099661         AIRXAK         LEGDITCPSVQUEVPTVELC*PDAK         C1202         NCXD1         0.00         same           Q099661         AIRXAK         VDEC*PDVNIECPEGK         C2366         NCF1         23.01         3.2.43         same           Q099661         AIRXAK         VDEC*PDVNIECPEGK         C2366         NCF1         13.50         9.76         same           Q099661         AIRXAK         SGC*DVNIPCVVNK         C5502         NCXD1         1.81         1.99         same           Q099661         AIRXAK         SGC*DVNIPCVVNK         C5502         NCXD1         1.81         1.99         same           Q12788-2         GTT3C1         LIRXALLEXCKTC*DPTFTK         C1364         NCF2         0.00         same           Q12788-2         GTT3C1         LIRXALLEXCKTC*TPAR         C248         NCF1         0.00         same	009666-1	AHNAK	LEGDLTGPSVGVEVPDVELEC*PDAK	C1900	NCF1	23.77	19.42	same	
Q0006-1         AHNAK         LECDLTCPYVGVEVPVPVELEC*PDAK         C1000         NCV1         0.03         0.00         manue           Q0006-1         AHNAK         LECDLTCPYVGVEVPVELEC*PDAK         C2162         NCP1         14.32         32.38         manue           Q0006-1         AHNAK         LECDLTCPYVEVPVELEC*PAC         C2162         NCP1         14.32         32.50         manue           Q0006-1         AHNAK         VDEC*PDVNECPECK         C2806         NCP1         22.50         manue           Q0006-1         AHNAK         VDEC*PDVNECPECK         C2806         NCP1         23.34         23.19         manue           Q0006-1         AHNAK         VDEC*PDVNECPVNE         C5502         NCP1         23.34         23.19         manue           Q12789-2         GTT3C1         LERELGC*ER         C286         NCP1         0.00         manue           Q12789-2         GTT3C1         LERELGC*ER         C283         NCP1         0.00         manue           Q12789-2         GTT3C1         LERELGC*ER         C283         NCP1         0.00         manue           Q12789-2         GTT3C1         LERELGC*ER         C283         NCP1         0.00         manue	000666 1	AHNAK	LECDLTCPSVCVEVPDVELEC*PDAK	C1000	NCF2	21.47	17 12	samo	
Question         AREAR         LECULULOPS OVER-UNVERCEDENDAR         C2003         NACU         D55         D03         same           Question         AREAR         LECULUTOPS OVER-UNVERCEDENDAR         C2102         NOKO1         0.00         0.00         same           Question         AREAR         LECULUTOPS OVER-UNVERCEDENDAR         C2102         NOKO1         0.00         same           Question         AREAR         LECULUTOPS OVER-UNVERCEDENDAR         C2102         NOKO1         0.55         0.75         same           Question         AREAR         VECEPDNNEEDENDAR         C2102         NOKO1         0.55         0.76         same           Question         AREAR         VECEPDNNEEDENDAR         C2102         NOKO1         0.00         same         same           Question         AREAR         CSECONNEEDENDENDENDENDENDENDENDENDENDENDENDEN	Q03000-1	AIINAK	LEGDLIGI SVGVEVI DVELEC I DAK	C1300	NOP2	21.47	11.12	same	
Qenome         AHNAR         LEGDL2GPNQDVEVPDVELEC*PDAK         C2182         NCP1         18.85         same           Qenome         AHNAR         LEGDL2GPNQDVEVPDVELEC*PDAK         C2182         NCX01         10.00         20.00         assume           Qenome         AHNAR         VUPC*PDVNIEGPECK         C23866         NCP1         24.37         32.44         assume           Qenome         AHNAR         VUPC*PDVNIEGPECK         C23866         NCP1         35.60         p.76         same           Qenome         AHNAR         SSGCPDVLEGVNVN         C5502         NCP1         35.60         p.76         same           Qenome         AHNAR         SSGCPDVLEGVNVN         C5502         NCP1         0.00         same           Qenome         C1780.1         VPPLPLEC         C178.01         NCP1         0.00         same           Qenome         C1780.2         C178.01         NCP1         0.00         same         same           Q12892.1         C178.01         VPPLPLPLEC*CTQEPLWR         C218         NCP1         0.00         same           Q12802.1         AKAP13         BELASC*AK         C1838         NCP1         0.00         same           Q12801.1 <td< td=""><td>Q09666-1</td><td>AHNAK</td><td>LEGDLTGPSVGVEVPDVELEC*PDAK</td><td>C1900</td><td>NOXOI</td><td>0.93</td><td>0.00</td><td>same</td><td></td></td<>	Q09666-1	AHNAK	LEGDLTGPSVGVEVPDVELEC*PDAK	C1900	NOXOI	0.93	0.00	same	
Q0966-1         AHNAK         LEGDLTGPSVDVEVPDVELC*PLAK         C2162         NCP2         14.92         00.28         same           Q0966-1         AHNAK         VEGDLTGPSVDVEVPDVELC*PLAK         C2160         NOXO         0.00         20.02         same           Q0966-1         AHNAK         VUVEC*PDVNECPEQK         C2266         NOXO         55.99         66.35         same           Q0966-1         AHNAK         VSEC*PDVNECPEQK         C2266         NOXO         18.1         20.97         same           Q0966-1         AHNAK         SSEC*PDVLPGVNKE         C5502         NOXO         18.1         20.90         same           Q12788-2         CTFSCI         LEPAAPLEERITMGTSC*LPDTTFK         C1704         NCF1         0.00         same           Q12788-2         GTFSCI         LEPAAPLEERITMGTSC*LPDTTFK         C1838         NCF1         0.00         same           Q12782-2         GTFSCI         LEPAAPLEERITMGTSC*LPDTFTK         C1838         NCF1         0.00         same           Q1280-1         LEPA         CTALAASLR         C233         NCF1         0.00         same           Q1280-1         LEPA         CTALAASLR         C238         NCCT1         0.00         same     <	Q09666-1	AHNAK	LEGDLTGPSVDVEVPDVELEC*PDAK	C2162	NCF1	18.98	18.35	same	
Q09666-1         AINAK         LEGEDITGISTIVEVEPERK         C2102         NOXOI         0.00         same           Q0966-1         AINAK         VUNCCTPONINGPECK         C2806         NCF1         21.37         21.50         same           Q0966-1         AINAK         VUNCCTPONINGPECK         C2806         NCF1         21.30         9.76         same           Q0966-1         AINAK         SSGCTPUNLGCVNVLC         C5502         NCF2         23.34         same           Q0966-1         AINAK         SSGCTPUNLGCVNVC         C1704         NCC2         0.00         same           Q12788-2         CTF3C1         LEBELLCTER         C286         NCF1         0.00         same           Q12788-2         CTF3C1         LEBELLCTER         C286         NCF1         0.00         same           Q12789-2         CTF3C1         VPPPPLPECTQEFUNR         C128         NCF1         0.00         same           Q1280-1         LEPS         CLAALASIR         C2142         NCF1         0.00         same           Q1290-1         LEPS         CLAALASIR         C2165         NCF2         100.00         same           Q1290-1         LEPS         VLCTLASIR         C275         <	Q09666-1	AHNAK	LEGDLTGPSVDVEVPDVELEC*PDAK	C2162	NCF2	14.92	20.28	same	
Operation         AHNAR         VUVEC*PUVNIEGPEGK         C2806         NCP1         24.37         31.30         same           Q096661         AHNAK         VUVEC*PUVNIEGPEGK         C2806         NOXO1         58.09         56.35         same           Q096661         AHNAK         VUVEC*PUVNIEGPEGK         C5502         NOXO1         18.41         0.76         same           Q096661         AHNAK         SSGC*DVNLFOVNEK         C5502         NOXO1         1.81         1.99         same           Q12780-2         CTFSC1         LEPAAAPLEEII/MCTSC'LPDTFTK         C1704         NCP1         0.00         same           Q12780-2         CTFSC1         LEPAAAPLEEI/MCTSC'LPDTFTK         C1704         NCP1         0.00         same           Q12780-2         CTFSC1         LEPAAPLEEI/MCTSC'LPDTFTK         C1838         NCP1         0.00         same           Q12802-1         AKAP13         ESLASC'AK         C1838         NCP1         0.00         same           Q12802-1         ILF3         CLAALASLR         C203         NCP1         0.00         same           Q12802-1         ILF3         VLACPLASC/WAPDGSGIVDPC*EK         C276         NCP1         0.00         same	000666 1	AUNAK	LECDLTCPSVDVEVPDVELEC*PDAK	C2162	NOVOI	0.00	0.00	co mo	
QB00561         ALBXAR         VDVRC+TPUNIEURECR         C2800         NCP1         24.37         21.30         same           QB00561         ABNAR         VDVRC+TPUNIEURECR         C2800         NCP1         13.50         same           QB00561         ABNAR         SSGCPUNLPGVNVK         C5502         NCP1         13.50         same           QB00561         ABNAR         SSGCPUNLPGVNVK         C5502         NCP1         1.81         1.99         same           QB00561         ABNAR         SSGCPUNLPGVNVK         C5502         NCR01         1.81         1.99         same           QB00561         ABNAR         SSGCPUNLPGVNVK         C5502         NCR1         0.00         same           Q127852         CFFSC1         LREELGCPER         C286         NCP1         0.00         same           Q127852         GFFSC1         LREELGCPER         C278         NCP1         0.80         same           Q128061         LFFS         VLFCYLARSITYCR         C501         NCP1         0.00         same           Q129061         LFFS         VLFCYLARSITYCR         C501         NCP1         0.00         same           Q129061         LFFS         VLFCYLARSITYCR <t< td=""><td>Q09000-1</td><td>ARNAK</td><td>LEGDLIGFSVDVEVFDVELEC FDAK</td><td>02102</td><td>NOAOI</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q09000-1	ARNAK	LEGDLIGFSVDVEVFDVELEC FDAK	02102	NOAOI	0.00	0.00	same	
Q09666-1         AHNAK         VDVEC*PDVNIBC/PEK         C2806         NCP2         29.21         29.24         same           Q0966-1         AHNAK         SSGC*PVNLGVVK         C2502         NORC         3.5.0         5.6.7         same           Q0966-1         AHNAK         SSGC*PVNLGVVNK         C5502         NORC         2.3.30         5.6.7         same           Q0966-1         AHNAK         SSGC*PVNLGVNVK         C5502         NORC1         1.81         1.99         same           Q1278-2         CTFSCI         LEPAAPLELLI/TGR         C1144         NCP1         0.00         same           Q1278-2         CTFSCI         VPFPFLPLEC*TQEFLWR         C246         NCP1         0.00         same           Q1280-1         AKAP13         LGPEC*ULVTQR         C2142         NCP1         0.00         same           Q1290-1         LF3         CTAALASLR         C203         NCP1         0.00         same           Q1290-1         LF3         CTAALASLR         C205         NCP1         0.00         same           Q1290-1         LF3         CTAALASLR         C205         NCP1         0.00         same           Q1290-1         LF3         NVTCAAPSR	Q09666-1	AHNAK	VDVEC*PDVNIEGPEGK	C2806	NCF1	24.37	21.50	same	
Q090661         AHNAK         VDYEC*PDVNIECHEGK         C2806         NOX01         58.99         66.35         same           Q090661         AHNAK         SSGC*PVNLECYNVK         C5502         NOX01         13.30         2.75         same           Q090661         AHNAK         SSGC*PVNLECYNVK         C5502         NOX01         23.31         2.07         same           Q1278-2         CTFSCI         LIPAAAPLEELTMETGSC*LPPTFTK         C1704         NCF1         0.00         same           Q1278-2         CTFSCI         LIPAAAPLEELTMETGSC*LPPTTFK         C1704         NCF1         0.00         same           Q1280-2         CTFSCI         LIPAAPLEELLOPER         C238         NCF1         0.00         same           Q1280-1         AKAP13         ESLASC*AK         C1383         NCF1         0.00         same           Q1280-1         LIPA         C1AALASLR         C233         NOX01         0.00         same           Q1280-1         LIF3         CTAALASLR         C236         NCF2         0.00         same           Q1280-1         LIF3         VLAALASLR         C236         NCF2         0.00         same           Q1280-1         LIF3         VLAALASLR	Q09666-1	AHNAK	VDVEC*PDVNIEGPEGK	C2806	NCF2	29.21	32.42	same	
Qippenei         AHINAK         SSGC*DVNLPGVNVK         C5502         NCP1         33.4         23.1         9.76         same           Qippenei         AHINAK         SSGC*DVNLPGVNVK         C5502         NCX01         1.31         1.99         same           Qippenei         AHINAK         SSGC*DVNLPGVNVK         C5502         NCX01         1.31         1.99         same           Qippenei         AHINAK         SSGC*DVNLPGVNVK         C5502         NCX01         1.31         1.99         same           Qippenei         AHINAK         SSGC*DVNLPGVNVK         C5502         NCX1         0.00         same           Qippenei         AHINAK         SSGC*DVNLPGVNVK         C236         NCF1         0.00         same           Qippenei         AHXAF         ILEGTC*TALSTR         C238         NCF1         0.00         same           Qippenei         ILF3         C*LAALASIR         C233         NCF1         0.00         same           Qippenei         ILF3         C*LAALASIR         C233         NCF1         0.00         same           Qippenei         ILF3         C*LAALASIR         C350         NCF1         0.00         same           Qippenei         ILF	009666-1	AHNAK	VDVEC*PDVNIEGPEGK	C2806	NOXO1	58 99	56.35	same	
Operation         A HISAR         SSGC=DVNLFDCVNVK         C5502         NCP2         23.3         Same           Q12789-2         GFFSG1         LIRPAAPLEELTMGTSC=UPDTFTK         C1704         NCP1         0.00         same           Q12789-2         GFFSG1         LIRPAAPLEELTMGTSC=UPDTFTK         C1704         NCP1         0.00         same           Q12789-2         GFFSG1         LIPAAPLEELTMGTSC=UPDTFTK         C1704         NCP2         0.00         same           Q1280-2         GFFSG1         LIPAAPLEELTMGTSC=UPDTFTK         C1704         NCP2         0.00         same           Q1280-2         GFFSG1         LIPAAPLEELTMGTSC=UPDTFTK         C1704         NCP2         0.00         same           Q1280-2         AKAP13         ESLASC-AK         C123         NCK01         0.00         same           Q1280-1         LE3         CTAALASER         C233         NCF2         0.00         same           Q12906-1         LE3         VLECTAACISTR         C236         NCK01         0.00         same           Q12906-1         LF3         VLECTAACISTR         C275         NCF1         0.00         same           Q12901-1         LF3         VLACASGWAPCSGUPDC*EK         C275	Q00000-1	ATINIATZ		C2000	NODI	12.50	0.00	Same	
Q0006-1         AHNAK         SSCC*DVM,PGVNVK         C5502         NCF2         23.43         23.19         same           Q00789-2         GTF3C1         LRPAAPLEELTMGTSC*UPPTFTK         C1704         NCF2         0.00         same           Q12788-2         GTF3C1         LRPAAPLEELTMGTSC*UPPTFTK         C1704         NCF2         0.00         same           Q12788-2         GTF3C1         LRPAAPLEELTMGTSC*UPPTFTK         C1704         NCF2         0.00         same           Q12788-2         GTF3C1         LRPAAPLEELTMGTSC*UPPTTFK         C138         NCF2         0.00         same           Q12802-1         AKAP13         LGFPC-TLEVTQETWR         C124         NCF1         0.00         same           Q12906-1         LF3         CTAALASER         C203         NCF2         0.00         same           Q12906-1         LF3         CTAALASER         C203         NCF2         0.00         same           Q12901         TRAP1         NIVYLC*APNR         C501         NCF2         0.00         same           Q12931         TRAP1         NIVYLC*APNR         C501         NCF1         0.00         same           Q12931         TRAP1         NIVYLC*APNR         C501	Q09666-1	AHNAK	SSGC"DVNLPGVNVK	05502	NCFI	13.50	9.76	same	
Q0966-1         AHNAK         SSGC*DVNLPGVNVK         C502         NOX01         1.41         1.99         same           Q1278-2         CFF3C1         LIRPAAPLEETIMCTSC*LPDTPTK         C104         NCE1         0.00         same           Q1278-2         CFF3C1         LIRPAAPLEETIMCTSC*LPDTPTK         C124         NCE1         0.00         same           Q1280-2         CFF3C1         LIRPAAPLEETIMCTSC*LPDTPTK         C124         NCE1         0.00         same           Q1280-2         AKAP13         ESLASC*AK         C1338         NCF1         0.00         same           Q1290-1         LF3         C*LAALASLR         C2142         NCF1         0.00         same           Q12906-1         LF3         C*LAALASLR         C233         NCX01         0.00         same           Q12906-1         LF3         C*LAALASLR         C233         NCK1         0.00         same           Q12906-1         LF3         C*LAALASLR         C236         NCP1         0.00         same           Q12931         TIAPI         NIVVLC*LAPNR         C301         NCP1         0.00         same           Q12934         DLG1         VNDC*ULR         C330         NCP1         0.	Q09666-1	AHNAK	SSGC*DVNLPGVNVK	C5502	NCF2	23.34	23.19	same	
$ \begin{array}{c} \hline 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	Q09666-1	AHNAK	SSGC*DVNLPGVNVK	C5502	NOXO1	1.81	1.99	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	012780.2	CTF3C1	I BPAAAPI FEI TMCTSC*I PDTETK	C1704	NCF1	0.00	0.00	samo	
QL2788-2         CH785C1         LIREADTLEMENDESCLPDIPTR         CL040         NCP2         0.00         same           QL280-2         GT73C1         VPPPTPLEDENCTOPERIAR         C22         NCF1         0.00         same           QL280-2         AKAP13         ESLASC*AK         C1838         NCF1         0.00         same           QL280-2         AKAP13         ESLASC*AK         C1838         NCF1         0.00         same           QL280-2         AKAP13         ESLASC*AK         C1838         NCF1         0.00         same           QL290-1         LLF3         CLAALASLR         C203         NCF2         0.00         same           QL290-1         LLF3         VLCTAASUVMPDCSGYPPC*5K         C276.256         NCF1         0.00         same           QL290-1         LLF3         VLC7APNR         C301         NCK01         0.00         same           QL290-2         DLG1         VNDC*LR         C275         NCF1         0.00         same           QL311-1         CHAP1A         VLQGPAAC*FLETLAAQEQTPK         C710         NCF1         0.00         same           QL311-1         CHAP1A         VLQGPAAC*FLETLAAQEQTPK         C710         NCF1         4.80	Q12789-2	GTF3CI	LIGHAAAF LEELI MG13C LFD1F1K	C1704	NOFT	0.00	0.00	same	
Q1278b-2         GTP3G1         LREFLGIC**R         C286         NCF1         0.00         same           Q1278b-2         GTP3G1         VFPPPPPEPC*TQEPLWR         C128         NCF1         0.00         same           Q12802-1         AKAP13         EGLPSC*TLLYTQR         C1242         NCF1         0.00         same           Q12802-1         AKAP13         EGLPSC*TLLYTQR         C2142         NCF1         0.00         same           Q12906-1         ILF3         C*LAALASLR         C203         NCF2         0.00         same           Q12906-1         ILF3         C*LAALASLR         C203         NCF2         0.00         same           Q12931         TRAP1         NYLC*APNR         C501         NCF2         0.00         same           Q12931         TRAP1         NYLC*APNR         C501         NCF1         0.00         same           Q12940-2         DLG1         VNDC?ILR         C375         NCF1         0.00         same           Q13111-1         CHAF1         VLQPAAC*FLETLAQEEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAF1         VLQPAAC*FLETLAQEEQTPK         C710         NCF1         0.00         same </td <td>Q12789-2</td> <td>GTF3CI</td> <td>LRPAAAPLEELTMGTSC*LPDTFTK</td> <td>C1704</td> <td>NCF2</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	Q12789-2	GTF3CI	LRPAAAPLEELTMGTSC*LPDTFTK	C1704	NCF2	0.00		same	
Q1278-2         GTT 3C1         VPFPFLPLEPC*TQEFLWR         C42         NCF1         0.00         same           Q1280-1         AKAP13         ESLASC*AK         C1838         NCF2         0.00         come           Q1290-1         ILF3         CTLAALASLR         C1838         NCF2         0.00         same           Q12906-1         ILF3         CTLAALASLR         C203         NCF2         89.84         same           Q12906-1         ILF3         CTLAALASLR         C203         NCF2         100.00         same           Q12930-1         ILF3         CTLAALASLR         C203         NCF2         100.00         same           Q12930-1         ILF3         VILC*LASCIVMPDGSGIVPC*EK         C278.1         NCF1         0.00         same           Q12935-2         DLG1         VNDC*ILR         C275         NCF1         0.00         same           Q13111-1         CHAF1A         VLQQFAAC*FLETLPAQEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAF1A         VLQQFAAC*FLETLPAQEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAF1A         VLQQFAAC*FLETLPAQEQTPK         C710         NCF1         0	Q12789-2	GTF3C1	LREELGLC*ER	C286	NCF1	0.00		same	
Q12902.1         AKAP13         ESLASC*AK         C1888         NCF1         0.00         same           Q12902.1         AKAP13         LGIPEC*LLMTQR         C2142         NCF1         40.00         0.00         same           Q12906.1         LLF3         C*LAALASLR         C203         NCF1         40.00         same           Q12906.1         LLF3         C*LAALASLR         C203         NCF2         0.00         same           Q12906.1         LLF3         C*LAALASLR         C303         NCF2         0.00         same           Q12906.1         LLF3         C*LAALASLR         C501         NCF1         0.00         same           Q12931         TRAP1         NTYLC*APNR         C501         NCF1         0.00         same           Q12931         TRAP1         NTYLC*APNR         C501         NCF1         0.00         same           Q12934         DLG1         VLOGPAAC*FLETLPAQEEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAF1A         VLQGPAAC*FLETLPAQEEQTPK         C710         NCF1         4.89         same           Q13177         PAK2         C*LEMDVEK         C480         NCF1         4.00 <t< td=""><td>012789-2</td><td>GTF3C1</td><td>VPPFPLPLEPC*TOEFLWB</td><td>C42</td><td>NCF1</td><td>0.00</td><td></td><td>same</td><td></td></t<>	012789-2	GTF3C1	VPPFPLPLEPC*TOEFLWB	C42	NCF1	0.00		same	
Q129021         AKAP13         DESLASC*AR         C1838         NCF2         0.00         name           Q129021         AKAP13         DESLASC*AR         C1838         NCF2         0.00         name           Q129061         ILF3         C*LAALASLR         C203         NCF1         0.00         same           Q129061         ILF3         C*LAALASLR         C203         NCF2         0         100.00         same           Q129061         ILF3         C*LAALASLR         C203         NCF2         0         100.00         same           Q129051         ILF3         C*LAALASLR         C203         NCF2         0         100.00         same           Q12931         TRAPI         NIYLC*APNR         C301         NCA01         0.00         same           Q12952         DLG1         VNDC*ILR         C275         NCF1         0.00         same           Q13111         CHAP1         NUQEPAC*FETTPAQEEQTPK         C710         NCF1         4.89         same           Q13111         CHAP1         NAGPCAC*CLR         C480         NCF1         0.00         same           Q13117         PAK2         C*LEMDVEK         C480         NCF1         0.00 <td>012802 1</td> <td>AVAD12</td> <td>FOLACCAN</td> <td>C1020</td> <td>NCEL</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	012802 1	AVAD12	FOLACCAN	C1020	NCEL	0.00		same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q12802-1	AKAP 15	ESLASC AK	01838	NOFI	0.00		same	
Q12802-1         AKAP13         LGIFPC/LLIVTQR         C2142         NCF1         0.00         same           Q12006-1         LLF3         C*LAALSER         C233         NCF1         40.60         same           Q12006-1         LLF3         C*LAALSER         C233         NCF2         0.00         same           Q12096-1         LF3         VLECTLASGUMPDCSGYDC*EK         C278,C295         NCF2         0.00         same           Q12931         TRAP1         NIVTLC*APNR         C501         NCF2         0.00         same           Q12851-2         DLG1         VNDC*ILR         C275         NCF1         0.00         same           Q12851-2         DLG1         VNDC*ILR         C275         NCF1         0.00         same           Q13111-1         CHAPIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCP1         100.00         same           Q13111-1         CHAPIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCP1         4.89         same           Q13117         PAK2         C*LEMDVEKR         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCP2         0.00         same<	Q12802-1	AKAP13	ESLASC*AK	C1838	NCF2	0.00	0.00	same	
	Q12802-1	AKAP13	LGIPEC*ILLVTOR	C2142	NCF1	0.00	0.00	same	
Q12906-1         ILF3         C*LAALASLR         C303         NCP2         80.00         83.00         83.00           Q12906-1         ILF3         C'LAALASLR         C303         NCX01         0.00         same           Q12906-1         ILF3         VLEC'LASGIVMPDGSGIYDPC*EK         C278,C295         NCP1         0.00         0.00         same           Q1231         TRAP1         NIVYLC'APNR         C301         NCX01         0.00         same           Q1231         TRAP1         NIVYLC'APNR         C301         NCX01         0.00         same           Q12352-2         DLG1         VNDC'ILR         C375         NCX01         0.00         same           Q13111-1         CHAF1A         VLQGFAAC*FLETLPAQEEQTPK         C710         NCP1         0.00         same           Q13111-1         CHAF1A         VLQGFAAC*FLETLPAQEEQTPK         C710         NCP1         0.00         same           Q13111-1         CHAF1A         VLQGFAAC*FLETLPAQEEQTPK         C710         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480	012006 1	IL F3	C*LAALASLB	C203	NCF1	40.60		samo	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q12300-1	11110	C LAALAGED	C203	NOPI	40.00	00.04	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q12906-1	ILF3	C*LAALASLR	C203	NCF2		89.84	same	
Q12906-1         ILF3         VLEC*LASGIVMPDCSGIYDPC*EK         C278, C295         NCP1         0.0.00         same           Q12931         TRAP1         NIYYLC*APNR         C501         NCP1         0.00         same           Q12931         TRAP1         NIYYLC*APNR         C501         NCP2         0.00         same           Q12930-2         DLG1         NIYLC*APNR         C301         NCX01         0.00         same           Q12950-2         DLG1         VNDC*ILR         C375         NCX01         0.00         same           Q13111-1         CHAPIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCP1         0.00         same           Q13111-1         CHAPIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCP1         0.00         same           Q13117         PAK2         C*LEMDVEK         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCP1         0.00         same	Q12906-1	ILF3	C*LAALASLR	C203	NOXO1	0.00		same	
Q12931         TRAP1         NYTYLC*AFNR         COUL         NCF1         0.00         same           Q12931         TRAP1         NYYLC*AFNR         C501         NCF2         0.00         same           Q12950-2         DLG1         VNDC*ILR         C275         NCC11         0.00         same           Q12950-2         DLG1         VNDC*ILR         C275         NCX01         0.00         same           Q13111-1         CHAPIA         VLQQPAAC*PLETLPAQEEQTPK         C710         NCX01         100.00         same           Q13111-1         CHAPIA         VLQQPAAC*PLETLPAQEEQTPK         C710         NCX01         100.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCP1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCP1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCP1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCP1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCP1         0.00         same <tr< td=""><td>Q12906-1</td><td>ILF3</td><td>VLEC*LASGIVMPDGSGIYDPC*EK</td><td>C278:C295</td><td>NCF2</td><td></td><td>100.00</td><td>same</td><td></td></tr<>	Q12906-1	ILF3	VLEC*LASGIVMPDGSGIYDPC*EK	C278:C295	NCF2		100.00	same	
	012021		NIVVI C*ADND	C501	NCF1	0.00	0.00	60 m 0	
	Q12931	TRAFT	NITILO AFINA	0301	NOFT	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q12931	TRAPI	NIYYLC*APNR	C501	NCF2	0.00	0.00	same	
Q12959-2         DLGI         VNDC*ILR         C275         NCK1         0.00         same           Q13111-1         CHAF1A         VLQCPAAC*FLETLPAQEEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAF1A         VLQCPAAC*FLETLPAQEEQTPK         C710         NCK01         100.00         same           Q13111-1         CHAF1A         VLQCPAAC*FLETLPAQEEQTPK         C710         NCK01         4.89         same           Q13117-1         CHAEDP         VTEDEDEDEPTEIPSEDDTVLLSTVT         C39         NCF1         0.00         same           Q13177         PAK2         C*LEAIDVEK         C480         NCF2         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCG1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCG1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCK1         0.00         same           Q13263         TRIM28         TVYC*NVHK         C209         NCF1         0.00	Q12931	TRAP1	NIYYLC*APNR	C501	NOXO1		0.00	same	
012959-2         DLCil         VNDC*TLR         C275         NOX01         0.00         same           Q13111-1         CHAFIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCF1         0.00         same           Q13111-1         CHAFIA         VLQQFAAC*FLETLPAQEEQTPK         C710         NCF1         100.00         same           Q13143-1         TARDBP         VTEDENDEPIEIPSEDDGTVLLSTVT         C39         NCF1         4.89         same           Q13143-1         TARDBP         C'LEMIPVER         C323         NCF1         0.00         same           Q13177         PAK2         C'LEMIPVER         C480         NCF2         0.00         same           Q13177         PAK2         C'LEMIPVER         C480         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCK1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCK1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCK1         0.00         same <td>012959-2</td> <td>DLG1</td> <td>VNDC*ILB</td> <td>C275</td> <td>NCF1</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	012959-2	DLG1	VNDC*ILB	C275	NCF1	0.00		same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	012050 2	DLCI	VNDC*ILD	0275	NOVOI	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q12959-2	DLGI	VNDC*ILR	0275	NOXOI	0.00	0.00	same	
Q13111-1         CHAFIA         VLQQFAAC*PLETLPAQEEQTPK         C710         NOF2         100.00         same           Q13114-1         TARDBP         VLQQFAAC*PLETLPSEDDGTVLLSTVT         C39         NCF1         4.89         same           Q13177         PAK2         C*LQALEFLHANQVIHR         C352         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF2         0.00         o.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF2         0.00         o.00         same           Q13176         PAK2         C*LEMDVEKR         C483         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NOC1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C33         NCF1         10.00         same           Q13206         DDX10         SIVFFSSC*K         C33         NCF1         0.00 </td <td>Q13111-1</td> <td>CHAF1A</td> <td>VLQQFAAC*FLETLPAQEEQTPK</td> <td>C710</td> <td>NCF1</td> <td></td> <td>0.00</td> <td>same</td> <td></td>	Q13111-1	CHAF1A	VLQQFAAC*FLETLPAQEEQTPK	C710	NCF1		0.00	same	
	Q13111-1	CHAF1A	VLQQFAAC*FLETLPAQEEQTPK	C710	NCF2	100.00		same	
Q13148-1         CARDE         VTEDENDEPIEPSEDDGTVLLSTVT         C/10         India         Manual           Q13147         PARC2         C*LQALEFLHANQVIHR         C352         N/CF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         N/CF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         N/CF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         N/CF2         0.00         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         N/CF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         N/CF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         N/CF1         0.00         same           Q13206         DDX10         C*PVSVVR         C471         N/CF1         0.00         same           Q13263         TRIM28         TVYC*N/HK         C209         N/CF1         1.00.00         same           Q13263         TRIM2         TVYC*N/HK         C73         NCF1         0.00         0.00         same	013111-1	CHAE1A	VLOOFAAC*FLETLPAOEEOTPK	C710	NOXO1		100.00	same	
Qi3148-1         TARDEP         ADDEC ADDEC INSERTION (LLS) (VI)         C39         NCF1         4.89         same           Qi3177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Qi3177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Qi3177         PAK2         C*LEMDVEK         C480         NCF2         0.00         same           Qi3177         PAK2         C*LEMDVEK         C480         NCF2         0.00         same           Qi3206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Qi3206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Qi3206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Qi3263         TRIM28         TVYC*NVHK         C209         NCF1         15.98         same           Qi3283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         2.24         same           Qi3243         G3BP1         VMSQNFTNC*HTK         C73         NCF1         0.00         same	4,101111	011111 111	VTEDENDEDIEIDGEDDCTVIICTVT	0110			100100	buille	
AddProAC*GLR         Case         Case         Case           Q13177         PAK2         CC*LEMDVEK         C352         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF2         0.00         same           Q13177         PAK2         C*LEMDVEK         C480         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13233         GBBP1         VMSQNFTNC+HTK         C73         NCF1         same         METAL           Q13243         GBBP1         VMSQNFTNC+HTK         C73	Q13148-1	TARDBP	VIEDENDEFIEIFSEDDGIVLLSIVI	C39	NCF1	4.89		same	
Q13177         PAK2         EC*LQALEFLIANQVIHR         C352         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCF1         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCF2         0.00         same           Q13177         PAK2         C*LEMDVEKR         C480         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCX1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCX1         0.00         same           Q13263         TRIM28         TYYC*NVHK         C209         NCF1         10.00         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         2.541         same           Q13427         PPIG         VMSQNFTNC*HTK         C73         NCC1         0.00         same           Q13470-2         TNK1         C4LPEGAVC*R         C109;C117         NCR1         0.00         same           Q1347	4,101101		AQFPGAC*GLR			1100		buille	
	Q13177	PAK2	EC*LQALEFLHANQVIHR	C352	NCF1	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	013177	PAK2	C*LEMDVEK	C480	NCF1		0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	010177	DAKO	C*LEMDVERD	C 400	NODI	0.00	0.00	Same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13177	PAK2	C*LEMDVEKR	C480	NCF1	0.00	0.00	same	
Q13177         PAK2         C*LEMDVEKR         C480         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCN1         0.00         same           Q13206         DDX10         SVFYSVR         C471         NCF1         0.00         same           Q13206         DX10         SVFYSVR         C471         NCF1         0.00         same           Q13283         TRIM28         TVYC*NVHK         C209         NCF1         100.00         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF2         5.41         same           Q13427         PPIG         UVSQNFTNC*HTK         C73         NCF1         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCK1         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCK1         0.00         same           Q13470-2	Q13177	PAK2	C*LEMDVEK	C480	NCF2	0.00	0.00	same	
C12206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF2         0.00         same           Q13206         DDX10         SIVFFSSC*K         C323         NCF1         0.00         same           Q13206         DDX10         C*FVSYVR         C471         NCF1         0.00         same           Q13203         TRIM28         TVYC*NVHK         C209         NCF1         15.98         same           Q13263         TRIM28         TYYC*NVHK         C209         NCF1         2.24         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         0.00         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         0.00         same           Q13427         PPIG         UVFELPSDVC*PK         C33         NCF1         0.00         same           Q13470-2         TNK1         C*LPEGAVC*R         C109;C117         NCF1         0.00         same           Q13470-2         TNK1         C*LPEGAVC*R         C109;C117         NCF1         0.00         same           Q13	Q13177	PAK2	C*LEMDVEKR	C480	NCF2	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	012206	DDV10	SIVEESCAR	C222	NCF1		0.00	60 m 0	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13200	DDA10	SIVEFSSC K	C323	NOFT		0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13206	DDA10	SIVFFSSC*K	0323	NCF2	0.00		same	
Q13206         DDX10         C*FVSYVR         C471         NCF1         0.00         0.00         same           Q13263         TRIM28         TVYC*NVHK         C209         NCF2         100.00         same         METAL           Q13263         TRIM28         TVYC*NVHK         C209         NCF2         100.00         same         METAL           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF2         2.24         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF2         5.41         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         0.00         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         0.00         same           Q13427         PPIG         VVEELPSDVC*PK         C33         NCF1         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF1         0.00         same           Q13470-2         TNK1         GELGSGC*FGVVHR         C126         NCF1         0.00         same           Q13470-2         TNK1         GELGSGC*FGVVHR         C126         NCF2	Q13206	DDX10	SIVFFSSC*K	C323	NOXO1	0.00		same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13206	DDX10	C*FVSYVR	C471	NCF1	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	012262	TDIMOS	TVVC*NVUK	C200	NCF1		15.09	60 m 0	METAI
Q122b3         INTRO         C209         NCF2         100.00         100.00         same         METAL           Q13263         TRIM28         TVYC*NVHK         C209         NCF1         100.00         same         METAL           Q13263         G3BP1         VMSQNFTNC*HTK         C73         NCF1         2.24         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCK2         5.41         same           Q13243         G3BP1         VMSQNFTNC*HTK         C73         NCK1         0.00         same           Q13427         PPIG         LSC*GELIPK         C174         NCF1         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF2         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCK1         0.00         same           Q13470-2         TNK1         GELGSGC*FGVHR         C126         NCF2         0.00         same           Q13470-2         TNK1         LPRPPLC*SR         C348         NOX01         0.00         same           Q13470-2         TNK1         LPRPPC*AQEAPR         C113         NCF1 <td>010200</td> <td>TTT11120</td> <td></td> <td>C203</td> <td>NOPI</td> <td>100.00</td> <td>10.30</td> <td>same</td> <td>METAL</td>	010200	TTT11120		C203	NOPI	100.00	10.30	same	METAL
Q13263         TRIM28         TVYC*NVHK         C209         NOXO1         100.00         same         METAL           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF1         2.24         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NOKC1         13.68         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NOXO1         13.68         same           Q13427         PPIG         LSC*GELIPK         C174         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF1         0.00         same         me           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF2         0.00         0.00         same           Q13470-2         TNK1         GELGSGC*FGVVHR         C126         NCF1         0.00         same         NP_BIN           Q13470-2         TNK1         LPRPLC*SR         C348         NCF2         23.30         22.49         same           Q13470-2         TNK1         LPRPPC*AQEAPR         C113         NCF1         0.00         same         Q1350.1         SQSTM1         D	Q13263	TRIM28	TVYC*NVHK	C209	NCF2	100.00	100.00	same	METAL
Q12283       G3BP1       VMSQNFTNC*HTK       C73       NCF1       2.24       same         Q13283       G3BP1       VMSQNFTNC*HTK       C73       NCK2       5.41       same         Q13283       G3BP1       VMSQNFTNC*HTK       C73       NCK1       13.68       same         Q13427       PPIG       ILSC*GELIPK       C174       NCF1       0.00       0.00       same         Q13427       PPIG       VVFELFSDVC*PK       C33       NCF1       0.00       0.00       same         Q13470-2       TNK1       C*LIPEGAVC*R       C109;C117       NCF2       0.00       0.00       same         Q13470-2       TNK1       C*LIPEGAVC*R       C109;C117       NOK01       0.00       same       NP_BIN         Q13470-2       TNK1       GELLGSGC*FGVVHR       C126       NCF1       0.00       same       NP_BIN         Q13470-2       TNK1       GELLGSGC*FGVVHR       C126       NCF2       2.3.30       22.49       same         Q13470-2       TNK1       LPRPPLC*SR       C348       NCO1       0.00       same       Q13470-2         Q13470-2       TNK1       LPRPPLC*SR       C113       NCF1       0.00       same	Q13263	TRIM28	TVYC*NVHK	C209	NOXO1		100.00	same	METAL
Q13283         G3BP1         VMSQNFTNC*HTK         C73         NCF2         5.41         same           Q13283         G3BP1         VMSQNFTNC*HTK         C73         NOX01         13.68         same           Q13427         PPIG         LISC*GELIPK         C174         NCF1         0.00         same           Q13427         PPIG         VVFELFSDVC*PK         C33         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOX01         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOX01         0.00         same           Q13470-2         TNK1         GELLGSGC*FGVVHR         C126         NCF2         0.00         0.00         same           Q13470-2         TNK1         LPRPLC*SR         C348         NOX01         0.00         same           Q13470-2         TNK1         LPRPC*AQEAPR         C113         NCF2         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113	Q13283	G3BP1	VMSONFTNC*HTK	C73	NCF1		2.24	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	012282	C3BP1	VMSONETNC*HTK	C73	NCE2		5.41	60 m 0	
Q13283         G3BP1         VMSQNF1NC*HTK         C/3         NOXO1         13.68         same           Q13427         PPIG         LSC*GELIPK         C174         NCF1         0.00         0.00         same           Q13427         PPIG         VVFELFSDVC*PK         C33         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF1         0.00         0.00         same           Q13470-2         TNK1         C#LLQSGC*FGVVHR         C126         NCF1         0.00         0.00         same         NP_BIN           Q13470-2         TNK1         LPRPPLC*SR         C348         NCF2         23.30         22.49         same         NP_BIN           Q13470-2         TNK1         LPRPPLC*SR         C348         NOX01         0.00         same         Q13470-2           Q13470-2         TNK1         LPRPPC*AQEAPR         C113         NCF1         0.00         same         Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NCK01         0.00         same	Q13283	GODD1 1	VMSQNFINO IIIK	015	NOF 2		0.41	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13283	G3BP1	VMSQNFINC"HIK	073	NOXOI		13.68	same	
Q13427         PPIG         VVFELFSDVC*PK         C33         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF1         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF2         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOX01         0.00         same           Q13470-2         TNK1         GELLCSGC*FGVVHR         C126         NCF2         0.00         0.00         same           Q13470-2         TNK1         IPRPPLC*SR         C348         NCF2         23.30         22.49         same           Q13470-2         TNK1         LPRPPLC*SR         C348         NCF1         0.00         same           Q13470-2         TNK1         LPRPPC*AQEAPR         C113         NCF1         0.00         same           Q13470-2         TNK1         DHRPC*AQEAPR         C113         NCF1         0.00         same           Q13501-1         SQSTM1         DHRPC*AQEAPR         C113         NCF1         0.00         same           Q13502-1         SQSTM1	Q13427	PPIG	ILSC*GELIPK	C174	NCF1	0.00		same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13427	PPIG	VVFELFSDVC*PK	C33	NCF1	0.00	0.00	same	
Q13470-2       TNK1       C*LIPEGAVC*R       C109;C117       NCF1       0.00       same         Q13470-2       TNK1       C*LIPEGAVC*R       C109;C117       NOX01       0.00       same         Q13470-2       TNK1       GELLGSGC*FGVVHR       C126       NCF1       0.00       0.00       same         Q13470-2       TNK1       GELLGSGC*FGVVHR       C126       NCF1       0.00       0.00       same         Q13470-2       TNK1       LPRPPLC*SR       C348       NCF2       0.00       0.00       same         Q13470-2       TNK1       LPRPPLC*SR       C348       NCF2       23.30       22.49       same         Q13470-2       TNK1       LPRPLC*SR       C348       NOX01       0.00       same         Q13501-1       SQSTM1       DHRPC*AQEAPR       C113       NCF1       0.00       same         Q13501-1       SQSTM1       DHRPC*AQEAPR       C113       NCF2       0.00       same         Q13501-1       SQSTM1       DHRPC*AQEAPR       C113       NCF1       0.00       same         Q13501-1       SQSTM1       DHRPC*AQEAPR       C113       NCF1       0.00       same         Q13642-1       FHL1	013470.2	TNK1	C*LIPECAVC*B	C100.C117	NCF1	0.00	0.00	samo	
Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NCF2         0.00         0.00         same           Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOXO1         0.00         same         NP_BIN           Q13470-2         TNK1         GELLGSGC*FGVVHR         C126         NCF1         0.00         same         NP_BIN           Q13470-2         TNK1         GELLGSGC*FGVVHR         C126         NCF2         2.00         0.00         same         NP_BIN           Q13470-2         TNK1         LPRPPLC*SR         C348         NOXO1         0.00         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NCF2         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NOXO1         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NOXO1         0.00         same           Q13502         PRF4B         DLADLGC*QR         C962         NCF1         0.00         same           Q13642-1         FHL1         C*SVNLANKR         C255         NCF1         0.00         same           Q13642-1	010470-2	TNICI	C LII EGAVO IL	G109,0117	NOPI	0.00	0.00	same	
Q13470-2         TNK1         C*LIPEGAVC*R         C109;C117         NOX01         0.00         same           Q13470-2         TNK1         GELLGSGC*FGVVHR         C126         NCF1         0.00         0.00         same         NP_BIN           Q13470-2         TNK1         LPRPPLC*SR         C348         NCF2         23.30         22.49         same           Q13470-2         TNK1         LPRPPLC*SR         C348         NOX01         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NCF1         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NCF2         0.00         same           Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NOX01         0.00         same           Q13523         PRF4B         DLLADLGC*QR         C962         NCF1         0.00         same           Q13642-1         FHL1         C*SVNLANKR         C255         NCF1         0.00         same           Q13642-1         FHL1         FDC*HYC*R         C7;C10         NCF1         0.00         same           Q13642-1         FHL1         C*HPLANETFVAK         C736	Q13470-2	TNKI	C*LIPEGAVC*R	C109;C117	NCF2	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13470-2	TNK1	C*LIPEGAVC*R	C109;C117	NOXO1	0.00		same	
Q13470-2       TNK1       GELLGSGC*FGVVHR       C126       NCF2       0.00       0.00       same       NP_BIN         Q13470-2       TNK1       LPRPPLC*SR       C348       NCF2       23.30       22.49       same         Q13470-2       TNK1       LPRPPLC*SR       C348       NOX01       0.00       0.00       same         Q13501-1       SQSTM1       DHRPPC*AQEAPR       C113       NCF1       0.00       0.00       same         Q13501-1       SQSTM1       DHRPPC*AQEAPR       C113       NCF2       0.00       same         Q13523       PRP4B       DLLADLIGC QR       C962       NCF1       0.00       0.00       same         Q13642-1       FHL1       C*SVNLANKR       C255       NCF1       0.00       same         Q13642-1       FHL1       FWL1       FDC*HYC*R       C7;C10       NCF1       0.00       same         Q13642-1       FHL1       C*WNAPIAGETK       C336       NCF1       0.00       same         Q13642-1       FHL1       C*HPLANETFVAK       C7;C10       NCF1       0.00       same         Q13642-1       FHL1       C*HPLANETFVAK       C7;C10       NCF1       0.00       same	013470-2	TNK1	GELLGSGC*FGVVHR	C126	NCF1	0.00	0.00	same	NP BIND
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	013470.2	TNK1	GELLGSGC*FGVVHB	C126	NCE2	0.00	0.00	eamo	NP BIND
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Q15470-2	TNKI	GELLGSGC FGVVIIN	0120	NCF2	0.00	0.00	same	MI_DIND
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13470-2	TNKI	LPRPPLC*SR	C348	NCF2	23.30	22.49	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q13470-2	TNK1	LPRPPLC*SR	C348	NOXO1	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	013501-1	SOSTM1	DHRPPC*AOEAPR	C113	NCF1	0.00	0.00	same	
Q13501-1       SQSTM1       DHRTPC*AQEAR       C113       NOXO1       0.00       same         Q13501-1       SQSTM1       DHRTPC*AQEAR       C113       NOXO1       0.00       0.00       same         Q13523       PRPF4B       DLLADLIGC*QR       C962       NCF1       0.00       0.00       same         Q13542       FHL1       DKPLC*HSEDEK       C56       NCF1       0.00       0.00       same         Q13642-1       FHL1       FWHDTC*FR       C65       NCF1       0.00       o.00       same         Q13642-1       FHL1       FDC*HYC*R       C7;C10       NCF1       0.00       o.00       same         Q13642-1       FHL1       FDC*HYC*R       C7;C10       NCF1       0.00       o.00       same         Q13642-1       FHL1       C*HPLANETFVAK       C71       NCF1       0.00       o.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCF2       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCF1       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCF1       0.00       same	012501 1	SOSTMI		C112	NCE2		0.00	co mo	
Q13501-1         SQSTM1         DHRPPC*AQEAPR         C113         NOXO1         0.00         0.00         same           Q13523         PRPF4B         DLLADLIGC*QR         C962         NCF1         0.00         100.00         same           Q13523         PRPF4B         DLLADLIGC*QR         C962         NCF1         0.00         0.00         same           Q13542-1         FHL1         C*SVNLANKR         C255         NCF1         0.00         0.00         same           Q13642-1         FHL1         FWHDTC*FR         C65         NCF1         0.00         0.00         same           Q13642-1         FHL1         FDC*HYC*R         C7;C10         NCF1         0.00         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C736         NCF1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCF2         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C362         NCF1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C362         NCF1         0.00         same           Q13823         GNL2	Q13501-1	SQSIMI	DIIMITO AQLATI	0113	NOF 2		0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13501-1	SQSTM1	DHRPPC*AQEAPR	C113	NOXO1	0.00	0.00	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q13523	PRPF4B	DLLADLIGC*QR	C962	NCF1	0.00	0.00	same	
Q13642-1         FHL1         C*SVNLANKR         C255         NCF1         0.000         same           Q13642-1         FHL1         FWHDTC*FR         C65         NCF1         0.00         0.00         same           Q13642-1         FHL1         FWHDTC*FR         C65         NCF1         0.00         0.00         same           Q13642-1         FHL1         FDC*HYC*R         C7;C10         NCF1         0.00         0.00         same           Q13642-1         FHL1         C*LHPLANETFVAK         C71         NCF1         0.00         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCF1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCF2         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C362         NCF1         0.00         same           Q13832         GNL2         VC*NVAPIAGETK         C362         NCF1         0.00         same           Q13833         GNL2         IFLIDC*PGVYPYSEDSETDIVLK         C362         NCF1         0.00         same           Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK	Q13586	STIM1	IDKPLC*HSEDEK	C56	NCF1	100.00	100.00	same	
Q13942-1         FIL1         C 3V NLAINER         C 255         NCF1         0.00         0.00         same           Q13642-1         FIL1         FWLDTC*FR         C65         NCF1         0.00         0.00         same           Q13642-1         FIL1         FDC*HYC*R         C7;C10         NCF1         0.00         0.00         same           Q13642-1         FIL1         C*LHPLANETFVAK         C7;C10         NCF1         0.00         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCF1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCS1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOX01         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOX01         0.00         same           Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOX01         9.84         same           Q13835         PKP1         SEPDLYC*DPR         C161         NOX01         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQ	012649 1	F111 1	C*SVNLANKD	COL	NOPI	100.00	100.00	Same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13042-1	r fili	O SVINLAINAN	0255	NOFT	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q13642-1	FHL1	FWHDTC*FR	C65	NCF1	0.00		same	
	Q13642-1	FHL1	FDC*HYC*R	C7;C10	NCF1	0.00	0.00	same	
Q13823       GNL2       VC*NVAPIAGETK       C336       NCF1       0.00       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCF2       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCF1       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCS1       0.00       same         Q13823       GNL2       VC*NVAPIAGETK       C336       NCS1       0.00       same         Q13823       GNL2       IFLIDC*PGVYPSEDSETDIVLK       C362       NCF1       0.00       same         Q13835       PKP1       TALAYEC*FQDQDNSTLALPSDQK       C14       NOXO1       9.84       same         Q13835       PKP1       SEPDLYC*DPR       C161       NOXO1       8.28       0.00       same         Q13835       PKP1       YSFYSTC*SGQK       C190       NCF2       0.00       same         Q13835       PKP1       IC*SEDIEC*SGLTIPK       C236;C242       NCF1       0.00       same	013642-1	FHL1	C*LHPLANETEVAK	C71	NCF1	0.00	0.00	samo	
Q13823         GRL2         VCTNVAPIAGETK         C336         NCF1         0.00         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NCF2         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOX01         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOX01         0.00         same           Q13823         GNL2         IFLIDC*PGVVYPSEDSETDIVLK         C362         NCF1         0.00         same         NP_BIN           Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOX01         9.84         same           Q13835         PKP1         SEPDLYC*DPR         C161         NOX01         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOX01         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q10042-1	CMLC		011	NOP1	0.00	0.00	same	
Q13823         GNL2         VC*NVAPIAGETK         C336         NCF2         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOXO1         0.00         same           Q13823         GNL2         VC*NVAPIAGETK         C336         NOXO1         0.00         same           Q13823         GNL2         IFLIDC*PGVVPSEDSETDIVLK         C362         NCF1         0.00         same           Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOXO1         9.84         same           Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q13823	GNL2	V C"N VAPIAGETK	C336	NCF1	0.00	0.00	same	
	Q13823	GNL2	VC*NVAPIAGETK	C336	NCF2		0.00	same	
Q13823         GNL2         IFLIDC*PGVVPSEDSETDIVLK         C362         NCF1         0.00         same         NP_BIN           Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOXO1         9.84         same         NP_BIN           Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q13823	GNL2	VC*NVAPIAGETK	C336	NOXO1		0.00	same	
Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOXO1         9.84         same         NP_BIN           Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	0120020	CNLO	IFUDC*PCVVVPCEDCETDIVI V	C260	NODI	0.00	0.00		ND DIND
Q13835         PKP1         TALAYEC*FQDQDNSTLALPSDQK         C14         NOXO1         9.84         same           Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q13823	GNL2	ILLIDU FUVVIFSEDSEIDIVLK	0302	INCEL	0.00		same	INF_BIND
Q13835         PKP1         SEPDLYC*DPR         C161         NOXO1         8.28         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q13835	PKP1	TALAYEC*FQDQDNSTLALPSDQK	C14	NOXO1	9.84		same	
Q13835         PKP1         YSFYSTC*SGQK         C190         NCF2         0.00         same           Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q13835	PKP1	SEPDLYC*DPR	C161	NOXO1	8.28	0.00	same	
Q13835         PKP1         IC*SEDIEC*SGLTIPK         C190         NOX01         13.09         14.75         same	013835	PKP1	VSFVSTC*SGOK	C100	NCF2	0.00		samo	
Q13835         PKP1         YSFYSTC*SGQK         C190         NOXO1         13.09         14.75         same           Q13835         PKP1         IC*SEDIEC*SGLTIPK         C236;C242         NCF1         0.00         same	Q10000	I MEL	Varvaration of Air	0190	NOVOI	19.00	14 85	same	
<u>Q13835 PKP1 IC*SEDIEC*SGLTIPK C236;C242 NCF1 0.00 same</u>	Q13835	PKP1	1 SF 1 ST U*SGQK	C190	NOXO1	13.09	14.75	same	
	Q13835	PKP1	IC*SEDIEC*SGLTIPK	C236;C242	NCF1	0.00		same	
Continued on nort name			Continued	on nort -	2000				

Table 2A.2 – continued	l from	previous	page
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q13835	PKP1	IC*SEDIEC*SGLTIPK	C236;C242	NCF2	0.00		same	
Q13835	PKP1	IC*SEDIEC*SGLTIPK	C236;C242	NOXO1	0.00	0.00	same	
Q13835	PKP1	QQVYQLGGIC*K	C290	NCF1	0.00	0.00	same	
Q13835	PKP1	QQVYQLGGIC*K	C290	NCF2	0.00	0.00	same	
Q13835	PKP1	VIIPFSGWC*DGNSNMSR	C387	NCF1	0.00	0.00	same	
Q13835	PKP1	VIIPFSGWC*DGNSNMSR	C387	NCF2	0.00		same	
Q13835	PKP1	VIIPFSGWC*DGNSNMSR	C387	NOXO1	0.00	0.00	same	
Q13835	PKP1	EVVDPEVFFNATGC*LR	C409	NCF2	0.00	0.00	same	
013835	PKP1	EVVDPEVFFNATGC*LB	C409	NOXO1	4 29	1 46	same	
013835	PKP1	SSTGC*FSNK	C513	NOXO1	0.00	0.00	same	
012925	DKD1	MMNNNVDC*DI DEFETNER	C513	NOXOI	0.00	0.00	same	
Q13835	DKD1	DATI FAC*ACALONI TASK	C528	NCEL	0.00	0.00	same	
Q13835	T KT I	DATLEAC AGALQNLIASK	C508	NOFI	0.00	0.00	same	
Q13835	PKPI	DATLEAC"AGALQNLIASK	0568	NCF2	0.00	0.00	same	
Q13835	PKPI	DATLEAC*AGALQNLIASK	0568	NOXOI	0.00	0.00	same	
Q13835	PKPI	LLTSHTGNTSNSEDILSSAC*YTVR	C662	NCFI	0.00	0.00	same	
Q13835	PKP1	LLTSHTGNTSNSEDILSSAC*YTVR	C662	NCF2	0.00	0.00	same	
Q13835	PKP1	LLTSHTGNTSNSEDILSSAC*YTVR	C662	NOXO1	0.00	0.00	same	
Q13838-1	DDX39B	NC*PHIVVGTPGR	C165	NCF1	0.00	0.00	same	
Q13838-1	DDX39B	NC*PHIVVGTPGR	C165	NCF2	0.00	0.00	same	
Q13838-1	DDX39B	C*IALAQLLVEQNFPAIAIHR	C300	NCF1	0.00	0.00	same	
Q14103	HNRNPD	GFC*FITFK	C226	NCF1	0.00		same	
Q14126	DSG2	TLAEVC*LGQK	C840	NCF1	5.40	8.17	same	
Q14126	DSG2	TLAEVC*LGOK	C840	NCF2	0.00	5.87	same	
Q14126	DSG2	TLAEVC*LGOK	C840	NOXO1	0.00	6.44	same	
014134-1	TRIM29	SGSEEVLC*DSC*IGNK	C173.C176	NCF1	0.00	0.00	same	
014134 1	TRIM29	SGSEEVLC*DSC*IGNK	C173:C176	NCF2	0.00	0.00	samo	
014124 1	TRIM20	DDLLNVC*MB	C420	NCF2	0.00	0.00	same	
Q14154-1 014151	SAED2	C*VCEVTMSTSDEATE	C440	NCF1	0.00	0.00	same	
Q14151 Q14151	SAF D2	LOLEC*OD	C649	NCEL	0.00	0.00	same	
Q14151	SAF D2	LQLEC QR	0072	NOFI	0.00	0.00	same	DIGULDID
0.1.101.0		attractor	C23;C26;	NOR		100.00		DISULFID;
Q14210	LY6D	C*HVC*TSSSNC*K	C32	NCF1	100.00	100.00	same	DISULFID;
								DISULFID
								DISULFID:
Q14210	LY6D	C*HVC*TSSSNC*K	C23;C26;	NCF2	100.00	100.00	same	DISULFID
Q14210	LIOD	e nive ibbbite k	C32	11012	100.00	100.00	Same	DISULFID,
								DISCHILD
			C23.C26.					DISULFID;
Q14210	LY6D	C*HVC*TSSSNC*K	C20,020,	NOXO1	100.00	100.00	same	DISULFID;
			0.52					DISULFID
014010	LVCD	HENNERDACED	Class	NODI		64.44		DICULUD
Q14210	LY6D	HSVVC*PASSR	C38	NCFI	50 50	64.44	same	DISULFID
Q14210	LY6D	HSVVC*PASSR	C38	NCF2	73.56	68.60	same	DISULFID
Q14210	LY6D	HSVVC*PASSR	C38	NOXO1	86.86	89.72	same	DISULFID
014241	TCEB3	MMTLHOOC*IB	C581	NCF1	0.00	0.00	same	
4611211	ELOA	mar magazo mo	0001		0.00	0.00	buille	
Q14247-1	CTTN	HC*SQVDSVR	C112	NCF1	24.44	21.08	same	
Q14247-1	CTTN	HC*SQVDSVR	C112	NCF2	19.49		same	
Q14247-1	CTTN	C*ALGWDHQEK	C246	NCF1	14.41	13.93	same	
Q14247-1	CTTN	C*ALGWDHQEK	C246	NCF2	12.96	13.84	same	
Q14247-1	CTTN	GVC*KGRYGLFPANYVELR	C534	NCF1	0.00	0.00	same	
Q14258	TRIM25	NTVLC*NVVEQFLQADLAR	C70	NCF1	0.00	0.00	same	
014574-1	DSC3	DLDEGPEC*TPA AOYVB	C471	NOXO1	100.00	100.00	same	
46110111	2000		C660.C671.		100.00	100100	banno	
Q14574-1	DSC3	VNLC*EC*THPTQC*R	C677	NCF2	100.00		same	
014574-1	DECO	CONOTI ESC*D	C702	NCEI	0.00	0.00		
Q14574-1	DSC3	GGNQILESC'R GGNOTI FEG*P	C792	NCED	0.00	0.00	same	
Q14574-1	DSC3	GGNQILESC*R	C792	NOF2	0.00	0.00	same	
Q14574-1	DSC3	GGNQILESC'R	C792	NOXOI	0.00	0.00	same	
Q14574-1	DSC3	C*NQNEDR	C836	NOXOI	0.00	0.00	same	
Q14574-1	DSC3	FITLAEACTK	C893	NCF1	0.00	0.00	same	
Q14574-1	DSC3	FITLAEAC*TK	C893	NCF2	0.00	0.00	same	
Q14574-1	DSC3	FITLAEAC*TK	C893	NOXO1	0.00	0.00	same	
Q14676	MDC1	C*NVEPVGR	C26	NCF2	100.00	100.00	same	
Q14676	MDC1	C*NVEPVGR	C26	NOXO1	100.00	100.00	same	
Q14678-1	KANK1	MLSAC*NLLK	C1093	NCF1	0.00	0.00	same	
Q14678-1	KANK1	MLSAC*NLLK	C1093	NCF2	0.00		same	
Q14678-1	KANK1	FC*LNTLQHEWFR	C1114	NCF1	0.00		same	
Q14678-1	KANK1	LLLDADVC*NVDHQNK	C1187	NCF1	0.00	0.00	same	
Q14678-1	KANK1	AASQINVC*GVR	C317	NCF1		0.00	same	
Q14692	BMS1	STLIOC*LIR	C101	NCF1	0.00	0.00	same	
Q14692	BMS1	STLIQC*LIB	C101	NCF2	0.00	0.00	same	
014692	BMS1	STLIOC*LIB	C101	NOXO1	0.00	0.00	same	
014692	BMS1	ADSLDC*SB	C734	NCF1	0.00	0.00	same	
014830	CHD4	FAEVEC*LAESHOHISK	C1897	NCF1	0.24	5.65	same	
Q14CN4 9	KBT79	KC*ADLETAIADAEOP	C262	NCES	9.04	0.00	same	
Q140114-2	SADT?	ALVENC*LVDDIWID	C303	NOP2	0.00	0.00	same	
Q15020 Q15020	SARIS		C241	NCET	0.00	0.00	same	
Q15020	SARI3	ALVENCE VDDIVID	0341	NOF2	0.00	0.00	same	
Q15020	SART3	ALVENC*LVPDLWIR	C341	NOXOI	0.00	0.00	same	
Q15020	SARI'3	EELEEIC"K	C821	NCF1	0.00	0.00	same	
Q15041	ARL6IP1	FHEIC*SNLVK	C109	NCF1	0.00	0.00	same	
Q15041	ARL6IP1	FHEIC*SNLVK	C109	NCF2	0.00	0.00	same	
Q15054	POLD3	FSAIQC*AAAVPR	C137	NCF1	0.00	0.00	same	
Q15070-1	OXA1L	C*LIFPLIVTGQR	C153	NCF1	0.00		same	
Q15070-1	OXA1L	C*LIFPLIVTGQR	C153	NCF2	0.00		same	
Q15070-1	OXA1L	C*LIFPLIVTGQR	C153	NOXO1	0.00	0.00	same	
Q15185	PTGES3	LTFSC*LGGSDNFK	C40	NCF1	0.00	0.00	same	
Q15233	NONO	FAC*HSASLTVR	C145	NCF1	4.92		same	
Q15233	NONO	FAC*HSASLTVR	C145	NOX01	~ -	100.00	same	
		C*SEGSFLLTTFPRPVTVEPMDOLDD						
Q15233	NONO	EEGLPEK	C208	NCF1	0.00		same	
		Continue	on nevt r	ງລຽບ				

Table 2A.2 –	continued from	m previous j	page
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
015365	PCBP1	LVVPATOC*GSLIGK	C109	NCF1	5.07	10.44	same	
015365	PCBP1	LVVPATOC*GSLIGK	C109	NCF2	0.00	10.44	same	
015365	PCBP1	AITIAGVPOSVTEC*VK	C158	NCF1	0.00	3 38	same	
Q15365	PCBP1	AITIAGVPOSVTEC*VK	C158	NCF2	0.00	0.00	same	
Q15305	DCDD1	OICHIVMI ETI SOSPOCE	C162	NOV01	0.00	0.00	same	
Q15305 Q15266 1	DCDD1	IVVDASOC*CSI ICK	C105	NCEI	0.00	2.42	same	
Q15300-1 Q15266 1	DCDD2	IVVPASOC*CSLICK	C109	NCF2	0.00	0.00	same	
Q15300-1 Q15266 1	PCPP2	LVVPASQC GSLIGK	C109	NOYO1	0.00	0.00	same	
Q15500-1	PCBP2	AITIACIDOSHEC*WZ	C109	NCEI	0.00	0.00	same	
Q15300-1	PCBP2	AITIAGIFQSILECTVK	C158	NCFI	0.00	0.00	same	
Q15366-1	PCBP2	AITIAGIPQSIEC*VK	C158	NOF2	0.00	0.00	same	
Q15366-1	PCBP2	ATTIAGIPQSIIEC*VK	C158	NOXOI	0.00	0.00	same	
Q15392	DHCR24	GLEAIC*AK	C252	NCFI	0.00	0.00	same	
Q15392	DHCR24	GLEAIC*AK	C252	NCF2	0.00	0.00	same	
Q15392	DHCR24	GLEAIC*AK	C252	NOXOI	0.00	0.00	same	
Q15393-1	SF3B3	FGNIC*VVR	C1054	NCF1	0.00	0.00	same	
Q15393-1	SF3B3	FGNIC*VVR	C1054	NCF2	0.00		same	
Q15393-1	SF3B3	SEHPPLC*GR	C1156	NCF1	8.48	12.70	same	
Q15393-1	SF3B3	SEHPPLC*GR	C1156	NCF2	11.15	14.89	same	
Q15393-1	SF3B3	SEHPPLC*GR	C1156	NOXO1	12.30		same	
Q15393-1	SF3B3	GMIFVC*SATHK	C289	NCF1	0.00		same	
Q15417	CNN3	DGIILC*ELINK	C59	NCF1	0.00	0.00	same	
Q15418-1	RPS6KA1	IC*DFGFAK	C556	NCF1	0.00	0.00	same	
Q15418-1	RPS6KA1	IC*DFGFAK	C556	NOXO1		0.00	same	
Q15424-1	SAFB	C*YGFVTMSTAEEATK	C448	NCF1	0.00		same	
Q15424-1	SAFB	C*YGFVTMSTAEEATK	C448	NCF1	0.00	0.00	same	
Q15424-1	SAFB	C*INHLHK	C463	NCF1	13.83	8.73	same	
Q15459	SF3A1	EVLDQVC*YR	C244	NCF1	0.00	0.00	same	
Q15637-2	SF1	SITNTTVC*TK	C279	NCF1	0.00	0.00	same	
015637-2	SF1	SITNTTVC*TK	C279	NCF2	0.00	0.00	same	
015637-2	SF1	SITNTTVC*TK	C279	NOXOI	0.00	0.00	same	
015942	ZVX	ONVAVNELC*GB	C384	NCF1	0.00	0.00	same	
Q15942 Q15042	ZIX	ONVAVNELC*CP	C284	NCF2	0.00	0.00	same	
Q10342 Q16620	CDSE6	VI ISSI ODC*I HCIESK	C476	NCE1	0.00	0.00	same	
Q10030	CPSF6	VLISSLQDC LIIGIESK	C476	NCE9		100.00	same	
Q10030	UFILE	C*OVTDD	C101	NCF2	12.67	14.76	same	
Q10000-1	IFI10 IEI16	C*QVIFR C*OUTDR	C191	NCES	13.07	14.70	same	
Q16666-1	1F110 1F110	C*QVIPR C*OVTDD	C191	NOF2	13.89	14.02	same	
Q10000-1	1F110	C*QVIPR	C191	NOXOI	1.23	4.90	same	
Q16666-1	IFII6	MDVVGTGQC*HNIPC*EEGDK	C351;C356	NCFI	0.00	0.00	same	
Q16666-1	1F116	MDVVGTGQC*HNIPC*EEGDK	C351;C356	NCFI	0.00		same	
Q16666-1	1F116	MDVVGTGQC*HNIPC*EEGDK	C351;C356	NCF2	0.00	0.00	same	
Q16666-1	1F116	MDVVGTGQC*HNIPC*EEGDK	C351;C356	NCF2		0.00	same	
Q16666-1	1F116	MDVVGTGQC*HNIPC*EEGDK	C351;C356	NOXO1	0.00	0.00	same	
Q16666-1	IFI16	MDVVGTGQC*HNIPC*EEGDKLQLFC	C351;C356;	NCF1	0.00	0.00	same	
Q10000-1	11 110	FR	C366	11011	0.00	0.00	Same	
		MDVVGTGOC*HNIPC*EEGDKLOLEC	C351-C356-					
Q16666-1	IFI16	FB	C366	NCF1	0.00	0.00	same	
		r n	0300					
016666 1	15116	MDVVGTGQC*HNIPC*EEGDKLQLFC	C351;C356;	NCE2	0.00	0.00	60 M 0	
Q10000-1	11.110	FR	C366	NOF 2	0.00	0.00	same	
		MDWVCTCOC*UNIDC*FECDVI OI EC	C251,C256,					
Q16666-1	IFI16	MDVVGIGQC'HNIFC'EEGDKLQLFC	C351;C350;	NOXO1	0.00	4.74	same	
		FR	C366					
Q16666-1	IFI16	LQLFC*FR	C366	NCF1	4.92	4.62	same	
Q16666-1	IFI16	LOLFC*FR	C366	NCF2	0.00	7.84	same	
Q16666-1	IFI16	LOLFC*FR	C366	NOXO1	0.00	0.00	same	
Q16666-1	IF116	HAIANYVC*B	C637	NCF1	0.30	0.79	same	
Q16666-1	IF116	KIIAIANYVC*B	C637	NCF1	4 24	4 15	same	
016666-1	IF116	IIAIANYVC*B	C637	NCF2	1.62	0.30	same	
Q10000-1 Q16666 1	IF116	KIIAIANYVC*B	C637	NCF2	6.16	6.80	samo	
Q10000-1 Q16666 1	IF116	IIAIANVVC*B	C637	NOXO1	2 10	2.03	same	
Q10000-1 Q16666 1	1F116	KILALANVVC*P	C627	NOXOI	2.10	2.05	same	
Q10000-1 Q16666 1	IF110 IF116	INOL C*SOTK	C670	NCEI	12.75	12.00	same	
Q10000-1	IF110 IF116	INQLO SQIK INOLOSOTI	C679	NCE9	12.07	14.09	same	
Q10000-1	IF110 IF116	INQLO SQIK INOLOSOTI	C679	NOV01	12.90	7.00	same	
Q10000-1	1F110	INGLUSQIK	C079	NOADI	0.21	7.00	same	
Q10000-1	1F110 1F110	LTTINC*EEGDK	0727	NCFI	5.53	8.11	same	
Q16666-1	IFII6	LTTINC*EEGDKLK	C727	NCFI	10.05	7.87	same	
Q16666-1	IF116	LTTINC*EEGDK	C727	NCF2	7.82	9.22	same	
Q16666-1	1F116	LTTINC*EEGDKLK	C727	NCF2	9.29	9.89	same	
Q16666-1	IFI16	LTTINC*EEGDK	C727	NOXO1	2.22	1.20	same	
Q16666-1	IFI16	LTTINC*EEGDKLK	C727	NOXO1	3.85	2.24	same	
Q16666-1	IFI16	LTC*FELAPK	C737	NCF1	10.99	9.74	same	
Q16666-1	IFI16	LTC*FELAPK	C737	NCF2	10.19	11.05	same	
Q16666-1	IFI16	LTC*FELAPK	C737	NOXO1	5.93	4.29	same	
01ED20	C16orf88	DVCDTC*SVCV	C104	NODI	0.00	0.00		
AIED38	KNOP1	DAGDIC.SAGK	0184	NOF 1	0.00	0.00	same	
01000	C16orf88		050	MODI		10 77		
CIFD38	KNOP1	GV51LU"LEHVEPETTLPAR	078	INCF'I		12.77	same	
Q1KMD3	HNRNPUL2	ALLPHVLC*K	C405	NCF1		0.00	same	
Q1KMD3	HNRNPUL2	NC*VVELNFGQK	C408	NCF1	0.00		same	
Q1KMD3	HNRNPUL2	NC*VVELNFGQK	C408	NCF2	0.00	0.00	same	
Q1KMD3	HNRNPUL2	NC*VVELNFGOK	C408	NOXO1	0.00	0.00	same	
Q1KMD3	HNRNPUL2	DLLVQQASQC*LSK	C518	NOXO1	0.00	100.00	same	
O1KMD3	HNRNPUL2	NFILDOC*NVYNSGOB	C538	NCF2	0.00	0.00	same	
O1KMD9	HNRNPUL2	NEILDOC*NVVNSCOR	C538	NOYO1	0.00	0.00	saille	
O40ANO 1	CRV9	C*VVILDEWEA ASSSVCIND	C230	NOVOI	0.00	53.07	same	
Q49AINU-1	AMOT	U VILLDI WIAA666VGIINA	C1047	NCEI	0.00	0.00	same	
Q4VCS5	AMOT	LSIPSITC NTDATDGEVENSNILER	C1047	NCET	0.00	0.00	same	
Q4VUS5	AMOT	Loir DLIC NEDKIDGEVERSNILER	01047	NCF2	0.00	0.00	same	
		Continued	on next p	bage				

<b>m</b> 11	<b>A</b>	0	1	C	•	
Table	2A.	2 -	continued	from	previous	page

GAVCSE         AMOCT         CHIPSELECTOPYER         CHIP         NORCI         0.00         name           GAVCSE         AMOT         CHIPSENCTYR         CLES         NORCI         0.00         name           GAVCSE         AMOT         NERGENERCTYR         CLES         NORCI         0.00         name           GAVCSE         AMOT         NERGENERCT         CLES         NORCI         0.00         name           GAVCSE         AMOT         CLESTER         CLESTER         NORCI         1.5.0         name           GAVCSE         AMOT         CLESTER         CLESTER         NORCI         1.6.0         name           GAVCSE         AMOT         CLESTER         CLESTER         CLESTER         NORCI         1.6.0         name           GAVCSE         AMOT         CLESTER         CLESTER         CLESTER         NORCI         1.6.0	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
QUVCSS         A.MOTT         NILKQEISSCUTEK         CL65         N.CFI         0.00         comme           QUVCSS         A.MOTT         NILKQEISSCUTEK         CL63         N.CFI         0.00         comme           QUVCSS         A.MOTT         MCQALAQLAACPEK         CL63         N.CFI         0.00         comme           QUVCSS         A.MOTT         CLASTARAACPEK         CL63         N.CFI         0.00	Q4VCS5	AMOT	LSIPSLTC*NPDKTDGPVFHSNTLER	C1047	NOXO1	0.00	0.00	same	
CHVCSS         AMOPT         CRESC. YEER         CRES         NCP1         7.68         11.36         memory           CAVCSS         AMOPT         NIGPLANCY YEER         CG15         NCV1         0.00         mass           CAVCSS         AMOPT         NIGPLANCY ALAC'EK         CG17         NCP1         0.00         0.00         mass           CAVCSS         AMOPT         MGQALACHAAC'EK         CG17         NCP1         0.00         mass           CAVCSS         AMOPT         GENCANCEGAAC'EK         CG17         NCP1         0.00         mass           CAVCSS         AMOPT         GENCANCEGAAC'EK         CG17         NCP1         0.00         mass           CAVCSS         AMOPT         CELECANCEGACHAR         CT41         NCP1         0.00         mass           CAVCSS         AMOPT         TEQUERCHARAC         CT41         NCP1 <t< td=""><td>04VCS5</td><td>AMOT</td><td>NI BOELECC*VEK</td><td>C455</td><td>NCF1</td><td></td><td>0.00</td><td>samo</td><td></td></t<>	04VCS5	AMOT	NI BOELECC*VEK	C455	NCF1		0.00	samo	
QAVESS         AMOT         NERGELENCYNEK         CLAS         NOXO1         Los         Dog         means           QAVESS         AMOTT         MEGQANNOLGAACTEK         CEIT         NCFP         0.00         Dog         Dog           QAVESS         AMOTT         MEGQANNOLGAACTEK         CEIT         NCFP         0.00         Dog         Dog           QAVESS         AMOTT         MEGQANNOLGAACTEK         CEIT         NCFP         0.00         Dog         Dog           QAVESS         AMOTT         MEGQANNOLGAACTEK         CEIT         NCFP         0.00         Dog	Q4VCS5	AMOT	OFLECC*VEV	C455	NOFI	7 69	11.96	same	
QAVCES         ANDOT         MCRUIDACTERN         CLEP         NCMUT         0.00         0.00         mannee           QAVCES         ANDOT         MCRUNDQGAACTER         CONT         NCPP         0.00         mannee           QAVCES         ANDOT         CLERCTPNESSYA ALMELLER         CONT         NCPP         0.00         mannee           QAVCES         ANDOT         DCSTGTER         CCRT         NCPP         0.00         mannee           QAVCER         DCTTTER         RCRT         C	Q4VCS5	AMOT	QELEGUTIEK	C455	NCFI	7.08	11.26	same	
QAVESS         AMOT         MQQALAGLQAACEEK         Corr         NCF1         0.00         0.00         name           QAVESS         AMOT         MQQALAGLQAACEK         Corr         NCNC         0.00         name           QAVESS         AMOT         MQQALAGLQAACEK         Corr         NCNC         0.00         name           QAVESS         AMOT         CLEMPER         CORT         NCNC         0.00         name           QAVESS         AMOT         CLEMPER         CORT         NCP         0.00         name           QAVESS         AMOT         CLEMPER         CTAI         NCT         1.498         1.547         name           QAVESS         AMOT         CLEMPER         CORT         NCP         1.498         1.547         name           QAVESS         AMOT         CLEMPER         CORT         NCP         0.00         0.00         name           QAVES         AMOT         CLEMPER         CLEMPER         CLEMPER         NCP         0.00         0.00         name           QAVES         AMOT         QALACESSA         NCP         0.00         0.00         name           QAVES         AMOT         QALACESSA         NCP	Q4VCS5	AMOT	NLRQELEGC*YEK	C455	NOXO1		0.00	same	
GAVCSS         AMOT         MGQALXQLQAACPEK         COIT         NCP1         0.00         0.00         same           GAVCSS         AMOT         MGQALXQLQAACPEK         COIT         NCP1         0.00         same           GAVCSS         AMOT         CGALVAUGAACPEK         COIT         NCP1         0.00         same           GAVCSS         AMOT         CLENERT         CAT         NCP1         0.00         same           GAVCSS         AMOT         TEXEGEN         CAT         NCP1         1.48         1.80         same           GAVCSS         AMOT         TEXEGEN         CAT         NCP1         1.48         1.86         same           GAVCSS         AMOT         TEXEGEN         CAT         NCP1         1.48         1.86         same           GAVCSS         AMOT         TEXEGEN         CAT         NCP1         1.63         same           GAVCSS         AMOT         GAVCANCMACQUECYVCERAGEN         CAT         NCP1         0.00         0.00         same           GAVESI         AMOT         GAVCANCMACQUECYVCERAGEN         CAT         NCP1         0.00         0.00         same           GAVCSI         AMOT         GAVCANCMACQUECYVC	Q4VCS5	AMOT	MQQALVQLQAAC*EK	C617	NCF1	0.00	0.00	same	
GIVCSS         AMOT         MGGADOBLGANCER         C017         NCP2         0.00         0.00         same           GIVCSS         AMOT         GUARDANALAMELER         C171         NCP1         6.00         same           GIVCSS         AMOT         CLUMEGA         C171         NCP1         6.00         same           GIVCSS         AMOT         CLUMEGA         C711         NCP1         6.00         same           GIVCSS         AMOT         CLUMEGA         C711         NCP1         16.87         same           GIVCSS         AMOT         CLUMEGA         C711         NCP1         16.84         same           GUARDANCE         CSS         NCP1         17.84         6.33         same           GUARDANCE         CSS         NCP1         91.86         6.33         same           GUARDANCE         CSS         NCP1         91.86         6.33         same           GUARDANCE         CSS         NCP1         91.86         6.33         same           GUARDANCE         GSS         NCP1         90.00         same         same           GUARDANCE         GSS         NCP1         90.00         same         same	Q4VCS5	AMOT	MQQALVQLQAAC*EK	C617	NCF1	0.00	0.00	same	
QAVESS         AMOT         CALL         Color	O4VCS5	AMOT	MOOALVOLOAAC*EK	C617	NCF2	0.00	0.00	samo	
CHVCSS         Abort         ChUMBER         Control         0.00         same           CHVCSS         Abort         CLIMECR         C741         NCPT         0.00         same           CHVCSS         Abort         CLIMECR         C741         NCPT         14.06         15.00         same           CHVCSS         Abort         C'STGTER         C741         NCPT         10.00         same           CHVCSS         Abort         C'STGTER         C642         NCP1         20.5         70.4         same           CAUCES         Abort         CCTTAL         REQUIVEDEAQSE         C53         NCP1         60.6         65.5         same           C40011         CHLIMER         C649         NCP1         0.00         0.00         same           C40112         CHLIMER         C77         NCP1         85.24         86.35         same           C40112         CHLIMER         C77         NCP1         0.00         0.00         same           C40114         REPTIP         CHLIMER         C77         NCP1         0.00         0.00         same           C40114         REPTIP         CHLIMER         C110         NCP1         0.00	Q4VOD5	AMOT	MOOALVOLOAAC*EV	0017	NOVOI	0.00	0.00	same	
QUICES         ALOT         CENTRAL         CONT         NCP1         Lind         same           QUICES         ALOT         CENERGE         C741         NCP1         Lind         Bace         same           QUICES         ALOT         CENERGE         C741         NCP1         Lind         Bace         same           QUICES         ALOT         TEQUESCHURK         C741         NCP1         Lind         Bace         same           QUICES         ALOT         TEQUESCHURK         C731         NCP1         20.5         same         same           QUELS         ALOT         CENTRAL         HQCVAUNGUECYVODEAGES         C633         NCP1         20.5         same         same           QUELS         CUELWONGUECYVODEAGES         C33         NCOL         0.4.0         86.7.2         same           QUELS         CUELWONGUECYVODEAGES         C37         NCOL         0.0.0         came         same         <	Q4VC55	AMOT	MQQALVQLQAAC EK	0017	NOXOI	0.00		same	
QAVCSS         AMOT         CHAMBOR         CT41         NCF1         Log         Hamme           QAVCSS         AMOT         TESLEXTMINAN         CT81         NCF1         Log         Hamme           QAVCSS         AMOT         DC*STQTMS         CNCP1         Log         Hamme           QAVCSS         AMOT         DC*STQTMS         CNCP1         Log         Hamme           QAVCSS         AMOT         DC*STQTMS         CNCP1         Log         Hamme           QAVCSS         AMOT         DC*STQTMS         CS3         NCP1         Log         Hamme           QAVLSS         OCHAD2         QALLPC*TK         CS3         NCXP1         HAMME         HAMME           QAVLS         OCHAD2         QALLPC*TK         CT7         NCXA         HAMME         HAMME           QAVLS         OCHAD2         QALLPC*TK         CHAMME         CS3         NCP1         0.00         0.00         Hamme           QAVLS         OCHAD2         QALLPC*TK         CHAMME         CS3         NCP1         1.10         Hamme           QAVLS         OCHAD2         QALLPC*TK         CS3         NCP1         1.11         Hamme           QAVLS         OCHA	Q4VCS5	AMOT	QGNC*QPTNVSEYNAAALMELLR	C647	NCF1	0.00		same	
QAVCSS         AMOT         CULMMEGR         CT41         NCP1         14.96         15.67         same           QUCSS         ACTELZ         HQCVANUGQRUCYYCELAQSK         CGS         NCP1         76.42         same           QG2R11         ACTELZ         HQCVANUGQRUCYYCELAQSK         CGS         NCP1         76.64         same           QG2R11         ACTELZ         HQCVANUGQRUCYYCELAQSK         CGS         NCP1         66.63         same           QG0013         ACLADZ         QSLACYM         GGALACSYNCELASK         CG7         NCP1         66.63         same           QG013         CCLADZ         QSLACYM         CG7         NCNC1         91.83         86.75         same           QG013         CCLADZ         QSLACYM         CT6         NCP2         71.64         63.9         same           QG0145         DNTTTP2         QLLACSTVSSVR         CT6         NCP2         0.00         same           QG2126         DNTTTP2         QLLACSTVSSVR         CT6         NCP2         13.11         15.26           QG2128         DNTTTP2         QLLACSTVSSVR         CG38         NCP2         13.11         15.26         same           QG7UWP         FAM838	Q4VCS5	AMOT	C*LDMEGR	C741	NCF1	0.00		same	
Qivess         AMOT         DESCRIPTION         CH2         NCF1         20.53         Rest         name           Qivess         AMOT         DESTTITE         CH2         NCF1         20.53         name         name           QBERL         ACTEL2         IIQEVANCAGARDE'TYOEDAAGSK         CG3         NCF2         20.64         65.55         name           QBERL         ACTEL2         IIQEVANCAGARDE'TYOEDAAGSK         CG3         NCF1         40.43         86.52         name           QBERL         OCLAD2         QBLFE'TK         CG7         NCF1         85.24         86.85         name           QBERL         OCLAD2         QBLFE'TK         CG7         NCF1         10.00         0.00         name           QBERL         IIPPS         TC*TTALK         CG39         NCF1         0.00         0.00         name           QGJIG         DNTTTP         NCF1         13.11         15.26         name           QGSIA:         HIPPS         TC*TTALK         CG39         NCK21         0.00         name           QGSIA:         HIPPS         TC*TTALK         CG39         NCK21         0.00         name           QGTOW         FAASSB         FLLADC*	Q4VCS5	AMOT	C*LDMEGR	C741	NCF1	14.98	15.80	same	
CALVESS         AMOT         DC*STQTER         Code         NCP1         20.5.3         DO         Earning           Q402R1         ACTEN12         HQCVAVCMQQKDC+VVCDEAQSK         C33         NCP1         70.24         aanne           Q402R1         ACTEN12         HQCVAVCMQQKDC+VVCDEAQSK         C33         NCP1         70.24         aanne           Q40713         OCIAP2         QSLEC*NK         C37         NCP1         75.44         86.35         aanne           Q40713         OCIAP2         QSLEC*NK         C37         NCP1         75.64         66.35         aanne           Q40713         OCIAP2         QSLEC*NK         C37         NCP1         86.27         8600         aanne           Q40713         OCIAP2         QSLEC*NK         C38         NCP1         0.00         600         earne           Q40713         DTTTP2         QLLAC*SPYSSVR         C168         NCP2         0.00         earne         earne           Q40714         DTTTP2         QLLAC*SPYSSVR         C388         NCP1         0.00         earne           Q40714         DTTTP3         NCP1         NCP1         1.55         6.64         earne           Q4070W         FAM838	O4VCS5	AMOT	TEOLSC*MBPAK	C781	NCE1		18.67	co mo	
Quintin         AUTILI         LIQCUMANDAGKREDYWEDBAQSK         CB3         NCP1         20.35         76.2         annee           QUINTING         CATTELIZ         HQCVANCMAGKREDYWEDBAQSK         CB3         NOXCI         64.02         66.35         annee           QUINTING         CATTELIZ         HQCVANCMAGKREDYWEDBAQSK         CB3         NOXCI         64.02         66.35         annee           QUINTING         CALDEY         SELECTIK         CB7         NOXCI         64.03         66.03         annee           QUINTING         CALDEY         SELECTIK         CB7         NOXCI         0.00         annee           QUINTING         QUINTING         CB3         NCP1         0.00         annee           QUINTING         QUINTING         QUINTING         QUINTING         ANNEE         QUINTING         QUINTING         QUINTING         QUINTING         QUINTING         QUINTING         QUINTING         QUINTING	Q4VC35	AMOT	DOMOTED	C101	NOPI	00 50	18.07	same	
Q02231         AC1912         HQCVAVCMQRQKDCVVCDPAQSK         C33         NCP1         77         76         76.35         same           Q02311         AC1912         HQCVAVCMQCAQQSK         C33         NCP1         67.02         65.35         same           Q07131         OCLAD2         QSLFC*TK         C27         NCP1         85.24         86.35         same           Q07141         CCLAD2         QSLFC*TK         C27         NCP1         60.00         0.00         same           Q07141         CCLAD2         QSLFC*TK         C37         NCP1         0.00         0.00         same           Q07142         CLLHIVI         C38         NCP1         0.00         0.00         same           Q07162         DNTTTP2         NLC4*SPYSYN R         C116         NCP1         0.00         same           Q02162         DNTTTP2         NLC4*SPYSSN R         C38         NCP1         1.298         same           Q02164         DNTTP2         NLC4*SPYSSN R         C384         NCP1         1.298         same           Q07100         FAMS38         FLLND*C4K         C234         NCP1         1.31         18.30         same           Q07100	Q4VCS5	AMOI	DC*SIQIER	0862	NCF1	20.53		same	
Qd2211         ACTIL: J. ILGUVARVARQUEC-VYGDEAQSK         C53         KCF1         6543         65.35         same           Qd5V1.3         OCIAD2         QSLLPCYFK         C37         NCF1         65.43         65.35         same           Qd5V1.3         OCIAD2         QSLLPCYFK         C37         NCACI         0.00         same           QG4DE1         DYTTP2         QLLACYSTYSSVR         C116         NCACI         0.00         same           QG2DE2         DYTTP2         QLLACYSTYSSVR         C116         NCACI         0.00         same           QG2DE3         DYTTP2         QLACYSTYSSKQEESAR         C236         NCC1         0.00         same           QG2DW3         PAMSB3         FLADOC QK         C231         NCT1         0.00         same           QTUW9         FAMSB3         FLADOC QK         C231         NCT1         0.00	Q562R1	ACTBL2	HQGVMVGMGQKDC*YVGDEAQSK	C53	NCF1		76.24	same	
QMS211         ACTIL2         HQGVMMQQKDCYUDEAQSK         C33         NCK01         64.02         65.55         same           QMVL3         OCIAD2         QSLLACPPK         C37         NCR1         65.34         66.35         same           QMVL3         OCIAD2         QSLLACPPK         C37         NCR1         65.34         66.35         same           QMVL3         OCIAD2         QSLLACPFK         C37         NCR1         0.00         0.00         same           QGVL3         OCIAD2         QSLLACPFK         C35         NCF1         0.00         0.00         same           QGUE3         DNTTP2         QLLACPFNSSVR         C018         NCF1         0.00         0.00         same           QSSL3-1         INTER3         TCTSTLALK         C359         NCF1         0.00         same         same           QTUW9         PAMS8         FLINDCCQK         C336         NCF1         0.00         same         same         same           QTUW9         FAMS8         FLINDCCQK         C331         NCF1         0.00         same         same         same         same           QTUW9         FAMS8         LCYNSTSAQESAR         C333         NCF1	Q562R1	ACTBL2	HQGVMVGMGQKDC*YVGDEAQSK	C53	NCF2	79.68		same	
GéNUL         OCIAD2         QÉLLC'PR         C27         NCT2         5.24         85.25         same           QéVILA         OCIAD2         QÉLLC'PR         C27         NCT2         57.66         85.27         same           QéVILA         OCIAD2         QÉLLC'PR         C37         NCT2         65.05         same           QéVILA         OCIAD2         QÉLLC'PR         C37         NCR2         0.00         0.00         same           QéVILA         ORITIP2         QULLC'STVSSVR         C116         NCK01         0.00         same           QéQUES         DNTTP2         QULLC'STVSSVR         C116         NCK01         0.00         same           QÉQUES         DNTTP3         TC'STLALK         C350         NCF3         0.00         same           QSSIS-1         HP1B9         TC'STLALK         C350         NCF3         0.00         same           QSTW09         FAMSB         SC'VYSSFAQEEAR         C281         NCC1         0.00         same           QTW09         FAMSB         SC'VYSSFAQEEAR         C281         NCC1         5.84         same           QTW09         FAMSB         SC'VYSSFAQEEARQORPK         C123         NCC1         <	Q562B1	ACTBL2	HOGVMVGMGOKDC*YVGDEAOSK	C53	NOXO1	64.02	65.55	same	
Gérélis         OCCIAD2         GéllerOPPK         C27         NCP2         177.66         66.95         same           GATTHAI         RHP12         C"LLHUR         C37         NCRO1         0.00         same           GATTHAI         RHP12         C"LLHUR         C389         NCP1         0.00         same           GATTHAI         RHP12         C"LLHUR         C389         NCP1         0.00         same           GASIDA         NCNTTP2         QUILACYSNYSSYR         C116         NOXO1         0.00         same           GSSIDA         HPH87         TC*STTALK         C399         NCP1         0.00         same           GSSIDA         HPH87         TC*STTALK         C399         NCP1         0.00         same           GSSIDA         HPH87         TC*STTALK         C399         NCN1         0.00         same           GSTWW         FAMSB         FLVDC*GK         C238         NCP1         1.0.0         same           GTWW         FAMSB         SC*VESEAGEESAR         C281         NCX01         0.00         same           GTWW         FAMSB         SC*VESEAGEESAR         C313         NCP1         1.0.00         same	O56VL3	OCIAD2	OSLLEC*PK	C27	NCF1	85.24	86.35	samo	
Gentral         Ocilizio         Gentral         Cd7         NOKG1         54.83         86.72         same           GGUE         DNTTP12         CLLAC*PNSVR         CS8         NCP1         0.00         60.00         same           GGUE         DNTTP2         QULAC*PNSVR         CS15         NCP1         0.00         60.00         same           GGUE         DNTTP2         QULAC*PNSVR         CS15         NCP1         0.00         60.00         same           GSS55.1         HFH13         TC*STTALK         CS59         NCP1         0.00         same           GSS55.1         HFH23         TC*STTALK         CS39         NCP2         0.00         same           GSS55.1         HFH23         TC*STTALK         CS39         NCP1         1.2.85         same           GSTWM9         FAMSB         SCVPSEGAQEEAR         C231         NCP1         0.00         same           GTWW9         FAMSB         SCVPSEGAQEEAR         C331         NCP1         0.00         same           GTWW9         FAMSB         SCVPSEGAQEEAR         C331         NCP1         0.00         same           GTWW9         FAMSB         SCVPSEGAQEEAR         C331         N	Q50VL5	OCIAD2	QULEC*DV	021	NOPI	55.24	CF OF	same	
QaVLa         OCIAND         QALLAC'STVESSVR         C17         NCKCI         91.83         86.72         same           QSQLEE         DNTTIP2         QLLAC'STVESSVR         C116         NCKOI         0.00         0.00         same           QSQLEE         DNTTIP2         QLLAC'STVESSVR         C116         NCKOI         0.00         0.00         same           QSQLEE         DNTTIP2         QLLAC'STVESSVR         C186         NCR1         0.00         same           QSSLS1         HPHB3         TC"STTALK         C369         NCR2         0.00         same           QSSLS1         HPHB3         TC"STTALK         C369         NCR2         0.00         same           QSSLS1         HPHB3         TC"STTALK         C369         NCR2         0.00         same           QSTWW         FAMSB         SC'VPESFAQEESAR         C381         NCR2         0.00         same           QTWW         FAMSB         SC'VPESFAQEESAR         C383         NCR1         1.029         Same           QTWW         FAMSB         SC'VPESFAQEESAR         C383         NCR1         0.00         same           QTWW         FAMSB         SC'VPESFAQEESAR         C383         NC	Q56VL3	OCIAD2	QSLLFC*PK	027	NCF2	57.06	65.95	same	
Q371991         RRP12         C*1.LHUN         C589         NCE1         0.00         0.00         same           Q5Q1DE         DNTTP2         Q114C'SPNSWR         C116         NCC1         0.00         0.00         same           Q5Q1DE         DNTTP2         Q114C'SPNSWR         C116         NCC1         0.00         0.00         same           Q5S15-1         HP1BP3         TC*STTALK         C359         NCF1         0.00         0.00         same           Q5S15-1         HP1BP3         TC*STTALK         C359         NCF1         0.00         0.00         same           Q5TW09         FAMS8B         FLUDC'QK         C236         NCF1         1.0.0         0.00         same           Q5TW09         FAMS8B         CYPESPAQEESAR         C281         NCX01         0.00         same           Q5TW09         FAMS8B         CYPESPAQEESAR         C321         NCR1         1.0.00         same           Q5TW09         FAMS8B         CYPESPAQEESAR         C321         NCR1         1.0.00         same           Q5TW09         FAMS8B         CYPESPAQEESAR         C321         NCR1         1.0.00         same           Q5TW09         FAMS8B	Q56VL3	OCIAD2	QSLLFC*PK	C27	NOXO1	91.83	86.72	same	
GQUED         DNTTIP         QULLACSPLVSSVI         C116         NCF1         0.00         name           GQUED         DNTTIP         QULLACSPLVSSVR         C116         NOKCI         0.00         same           QSSISI-1         HPIBP3         TC*TTALK         C359         NCF1         0.00         same           QSSISI-1         HPIBP3         TC*TTALK         C350         NCF1         0.00         same           QSSISI-1         HPIBP3         TC*TTALK         C350         NCF1         0.00         same           QSSISI-1         HPIBP3         TC*TTALK         C350         NCF1         0.00         same           QSTUW9         FAMSB         SC'VPSSPAQEESAR         C281         NCF1         0.00         same           QSTUW9         FAMSB         SC'VPSSPAQEESAR         C281         NCF1         10.20         0.00         same           QSTUW9         FAMSB         SC'VPSSPAQEESAR         C331         NCF1         10.22         15.25         same           QSTUM9         FAMSB         SC'VPSSPAQEESAR         C332         NCF1         10.22         15.25         same           QSTUM5         FAMSB         SC'VPSSPAQEESAR         C32 <t< td=""><td>Q5JTH9-1</td><td>RRP12</td><td>C*LLHIVR</td><td>C839</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q5JTH9-1	RRP12	C*LLHIVR	C839	NCF1	0.00	0.00	same	
GGGE         DNTTIP         QLLAC*SPVSSVR         C116         NOX01         0.00         same           GGGLE6         DNTTIP         TC*STTALK         C353         NCF1         0.00         0.00         same           GSS35.1         HIPHP3         TC*STTALK         C359         NCF1         0.00         0.00         same           GSS35.1         HIPHP3         TC*STTALK         C350         NCF1         12.98         same           GTUW9         FAMSB         FLUDC*QK         C236         NCF1         13.11         18.30         same           GTUW9         FAMSB         SC*VPSSFAQEESAR         C381         NCF2         0.00         same           GTUW9         FAMSB         SC*VPSSFAQEESAR         C381         NCF2         0.00         same           GTU0         GPATCH         LTDEALLQAC*GR         C123         NCF1         10.27         same           GTU0         GPATCH         ATADC*SK         C333         NCF1         10.27         same           GTU0         GPATCH         INTEALLAC*GR         C316         NCF1         10.00         same           GTU0         GPATCH         ATADC*SK         C116         NCS1         0.00<	Q5QJE6	DNTTIP2	QILIAC*SPVSSVR	C116	NCF1	0.00	0.00	same	
CODE         CODE <thcode< th="">         CODE         CODE         <thc< td=""><td>OSO IE6</td><td>DNTTIP2</td><td>OILLAC*SPVSSVB</td><td>C116</td><td>NOXO1</td><td></td><td>0.00</td><td>samo</td><td></td></thc<></thcode<>	OSO IE6	DNTTIP2	OILLAC*SPVSSVB	C116	NOXO1		0.00	samo	
QQUDD         LDR1 112         ARU-YT DESK         Call         North         0.00         same           QSUDD         LDR1 112         ARU-YT DESK         Call         North         0.00         same           QSUDD         CSTATALK         CSD         NORD         0.00         same           QSTUM9         FAMSB         FULDECTRITALK         CSD         NORD         11.10         same           QSTUM9         FAMSB         FULDECTRITALK         CSD         NORD         0.00         same           QSTUM9         FAMSB         FULDECTRIC         CSD         NORD         1.11         1.20         same           QSTUM9         FAMSB         SCVPSSPAQEESAR         CSB         NORD         0.00         same           QSTUM9         FAMSB         SCVPSSPAQEESAR         CSB         NORD         0.00         same           QSTUM0         CPATCH4         ANDPC'SR         CSB         NORD         10.00         same           QSTUM0         CEPSSO         LCC"FFLDLLTR         C2716         NORD         0.00         same           QVT06         CEPSSO         LCC"FFLDLLTR         C2716         NORD         0.00         same           Q	Q5Q5E0	DNTTII 2	VILLAC DI VDDVIL	Cillo	NOROI	0.00	0.00	same	
QSSS1:1         HPIBP3         TC*STTALK         C359         NCF1         0.00         comme           QSSS1:1         HPIBP3         TC*STTALK         C359         NCK1         12.98         mame           QSTUM9         FAMSB         FLUNDC*QK         C236         NCF1         12.98         mame           QSTUM9         FAMSB         FLUNDC*QK         C236         NCF1         13.11         18.30         same           QSTUM9         FAMSB         SCUPSSAQEESAR         C281         NCF1         0.00         0.00         mame           QSTUM9         FAMSB         SCUPSSAQEESAR         C281         NCF1         0.00         mame           QSTUM9         FAMSB         LC*SSDTLVSEGEENQKYK         C601         NOX01         0.00         mame           QSTUM9         FAMSB         LC*STSTALK         C132         NCF1         100.00         mame           QSTUM0         CAPACHA         HIPELPLALQAC*REGR         C123         NCF1         100.00         mame           QUVT0         HIP         SLUDNFALMPDILC*SAK         C12         NCF1         100.00         mame           QUVT0         CEF550         LC*TPELDLLTR         C2716         NOK01	Q9Q1F0	DN111P2	NHUTVPPYSESK	0018	NCFI	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q5SSJ5-1	HP1BP3	TC*STTALK	C359	NCF1	0.00	0.00	same	
GSS35-1         HPIB73         TC*STTALK         C359         NOC1         0.00         same           GSTUW9         FAMS38         FLAPDC*QK         C348         NCP1         13.11         18.20         same           GSTUW9         FAMS38         FCAPCTQK         C348         NCP1         13.11         18.20         same           GSTUW9         FAMS38         SC*VPSSFAQEESAR         C281         NCP1         0.00         same           GSTUM9         FAMS38         SC*VPSSFAQEESAR         C281         NCNO1         0.00         same           GSTUM9         FAMS38         SC*VPSSFAQEESAR         C331         NCP1         10.32         15.27         same           GST300         CPATCH4         MADPC*SR         C333         NCP1         10.00         same         same           GSTTW7         TSTD2         FQGC*APDIR         C334         NCP1         10.00         same         same           GVT06         CEP30         LC*TPLIDLITR         C2716         NCN01         0.00         same           GVT076         CEP30         LC*TPLIDLITR         C3716         NCX01         0.00         same           GVT078         ATP32H2         YSQC*AK <td>Q5SSJ5-1</td> <td>HP1BP3</td> <td>TC*STTALK</td> <td>C359</td> <td>NCF2</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	Q5SSJ5-1	HP1BP3	TC*STTALK	C359	NCF2	0.00		same	
Corrow         FAMS3B         FLVDC*QK         C236         NCF1         12.98         name           QSTUW9         FAMS3B         FLVDC*QK         C236         NCF1         0.00         0.00         same           QSTUW9         FAMS3B         SC-VFSSFAQEESAR         C281         NCF1         0.00         0.00         same           QSTUW9         FAMS3B         SC-VFSSFAQEESAR         C281         NCF1         0.00         same           QSTUW9         FAMS3B         IC*SSDTUMSGREENQRYK         C801         NOX01         0.00         same           QSTI00         CPATCH4         ITDEMLIQAC*EGR         C152         NCF1         18.38         14.29         same           QSTI00         CPATCH4         AUAD*C*SIR         C312         NCF1         10.00         same           QSTT07         RF1         SLDNFAINPDLC*SAK         C312         NCF1         0.00         same           QSVT06         CEP350         LC*TPLIDLITR         C2716         NCF2         0.00         same           QSVT08         ATPFEP2         YSQC*AK         C19         NCF2         0.00         same           QSVT08         ATPFEP2         YSQC*AK         C19         NCF	05SSJ5-1	HP1BP3	TC*STTALK	C359	NOXO1	0.00		same	
Optimize         FAMSUB         FLLYDC*QR         C2266         NCF2         13.1         18.20         issue           QSTUW9         FAMSUB         SCVPESSFAQEESAR         C281         NCF2         0.00         came           QSTUW9         FAMSUB         SCVPESSFAQEESAR         C281         NCR2         0.00         came           QSTUW9         FAMSUB         SCVPESSFAQEESAR         C281         NCR01         0.00         came           QSTUW9         FAMSUB         SCVPESSFAQEESAR         C281         NCR01         0.00         came           QSTUW9         FAMSUB         SCVPESSFAQEESAR         C281         NCR1         10.22         15.27         same           QSTU00         CPATCH4         ITDEMLIQACRESK         C132         NCF1         10.00         same         same           QUPU0         RIF1         SIDNFALAPDILC*SAK         C132         NCF1         0.00         0.00         same           QVT06         CEP330         LC*TPLILITR         C2716         NCR2         0.00         0.00         same           QVT08         ATPSEP2         YSQLC*AK         C19         NCP2         0.00         o.00         same           QVT08         <	OFTOWO	FAM83B	FUVDC*OK	C236	NCEL	12.09		same	
QP11000         FARSBS         FLEVDCVGA         Construction         Notes         1         1520         same           QFTUN09         FARSBS         SCVPESFAQEESAR         C281         NCC2         0.00         same           QFTUN09         FARSBS         SCVPESFAQEESAR         C281         NCX01         0.00         same           QFTUN0         FARSBS         SCVPESFAQEESAR         C281         NCX01         0.00         same           QFTUN0         FARSBS         SCVPESFAQEEEXQKPK         C81         NOX01         0.00         same           QFTUN0         FARSB         SCVPESFAQEEEXQKPK         C81         NCX01         1.00.00         same           QFTUN0         GFTATM         ITTEMLLQACEEGEXQKPK         C132         NCF1         100.00         same           QFTUN0         GEP350         LC*TPLLDLTR         C2716         NCP1         0.00         same           QFVT06         CEP350         LC*TPLLDLTR         C2716         NCV1         0.00         same           QFVT08         ATPSEP2         YSQC*AK         C139         NCF1         0.00         same           QFVT08         ATPSEP2         YSQC*AK         C1139         NCF2         0	Q510W9	PANOOD	FLLVDO QK	C230	NGEO	12.98	10.00	same	
QFTM09         EAMS38         SC*VFSSRQEESAR         C281         NCP1         0.00         0.00         same           QFTM09         FAMS38         SC*VFSSRQEESAR         C281         NCN1         0.00         0.00         same           QFTM09         FAMS38         LC*SSDTUYSEGEENQRYK         C801         NCN1         0.00         0.00         same           QFTM04         FAMS38         LC*SSDTUYSEGEENQRYK         C801         NCN1         0.00         same           QFTM04         FAMCHALLIA/C*EGR         C152         NCP1         18.38         14.29         same           QFTM04         CPATCH4         HTDEMLLQA/C*EGR         C152         NCP1         10.20         15.27         same           QFUT06         CEP350         LC*TPLLDLTR         C2716         NCP1         0.00         same           QFVT06         CEP350         LC*TPLLDLTR         C2716         NCP2         0.00         same           QFVT08         ATPFEP2         YSQC*AK         C19         NCP1         0.00         same           QFVT08         ATPFEP2         YSQC*AK         C19         NCP1         0.00         same           QFVWN6         FAM208B         VC*SLQK	Q510W9	FAM83B	FLLVDC*QK	0236	NCF2	13.11	18.20	same	
QFTUW9         FAMSBB         SCV_PSEAQEESAR         C281         NCF2         0.00         same           QFTUW9         FAMSBB         SCV_PSEAQEESAR         C281         NCR1         0.00         0.00         same           QFTUM9         FAMSBB         SCVPSEAQEESAR         C281         NCR1         0.00         same           QFTUM9         FAMSBB         SCVPSEAQEESAR         C281         NCR1         0.00         same           QFTUM0         FAMSBB         SCVPSEAQEESAR         C281         NCR1         100.00         same           QFTUG         FAMSBB         SCVPSEAQEACHORK         C281         NCF1         100.00         same           QFTUR         RET         SUDPALAPPILC*SK         C314         NCF1         100.00         same           QFTUG         REF         SUDPALAPPILC*SK         C319         NCF1         0.00         same           QFVT06         CEP350         LC*TPLLDLTR         C2716         NCF1         0.00         same           QFVT08         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           QFVT08         FAM208B         AVC*SLQK         C1139         NCF1         0.00 <t< td=""><td>Q5T0W9</td><td>FAM83B</td><td>SC*VPSSFAQEESAR</td><td>C281</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q5T0W9	FAM83B	SC*VPSSFAQEESAR	C281	NCF1	0.00	0.00	same	
QFUT099         FAMSBB         CCVPSERAQEESAR         C281         NOXOI         0.00         same           QTTM09         FAMSBB         LCVSSEDTUNSECENQRYK         C801         NOXOI         0.00         same           QTTM0         GPATCH4         LTDEMLQAC*ECR         C152         NCF1         18.38         14.39         same           QTTM0         GPATCH4         LTDEMLQAC*ECR         C152         NCF1         18.38         14.39         same           QTTM07         GPATCH4         LTDEMLQAC*ECR         C152         NCF1         18.38         14.39         same           QTTM07         GPATCH4         LTDEMLQAC*ECR         C324         NCF1         18.38         16.39         same           QTTM06         CEP330         LC*TPLLDLTR         C2716         NCF1         0.00         0.00         same           QVTU8         ATP5EP2         YSQC*AK         C19         NCF1         0.00         0.00         same           QVTU8         ATP5EP2         YSQC*AK         C1139         NCF1         0.00         same           QVWN6-         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           QVWN6-         FAM	Q5T0W9	FAM83B	SC*VPSSFAQEESAR	C281	NCF2	0.00		same	
CTUW9         FAMSBB         LC*SSDTIXSECEENQKPK         C801         NOXO1         0.00         same           GT310         GPATCH4         HLTDEMLLQAC*EGR         C152         NCF1         5.58         5.64         same           GT310         GPATCH4         HLTDEMLLQAC*EGR         C152         NCF1         10.22         same           GTTW1         TNTD         PGGCHLAPDIN         C333         NCF1         10.22         same           GTTW1         TNTD         PGGCHAPDIN         C334         NCF1         10.00         same           GVT06         CEP350         LC*TPLLDLTR         C2716         NCF1         0.00         0.00         same           GVT06         CEP350         LC*TPLLDLTR         C2716         NCF1         0.00         0.00         same           GVT08         ATP5EP2         YSQLC*AK         C19         NCF1         0.00         0.00         same           GVWN6         FAM208B         YLC*ASSUGGETLDK         C1129         NCF1         0.00         same           GVWN6         FAM208B         YUSINSTLESCELQK         C139         NCF1         0.00         same           GVWN6         FAM208B         YUSINSTLESCELQK         <	05T0W9	FAM83B	SC*VPSSFAOEESAB	C281	NOXO1	0.00	0.00	same	
Optiming         Optiming         Intropendic of the second	OFTOWO	FAM02D	I C*SSEDTI VSECEENOVDV	C201	NOVOI	0.00	0.00	Banne	
QD1300         GFATCH1         LLDEBILLQAC'EUR         CD2         NCP1         0.58         8.64         same           GF1300         GFATCH4         AADBC'SE         GC333         NCF1         18.32         18.37         same           GSTATCH4         AADBC'SE         GC334         NCF1         100.00         same           GSTATCH4         AADBC'SE         GC334         NCF1         100.00         same           GSTT06         CEP350         LC"TPLLDLTR         C2716         NCF1         0.00         0.00         same           GSVT06         CEP350         LC"TPLLDLTR         C2716         NCF1         0.00         0.00         same           GSVT06         CEP350         LC"TPLLDLTR         C2716         NCF1         0.00         0.00         same           GSVT06         CEP350         LC"TPLDLTR         C2716         NCF1         0.00         same           GSVT07         TATSEP2         YSQC'AK         C1139         NCF1         0.00         same           GSVWN6         FAM208B         AVC"SLQK         C1139         NCF1         0.00         same           GSVWN6         FAM208B         VVSINSTLESC*ELR         C333         NOX01 <td>QSIUWS</td> <td>FAM65D</td> <td>LC SSSDILV SEGEENQKFK</td> <td>0801</td> <td>NOADI</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	QSIUWS	FAM65D	LC SSSDILV SEGEENQKFK	0801	NOADI	0.00		same	
QFT310         GPATCH4         ILTDEMLLQAC*EGR         Cl52         NCF1         18.38         14.29         same           QFT310         GPATCH4         MADPC*SR         G332         NCF1         10.20         same           QFD100         RIP1         SLIDSFALNPDLC*SAK         G332         NCF1         10.20         same           QSVT06         CEP550         LC*TPLLDLTR         C2716         NCF2         0.00         0.00         same           QSVT06         CEP530         LC*TPLLDLTR         C2716         NCF2         0.00         0.00         same           QSVT05         ATPSEP2         YSQIC*AK         C119         NCF1         8.98         7.55         same           QSVT05         FAM208B         YLC*ASSVGGETLDK         C1125         NCF1         0.00         same           QSVWN6         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           QSVWN6         FAM208B         VLSC*DDSVK         C739         NCF1         0.00         same           QSVWN6         FAM208B         VVSINSTLESC*ELR         C833         NOXO1         0.00         same           QSVWN6         FAM208B         VVSINSTLESC*ELR	Q5T310	GPATCH4	ILTDEMLLQAC*EGR	C152	NCF1	5.58	8.64	same	
Q5T300         GPATCH4         AYADPC*SR         C333         NCF1         10.22         15.27         same           Q5UTW0         RF1         SLIDNFALNPDILC*SAK         C324         NCF1         100.00         same           Q5UT00         RF1         SLIDNFALNPDILC*SAK         C312         NCF1         100.00         same           Q5VT06         CFP350         LC*TFLDLITR         C2716         NCF1         0.00         same           Q5VT06         CFP350         LC*TFLDLITR         C2716         NCF1         0.00         same           Q5VT06         CFP350         LC*TFLDLITR         C2716         NCF1         0.00         same           Q5VT05         ATP5EP2         YSQIC*AK         C19         NCF1         0.00         same           Q5VWN6         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           Q5WW86         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         same           Q5WW86         FAM208B         YSINSTLESC*ELR         C833         NOX01         0.00         same           Q5XXA6         AN01         HAPWNUC*R         C166         NOX01         0.00         sam	Q5T3I0	GPATCH4	ILTDEMLLQAC*EGR	C152	NCF1	18.38	14.29	same	
Q5TW7W         TSTD2         FQGC*LAPDIR         C324         NCF1         100.00         same           Q5UT06         CEP300         LC*TPLLDLTR         C2716         NCF1         0.00         0.00         same           Q5VT06         CEP300         LC*TPLLDLTR         C2716         NCF2         0.00         0.00         same           Q5VT06         CEP350         LC*TPLLDLTR         C2716         NCC1         0.00         same           Q5VT06         CEP350         LC*TPLLDLTR         C2716         NCC1         0.00         same           Q5VT06         CEP350         LC*TPLDLTR         C216         NCC1         0.00         same           Q5VT08         ATPSEP2         YSQC*AK         C139         NCF1         0.00         same           Q5WW6-         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           Q5WW6-         FAM208B         VCSINSTLESC*ELR         C333         NOX01         0.00         same           Q5XM6-         AN01         HAPWNUC*R         C166         NCF1         0.00         same           Q5XA6-         AN01         HAPWNUC*R         C166         NCF1         0.00 <td>Q5T3I0</td> <td>GPATCH4</td> <td>AYADPC*SR</td> <td>C333</td> <td>NCF1</td> <td>10.22</td> <td>15.27</td> <td>same</td> <td></td>	Q5T3I0	GPATCH4	AYADPC*SR	C333	NCF1	10.22	15.27	same	
Objection         Right Network (CS)         SLIDEFALNEDLC'SAK         C312         NCF1         100.00         same           GNUT06         CEP350         LC*TPLLDLITR         C2716         NCF1         0.00         0.00         same           GSVT06         CEP350         LC*TPLLDLITR         C2716         NCF1         0.00         0.00         same           GSVT06         CEP350         LC*TPLLDLITR         C2716         NCS1         0.00         same           GSVT08         ATP5EP2         YSQIC*AK         C19         NCF1         0.00         same           GVTV18         ATP5EP2         YSQIC*AK         C113         NCF1         0.00         same           GVWN6-         FAM208B         AVC*SLQK         C1139         NCF2         0.00         same           GVWN6-         FAM208B         IVLS*DDSVK         C739         NCF1         0.00         same           1         GSWN6-         FAM208B         IVSINSTLESC*ELR         C833         NOX01         0.00         same           1         GSWN6-         FAM208B         YVSINSTLESC*ELR         C166         NCF1         0.00         same           1         GSXA6-         AN01         HA	O5T7W7	TSTD2	FOGC*LAPDIR	C324	NCF1	100.00		same	
$ \begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	OFUIDO	DIE1	CLIDNEALNDDU C*CAV	C212	NCEL	100.00		same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	QSUIFU	RIF I	SLIDNFALNFDILC SAK	0312	NOFI	100.00		same	
	Q5VT06	CEP350	LC*TPLLDLLTR	C2716	NCF1	0.00	0.00	same	
	Q5VT06	CEP350	LC*TPLLDLLTR	C2716	NCF2	0.00	0.00	same	
Civitus         ATPSEP2         YSQIC*AK         Cip         NCF1         0.00         same           GSVTUS         ATPSEP2         YSQIC*AK         Cl9         NCC21         0.00         0.00         same           GSVTUS         ATPSEP2         YSQIC*AK         Cl9         NCC1125         NCP1         0.00         same           GSVWN6-         FAM208B         AVC*SLQK         Cl139         NCF1         0.00         same           GSWWN6-         FAM208B         AVC*SLQK         C739         NCF1         0.00         same           GSWWN6-         FAM208B         VVSINSTLESC*ELR         C833         NCF1         0.00         same           GSWWN6-         FAM208B         YVSINSTLESC*ELR         C833         NCF1         0.00         same           1         GSXXA6-         ANO1         IHAPWNVLC*R         Cl66         NCF2         0.00         same           1         GSXXA6-         ANO1         IHAPWNVLC*R         Cl66         NCF1         0.00         same           1         GSXXA6-         ANO1         MSAC*ATAR         C395         NCF1         0.00         same           1         GSXXA6-         ANO1         MSSAC*ATAR <td>O5VT06</td> <td>CEP350</td> <td>LC*TPLLDLLTR</td> <td>C2716</td> <td>NOXO1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	O5VT06	CEP350	LC*TPLLDLLTR	C2716	NOXO1	0.00	0.00	same	
Obvirus       ATPSEP2       YSQIC*AR       C19       NCP2       0.00       same         Q5VWN6       FAM208B       YLC*ASSVGGETLDK       C119       NCP1       0.00       0.00       same         Q5VWN6       FAM208B       AVC*SLQK       C1139       NCP1       8.98       7.55       same         Q5VWN6       FAM208B       AVC*SLQK       C1139       NCP1       0.00       same         Q5VWN6       FAM208B       IVLC*ASSVGGETLDK       C739       NCP1       0.00       same         Q5VWN6       FAM208B       IVLSC*DDSVK       C739       NCP1       0.00       same         Q5VWN6       FAM208B       YVSINSTLESC*ELR       C833       NOC01       0.00       same         Q5XXA6       ANO1       IHAPWNVLC*R       C166       NCF1       0.00       same         Q5XXA6       ANO1       IHAPWNVLC*R       C166       NCC91       0.00       same         Q5XXA6       ANO1       IHAPWNVLC*R       C166       NCC91       0.00       same         Q5XXA6       ANO1       MSSAC*ATAR       C395       NCF1       0.00       same       DISULFD         Q5XXA6       ANO1       MSSAC*ATAR       C395 <td>O5VTU8</td> <td>ATP5EP2</td> <td>VSOIC*AK</td> <td>C19</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>samo</td> <td></td>	O5VTU8	ATP5EP2	VSOIC*AK	C19	NCF1	0.00	0.00	samo	
Opvilos         AlfPSEP2         1540-AR         Cl9         NOX01         0.000         same           QSVT08         ATPSEP2         1540-AR         Cl9         NOX01         0.000         same           QSVT08         FAM208B         YIC*ASSVGGETLDK         Cl130         NCF1         0.000         same           QSVWN6         FAM208B         AVC*SLQK         Cl130         NCF2         0.00         same           QSVWN6         FAM208B         AVC*SLQK         Cl130         NCF1         0.00         same           QSVWN6         FAM208B         YVSINSTLESC*DSVK         C739         NCF1         0.00         same           QSVWN6         FAM208B         YVSINSTLESC*ELR         C833         NOX01         0.00         same           QSXXA6         AN01         IHAPWNVLC*R         Cl66         NCF1         0.00         same           QSXXA6         AN01         IHAPWNVLC*R         Cl66         NOX01         0.00         same           QSXXA6         AN01         MSSAC*ATAR         C395         NCF1         90.05         100.00         same           QSXXA6         AN01         MSSAC*ATAR         C395         NCF1         90.00         100.00 </td <td>QUVIUS</td> <td>ATTODIZ</td> <td>VOICEAN</td> <td>C19</td> <td>NGPA</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	QUVIUS	ATTODIZ	VOICEAN	C19	NGPA	0.00	0.00	same	
Q5VT08         ATP5EP2         YSQLC*AK         C19         NCK01         0.00         same           Q5VWN6-         FAM208B         AVC*SLQK         C1139         NCF1         0.00         same           Q5WWN6-         FAM208B         AVC*SLQK         C1139         NCF2         0.00         same           Q5WWN6-         FAM208B         AVC*SLQK         C1139         NCF2         0.00         same           Q5WWN6-         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         same           Q5WWN6-         FAM208B         YVSINSTLESC*ELR         C833         NCF1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCS2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C395         NCF1         90.00         i00.00         same           Q5XXA6-         ANO1         IMSSAC*ATAR         C395         NCF1         90.00         i00.00         same           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         90.00	Q5V108	AIP5EP2	YSQIC*AK	019	NCF2	0.00	0.00	same	
Q5VWn6-         FAM208B         YLC*ASSVGGETLDK         Cl125         NCF1         0.00         same           Q5VWn6-         FAM208B         AVC*SLQK         C1139         NCF1         8.98         7.55         same           Q5VWn6-         FAM208B         AVC*SLQK         C1139         NCF2         0.00         same           Q5VWn6-         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         same           Q5VWn6-         FAM208B         YVSINSTLESC*ELR         C833         NOC1         0.00         same           Q5VWn6-         FAM208B         YVSINSTLESC*ELR         C833         NOC1         0.00         same           Q5XXA6-         AN01         IHAPWNVLC*R         C166         NCF1         0.00         same           Q5XXA6-         AN01         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         AN01         MSAC*ATAR         C395         NCF1         90.05         100.00         same           Q5XXA6-         AN01         MSAC*ATAR         C395         NCF1         90.00         same         DISULFID           Q5XXA6-         AN01         MSAC*ATAR         C395	Q5VTU8	ATP5EP2	YSQIC*AK	C19	NOXO1	0.00	0.00	same	
1       G5WW6       FAM208B       AVC*SLQK       C1139       NCF1       8.98       7.55       same         05WW6       FAM208B       AVC*SLQK       C1139       NCF2       0.00       same         0       G5WW6       FAM208B       IVLSC*DDSVK       C739       NCF1       0.00       0.00       same         0       G5WW6       FAM208B       IVLSC*DDSVK       C739       NCF1       0.00       same         0       G5WW6       FAM208B       YVSINSTLESC*ELR       C833       NOXO1       0.00       same         0       G5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF1       0.00       same         1       G5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       same         1       G5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       same       DISULFID         1       G5XXA6-       ANO1       MSSAC*ATAR       C395       NCF1       90.05       100.00       same       DISULFID         1       G5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       9.40       100.00       same       DISULFID         1	Q5VWN6-	FAM208B	YLC*ASSVGGETLDK	C1125	NCF1	0.00		same	
G5VWN6-         FAM208B         AVC*SLQK         Cl139         NCF1         8.98         7.55         same           Q5VWN6-         FAM208B         AVC*SLQK         Cl139         NCF2         0.00         same           Q5VWN6-         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         0.00         same           Q5VWN6-         FAM208B         YVSINSTLESC*ELR         C833         NOX01         0.00         0.00         same           Q5VWN6-         FAM208B         YVSINSTLESC*ELR         C833         NOX01         0.00         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NOX01         0.00         same           Q5XXA6-         ANO1         MSAC*ATAR         C395         NCF1         90.05         100.00         same           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF2         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NOX01         9.40         0.00         same           Q69YH5-1 <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	1								
Qot Who         FAM200E         AVC SEQR         C1100         NCF1         0.39         7.30         same           Q5VWN6-         FAM208E         AVC*SLQK         C1309         NCF1         0.00         same           Q5VWN6-         FAM208E         IVLSC*DDSVK         C739         NCF1         0.00         same           Q5VWN6-         FAM208E         YVSINSTLESC*ELR         C833         NCF1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCS1         0.00         same           Q5XXA6-         ANO1         MSAC*ATAR         C395         NCF1         90.05         100.00         same           Q5XXA6-         ANO1         MSAC*ATAR         C395         NCF1         90.05         100.00         same         DISULFID           Q5XXA6-         ANO1         MSAC*ATAR         C395         NOX01         98.40         100.00         same         DISULFID           Q5XXA6-         ANO1	OFVWNG	E4 M208B	AVC*SLOK	C1130	NCEL	0 0 0	7 55	60 m 0	
L         GSVWN6-         FAM208B         AVC*SLQK         C1139         NCF2         0.00         same           QSVWN6-         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         0.00         same           QSVWN6-         FAM208B         YVSINSTLESC*ELR         C833         NCF1         0.00         0.00         same           QSVWN6-         FAM208B         YVSINSTLESC*ELR         C833         NOX01         0.00         0.00         same           QSXXA6-         ANO1         IHAPWNVLC*R         C166         NCF1         0.00         same           QSXXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           QSXXA6-         ANO1         IHAPWNVLC*R         C166         NOX01         0.00         same         DISULFID           QSXXA6-         ANO1         MSSAC*ATAR         C395         NCF1         90.05         100.00         same         DISULFID           QSXXA6-         ANO1         MSSAC*ATAR         C395         NCF1         0.00         same         DISULFID           Q6XYA6-         ANO1         MSSAC*ATAR         C395         NCF1         0.00         same         DISULFI	Q3 V W IND-	I'AM200D	AVO BLOR	01105	NOPT	0.90	1.55	same	
Q5VWN6         FAM208B         AVC*SLQK         C1130         NCF2         0.00         same           Q6VWN6         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         0.00         same           Q6VWN6         FAM208B         YVSINSTLESC*ELR         C833         NCF1         0.00         0.00         same           Q6VWN6         FAM208B         YVSINSTLESC*ELR         C833         NOXO1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         0.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         0.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         0.00         same         DISULFID           Q6XXA6-         ANO1         QSPDPHEEC*V	1								
1       G5VWN6-       FAM208B       IVLSC*DDSVK       C739       NCF1       0.00       same         25VWN6-       FAM208B       YVSINSTLESC*ELR       C833       NCF1       0.00       same         25VWN6-       FAM208B       YVSINSTLESC*ELR       C833       NOX01       0.00       same         25VXN6-       AN01       IHAPWNVLC*R       C166       NCF1       0.00       same         25XXA6-       AN01       IHAPWNVLC*R       C166       NCF2       0.00       same         25XXA6-       AN01       IHAPWNVLC*R       C166       NCS1       0.00       same         25XXA6-       AN01       MSAC*ATAR       C395       NCF1       90.05       100.00       same         25XXA6-       AN01       MSSAC*ATAR       C395       NCS1       98.40       100.00       same       DISULFID         26XXA6-       AN01       MSSAC*ATAR       C395       NCS01       0.00       same       DISULFID         26SXXA6-       AN01       MSSAC*ATAR       C395       NCS1       0.00       same       DISULFID         269YH5-1       CDCA2       VADC*VVGK       C706       NOX01       0.00       same       DISULFID	Q5VWN6-	FAM208B	AVC*SLQK	C1139	NCF2		0.00	same	
Q5VWN6-         FAM208B         IVLSC*DDSVK         C739         NCF1         0.00         0.00         same           Q5VWN6-         FAM208B         YVSINSTLESC*ELR         C833         NCF1         0.00         0.00         same           Q5VWN6-         FAM208B         YVSINSTLESC*ELR         C833         NOX01         0.00         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF1         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF2         0.00         same           Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NCF1         90.05         100.00         same           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         90.05         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF2         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NOX01         9.00         same         DISULFID           Q5XXA6-         ANO1         QSPPDHEEC*VK         C706         NOX01         0.00         same	1								
and         box         box <td>O5VWN6-</td> <td>FAM208B</td> <td>IVLSC*DDSVK</td> <td>C739</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	O5VWN6-	FAM208B	IVLSC*DDSVK	C739	NCF1	0.00	0.00	same	
$ \begin{bmatrix} 25 \text{VWN6-} & FAM208B & \text{YVSINSTLESC*ELR} & C833 & \text{NCF1} & 0.00 & \text{same} \\ 1 & & & & & & & & & & & & & & & & & &$	1	111012001	IVESC DESVIR	0105	NOP 1	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1	EL MARA		<i>a</i>	N.C.D.				
1       Q5VWNc       FAM208B       YVSINSTLESC*ELR       C833       NOXO1       0.00       same         Q5XXA6-       AN01       IHAPWNVLC*R       C166       NCF1       0.00       same         Q5XXA6-       AN01       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       AN01       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       AN01       IHAPWNVLC*R       C166       NOX01       0.00       same       DISULFID         Q5XXA6-       AN01       MSSAC*ATAR       C395       NCF1       90.05       100.00       same       DISULFID         Q5XXA6-       AN01       MSSAC*ATAR       C395       NCF2       100.00       same       DISULFID         1       0       0.00       same       DISULFID       0.00       same       DISULFID <tr< td=""><td>Q5VWN6-</td><td>FAM208B</td><td>YVSINSTLESC*ELR</td><td>C833</td><td>NCF1</td><td>0.00</td><td></td><td>same</td><td></td></tr<>	Q5VWN6-	FAM208B	YVSINSTLESC*ELR	C833	NCF1	0.00		same	
Q5VWN6-       FAM208B       YVSINSTLESC*ELR       C833       NOX01       0.00       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF1       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCS2       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       0.00       same         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NCF1       90.05       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       QQSPPDHEEC*VK       C706       NOXO1       0.00       same       DISULFID         Q69YH5-1       CDCA2       SPATPAC*R       C315 <t< td=""><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	1								
Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF1       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCS2       0.00       same         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NCF1       90.05       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NCF2       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       QQSPPDHEEC*VK       C706       NOXO1       0.00       same       DISULFID         Q69YH5-1       CDCA2       SPATPAC*R       C315       NCF1       29.06       same         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       s	O5VWN6-	FAM208B	YVSINSTLESC*ELB	C833	NOXO1	0.00	0.00	same	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	1					0.00	0.00	buille	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1	11101		<b>G1</b> 00	N.C.D.				
1 Q5XXA6- ANO1       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6- ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       0.00       same         Q5XXA6- ANO1       MSSAC*ATAR       C395       NCF1       90.05       100.00       same       DISULFID         Q5XXA6- ANO1       MSSAC*ATAR       C395       NCF2       100.00       100.00       same       DISULFID         Q5XXA6- ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6- ANO1       QSPPDHEEC*VK       C706       NOXO1       0.00       same       DISULFID         Q69YH5-1       CDCA2       VADC*VVGK       C280       NCF1       0.00       same       DISULFID         1       069YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q68YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q68YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q61BS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NOCF1       0.00       same         Q61BS0<	Q5XXA6-	ANOI	IHAPWNVLC*R	C166	NCF1	0.00		same	
Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NCF2       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       0.00       same         Q5XXA6-       ANO1       IHAPWNVLC*R       C166       NOXO1       0.00       0.00       same         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NCF2       100.00       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       9.00       100.00       same       DISULFID         Q5XXA6-       ANO1       QQSPPDHEEC*VK       C706       NOXO1       0.00       same       DISULFID         1       -       -       -       -       -       -       -       -         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOX01       0.00       same       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -	1								
	Q5XXA6-	ANO1	IHAPWNVLC*R	C166	NCF2		0.00	same	
Q5XXA6-         ANO1         IHAPWNVLC*R         C166         NOXO1         0.00         0.00         same           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF1         90.05         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NCF2         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NOXO1         98.40         100.00         same         DISULFID           Q5XXA6-         ANO1         MSSAC*ATAR         C395         NOXO1         0.00         same         DISULFID           Q5XXA6-         ANO1         QSPPDHEEC*VK         C706         NOXO1         0.00         same         DISULFID           Q69YH5-1         CDCA2         SPATPAC*R         C315         NOXO1         0.00         same         DISULFID           Q69YH5-1         CDCA2         SPATPAC*R         C315         NOXO1         0.00         same         Q61850           TWF2         AVLPLLDAQQPC*YLLYR         C67         NCF1         0.00         same           Q61BS0         TWF2         AVLPLLDAQQPC*YLLYR         C67         NCF1         0.00	1								
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	OFVVAG	ANOI	III A DWNWL C*D	C166	NOVOI	0.00	0.00		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	QOAAA0-	ANOI	INAF WINVLC'R	0100	NOAOI	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q5XXA6-	ANO1	MSSAC*ATAR	C395	NCF1	90.05	100.00	same	DISULFID
Q5XXA6-       ANO1       MSSAC*ATAR       C395       NCF2       100.00       100.00       same       DISULFID         1	1								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	O5XXA6-	ANO1	MSSAC*ATAB	C395	NCF2	100.00	100.00	same	DISULFID
Q5XXA6-       ANO1       MSSAC*ATAR       C395       NOXO1       98.40       100.00       same       DISULFID         Q5XXA6-       ANO1       QQSPPDHEEC*VK       C706       NOXO1       0.00       0.00       same       DISULFID         Q69YH5-1       CDCA2       YADC*VVGK       C280       NCF1       0.00       0.00       same       QISULFID         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same       QISULFID         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q6F181-1       CIAPINI       ILRPGC*LFLK       C92       NCF1       0.00       same         Q6HBS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NCF2       19.58       same         Q6N043       ZNF280D       LQFLTC*K       C487       NCF1       0.00       same         Q6P158-1       DHX57       VPLEQLC*LR       C1003       NCF1       0.00       same         Q6P158-1       DHX57       VPLEQLC*KR       C145       NCF1       0.00       same         Q6P159-1       EDC4       LC*TQLEGLQSTVTGHVER       C145       NCF1       0.00       same	1	111101		0000		100.00	100100	buille	DIGGHTID
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1	11101	100 L 01 L 01 D	Gook			100.00		BIGIN DID
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q5XXA6-	ANOI	MSSAC*ATAR	C395	NOXOI	98.40	100.00	same	DISULFID
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q5XXA6-	ANO1	QQSPPDHEEC*VK	C706	NOXO1	0.00	0.00	same	DISULFID
Q69YH5-1CDCA2VADC*VVGKC280NCF10.000.00sameQ69YH5-1CDCA2SPATPAC*RC315NCF129.06sameQ69YH5-1CDCA2SPATPAC*RC315NOXO10.00sameQ6F181-1CIAPINIILRPGGC*LFLKC92NCF10.000.00sameQ6IBS0TWF2AVLPLLDAQQPC*YLLYRC67NCF219.58sameQ6IBS0TWF2AVLPLLDAQQPC*YLLYRC67NOXO1100.00sameQ6N043ZNF280DLQFLTC*KC487NCF10.00sameQ6P158-1DHX57VPLEQLC*LRC1003NCF10.00sameQ6P259-1EDC4LC*TQLEGLQSTVTGHVERC976NCF10.00sameQ6P259-1EDC4LC*TQLEGLQSTVTGHVERC196NOXO1100.00sameQ6PJ77-1ZC3H14C*LFVHPNC*KC634;C641NCF111.255.38sameQ6ZMH5SLC39A5QFALLC*PALLYQIDSRC185NCF10.000.00sameQ6ZRV2FAM83HFEVFC*KC1140NCF10.000.00sameQ6ZRV2FAM83HFEVFC*KC1140NCF10.000.00same	1								
Q697H5-1       CDCA2       SPATPAC*R       C315       NCF1       29.06       same         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOX01       0.00       same         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOX01       0.00       same         Q6FB1-1       CIAPIN1       ILRPGC*LFLK       C92       NCF1       0.00       same         Q6HBS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NCF2       19.58       same         Q6HBS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NOX01       100.00       same         Q6H043       ZNF280D       LQFLTC*K       C487       NCF1       0.00       same         Q6P139       CDC73       IEDEEC*VR       C145       NCF1       0.00       same         Q6P269-1       EDC4       LC*TQLEGLQSTVTGHVER       C976       NCF1       0.00       same         Q6P259-1       EDC4       LC*EPEVLNSLEETYSPFFR       C261       NCF1       10.00       same         Q6P3T7-1       ZC3H14       LC*EPEVLNSLEETYSPFFR       C261       NCF1       11.25       5.38       same         Q62MH5       SLC39A5       QFALLC*PALLYQIDSR       C185 <td>O69VHE 1</td> <td>CDCA9</td> <td>VADC*VVGK</td> <td>C280</td> <td>NCEL</td> <td>0.00</td> <td>0.00</td> <td>came</td> <td></td>	O69VHE 1	CDCA9	VADC*VVGK	C280	NCEL	0.00	0.00	came	
Q697H5-1       CDCA2       SPATPAC*R       C315       NCF1       29.06       same         Q69YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q6181-1       CIAPIN1       ILRPGGC*LFLK       C92       NCF1       0.00       0.00       same         Q61BS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NCF2       19.58       same         Q61BS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NOC1       100.00       same         Q6N043       ZNF280D       LQFLTC*K       C487       NCF1       0.00       same         Q6P158-1       DHX57       VPLEQLC*LR       C1003       NCF1       0.00       same         Q6P269-1       EDC4       LC*TQLEGLQSTVTGHVER       C145       NCF1       0.00       same         Q6P269-1       EDC4       LC*TQLEGLQSTVTGHVER       C976       NCF1       0.00       same         Q6PJ77-1       ZC3H14       C*LFVHPNC*K       C634;C641       NCF1       0.00       same         Q6FJT7-1       ZC3H14       C*LFVHPNC*K       C634;C641       NCF1       0.00       same         Q6FJT7-1       ZC3H14       C*LFVHPNC*K       C634;C641	~000 I II0-I	CDCA2		0200	NOPI	0.00	0.00	same	
Q69YH5-1       CDCA2       SPATPAC*R       C315       NOXO1       0.00       same         Q6F181-1       CIAPIN1       ILRPGC*LFLK       C92       NCF1       0.00       0.00       same         Q6IBS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NCF2       19.58       same         Q6IBS0       TWF2       AVLPLLDAQQPC*YLLYR       C67       NOXO1       100.00       same         Q6N043       ZNF280D       LQFLTC*K       C487       NCF1       0.00       same         Q6P158-1       DHX57       VPLEQLC*LR       C1003       NCF1       0.00       same         Q6P1J9       CDC73       IEDEEC*VR       C145       NCF1       0.00       same         Q6P29-1       EDC4       LC*TQLEGLQSTVTGHVER       C976       NCF1       0.00       same         Q6P217-1       ZC3H14       LC*EPEVLNSLEETYSPFFR       C261       NCF1       11.25       5.38       same         Q6P3H5       SLC39A5       QFALLC*PALLYQIDSR       C185       NCF1       0.00       same         Q6P3H5       SLC39A5       QFALLC*PALLYQIDSR       C185       NCF1       0.00       same         Q6ZMH5       SLC39A5       QFALLC*PALLYQIDS	Q69YH5-1	CDCA2	SPATPAC <sup>*</sup> R	C315	NCFI		29.06	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q69YH5-1	CDCA2	SPATPAC*R	C315	NOXO1		0.00	same	
Q6IBS0TWF2AVLPLLDAQQPC*YLLYRC67NCF219.58sameQ6IBS0TWF2AVLPLLDAQQPC*YLLYRC67NOXO1100.00sameQ6N043ZNF280DLQFLTC*KC487NCF10.00sameQ6N043ZNF280DLQFLTC*KC487NCF20.00sameQ6P158-1DHX57VPLEQLC*LRC1003NCF10.000.00sameQ6P259-1EDC4LC*TQLEGLQSTVTGHVERC976NCF10.000.00sameQ6P269-1EDC4LC*TQLEGLQSTVTGHVERC196NOXO1100.00sameQ6PJ17-1ZC3H14LC*EPEVLNSLEETYSPFFRC261NCF111.255.38sameQ6ZMH5SLC39A5QFALC*PALYQIDSRC185NCF187.68sameQ6ZRV2FAM83HFEVFC*KC1140NCF10.000.00sameQ6ZRV2FAM83HFEVFC*KC1140NCF10.000.00same	Q6FI81-1	CIAPIN1	ILRPGGC*LFLK	C92	NCF1	0.00	0.00	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	O6IBS0	TWF2	AVLPLLDAQQPC*YLLYR	C67	NCF2	19.58		same	
Q0150       TWF2       AVELLEDAQCECTER       C07       NOAOT       100.00       same         Q6N043       ZNF280D       LQFLTC*K       C487       NCF1       0.00       same         Q6P158-1       DHX57       VPLEQLC*LR       C1003       NCF1       0.00       same         Q6P159       DC73       IEDEEC*VR       C145       NCF1       0.00       same         Q6P2E9-1       EDC4       LC*TQLEGLQSTVTGHVER       C976       NCF1       0.00       same         Q6P157-1       ZC3H14       C*EPEVLNSLEETYSPFFR       C261       NCF1       100.00       same         Q6PJT7-1       ZC3H14       C*LFVHPNC*K       C634;C641       NCF1       0.00       same         Q6ZMH5       SLC39A5       QFALLC*PALLYQIDSR       C185       NCF1       0.00       same         Q6ZRV2       FAM83H       FEVFC*K       C1140       NCF1       0.00       0.00       same         Q6ZRV2       FAM83H       FEVFC*K       C1140       NCF1       0.00       0.00       same	OGIDSO	- WE9	AVI PLI DAOOPC*VI I VP	C67	NOVOI	10.00	100.00	Same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	QUID5U		LOEIMONN	007	NOAUI		100.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q6N043	ZNF280D	LQFLTU"K	C487	NCFI		0.00	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q6N043	ZNF280D	LQFLTC*K	C487	NCF2		0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q6P158-1	DHX57	VPLEQLC*LR	C1003	NCF1	0.00	0.00	same	
Q6P2E9-1         EDC4         LC*TQLEGLQSTVTGHVER         C976         NCF1         0.00         0.00         same           Q6P2E9-1         EDC4         LC*TQLEGLQSTVTGHVER         C976         NCF1         0.00         0.00         same           Q6P262         CTR9         TNPGC*PAEVR         C196         NOX01         100.00         same           Q6PJT7-1         ZC3H14         LC*EPEVLNSLEETYSPFFR         C261         NCF1         11.25         5.38         same           Q62JT7-1         ZC3H14         C*LFVHPNC*K         C634;C641         NCF1         0.00         0.00         same           Q6ZM15         SLC39A5         QFALLC*PALLYQIDSR         C185         NCF1         87.68         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	O6P110	CDC73	IEDEEC*VB	C145	NCEL	0.00		samo	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q01 139	EDCIS		0140	NOPI	0.00	0.00	same	
Q6PD62         CTR9         TNPGC*PAEVR         C196         NOXO1         100.00         same           Q6PJT7-1         ZC3H14         LC*EPEVLNSLEETYSPFFR         C261         NCF1         11.25         5.38         same           Q6PJT7-1         ZC3H14         C*EPEVLNSLEETYSPFFR         C261         NCF1         11.25         5.38         same           Q6ZMH5         SLC39A5         QFALLC*PALLYQIDSR         C185         NCF1         87.68         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	Q6P2E9-1	EDC4	LC*TQLEGLQSTVTGHVER	C976	NCF1	0.00	0.00	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q6PD62	CTR9	TNPGC*PAEVR	C196	NOXO1	100.00		same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q6PJT7-1	ZC3H14	LC*EPEVLNSLEETYSPFFR	C261	NCF1	11.25	5.38	same	
Q6ZMH5         SLC39A5         QFALLC*PALLYQIDSR         C185         NCF1         87.68         same           Q6ZMH5         SLC39A5         QFALLC*PALLYQIDSR         C185         NCF1         87.68         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	Q6PJT7-1	ZC3H14	C*LFVHPNC*K	$C634 \cdot C641$	NCF1	0.00	0.00	same	
Q6ZM10         SLC03A5         QFALLC*PALLYQIDSR         C165         NCF1         61.05         Same           Q6ZM15         SLC03A5         QFALLC*PALLYQIDSR         C185         NCF2         63.42         56.17         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	OGZMUE	SLC20AE	OFALLC*PALLYOUDSP	C195	NCEL	5.00	87 69	eamo	
Q0ZMHD         SLC39A5         QFALLC*PALLYQIDSK         C185         NCF2         63.42         56.17         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	QUZIMITO	STC9949	ODALL CEDALLYODOD	0100	NOFI	00.42	01.00	same	
Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF1         0.00         0.00         same           Q6ZRV2         FAM83H         FEVFC*K         C1140         NCF2         0.00         0.00         same	Q6ZMH5	SLC39A5	QFALLC <sup>*</sup> PALLYQIDSR	C185	NCF2	63.42	56.17	same	
Q6ZRV2 FAM83H FEVFC*K C1140 NCF2 0.00 0.00 same	Q6ZRV2	FAM83H	FEVFC*K	C1140	NCF1	0.00	0.00	same	
Continued on next name	Q6ZRV2	FAM83H	FEVFC*K	C1140	NCF2	0.00	0.00	same	

Table 2A.2 – continued from previous p	age
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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q6ZRV2	FAM83H	FLATEGAPDFLC*PEELEHVSR	C57	NCF1	0.00	0.00	same	
Q6ZRV2	FAM83H	FLATEGAPDFLC*PEELEHVSR	C57	NCF2		0.00	same	
Q6ZRV2	FAM83H	SLESC*LLDLR	C789	NCF1	0.00	0.00	same	
Q6ZRV2	FAM83H	SLESC*LLDLR	C789	NCF2	0.00	0.00	same	
Q6ZRV2	FAM83H	SLESC*LLDLR	C789	NOXO1	0.00	0.00	same	
Q6ZTQ4-	CDHR3	AVC*HHFGLHIASGSPR	C215	NCF2	100.00	100.00	same	
2								
Q6ZTQ4-	CDHR3	AVC*HHFGLHIASGSPR	C215	NOXO1		100.00	same	
2								
Q71DI3	H3C15	FQSSAVMALQEASEAYLVGLFEDTNL	C111	NCF1		14.63	same	LIPID
0.71.014	DDV4C	U*AIHAK SWWOC*CISNIK	0.977	NODI	0.00	0.00		
Q7L014	DDX40	SWVQC*CISMK	C377	NOVOI	0.00	0.00	same	
Q7L014	DDX40	VVC*VVCCTCISEOLAELKP	C479	NCEI	0.00	0.00	same	
Q7L014	DDX40	CAEUVC*TPCB	C501	NCF1	0.00	0.00	same	
07L014	DDX46	GAEUVC*TPGB	C501	NCF2	0.00	0.00	same	
07L014	DDX46	SVVC*SDVEOOVIVIEEEKK	C590	NCF2	62.82	0.00	same	
07L014	DDX46	SVVC*SDVEQQVIVIEEEKK	C590	NOXO1	02.02	100.00	same	
07L014	DDX46	ASYPC*MSLHGGIDQYDR	C646	NCF1	0.00	100.00	same	
Ö7L2H7	EIF3M	YTVYC*SLIK	C125	NCF2	100.00		same	
Q7Z2W4	ZC3HAV1	LHIC*DHFTR	C174	NCF1	0.00	0.00	same	
Q7Z2W4	ZC3HAV1	EHGLNPDVVQNIQDIC*NSK	C219	NCF1	0.00	0.00	same	
OFFICE 1	WAPAL		Glas	NODI	0.00	0.00		
Q7Z5K2-1	WAPL	IVEDDASISSC*NK	C160	NCFI	0.00	0.00	same	
OFFERA 1	WAPAL	IVEDDA GIGGO*NIZ	C160	NODO		0.00		
QIZ3K2-1	WAPL	IVEDDA5155C NK	0100	NCF2		0.00	same	
0775K9 1	WAPAL	C*I SVISI ATK	C675	NCF1	0.00	0.00	samo	
Q120112-1	WAPL	0 LOVIDLIIIK	0010	11011	0.00	0.00	Same	
Q7Z6E9	RBBP6	KPLGPPPPSYTC*FR	C161	NCF1	0.00	0.00	same	
Q7Z6E9	RBBP6	KPLGPPPPSYTC*FR	C161	NOXO1	0.00	0.00	same	
Q7Z6E9	RBBP6	C*GKPGHYIK	C164	NCF2	100.00	100.00	same	
Q7Z6E9	RBBP6	C*GKPGHYIK	C164	NOXO1	13.29	13.50	same	
Q7Z6E9	RBBP6	NC*PTNGDKNFESGPR	C174	NOXO1	0.00		same	
Q7Z6E9	RBBP6	AADC*DLQITNAQTK	C44	NOXOI	6.52	7.40	same	
Q86TP1-4	PRUNE	VAISAIYMDLEIC*EVLER	C100	NCF2	100.00		same	
0861142 1	DADDN1	VTU C*DK	C205	NCEL	0.00	0.00	60 M 0	
Q80U42-1 O86V48_1	LUZP1	SC*LEEOGTB	C205	NCF1	0.00	0.00	same	
Q86V48-1	LUZP1	SC*LFEQGTB	C969	NCF2	0.00	0.00	same	
Q86V48-1	LUZP1	SC*LFEQGTB	C969	NOX01	0.00	0.00	same	
Q86Y46	KBT73	OC*ANLETALADAEOB	C371	NCF1	0.00	0.00	same	
086Y46	KBT73	OC*ANLETALADAEOB	C371	NCF2	0.00	0.00	same	
Q8IVF2-3	AHNAK2	EKEDTDVADGC*R	C125	NCF1	0.00	0.00	same	
08IVF2-3	AHNAK2	EKEDTDVADGC*R	C125	NCF2	0.00	0.00	same	
Q8IVF2-3	AHNAK2	EKEDTDVADGC*R	C125	NOXO1	0.00	0.00	same	
Q8IVF2-3	AHNAK2	LC*EGTPQEGGLR	C305	NCF1	100.00	100.00	same	
Q8IVF2-3	AHNAK2	LC*EGTPQEGGLR	C305	NCF2	100.00	100.00	same	
Q8IVF2-3	AHNAK2	LC*EGTPQEGGLR	C305	NOXO1	100.00		same	
Q8IVF2-3	AHNAK2	VQMPC*LK	C4123	NCF1	3.98	0.00	same	
Q8IVF2-3	AHNAK2	VQMPC*LK	C4123	NCF2		10.56	same	
Q8IVF2-3	AHNAK2	VQMPC*LK	C4123	NOXO1	0.00	0.00	same	
Q8IVF2-3	AHNAK2	LDLTGPHFESSILSPC*EDVTLTK	C4687	NCF1	12.80	17.42	same	
Q8IVF2-3	AHNAK2	LDLTGPHFESSILSPC*EDVTLTK	C4687	NCF2	31.98	27.22	same	
Q8IVF2-3	AHNAK2	LDLTGPHFESSILSPC*EDVTLTK	C4687	NOXO1	0.00	0.00	same	
Q8IVF2-3	AHNAK2	VDPEC*SVEDSK	C4879	NCF1	9.02	9.82	same	
Q8IVF2-3	AHNAK2	VDPEC*SVEDSK	C4879	NOXO1	0.00	0.00	same	
Q81VF2-3	AHNAK2	C*DLDSTGLK	C5171	NCFI	28.21	25.84	same	
Q81VF2-3	AHNAK2	C*DLDSTGLK	C5171	NCF2	17.14	15.77	same	
Q8IVF2-3	AHNAK2	EVQC*PEANIDTALC*K	C5315;	NCF1	0.00	0.00	same	
			C5315					
Q8IVF2-3	AHNAK2	EVQC*PEANIDTALC*K	C5325	NCF2	0.00	0.00	same	
Q8IWI9-1	MGA	MPVVYLEPC*AVTR	C474	NOXO1		100.00	same	
Q8IWX8	CHERP	LLEETQLDMNEFDNLLQPIIDTC*TK	C168	NCF1	0.00		same	
Q8IWX8	CHERP	SPPHC*ELMAGHLR	C190	NCF1	0.00		same	
Q8IWX8	CHERP	SPPHC*ELMAGHLR	C190	NCF2		100.00	same	
Q8IWX8	CHERP	SPPHC*ELMAGHLR	C190	NOXO1	100.00	100.00	same	
Q8IWX8	CHERP	VVVPIYC*TSFLAVEEDKQQK	C246	NCF1	0.00		same	
Q8IWX8	CHERP	VVVPIYC*TSFLAVEEDKQQK	C246	NOXO1		0.00	same	
Q8IWX8	CHERP	LALEQQQLIC*K	C69	NCF1	0.00	0.00	same	
Q8IWX8	CHERP	LALEQQQLIC*K	C69	NCF2	0.00	0.00	same	
Q8IWX8	CHERP	LALEQQQLIC*K	C69	NOXO1	0.00		same	
Q81X01-1	SUGP2	FSQLFQTLFELETETC*AK	C362	NCF1	1.05	2.66	same	
Q8IX01-1	SUGP2	C*SLKPEHR	C371	NCF2		100.00	same	
Q8IX01-1	SUGP2	DFC*FFTTK NC*FFFUKDEDK	0381	NCF1	0.00	0.00	same	
Q81A01-1	SUGP2	ΝΟ ΓΓΕΠΑΓΓΟΚ SVTDII ΜΑΓ*ΝΑντιςνι	C417	NOFT	2.94	2.74	same	
Q01AU1-1	SUCPS	TISNELDIALALETTNELC*E	C447	NCEI	3.16	1.00	same	
Q01AU1-1	SUCPS	TLSNELDLALALETINGLU"K	C476	NCE2	0.10	4.36	same	
Q01AU1-1	SUGP2	AWIVSSCC*PLOVY	C540	NCF2	0.09	4.02	same	
Q8IX01-1	SUGP2	GADOKPTSADC*AVR	C656	NCF1	4.15	5.51	same	
~~~~~	50012	SEGSTPADGLPGEAAEDDLAGAPALS	0000	1.01.1	4.10	0.01	Same	
Q8IX01-1	SUGP2	QASSGTC*FPR	C947	NCF1		17.10	same	
Q8IX01-1	SUGP2	RVC*LIQEPK	C970	NCF1	5.76	11.04	same	
Q8IX01-1	SUGP2	VC*LIQEPK	C970	NCF1		14.97	same	
Q8IX01-1	SUGP2	RVC*LIQEPK	C970	NCF2	0.00	6.19	same	
Q8IX01-1	SUGP2	VC*LIQEPK	C970	NCF2		100.00	same	
		Continued	on next r	age				
<b>m</b> -1-1-	010	1	C .	• • • • •				
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Table	ZA.Z	- continued	from	previous	page			

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q8IX01-1	SUGP2	RVC*LIQEPK	C970	NOXO1	0.00	( )	same	
Q8IX01-1	SUGP2	VC*LIQEPK	C970	NOXO1	100.00	100.00	same	
Q8IXZ2-1	ZC3H3	EASLVVTC*R	C301	NCF1	0.00		same	
Q8IY81	FTSJ3	LAC*DFLAR	C145	NCF1	0.00	0.00	same	
Q8IY81	FTSJ3	LAC*DFLAR	C145	NCF2	0.00	0.00	same	
Q8IY81	FTSJ3	LAC*DFLAR	C145	NOXO1	0.00	0.00	same	
Q8N0X7	SPG20 SPART	C*IVNNVSAETVQTVR	C562	NCF2		0.00	same	
Q8N0X7	SPG20 SPART	C*IVNNVSAETVQTVR	C562	NOXO1	0.00		same	
Q8N163-1	CCAR2 KIAA1967	$\rm VHLTPYTVDSPIC^*DFLELQR$	C238	NCF1	0.00		same	
Q8N1G0	ZNF687	TSC*GNITR	C339	NCF1	0.00	0.00	same	
Q8N1G0	ZNF687	C*SLLLHAR	C576	NCF1	0.00	0.00	same	
Q8N1G0	ZNF687	C*SFSAHQR	C718	NCF1	0.00	0.00	same	
Q8N1G0	ZNF687	C*SFSAHQR	C718	NCF2	0.00	0.00	same	
Q8N1G0	ZNF687	C*SFSAHQR	C718	NOXO1	0.00	0.00	same	
Q8N1G2	CMTR1 FTSJD2	SNESHC*SLQIK	C504	NCF1	0.00	0.00	same	
Q8N1G2	CMTR1 FTSJD2	DSTFDLPADSIAPFHIC*YYGR	C794	NCF1	0.00	0.00	same	
Q8N1G2	CMTR1 FTSJD2	RTDPEC*TAPIKK	C9	NCF1	0.00	0.00	same	
Q8N1G2	CMTR1 FTSJD2	RTDPEC*TAPIKK	C9	NOXO1	0.00		same	
Q8N3C0	ASCC3	TVEELFVNC*K	C1638	NCF2	100.00	100.00	same	
Q8N3C0	ASCC3	TVEELFVNC*K	C1638	NOXO1		100.00	same	
0011000	AGGGS	LKPEC*STEELLSILSDAEEYTDLPV	G1040	NODI	0.00			
Q8N3C0	ASCC3	R	C1840	NCF1	0.00		same	
Q8N3C0	ASCC3	FLNEHLQEAC*TPELKPVEK	C208	NCF1	0.00	0.00	same	
Q8N3C0	ASCC3	FLNEHLQEAC*TPELKPVEK	C208	NCF2	0.00	0.00	same	
Q8N3C0	ASCC3	FQALQDNC*K	C310	NCF1	0.00	0.00	same	
Q8N3C0	ASCC3	FQALQDNC*K	C310	NCF2	0.00	0.00	same	
Q8N3C0	ASCC3	FQALQDNC*KK	C310	NCF2	35.88		same	
Q8N5K1	CISD2	VVNEINIEDLC*LTK	C92	NCF1	0.00	0.00	same	
Q8N5K1	CISD2	VVNEINIEDLC*LTK	C92	NCF2	0.00	0.00	same	
Q8N5K1	CISD2	VVNEINIEDLC*LTK	C92	NOXOI	0.00	0.00	same	
Q8ND82	ZNF280C	SERPC*DEDKTDSETGK	C278	NCFI	0.00	0.00	same	
Q8NE71-1	ABCFI	FCI FSHAUTIOIC*K	C055	NCF1 NCE1	0.00	0.00	same	
Q8NE71-1	ABCFI	VVEAELAC*P	C741	NCF1 NCF1	0.00	0.00	same	
QONE71-1 OSNEA2 3	NOXO1	FCCPSLCSSCPOFC*ASB	C238	NOYOI	0.00	0.00	same	
OSTDX7	NEK7	AAC*LLDGVPVALK	C53	NCF1	100.00	100.00	same	
O8TDX7	NEK7	AAC*LLDGVPVALK	C53	NCF2	100.00	100.00	same	
Q8TDX7	NEK7	AAC*LLDGVPVALK	C53	NOXO1		100.00	same	
Q8TF68-1	ZNF384	C*AHPGC*EK	C375;C380	NCF1	0.00	0.00	same	
Q8TF68-1	ZNF384	VYTC*TIC*SR	C435;C438	NCF1	0.00		same	
Q8WU76	SCFD2	LLEAVGGPDC*HLR	C54	NCF1	0.00	0.00	same	
Q8WU76	SCFD2	LLEAVGGPDC*HLR	C54	NOXO1	0.00	0.00	same	
Q8WUM0	NUP133	LLLC*EHAEK	C641	NCF1	0.00	0.00	same	
Q8WUM0	NUP133	LLLC*EHAEK	C641	NCF2	0.00	0.00	same	
Q8WUM0	NUP133	LLLC*EHAEK	C641	NOXO1	0.00	0.00	same	
Q8WUY1	THEM6	AHTVLAASC*AR	C104	NCF1	11.65	0.00	same	
Q8WUY1	THEM6	AHTVLAASU*AR	C104	NCF2	0.00	0.00	same	
Q8WUYI	THEM6	AHTVLAASU*AR DOEVO*ALLD	C104	NOXOI	11.52	0.00	same	
Q8WUY1	THEMO	DGFVC*ALLR	C146	NCFI	0.00	0.00	same	
Q8WUY1	THEMO	DCFVC*ALLR	C140	NOF 2	0.00	0.00	same	
Q8WUV1	THEM6	VVOHLC*OB	C140	NCE1	21.54	26.26	same	
O8WUV1	THEM6	VVOHLC*OB	C168	NCF2	8 27	11 74	same	
08WUY1	THEM6	VVOHLC*OR	C168	NOXO1	23.78	28.30	same	
Q8WV24	PHLDA1	TVDC*VER	C242	NCF1	10.68	10.01	same	
Q8WV24	PHLDA1	TVDC*VER	C242	NCF2	27.52	39.08	same	
Q8WV24	PHLDA1	TVDC*VER	C242	NOXO1	18.68		same	
Q8WWM7	ATXN2L	MLHFLTAVVGSTC*DVK	C135	NCF1	0.00	0.00	same	
Q8WXI9	GATAD2B	SC*ASLLR	C409	NCF1	100.00	100.00	same	
Q8WXI9	GATAD2B	VEPFVC*AQC*R	C420;C423	NCF1	0.00	0.00	same	
Q8WXI9	GATAD2B	VEPFVC*AQC*R	C420;C423	NCF2		0.00	same	
Q8WXI9	GATAD2B	VEPFVC*AQC*R	C420;C423	NOXO1	0.00	0.00	same	
Q8WYP5	AHCTF1	C*LVAGLLSPR	C521	NCF1	0.00	0.00	same	
Q8WYP5	AHCTFI	C*LVAGLLSPR	C521	NCF2	0.00	0.00	same	
Q8WYP5	AHCTFI	C*CEMI UD	C521	NOXOI	0.00	0.00	same	
Q92482-1	AQP3	C*CEMLHIR C*CEMLHIR	CII	NCFI	13.84	12.29	same	
Q92482-1	AQF3 AOP3	C*CEMLHIR	C11	NOF 2	13.97	18.57	same	
Q92402-1 092547	TOPRP1	LKPDDSGVNIAEAAAONVVC*LB	C1463	NCF1	100.00	100.00	same	
Q92547	TOPBP1	LKPDDSGVNIAEAAAONVYC*LB	C1463	NCF2	100.00	100.00	same	
Q92547	TOPBP1	LKPDDSGVNIAEA A AONVYC*LB	C1463	NOXO1	100.00	100.00	same	
Q92551	IP6K1	YPC*VLDLK	C221	NCF1	86.94		same	
Q92551	IP6K1	YPC*VLDLK	C221	NCF2		100.00	same	
Q92551	IP6K1	YPC*VLDLK	C221	NOXO1	0.00		same	
Q92621	NUP205	C*QDVSAGSLQELALLTGIISK	C1662	NCF1	0.00		same	
Q92665	MRPS31	HFMELVTC*GLSK	C356	NCF1	0.00		same	
Q92665	MRPS31	HFMELVTC*GLSK	C356	NOXO1	0.00	0.00	same	
Q92797-1	SYMPK	FVIGFIEEAC*KR	C100	NCF1	0.00		same	
Q92797-1	SYMPK	AVAC*SGAAQVR	C578	NCF1	14.47	21.14	same	
Q92797-1	SYMPK	AVAC*SGAAQVR	C578	NCF2	0.00	0.00	same	
		Continued	on next r	bage				

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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
092797 1	SVMPK	AVAC*SCAAOVB	C578	NOXO1	0.00	0.00	samo	- I uncertoin
Q92797-1	SVMDK	VC*EDESP	C518	NCEI	2.59	0.00	same	
Q92797-1	SVMDK	VC*EDESR	C686	NCF1	100.00	100.00	same	
Q92797-1	SIMPK	KIC EDESK VC*EDESP	C686	NOF2	100.00	100.00	same	
Q92797-1	SIMPK	IC'EDEST	C080	NOXOI	0.00	0.00	same	
Q92797-1	SIMPK	GMGMINSFELLLIVENC*PK	C848	NCF1 NCF1	0.00	0.00	same	
Q92797-1	SIMPK	GMGMINSFELLLIVENC*PK	C848	NCES	3.30	0.00	same	
Q92797-1	SIMPK	GMGMINSFELLLLVENC*PK	C848	NOF2	0.00	0.00	same	
Q92797-1	SYMPK	GMGMINSPELLLLVENC*PK	C848	NOXOI	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDK	C859	NCFI	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDKVPPSPELVK	C859	NCFI	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDKVPPSPELVKR	C859	NCF1	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDK	C859	NCF2	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDKVPPSPELVK	C859	NCF2	0.00		same	
Q92797-1	SYMPK	C*LHSLTDK	C859	NOXO1	0.00	0.00	same	
Q92797-1	SYMPK	C*LHSLTDKVPPSPELVK	C859	NOXO1	0.00	0.00	same	
Q92797-1	SYMPK	ATNLC*FAER	C969	NCF1	4.04	7.05	same	
Q92797-1	SYMPK	ATNLC*FAER	C969	NOXO1	0.00	0.00	same	
Q92879	CELF1	VMFSSFGQIEEC*R	C137	NCF1	0.00	0.00	same	
Q92900	UPF1	ADSVVVLLC*R	C209	NCF1	0.00	0.00	same	
Q92900	UPF1	ADSVVVLLC*R	C209	NCF2	0.00	0.00	same	
Q92900	UPF1	ADSVVVLLC*R	C209	NOXO1	0.00		same	
Q92900	UPF1	C*FLSWLVK	C237	NCF1	0.00	0.00	same	
Q92900	UPF1	LMQGDEIC*LR	C374	NCF1	0.00	0.00	same	
Q92900	UPF1	LMQGDEIC*LR	C374	NCF2		0.00	same	
Q92900	UPF1	LMQGDEIC*LR	C374	NOXO1		0.00	same	
Q92900	UPF1	QGNGPVLVC*APSNIAVDQLTEK	C531	NCF1	0.00	0.00	same	
Q92900	UPF1	QGNGPVLVC*APSNIAVDQLTEK	C531	NCF2	0.00		same	
Q92900	UPF1	QGNGPVLVC*APSNIAVDQLTEK	C531	NOXO1	0.00		same	
Q92900	UPF1	EKDFIILSC*VR	C852	NCF1	0.00	0.00	same	
Q92900	UPF1	EKDFILLSC*VR	C852	NCF2	0.00		same	
092900	UPF1	EKDFIILSC*VB	C852	NOXO1	0.00		same	
092922	SMARCC1	TODEC*ILHELB	C657	NCF1	0.00	0.00	same	
092973-1	TNPO1	SITC*WTLSB	C467	NCF1	0.00	0.00	same	
002073 1	TNPO1	SITC*WTLSR	C467	NCF2	0.00	0.00	same	
002073 1	TNPO1	SITC*WTLSR	C467	NOYO1	0.00	0.00	same	
002000	USD7	VDVIEC*DK	C700	NCEI	0.00	0.00	same	
002000	USD7	I SESVI SDDC*EVD	C199	NOVOI	0.00	0.00	same	
Q93009	LDDCEO	LSESVESFFC FVR	C90	NOADI	0.00	0.00	same	
Q90AG4	LDDC59	VAGDC*LDEK VAGDC*LDEK	C131	NCFI	0.00	0.00	same	
Q96AG4	LRRC59	VAGDC*LDEK	C131	NOF2	0.00	0.00	same	
Q96AG4	LRRC59	VAGDC*LDEK	C131	NOXOI	0.00	0.00	same	
Q96AG4	LRRC59	ATTLDLSC*NK	C48	NCF2	0.00	0.00	same	
Q96AG4	LRRC59	LTTLPSDFC*GLTHLVK	C59	NCFI	0.00		same	
Q96AG4	LRRC59	LTTLPSDFC*GLTHLVK	C59	NCF2	0.00	0.00	same	
Q96C19	EFHD2	AAAGELQEDSGLC*VLAR	C172	NCF1	0.00	0.00	same	
Q96C19	EFHD2	AAAGELQEDSGLC*VLAR	C172	NCF2	0.00	0.00	same	
Q96C19	EFHD2	AAAGELQEDSGLC*VLAR	C172	NOXO1		0.00	same	
Q96C24	SYTL4	C*QESLGR	C66	NCF1	0.00	0.00	same	
Q96C24	SYTL4	C*QESLGR	C66	NCF2	0.00	0.00	same	
Q96C24	SYTL4	C*QESLGR	C66	NOXO1	0.00	0.00	same	
Q96C24	SYTL4	GC*NHLVC*R	C83;C88	NCF1	0.00	0.00	same	
Q96D03	DDIT4L	LSSTEPC*GLR	C101	NCF1	100.00	100.00	same	
Q96D03	DDIT4L	LSSTEPC*GLR	C101	NCF2	100.00	100.00	same	
Q96D03	DDIT4L	LSSTEPC*GLR	C101	NOXO1	100.00	100.00	same	
Q96DT7	ZBTB10	SFSC*DIC*GK	C752;C755	NCF1	0.00	0.00	same	
Q96DT7	ZBTB10	SFSC*DIC*GK	C752;C755	NCF2	0.00	0.00	same	
Q96DT7	ZBTB10	SFSC*DIC*GK	C752;C755	NOXO1	0.00	0.00	same	
Q96F86	EDC3	SQDVAVSPQQQQC*SK	C137	NCF1	0.00	0.00	same	
Q96F86	EDC3	SQDVAVSPQQQQC*SK	C137	NCF2	0.00	0.00	same	
Q96F86	EDC3	SODVAVSPOQOOC*SK	C137	NOXO1	0.00		same	
Q96F86	EDC3	EFC*TDSGLVVPSISYELHK	C272	NCF1	98.47	97.84	same	
096F86	EDC3	EFC*TDSGLVVPSISYELHK	C272	NCF2	100.00	100.00	same	
Q96F86	EDC3	EFC*TDSGLVVPSISYELHK	C272	NOXO1	100.00	100.00	same	
Q96F86	EDC3	NVHQRPTVALLC*GPHVK	C341	NCF1	0.00	0.00	same	
Q96F86	EDC3	NVHORPTVALLC*GPHVK	C341	NCF2	0.00	0.00	same	
Q96F86	EDC3	NVHORPTVALLC*GPHVK	C341	NOXO1	0.00	0.00	same	
Q96F86	EDC3	GAOGISC*GB	C353	NCE1	9.85	12.02	same	
Q96F86	EDC3	GAOGISC*GB	C353	NOXOI	0.00	12.02	same	
Q96F86	EDC3	DLPTSPVDIVINC*I DC*DENVE	LB C410-C419	NCEI	0.00	0.00	same	
Q90F80	EDC3	C*LUDEVIED	C410,0413	NCEI	5.01	5.00	same	
Q90F80	EDC3	C*IVDEVTED	C47	NCES	0.00	0.27	same	
Q96F86	EDC3	C'LVFEVIFR MCDC*VTELEV	C47	NGF2	0.00	0.00	same	
Q90FQ6	S100A10	MSDC*VTELEK MSDC*VTELEV	04	NOFT	0.00	0.00	same	
Q90FQ0	S100A10	MOD C*VTELEK	C4	NOF2	0.00	0.00	same	
Q90FQ0	SIUUAI0	MODU TIELEK	C100	NOAUI	0.00	0.00	same	
006124-1	FUBP3		C109	NOPI	0.00		same	
090124-1	FUBP3	C "QHAAHIISELILTAQER C*VIEEIDGADEDEAVE	C310	NCF1	0.00	0.00	same	
Q96125	KBM17	OTVIFEIPGAPDDEAVR	C339	NCFI	0.00	0.00	same	
Q96125	KBM17	AU"FYNLDK	C385	NCF1	0.00	0.00	same	
Q96182-1	KAZALD1	GEVPEPLC*AC*R	C126;C128	NCF1	100.00	100.00	same	
Q96182-1	KAZALD1	GEVPEPLC*AC*R	C126;C128	NCF2	100.00	100.00	same	
Q96182-1	KAZALD1	GEVPEPLC*AC*R	C126;C128	NOXO1	100.00	100.00	same	
Q96JM3	CHAMP1	LEC*DHC*SFR	C16;C19	NCF1	0.00	0.00	same	
Q96JM3	CHAMP1	C*NFESNFPR	C770	NCF1	0.00	0.00	same	
Q96JP5-1	ZFP91	C*EMEGC*GTVLAHPR	C313;C318	NCF1	0.00	0.00	same	
Q96JP5-1	ZFP91	YVC*PHPSC*GR	C344;C349	NCF1	0.00	0.00	same	
Q96JP5-1	ZFP91	DYIC*EYC*AR	C374;C377	NCF1	0.00	0.00	same	
096 IP5 1	ZEP01	MIHTGEKPLOC*EIC*CETC*P	C402;C405;	NCF1	0.00	0.00	samo	
~2001F 0-1	21° F 31	MILLOUNT DOG FIC. R	C409	1101/1	0.00	0.00	same	
		Conti	nued <u>on next</u> r	nage				

Table 2A.2 – continued from previous page

Table 2A.2 –	continued from	n previous	page

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q96KG9	SCYL1	LGC*LIWEVFNGPLPR	C210	NCF2		100.00	same	
Q96KR1	ZFR	NVNLVLLC*SEKPSK	C812	NCF1		0.00	same	
Q96PK6-1	RBM14	VIEC*DVVK	C108	NCF1	0.00	0.00	same	
Q96PK6-1	RBM14	VIEC*DVVK	C108	NCF2	0.00	0.00	same	
Q96PK6-1	RBM14	VIEC*DVVK	C108	NOXO1	0.00	0.00	same	
Q96PK6-1	RBM14	IFVGNVDGADTTPEELAALFAPYGTV MSC*AVMK	C31	NCF1		0.00	same	
Q96PK6-1	RBM14	IFVGNVDGADTTPEELAALFAPYGTV MSC*AVMK	C31	NOXO1	5.26	0.00	same	
Q96PK6-1	RBM14	IFVGNVSAAC*TSQELR	C90	NCF1	0.00	0.00	same	
Q96PK6-1	RBM14	IFVGNVSAAC*TSQELR	C90	NCF2		0.00	same	
Q96PK6-1	RBM14	IFVGNVSAAC*TSQELR	C90	NOXO1	0.00	0.00	same	
Q96Q89-1	KIF20B	VSELSLC*DLAGSER	C379	NCF1		0.00	same	
Q96Q89-1	KIF20B	VSELSLC*DLAGSER	C379	NCF2	0.00		same	
Q96Q89-1	KIF20B	VSELSLC*DLAGSER	C379	NOXO1		0.00	same	
Q96QC0	PPPIR10	C*TYLNILLQTR C*UPDUPUPCP	C48	NCFI	0.00	0.00	same	
Q96QD5-1	DEPDC7	C*HPDIFIEHFGD C*HPDIFIEHECD	C500	NCF1	0.00	0.00	same	
Q96QD5-1	MED15	TEVPAMTAIHGPPITAPVVC*TB	C500	NCF2	0.00	0.00	same	
Q90RN5	MED15	TEVPAMTAIHGPPITAPVVC*TB	C660	NCF1	0.00	0.00	same	
096BN5	MED15	TFVPAMTAIHGPPITAPVVC*TB	C660	NOXOI	0.00	0.00	same	
QUEROS	MCCC1	TSAAQAIHPGC*GFLSENMEFAELC*	C120:C142	NCEI	0.00	2.10	same	
Q901Q3	MCCC1	${\rm K} \\ {\rm TSAAQAIHPGC}^{*}{\rm GFLSENMEFAELC}^{*}$	C129;C142	NCF1	6.98	17 30	same	
03011025	Meeee	K TSAAQAIHPGC*GFLSENMEFAELC*	0123,0142	NOF 2	0.56	17.50	same	
Q96RQ3	MCCC1	K	C129;C142	NOXO1	3.49	4.88	same	
Q96RQ3	MCCCI	SIMAAAGVPVVEGYHGEDQSDQC*LK	C190	NCF1	0.00	0.00	same	
Q96RQ3	MCCC1	SIMAAAGVPVVEGYHGEDQSDQC*LK	C190	NCF1	15.09	10.31	same	
Q96RQ3	MCCC1	SIMAAAGVPVVEGYHGEDQSDQC*LK	C190	NCF2		0.00	same	
Q96RQ3	MCCC1	${\rm SIMAAAGVPVVEGYHGEDQSDQC*LK}$	C190	NCF2	17.21	15.23	same	
Q96RQ3	MCCC1	${\rm SIMAAAGVPVVEGYHGEDQSDQC*LK}$	C190	NOXO1	0.00	0.00	same	
Q96RQ3	MCCC1	SIMAAAGVPVVEGYHGEDQSDQC*LK	C190	NOXO1	5.20	1.08	same	
Q96RQ3	MCCC1	HNFC*FMEMNTR	C332	NCF1		0.00	same	
Q96RQ3	MCCC1	HNFC*FMEMNTR	C332	NCF1	4.42	2.48	same	
Q96RQ3	MCCC1	HNFC*FMEMNTR	C332	NCF2	8.06	7.05	same	
Q96RQ3	MCCCI	HNFC*FMEMNTR	C332	NOXOI	0 5 4	0.00	same	
Q96RQ3	MCCCI	HNFC*FMEMNTR	C332	NOXOI	0.54	0.00	same	
Q96RQ3	MCCCI	ESLC*QAALGLILK	C509	NCFI	6.87	5.50	same	
Q96RQ3	MCCCI	ESLC*QAALGLILK FSLC*QAALGLILK	C509	NOF2	7.37	10.66	same	
Q96RQ3	MCCC1	TEOVI CNI VSECDC*TVLK	C509	NOXOI	7.49	0.20	same	
Q90RQ3	MCCC1	TFOVI CNLVSECDC*TVLK	C595	NCF1	2.39	12.78	same	
Q96R03	MCCC1	TFOVLGNLYSEGDC*TYLK	C595	NOX01	0.00	0.00	same	
Q96RQ3	MCCC1	C*SVNGVASK	C600	NCF1	5.48	5.42	same	
Q96RQ3	MCCC1	C*SVNGVASK	C600	NCF2	8.43	7.40	same	
Q96RQ3	MCCC1	C*SVNGVASK	C600	NOXO1	4.06	3.77	same	
Q0010001	ERBB2IP		Gree	NGDI	1.00	0.00	buillo	
Q96R11	ERBIN ERBB2IP	AQVAFEC*DEDKDER	C464	NCF1	0.00	0.00	same	
Q96RT1	ERBIN	AQVAFEC*DEDKDER	C464	NOXOI NCE1	0.00	0.00	same	
Q90519 Q96519	STRBP	SIGTC*NBPLGAGEALB	C254	NCF2	100.00	100.00	same	
Q96ST2	IWS1	ALRPGDPGFC*AR	C749	NCF1	78.74	100.00	same	
Q96ST2	IWS1	ALRPGDPGFC*AR	C749	NOXO1	86.20		same	
Q99442	SEC62	AVDC*LLDSK	C55	NCF1	100.00		same	
Q99459	CDC5L	TAAQC*LEHYEFLLDK	C96	NCF1	0.00	0.00	same	
Q99613	EIF3C	GC*ILTLVER	C443	NCF1	86.73		same	
Q99613	EIF3C	GC*ILTLVER	C443	NCF2	100.00		same	
Q99613	EIF3C	GC*ILTLVER	C443	NOXO1	100.00	100.00	same	
Q99613	EIF3C	GTTEEVC*R	C500	NCF1	0.00	0.00	same	
Q99613	EIF3C EIF2C	TMVQLGIC*AFR TMVQLGIC*AFR	C619 C610	NOFT	0.00	0.00	same	
Q99613 Q00612	EIF3C EIF3C	TC*HSFUNEK	C752	NOXOI	0.00	0.00	same	
Q99013 000613	EIF3C EIF3C	C*LEFFELLCK	C79	NCF1	0.00	0.00	same	
Q99613	EIF3C	C*LEEFELLGK	C79	NCF2	0.00	0.00	same	
Q99714-1	HSD17B10	VDVAVNC*AGIAVASK	C91	NCF1	0.00	0.00	same	
Q99832	CCT7	TC*TFILR	C370	NCF1	0.00	0.00	same	
Q99832	CCT7	TC*TFILR	C370	NCF2	0.00	0.00	same	
Q99959	PKP2	AVC*GALR	C416	NOXO1	0.00	0.00	same	
Q99959	PKP2	C*DGLIDSLVHYVR	C579	NOXO1	0.00	0.00	same	
Q99961	SH3GL1	QNFIDPLQNLC*EK	C147	NCF1	21.97		same	
Q99961	SH3GL1	SMPPLDQPSC*K	C311	NCF1	0.00	10.11	same	
Q99961	SH3GL1	NPGYPQSEGLLGEC*MIR	C96	NCF1	0.00	0.00	same	
Q9BQ39	DDX50	AHFC*ETK	C396	NCF1	0.00	0.00	same	
Q9BQ39	DDX50	AIIFC*ETK IETHILLC*D	C396	NCF2	0.00	0.00	same	
COBCIO COBCIO	MRIDO	IF I HHLU' N ISACC'ELSB	C189	NCF1	0.00	100.00	same	
00BU10	NRIP9	ISAGC*LSR	C188	NOF2	100.00	100.00	same	
Q9BBB8	GPATCH1	LPPVFC*PNAR	C839	NCF1	0.00	0.00	same	
		Continued	on port -	2000	5.00	0.00	201110	
		Commuea	on next L	age				

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Table	2A.2-	continued	from	previous	nage
Table	<b>A</b> 1 1 • <b>A</b>	oominaoa	II OIII	provious	pase

Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q9BSJ8	ESYT1	LGTQTFC*SR	C370	NCF1	0.00	0.00	same	
Q9BSJ8	ESYT1	LGTQTFC*SR	C370	NCF2		0.00	same	
Q9BSJ8	ESYT1	LGTQTFC*SR	C370	NOXO1	0.00		same	
Q9BSJ8	ESYT1	KLVSIVHGC*R	C995	NCF1	0.00	0.00	same	
Q9BTC0	DIDOI	AYPVSGC*FDYLSEDLPDTHIGGR	C1079	NCF1	0.00	0.00	same	
Q9BTC0	DIDOI	AYPVSGC*FDYLSEDLPDTIHIGGR	C1079	NOXOI	0.00	0.00	same	
Q9BTT6	LRRCI	NEIPEIPESISFC*K	C104 C104	NCFT	0.00	0.00	same	
Q9B116 ODDTT6	LRRCI	C*CALENIANDVCDEANNED	C104 C422	NOXOI		0.00	same	
Q9BII6 OOPTT6	LERC1	C*CALENLVNDVSDEAWNER	C432	NOYOI	0.00	0.00	same	
Q9D110 O9BU76 1	Clorf35	AEDOTESSC*ESHB	C179	NCF1	0.00	2.18	same	
Q9BU76-1	C1orf35	AEDQTESSC ESHR	C179	NOYOI	0.00	2.18	same	
Q9BU12-1	HNRNPUL1	AEPYC*SVLPGETFIOHLPLSEB	C391	NCF1	0.00	0.00	same	
Q9BUJ2-1	HNRNPUL1	WDVLIQQATQC*LNR	C487	NCF1	0.00	82.61	same	
Q9BUJ2-1	HNRNPUL1	WDVLIQOATOC*LNR	C487	NCF2		100.00	same	
Q9BUJ2-1	HNRNPUL1	WDVLIQOATOC*LNR	C487	NOXO1	100.00	100.00	same	
Q9BUJ2-1	HNRNPUL1	AIVIC*PTDEDLKDR	C532	NCF2	100.00		same	
Q9BV81	EMC6	GNAAVLDYC*R	C29	NCF2	100.00	100.00	same	
Q9BY42	RTFDC1	RPIVAC*ELGR	C51	NCF1	0.00	0.00	same	
Q9BY89-1	KIAA1671	VSSNQDPDSC*R	C585	NCF2	0.00	0.00	same	
Q9BY89-1	KIAA1671	ATVAVSEEHC*APGATSVR	C842	NCF1	0.00	0.00	same	
Q9BZE4	GTPBP4	TLLLC*GYPNVGK	C174	NCF1	0.00		same	
Q9C0C2	TNKS1BP1	EHGVGGVSQC*PEPGLR	C1373	NCF1		0.00	same	
Q9H089	LSG1	QFLC*IPR	C112	NCF1	0.00	0.00	same	
Q9H089	LSG1	QFLC*IPR	C112	NCF2		0.00	same	
Q9H0A0	NAT10	FILSLASC*K	C194	NCF1	0.00	0.00	same	
Q9H0A0	NAT10	FILSLASC*K	C194	NCF2		0.00	same	
Q9H0A0	NAT10	FILSLASC*K	C194	NOXOI	0.00	0.00	same	
Q9H0A0	NAT10	WLNDLLC*LDC*LNITR	C486;C489	NCFT	0.00	0.00	same	
Q9H0A0	NAT10	WLNDLLC*LDC*LNTTR C*LLDTEV	C486;C489	NOXOI	0.00	0.00	same	
Q9HUC8	ILKAF	C*CUTSUDDD	C190	NCEL	0.00	0.00	same	
Q9H0C8	ILKAF	FILLAC*DCLEK	C301	NCFI	0.00	0.00	same	
Q9110C8	ADNP	FESSIHC*K	C223	NCF1	0.00	0.00	same	
Q91121 0 Q9H2P0	ADNP	IC*TIC*NELEPENVYSVHFEK	C449.C452	NCF1	0.00	0.00	same	
09H2P0	ADNP	TLC*PLC*FSILK	C624:C627	NCF1	0.00	0.00	same	
Q9H3N1	TMX1	FIITALPTIYHC*K	C106	NCF1	0.00	0.00	same	
Q9H5V9-1	CXorf56	SVVC*SDTR	C11	NCF2	100.00	100.00	same	
Q9H5V9-1	CXorf56	SVVC*SDTR	C11	NOXO1	100.00	100.00	same	
Q9H6R4-1	NOL6	LAELLTQQHGLQC*R	C777	NOXO1	81.38		same	
Q9H6S0	YTHDC2	IFC*TQPR	C245	NCF1	0.00	0.00	same	
Q9H8V3	ECT2	VTHLVANC*TQGEK	C221	NCF1	0.00	0.00	same	
Q9H8V3	ECT2	INQAKPEC*GR	C584	NCF1	0.00	0.00	same	
Q9H8V3	ECT2	VETISLGEHPC*DR	C686	NCF2	100.00	100.00	same	
Q9H8Y5	ANKZF1	APRTSC*SGSGERESPER	C48	NCF2	0.00		same	
Q9H8Y5	ANKZF1	APRTSC*SGSGERESPER	C48	NOXO1	0.00	0.00	same	
Q9H910-1	HN1L	DHVFLC*EGEEPK	C118	NCF1	0.00	0.00	same	
Q.0	JPT2		 	NODA	0.00	0.00		
Q9H920	RNF121	LSC*NHVFHEFC*IR	C251;C259	NCF1	0.00	0.00	same	
Q9H9B1	EHMTI	APLLVLC*EDHR	C575	NCFI	0.00	9.43	same	
Q9H9B1 OOUOD1	EHMII FUMT1	APLLVLC*EDHR ADI IVI C*EDHR	C575	NOF2	0.00		same	
Q9H9B1	LICK1	AFLLVLC'EDIR STVC*EKIMELLCONEVEOD	C375	NOXOI	100.00	100.00	same	
Q911A47	UCK1	STVC*EKIMELLCONEVEOR	C40	NCF2	100.00	100.00	same	
Q911A47 O9HB71	CACYBP	TDTVLLC*B	C154	NCF1	100.00	0.00	same	
09HCS7	XAB2	LWLDYC*OFLMDOGB	C117	NCF1	0.00	0.00	same	
09HCS7	XAB2	LWLDYC*OFLMDOGB	C117	NCF1	4.92	6 76	same	
Q9HCS7	XAB2	LWLDYC*QFLMDQGR	C117	NCF2	0.00	0.00	same	
Q9HCS7	XAB2	SNYQLWHELC*DLISQNPDK	C225	NCF1	0.00		same	
Q9HCS7	XAB2	LWC*SLADYYIR	C260	NCF1	0.00	0.00	same	
Q9HCS7	XAB2	LWC*SLADYYIR	C260	NCF2	0.00	0.00	same	
Q9HCS7	XAB2	QVDDLASVWC*QC*GELELR	C437;C439	NCF1	0.00	0.00	same	
Q9HCS7	XAB2	DLFEQALDGC*PPK	C587	NCF1	0.00	1.69	same	
Q9HCS7	XAB2	ARDLFEQALDGC*PPK	C587	NCF2		100.00	same	
Q9HCS7	XAB2	DLFEQALDGC*PPK	C587	NCF2	0.00	0.00	same	
Q9HCS7	XAB2	ARDLFEQALDGC*PPK	C587	NOXO1	100.00	100.00	same	
Q9HCS7	XAB2	DLFEQALDGC*PPK	C587	NOXO1	0.00	0.00	same	
Q9HCS7	XAB2	LLPC*SYK	C66	NCF1	12.96	12.29	same	
Q9HCS7	XAB2	LLPC*SYK	C66	NCF2	18.99	18.26	same	
Q9HCS7	XAB2	LLPU*SYK FADMEC*K	C66	NOXOI	32.38	0.00	same	
Q9HCS7	XAB2 XAD2	FADMEC*K	C676	NCF1 NCF1	5 69	2.82	same	
Q9HCS7	XAB2	FADMEC'K FADMEC*K	C676	NCF1	5.62	100.00	same	
Q9HCS7	XAB2	FADMEC K	C676	NCF2	1.92	1.54	same	
Q9HCS7	XAB2	FADMEC *K	C676	NOXO1	0.00	0.00	same	
Q9HCS7	XAB2	AIVSEC*SOIC*DPB	C691-C695	NCF1	0.00	0.00	same	
Q9HCS7	XAB2	AIYSEC*SOIC*DPB	C691.C695	NCF2	0.00	0.00	same	
Q9HCS7	XAB2	AIYSFC*SOIC*DPR	C691:C695	NOX01	0.00	0.00	same	
Q9HCS7	XAB2	C*VTDPAYEDVNNC*HER	C86:C98	NCF1	0.00	0.00	same	
Q9HCS7	XAB2	C*VTDPAYEDVNNC*HER	C86:C98	NCF2	0.00	0.00	same	
Q9HCS7	XAB2	C*VTDPAYEDVNNC*HER	C86;C98	NOXO1	0.00	0.00	same	
Q9HCY8	S100A14	DLVTQQLPHLMPSNC*GLEEK	C62	NCF2	0.00	0.00	same	
Q9HCY8	S100A14	IANLGSC*NDSK	C74	NCF1	0.00	0.00	same	
Q9HCY8	S100A14	IANLGSC*NDSK	C74	NCF2	0.00	0.00	same	
Q9HCY8	S100A14	IANLGSC*NDSK	C74	NOXO1	0.00	0.00	same	
Q9NQS7	INCENP	MGTTAPGPIHLLELC*DQK	C15	NCF2	0.00	0.00	same	
Q9NQS7	INCENP	MGTTAPGPIHLLELC*DQK	C15	NOXO1	0.00		same	
		Continue	d on ne <u>xt p</u>	age				

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Table 2A.2	- continued	from	previous	page

Accession	Protein	Sequence	Positions	Bait	(-) CAI	(+) CA1	Different	Function
Q9NQS7	INCENP	LMEFLC*NMDNK	C24	NCF1	0.00	0.00	same	
O9NOS7	INCENP	IIC*HSYLEB	C355	NCF1	11.82	3 36	same	
0011007	INCENT		COSS	NOVOI	11.02	0.00	Same	
Q9NQS7	INCENP	IIC*HSYLER	C355	NOXOI		0.00	same	
Q9NQS7	INCENP	TPSSPC*PASK	C483	NCF1	0.00	0.00	same	
OONB 30 1	DDX21	THEC*ETK	C445	NCF1	6.03	0.00	samo	
Q3111130-1	DDN21	THE C LIK	0110	NOPI	0.55	0.00	same	
Q9NR30-1	DDA21	THFC"EIK	C445	NCF2	0.00	0.00	same	
Q9NR30-1	DDX21	TIIFC*ETK	C445	NOXO1	0.00	0.00	same	
OONB 30 1	DDX21	I CVC*EDVPTASVTEIOEK	C682	NCF1	100.00	100.00	samo	
Q9IVIL30-1	DDA21	LGVC FDVI IASVIEIQER	0082	NOPT	100.00	100.00	same	
Q9NR30-1	DDX21	LGVC*FDVPTASVTEIQEK	C682	NCF2	100.00	100.00	same	
Q9NR30-1	DDX21	LGVC*FDVPTASVTEIQEK	C682	NOXO1	100.00	100.00	same	
OONDDO	DUOVI	AC*OLIND	C11522	NCEI	0.00			
QantDa	DUOXI	ACCULING	01555	NOFI	0.00		same	
Q9NRD9	DUOX1	TDHLASC*LQR	C423	NCF1		0.00	same	
O9NB D9	DUOX1	TDHLASC*LOB	C423	NOXO1	0.00	0.00	same	
OONDDO	DUOX1		C 120	NODI	0.00	0.00	Same	
Q9NRD9	DUOXI	EALICTELSR	0800	NOFI		0.00	same	
Q9NRD9	DUOX1	EALTC*ELSR	C800	NOXO1	7.83	0.00	same	
O9NB D9	DUOX1	SFIEISNNC*LSK	C890	NOXO1	0.00	0.00	same	
CONDDO	DOOMI		Glit	NOROI	0.00	0.00	Same	
Q9NRP0-	OSTC	VPFLVLEC*PNLK	C14	NCF1	0.00	0.00	same	
1								
O9NBP0-	OSTC	VPFLVLEC*PNLK	C14	NCF2	0.00	0.00	same	
1								
1								
Q9NRP0-	OSTC	VPFLVLEC*PNLK	C14	NOXO1	0.00	0.00	same	
1								
OONDVE	EAMILLAAD		C1999	NODI	0.00			
Q9Nn15	FAM114A2	SLAELIAC SIELFIK	0388	NULL	0.00		same	
Q9NVP1	DDX18	NLQC*LVIDEADR	C329	NCF1	9.51	13.79	same	
O9NVP1	DDX18	NLOC*LVIDEADB	C329	NCE2	0.00	0.00	same	
CONVDI	DDN10	NLOCHUNDEADD	C025	NOVOI	0.00	0.00	Same	
Q9NVP1	DDX18	NLQC*LVIDEADR	C329	NOXOI	0.00	0.00	same	
Q9NX02	NLRP2	LGPC*SFAELVFR	C256	NCF1	0.00		same	
OON X02	NLRP2	LGPC*SFAELVEB	C256	NCF2	0.00		samo	
0011702	DOI AD1	CTDCADLD	C200	NOF 2	0.00		same	
Q9NYF8-	BCLAFI	C*DSADLR	C688	NCF1	0.00	4.57	same	
1								
OONVE8	BCLAE1	C*DSADLB	C688	NOXO1	0.00		samo	
Q91111-0-	BCLAFI	C DSADLIG	0088	NOAOI	0.00		same	
1								
Q9NYL9	TMOD3	C*FSLAATR	C231	NCF1	0.00	0.00	same	
OONVIO	TMOD2	C*ESI A ATD	C221	NCES	0.00		60 m 0	
Q9N I L9	110003	C FSLAAIN	0231	NOF 2	0.00		same	
Q9NYZ3	GTSE1	ESC*TAHAASQAATQR	C198	NCF1	0.00	0.00	same	
O9NYZ3	GTSE1	ESC*TAHAASOAATOB	C198	NCF2		0.00	same	
CONVER	GTODI	AVCCDLC*VDAD	Grao	NODI	0.00	0.00	banno	
Q9N YZ3	GISEI	AVGSPLC*VPAR	C539	NCF1	0.00		same	
Q9NZ01-1	TECR	LC*FLDK	C18	NCF1	0.00	4.54	same	
O9NZ01-1	TECB	LC*FLDK	C18	NCF2	3 31	5 36	same	
Q011201-1	TECR	LOVELDK	C10	NOVOI	0.01	0.00	Same	
Q9NZ01-1	TECR	LC*FLDK	C18	NOXOI	0.00	0.00	same	
Q9NZB2-1	FAM120A	LLVDADNC*LHR	C53	NCF1	0.00	0.00	same	
OONZB2 1	FAM120A	LIVDADNC*LHB	C53	NCF2		0.00	samo	
QONZD2 1	EAMI 2011		C55	NOVOI	0.00	0.00	Same	
Q9NZB2-1	FAM120A	LLVDADNC*LHR	C53	NOXOI	0.00	0.00	same	
Q9NZM1	MYOF	KPVVGQC*TIER	C1392	NCF1	0.00	0.00	same	
OONZM1	MYOF	KPVVCOC*TIFR	C1302	NCF2	0.00	0.00	samo	
Q9INZIVII	MIOF	KIVVGQC TIER	01392	NOF 2	0.00	0.00	same	
Q9NZM1	MYOF	KPVVGQC*TIER	C1392	NOXO1		0.00	same	
Q9NZM1	MYOF	GLELOPODNNGLC*DPYIK	C1574	NCF1	100.00	100.00	same	
OOPOLO	VADA	IMEEC*KP	C170	NCF1	0.00	0.00	00000	
Q91 0L0	VALA		0179	NOPT	0.00	0.00	same	
Q9P0L0	VAPA	KLMEEC*KR	C179	NCF1	11.96		same	
O9P0L0	VAPA	LMEEC*KB	C179	NCF2		0.00	same	
OODOLO	VADA	VIMEEC*VD	C170	NCES	6 9 1	0.00		
Q9F0L0	VAFA	KLMEEC KR	0179	NOF 2	0.84	0.00	same	
Q9P0L0	VAPA	LMEEC*KR	C179	NOXO1	0.00		same	
O9P258	BCC2	LIEGLSHEVIVSAAC*GR	C209	NCF1	0.00		same	
Q01 200	DDM2	VATEUDC*EDAAD	007	NODI	0.00	0.00	Same	
Q9P2X0-1	DPM3	VAIFHDU"EDAAR	067	NCF1	0.00	0.00	same	
Q9P2X0-1	DPM3	VATFHDC*EDAAR	C67	NOXO1	0.00	0.00	same	
OQUECO	SPBB3	VPEPGC*TK	C66	NCF1	0.00	0.00	same	
QUUDCO	GDDDD	VIELGO IN	Coo	NGDO	0.00	0.00	Same	
Q90BC9	SPRR3	VPEPGC*TK	C66	NCF2	0.00	0.00	same	
Q9UBC9	SPRR3	VPEPGC*TK	C66	NOXO1	0.00	0.00	same	
O9UBD5	ORC3	SYC*ENHLOSTAK	C/83	NCF1	0.00	0.00	samo	
Q30DD3-	01105	510 ENIEGSTAR	0405	NOLI	0.00	0.00	same	
1								
Q9UBD5-	ORC3	ENVVNFIDC*LVR	C561	NCF1	0.00	0.00	same	
1								
OULDM7	DUCD7	VIEC*SVTSADCOD	C1200	NCEL	0.00	0.00		
Q9UDMI	DICKI	VIEC STISADGQR	0380	INCEL	0.00	0.00	same	
Q9UBM7	DHCR7	VIEC*SYTSADGQR	C380	NCF2	0.00		same	
Q9UBM7	DHCR7	VIEC*SYTSADGOR	C380	NOX01	0.00	0.00	same	
QUUCES	ADCES	LAUEDAEC*EV	C196	NCES	0.00	0.00	Bame	
290.903	ADCF2	LATEDAEU EK	0180	INCF2	0.00	0.00	same	
Q9UGU0	TCF20	SVIC*DISPLR	C868	NCF1	15.48		same	
Q9UGU0	TCF20	SVIC*DISPLR	C868	NCF2	0.00		same	
QUICTIO	TOPPO	SVIC*DIGDI D	0000	NOVOI	0.00	0.00		
090000	1 CF20	SVIC"DISPLR	0868	NOXOI		0.00	same	
Q9UHB6-	LIMA1	LLANQQVFHISC*FR	C415	NCF2		22.21	same	
4		•••						
T OOLUDA	1 13 6 4 1	ING*UDUDNOL DV	G 100	NODA	0.00	0.00		
Q90HB6-	LIMAI	IYC*KPHFNQLFK	C439	NCF1	0.00	0.00	same	
4								
OOLIND2	AFF4	C*ESLLYLB	C1005	NCET	0.00	0.00		
чалив <i>і-</i>	ALCE 4		01005	INCP I	0.00	0.00	same	
1								
Q9UHB9	SRP68	FETFC*LDPSLVTK	C562	NCF2	100.00	100.00	same	
COULD3	CHOPDOT	MALLOWVID	0502	NCDI	100.00	100.00	Same	MERCAT
CAOHD1	CHORDCI	MALLC"YNK	C5	NCFI	0.00	0.00	same	METAL
Q9UHD1	CHORDC1	MALLC*YNR	C5	NCF2	0.00		same	METAL
OUTHOR	CVPEDI	VPEDPTOC*FULEANOTEV	(1200	NCEL	100.00		69700	
Canuda Aanuda	O I BORI	VIEDFIQUIEK	0208	INCEL	100.00		same	
Q9UHQ9	CYB5R1	VPEDPTQC*FLLFANQTEK	C208	NCF2		100.00	same	
Q9UHO9	CYB5R1	VPEDPTQC*FLLFANOTEK	C208	NOX01		100.00	same	
	SICIONE	HIDVC*SK	C200	NCE9	100.00	100.00	20	
QSOH W 9	SLU12A6	IIIDVO SK	C390	INCF2	100.00	100.00	same	
Q9UHW9	SLC12A6	HIDVC*SK	C390	NOXO1	100.00	100.00	same	
O9UHX1-	DUEGO	ALAIMC*B	C129	NCF2		0.00	same	
1	E U P DU		0140			0.00	Same	
1	10100							
0.01116-	PAGED		G1000			100		
Q9UIG0	BAZ1B	ELDELLNC*LHPQGIR	C1006	NCF1		100.00	same	
Q9UIG0 Q9UIG0	BAZ1B BAZ1B	ELDELLNC*LHPQGIR ELDELLNC*LHPQGIR	$\begin{array}{c} C1006 \\ C1006 \end{array}$	NCF1 NOXO1		$100.00 \\ 100.00$	same same	
Q9UIG0 Q9UIG0	BAZ1B BAZ1B	ELDELLNC*LHPQGIR ELDELLNC*LHPQGIR	C1006 C1006	NCF1 NOXO1		100.00 100.00	same same	

Accession         Pointine	<b>Table 2A.2</b> $-$ continued from previous page								
Opticity         DATA         SALE-VYER         C427         NCF1         0.00         same           QUENCE         PARMERA         LCLVYERA         COTI         NCF1         0.00         same           QUENCE         PARMERA         LCLVYERA         COTI         NCF1         0.00         same           QUENCE         PARMERA         LCLVYERA         CORE         NCF2         0.00         same           QUENCE         ACNI         ARCTYVERTSTVERAVATE         CUENC         ACON         same           QUENCE         ACTI         AARCTYVERTSTVERAVATE         CUENC         0.00         same           QUENCE         ACTI         AARCTYVERTSTVERAVATE         CUENC         0.00         same           QUENCE         ACTI         AARCTYVERTSTVERAVATE         CUENC         0.00         same           QUENCE         NUPSO         ACTIVERAVATE         CUENC         0.00         same           QUENCE         NUPSO         ACTIVERAVATE         CUENC         0.00         0.00         same           QUENCE         NUPSO         ACTIVERAVATE         CUENC         NUPSO         ACTIVERAVATE         CUENC         NUPSO         ACTIVERAVATE           QUENCE	Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
QUILDO         DADADS         LQUILALC'IN         CTSS         NCF1         0.00         0.00         constraint           QUILEVA         ACRNI         SICTYTYTYTERANATR         CUISS         NCF1         0.00         0.00         same           QUILEVA         ACRNI         SICTYTYTYTERANATR         CUISS         NCF1         0.00         0.00         same           QUILEVA         ACRNI         AAPCTIVWLPUTDSQUVQK         CUISS         NCF1         0.00         0.00         same           QUILEVA         ACRNI         AAPCTIVWLPUTDSQUVQK         CUISS         NCF1         0.00         0.00         same           QUILEVA         ACRNI         AAPCVINATIR         CUIS         NCF1         0.00         0.00         same           QUILEVA         ACRNI         ACVINATIR         CUIS         NCF1         0.00         0.00         same           QUILEVA         NCF5         0.00         0.00         same         same         same           QUILEVA         NCF5         0.00         0.00         same         same         same           QUILEVA         NCF6         0.00         0.00         same         same         same           QUILEVA	Q9UIG0	BAZ1B	SALSC*VISK	C497	NCF1	0.00	0.00	same	
Optical Politikal (CLEVI)         List, VIALI, ACMNIN         List, VIALI, MCDEVIY, ACMNIN         List, VIALI, MCDEVIY, ACMNIN         List, VIALI, MCDEVIY, ACMNIN         List, VIALI, MCDEVIY, ACMNIN         MCTPUTTYETVERAVATR         C1052         NCF1         0.00         0.00         manuel and and and and and and and and and and	Q9UIG0	BAZ1B	LQILTALC*HR	C753	NCF1	0.00	0.00	same	
Control         Patters         Entrological         Control         No.P1         0.00         0.00         no.me           QUILV23         ACINI         SRC*YTYSTYEEAATR         C1052         NCP1         0.00         no.me           QUILV24         ACINI         AAPC*TYWEPTESQUYQK         C1223         NCP1         0.00         no.me           QUILV24         ACINI         AAPC*TYWEPTESQUYQK         C1223         NCP2         0.00         0.00         no.me           QUILV24         ACINI         AAPC*TYWEPTESQUYQK         C1223         NCP1         4.30         16.09         no.me           QUILV24         NUP50         AC*VCINATINE         C1181         NCP1         4.30         16.09         no.me           QUILV24         NUP50         ADTNEXNIL/VLPTNATC*TITIOPIK         C1181         NCP1         0.00         no.me         no.me           QUILV24         DNTE*         NDTC*C*TITIOPILAST         C1181         NCP1         0.00         no.me         no.me           QUILV24         DNTE*         NDTC*CTTIOPILAST         C1181         NCP1         0.00         no.me           QUILV34         NARND30         TALSYALC*VPARK         C720         NCV1         0.00         no.m	Q9UK61	FAM208A	LLC*YISLR	C371	NCF1	0.00	0.00	same	
OPENNON         ALCHN         SINC-FY INFLEXANTR         CLUZ         NCF1         0.00         0.00         same           QUIRVA         ACRN         AAPCTTWEPTEDESQUYCK         CLUZ         NCF2         0.00         0.00         same           QUIRVA         ACRN         AAPCTTWEPTEDESQUYCK         CLUZ         NCF2         0.00         0.00         same           QUIRVA         ACNN         AAPCTTWEPTENESQUYCK         CLUZ         NCF2         0.00         0.00         same           QUIRVA         NUE59         ACVENATIK         CLUZ         NCF2         0.00         0.00         same           QUIRVA         NUE59         ACVENATIK         CLUZ         NCF2         0.00         0.00         same           QUIRVA         DNPEP         NDTFCTTTUPTLASK         CLUZ         NCF2         0.00         same           QUIRVA         DNPEP         NDTFCTTTUPTLASK         CLUZ         NCF2         0.00         same           QUIRVA         DNPEP         NDTFCTTUPTLASK         CTUZ         NCF1         0.00         same           QUIRVA         DNPEP         NDTFCTTUPTLASK         CTUZ         NCF1         0.00         same           QUIRVA <t< td=""><td>Q9UK61</td><td>FAM208A</td><td>ELINLIQC<sup>*</sup>R SHO*EVTVET AVATE</td><td>C690</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q9UK61	FAM208A	ELINLIQC <sup>*</sup> R SHO*EVTVET AVATE	C690	NCF1	0.00	0.00	same	
QUEVL>         ACRN         SHCPVTYSTERANTR         C102         NCP2         0.00         same           QUEXP         ACNN         AAPC9TVWLPUEDGQVQK         C1223         NCP2         0.00         same           QUEXT         NUP90         ACVGNATIK         C151         NXXX1         0.00         same           QUEXT         NUP90         ACVGNATIK         C151         NXXX1         0.00         same           QUEXT         NUP90         ACVGNATIK         C161         NXX1         0.00         same           QUEXT         NUP90         ACVGNATIK         C161         NXX1         0.00         same           QUEXT         NUP90         ACVGNATIK         C163         NXX1         0.00         same           QUEAT         DAVEPS         NUPFCCTFIDIPLASK         C720         NCP1         0.00         same           QUEAT         AXXALCVPASK         C720         NCP1         0.00         same         same           QUEAT         AXXALCVPASK         C720         NCP1         0.00         same         same           QUEAT         AXXALCVPASK         C720         NCP1         0.00         same           QUEAT         AXXALCVPASK <td>Q90KV3- 1</td> <td>ACINI</td> <td>SHC FVIISIVEEAVAIR</td> <td>01052</td> <td>NCF1</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	Q90KV3- 1	ACINI	SHC FVIISIVEEAVAIR	01052	NCF1	0.00	0.00	same	
QuIEVSA         ACRS1         AAPCPTWWEPLEDSQUVQK         C1223         NCP1         0.00         none           QUIEVSA         ACMIN         AAPCPWWEPLEDSQUVQK         C1223         NCP2         0.00         none           QUIEVSA         ACMINALALE         C131         NCP1         0.00         none           QUIEXA         NUP50         ACMINALALE         C131         NCP1         0.00         none           QUIEXA         NUP50         ACMINALALE         C131         NCP1         0.00         none           QUIEXA         NUP50         ATMINIC TRUTHCHASK         C131         NCP2         0.00         none           QUIEXA         NUP50         NDTECTOTTICPLASK         C131         NCP2         0.00         none           QUILAT         ANKID30         TALSVALCYVEXK         C720         NCP2         0.00         none         none           QUILAT         ANKID30         TALSVALCYVEXK         C720         NCP1         0.00         none         none           QUILAT         ANKID30         TALSVALCYVEXK         C244         NCP1         0.00         none           QUILAT         ANKID30         TALSVALCYVEXK         C264         NCP1         0.00 <td>Q9UKV3- 1</td> <td>ACIN1</td> <td>SHC*FVTYSTVEEAVATR</td> <td>C1052</td> <td>NCF2</td> <td></td> <td>0.00</td> <td>same</td> <td></td>	Q9UKV3- 1	ACIN1	SHC*FVTYSTVEEAVATR	C1052	NCF2		0.00	same	
QUELYA         ACINI         AAPCTYURLTDSQUYK         C123         NCF2         0.00         0.00         eame           QUEXY         NUTPO         ACYVONAVIK         C151         NOC1         0.00         0.00         eame           QUEXY         NUTPO         ACYVONAVIK         C151         NOC1         0.00         0.00         eame           QUEXY         NUTPO         ACYVONAVIK         C151         NOC2         0.00         0.00         eame           QUEAT         NUTPO         ACYVONAVIK         C131         NCF1         1.00         100.00         eame           QULAD         DNPEP         NUTPCCTTIGPLASH         C133         NCF2         100.00         eame           QUELT         ANRIBO         TALSYALCY PASK         C720         NOC2         0.00         eame           QUELT         ANRIBO         TALSYALCY PASK         C720         NOC2         0.00         eame           QUELT         ANRIBO         TALSYALCY PASK         C720         NOC2         0.00         eame           QUELT         ANRIBO         TALSYALCY PASK         C720         NOC4         0.00         eame           QUELT         ANRIBO         TALSYALCY PASK	Q9UKV3- 1	ACIN1	AAPC*IYWLPLTDSQIVQK	C1223	NCF1	0.00	0.00	same	
QUEXT         NUTBO         ACTVENATIK         C151         NCF1         4.35         10.49         eame           QUEXT         NUTBO         AVTVENATIK         C151         NCF1         10.00         100         100           QUEXT         NUTBO         AVTVENATIK         C151         NCF1         10.00         100.00         came           QUEAD         DNPEP         NUTPCCTTICULASE         C133         NCR1         100.00         came           QUELAD         DNPEP         NUTPCCTTICULASE         C133         NCR1         100.00         came           QUELAT         ANKR050         TALSVALC-VPASK         C720         NCP1         0.00         came           QUELAT         ANKR050         TALSVALC-VPASK         C721         NCP1         0.00         came           QUEAL         MED23         INCYNLCALK         C134         NCP1         0.00         came           QUEAL         MED23         INCYNLCALK         C134         NCP1         0.00         came           QUEAL         MED33         INCYNLCALK         C136         NCP1         0.00         came           QUEAL         NED33         INCYNLCALK         C136         NCP1         <	Q9UKV3- 1	ACIN1	AAPC*IYWLPLTDSQIVQK	C1223	NCF2	0.00	0.00	same	
Quilk, NUPPO         AUVORATING         Clip         NOXOL         0.00         same           QUILX, NUPPO	Q9UKX7	NUP50	AC*VGNAYHK	C151	NCF1	4.35	16.49	same	
QUILN:         NUPPO         HUMPING/LD/UPPER         CD11         NCP1         0.00         same           QUILAD         DNFEP         NDTFC*CTTIGPLASR         C13         NCP1         100.00         same           QUILAD         DNFEP         NDTFC*CTTIGPLASR         C13         NCP1         100.00         same           QUILAD         DNFED         NDTFC*CTTIGPLASR         C13         NCP1         100.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C720         NCP2         0.00         0.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C720         NCP1         0.00         0.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C720         NCP1         0.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C284         NCP1         0.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C365         NCP1         0.00         same           QUILAT         ANRUESO         TALSVALC-YPASK         C365         NCP1         0.00         same           QUILAT         TARSUESON         C286         NCP1         0	Q9UKX7	NUP50	AC*VGNAYHK	C151	NOXO1	0.00		same	
QUILAD         NUPPE         AUTORECONTRACTING AUTORS         C113         NCF1         0.0.00         Banno           QUILAD         DNPEP         NUTPECGTTIGFILASIR         C113         NCXCI         100.00         Banno           QUILAD         DNPEP         NUTPECGTTIGFILASIR         C113         NCXCI         100.00         Banno           QUILAT         DNPEP         NUTPECGTTIGFILASIR         C113         NCXCI         100.00         Banno           QUILAT         ANREDO         TALSVALLCYVFASK         C720         NCXCI         0.00         Banno           QUILAT         ANREDO         TALSVALLCYVFASK         C720         NCXCI         0.00         Banno           QUILAT         ANREDO         TALSVALLCYVFASK         C720         NCXCI         0.00         Banno           QUILAN         MED33         IDATORQUEVERS         C33         NCF1         0.00         Banno           QUILAN         NERDS         TALSVALLOVYFASK         C34         NCF2         0.00         Banno           QUILAN         TYS2         TVEICPEPSFINK         C36         NCF1         0.00         Banno           QUILAN         TYS2         TVEICPEPSFINK         C136         NCF2	Q9UKX7	NUP50	HVNTNPLC*DLTPIFK	C181	NCF1	0.00	0.00	same	
Optimize         Dates         NUMPER	Q9UKX7	NUP50	ADTNLGNILLNVLIPPNMPC*TR	C416	NCF1	6.97	9.17	same	
Optime         Optim         Optim         Optim <td>QULAU</td> <td>DNPEP</td> <td>NDTPC*GTTICPILASR</td> <td>C413 C412</td> <td>NCF1</td> <td>100.00</td> <td>100.00</td> <td>same</td> <td></td>	QULAU	DNPEP	NDTPC*GTTICPILASR	C413 C412	NCF1	100.00	100.00	same	
QUULT: QUULT: ANREDB0         TALSVALC-VPASK TALSVALC-VPASK         C720         KCT21         0.00         same           QUULT: ANREDB1         TALSVALC-VPASK         C720         NCT2         0.00         same           QUULT: ANREDB1         TALSVALC-VPASK         C720         NCT2         0.00         same           QUULT: ANREDB1         TALSVALC-VPASK         C130         NCT2         0.00         same           QUULT: ANREDB1         TALSVALC-VPASK         C130         NCT2         0.00         same           QUULK: ANREDB1         TALSVALC-VPASK         C138         NCT1         0.00         same           QUULK: QUULW0         TFX2         HVPC'MPAC         C138         NCT1         0.00         same           QUUN0         TFX2         CARPPTTYACT         C36         NCT1         0.00         same           QUUR1         ZEP148         INVC*RAFR	Q9ULA0	DNPEP	NDTPC*GTTIGPILASR	C413	NOX01	100.00	100.00	same	
QUULT:1         ANREDS0         TALSYAALCYVPASK         C720         NCR2         0.00         0.00         same           QUULT:1         ANREDS0         TALSYAALCYVPASK         C720         NCR2         0.00         0.00         same           QUULT:1         MED33         DUCYMLANALK         C1339         NCR1         0.00         same           QUULK:4         MED33         DUCYMLANALK         C1339         NCR1         0.00         same           QUULK:4         MED33         LSC*LGAPR         C.00         NCR1         5.76         1.4.40         same           QUULW         TFX2         TVPCTMPTATK         C364         NCP1         0.00         same           QUUN0         TFX2         TVPCTMPTATK         C364         NCP1         0.00         same           QUUN0         TFX2         TVPCTMPTATK         C78         NCP1         0.00         same           QUUN0         TFX2         TVPCTMPTATK         C78         NCP1         0.00         same           QUUN0         TFX2         TVPCTMPTATK         C78         NCP1         0.00         same           QUUN0         TTY2         TTPLATK         C28         NCP1         0.00 <td>Q9ULJ7-1</td> <td>ANKRD50</td> <td>TALSVAALC*VPASK</td> <td>C720</td> <td>NCF1</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	Q9ULJ7-1	ANKRD50	TALSVAALC*VPASK	C720	NCF1	0.00		same	
QULLAT         ANKILDS         TALSYAALC*VPASK         CT20         NOX01         0.00         same           QULKA         MED33         DNVCYNLGLINK         C104         NCF1         0.00         same           QULKA         MED33         DNVCYNLGLINK         C34         NCF1         0.00         same           QULKA         MED33         DNVCYNLGLINK         C36         NCF1         6.27         8.45         same           QULKA         MED33         DNVCYNLGUN         C36         NCF1         0.00         same           QULWA         COR01C         NDQC*DDIR         C33         NCF1         0.00         same           QULWA         TF23         TVEIC*PEPSPERS         C36         NCF1         0.00         same           QULWA         TF23         TVEIC*PERSER         C34         NCF1         0.00         same           <	Q9ULJ7-1	ANKRD50	TALSVAALC*VPASK	C720	NCF2	0.00	0.00	same	
QPULK4         MED23         DNNPGQWC*LSDTLK         C1043         NCF1         0.00         mame           QPULK4         MED23         LISC*LGAFR NR         C40         NCF1         5.78         14.0         same           QPULK4         MED23         LISC*LGAFR NR         C40         NCF1         6.27         8.4.0         same           QPULK4         MED23         LISC*LGAFR NR         C40         NCF1         0.00         0.00         same           QPULK4         MED23         LISC*LGAFR NR         C40         NCF1         0.00         0.00         same           QPULW0         TP32         TC*IEAHQH         C236         NCF1         0.00         same           QPUN0         TRHAS         NCF1         NCF1         0.00         same         METAL           QPUN0         TRHAS         NCF1         NCF1         0.00         same         METAL           QPUN0         TRHAS         NCF1         NCF1         0.00         0.00         same           QPUN0         TRHAS         NCF1         NCF1         0.00         same         same           QPUN0         TRHAS         NCF1         0.00         0.00         same	Q9ULJ7-1	ANKRD50	TALSVAALC*VPASK	C720	NOXO1	0.00	0.00	same	
QULK4         MED23         IC*NLAFALK         C1519         NCF1         0.00         same           QULK4         MED23         DUCK1         NCF1         0.77         8.45         same           QULM4         COR01C         NDQC*VDDIR         C23         NCF1         6.77         8.45         same           QULM0         TFX2         HTVPC*MPRAK         C180         NCF1         0.00         0.00         same           QULM0         TFX2         ICTEDTPTVI_QTK         C364         NCF1         0.00         0.00         same           QULM0         TFX2         ICTELTPTSTDRIG         C550         NCF1         0.00         same         METAL           QUPN9         TTRS         CFFENDAWR         C640         NCF1         0.00         same         METAL           QUPN3         LEMD3         LAQLGDHECCRESSQR         C172.C178         NCF1         0.00         same         METAL           QVYX3         NOF85         LALSC'HESPVNELMR         C160         NCF1         0.00         same         same           QVYX3         NOF85         LALSC'HESPVNELMR         C160         NCF1         0.00         same         same           QVYX4	Q9ULK4	MED23	DNRPQGWC*LSDTYLK	C1043	NCF1	0.00		same	
QUILLA         MED33         DAMC'NULGIANK         C344         NCFI         0.00         mame           QUILLA         OCODIC         NOCCYDIPR         C33         NCFI         0.00         amme           QUILWO         TFX2         ICTUDCYTPRIC         C34         NCFI         0.00         0.00         same           QUILWO         TFX2         ICTEDCYTPRIDEN         C364         NCFI         0.00         0.00         same           QUILWO         TFX2         ICTEDCYTRING         C364         NCFI         0.00         0.00         same           QUILWO         TFX2         ICTEDCYTRING         C364         NCFI         0.00         0.00         same           QUINNO         TFX2         ICTEDCYTRING         C360         NCFI         0.00         same           QUINNO         TFX2         ICTACTOR         NCFI         0.00         same         same           QUINNO         TFX2         ICTACTORNAR         C366         NCFI         0.00         same         same           QUYXX         NOF85         LNACTINERVNEIMR         C106         NCF2         0.00         same         quixii           QUYX14         NOSHP         DESISNATPC*AV	Q9ULK4	MED23	IIC*NLKPALK	C1319	NCF1	0.00	0.00	same	
QUILNA         MECUO         LISC-MARTAR         Cuit         NCP1         5.79         1.4.00         same           QUILNO         TFX2         IC*RDFQTPVLQTK         C108         NCP1         0.00         0.00         same           QUILNO         TFX2         IC*RDFQTPVLQTK         C364         NCP1         0.00         0.00         same           QUILNO         TFX2         IC*RDFQTPVLQTK         C364         NCP1         0.00         0.00         same           QUILNO         TFX2         IC*RDFQTPVLQTK         C780         NCP1         0.00         same           QUILNO         TYZ         C*SPTDEFNUR         C781         NCP1         0.00         same           QUINA         INFSCTIBSFV/NELMR         C106         NCP1         0.00         same         same           QVIXA         NOF58         INISCTIBSFV/NELMR         C106         NCP1         0.00         same         same           QVIXA         NOSIF         INISCTIBSFV/NELMR         C106         NCP1         0.00         same         same           QVIXA         NOSIF         EX         C185         NCP1         0.00         same         same           QVIXA         NOSI	Q9ULK4	MED23	DMVC*NMLGLNK	C284	NCF1	0.00		same	
Odd(LW)         CTPX2         ITTNPC MIPRAR         C138         NCP1         0.00         0.00         name           QUILNO         TFX2         CYRNPQTPVLQTK         C364         NCP1         0.00         0.00         same           QUILNO         TFX2         TVEICTPSFDSR         C364         NCP1         0.00         0.00         same           QUINU         TTF2         CTSPDEFINWR         C785         NCP1         0.00         same           QUINU         TTF2         CSPDEFINWR         C787         NCP1         10.00         same           QUINU         TTF3         CTSPDEFINWR         C175.C176         NCP1         10.00         same           QUVIN         LEDDS         LAIACDBECKSSQR         C371         NCP1         10.00         same           QVX3         NOPSE         LNECTBEFVNELAR         C106         NCX01         0.00         same           QVX3         NOPSE         LNECTBEFVNELAR         C167         NCP1         0.00         same           QVX3         NOSE         DSISNTFC*AVLRPSGAVVTEC*V         C236.C250         NCF1         0.00         same           QV314         NOSE         DSISNTFC*AVLRPSGAVVTEC*V         C236.C250	Q9ULK4	COPO1C	NDOC*VDDIP	C40	NCF1	5.76	14.40	same	
CONTINUE         TEX2         ICPREPORT FULTY         CORR         CORR </td <td>Q9ULV4</td> <td>TPY2</td> <td>HTVPC*MPPAK</td> <td>C198</td> <td>NCF1 NCF1</td> <td>0.27</td> <td>8.45</td> <td>same</td> <td></td>	Q9ULV4	TPY2	HTVPC*MPPAK	C198	NCF1 NCF1	0.27	8.45	same	
QUUND         TPX2         TVEICPPSPIDER         C536         NCP1         0.00         0.00         same           QUUNY-         TTF2         CSPEDEFNURR         C385         NCP1         0.00         same         METAL           QUUNY-         TRIM33         TC*IEAHQR         C241         NCP2         0.00         same         METAL           QUURL         ZNP148         SHVC*ELC*NAAFR         C175;C176         NCP1         100.00         isome         same           QUYATS         LEMD3         LAQLACDHECKSSSQR         C477         NCP1         100.00         same           QUYATS         NOP58         LNLSC*IHSPV/NELMR         C166         NCP1         0.00         0.00         same           QUYATS         NOP58         LNLSC*IHSPV/NELMR         C367         NCP2         0.00         same           QUYATS         XOP58         TC*GEVIVK         C367         NCP2         0.00         same           QYATA         NOSIP         TC*GEVIVK         C367         NCP2         0.00         same           QY314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCF1         0.00         same           QY314         NOSIP	Q9ULW0	TPX2	IC*BDPOTPVLOTK	C364	NCF1	0.00	0.00	same	
QUUN14- QUUN9- QUUN9- TRIM33         TC*IEAHQR         C785         NCF1         0.00         same           QUUN9- QUUN9- QUUN9- QV2X3         TRIM33         TC*IEAHQR         C241         NCF2         0.00         same           QUUN9- QV2X3         LAQLAGDHEC*CSSSQR         C547         NCF1         0.00         same           QV2X3         NOP58         LALSC*IISFVNEELMR         C106         NCF1         0.00         same           QV2X3         NOP58         LALSC*IISFVNEELMR         C106         NCF2         0.00         same           QV2X3         NOP58         LALSC*IISFVNEELMR         C106         NCF2         0.00         same           QV2X3         NOP58         LNLSC*IISFVNEELMR         C185         NCF1         0.00         same           QV314         NOSIP         TC*GEVIVK         C386(C250         NCF2         0.00         same           QV314         NOSIP         DELSNATPC*AVLRPSGAVTLEC*V         C236(C250         NCF1         0.00         same           QV314         NOSIP         DELSNATPC*AVLRPSGAVTLEC*V         C236(C250         NCK1         0.00         same           QV314         NOSIP         DELSNATPC*AVLRPSGAVTLEC*V         C236(C250         NCK1	Q9ULW0	TPX2	TVEIC*PFSFDSR	C536	NCF1	0.00	0.00	same	
Open Set State         TRIM33         TC*EAHQR         C241         NCF2         0.00         same         METAL           QUUQUI         ZNP148         SIVC*EBIC*NAAFR         C173;C176         NCF1         100.00         same           QUY2US         LABIAS         LALSC*BEYVNELMR         C106         NCF1         100.00         0.00         same           QYXX3         NOPS8         LALSC*BEYVNELMR         C106         NCF1         100.00         same           QYXX3         NOPS8         LALSC*BEYVNELMR         C106         NCF1         0.00         0.00         same           QYX33         NOPS8         LALSC*BEYVNELMR         C367         NCF1         0.00         same           QYX34         NOSIP         TYTC*PMSGRPLR         C185         NCF1         0.00         same           QY314         NOSIP         DELSNATPC*AVLRPSGAVYTLEC*V         C236;C250         NCF1         0.00         same           QY314         NOSIP         DELSNATPC*AVLRPSGAVTLEC*V         C236;C250         NCF2         0.00         same           QY314         NOSIP         DELSNATPC*AVLRPSGAVTTLEC*V         C236;C250         NCF1         0.00         same           QY314         NOSIP	Q9UNY4-	TTF2	C*SPFDEFNLWR	C785	NCF1	0.00	0.00	same	
OUDLID         ZEF148         SHVC*EHC*NAFE         C173/C176         NCF1         10.00         same           Q9Y203         NOP58         LNLSC*HSPVVNELMR         C106         NCF2         0.00         0.00         same           Q9Y203         NOP58         LNLSC*HSPVVNELMR         C106         NCF2         0.00         0.00         same           Q9Y203         NOP58         LNLSC*HSPVVNELMR         C106         NCF2         0.00         same           Q9Y314         NOSIP         TC*GEVIVK         C367         NCF2         8.10         same           Q9Y314         NOSIP         TVC*GVTR         C236         C250         NCF1         0.00         same           Q9Y314         NOSIP         TVC*AVTR         C236         C250         NCF2         0.00         same           Q9Y314         NOSIP         DSLSNATC*AVLRPSGAVVTLEC*V         C236/C250         NCF1         0.00         same           Q9Y314         NOSIP         DSLSNATC*AVLRPSGAVVTLEC*V         C236/C250         NCF1         0.00         same           Q9Y314         NOSIP         DSLSNATC*AVLRPSGAVVTLEC*V         C236/C250         NCF1         0.00         same           Q9Y314         NOSIP <td>Q9UPN9-</td> <td>TRIM33</td> <td>TC*IEAHQR</td> <td>C241</td> <td>NCF2</td> <td></td> <td>0.00</td> <td>same</td> <td>METAL</td>	Q9UPN9-	TRIM33	TC*IEAHQR	C241	NCF2		0.00	same	METAL
QPY218         LExLD3         LAQLACUMECCUSSQUE         C147         NCF1         100.00         100.00         same           QPY2X3         NOP58         LNLSC"HEPVNELMR         C106         NCK1         100.00         0.00         same           QPY2X3         NOP58         LNLSC"HEPVNELMR         C106         NCK1         15.37         same           QPY2X9         ZNF281         TC"GEVIVK         C367         NCF2         0.00         same           QPY314         NOSIP         TVTC"PMSCKPLR         C185         NCF1         0.00         same           QPY314         NOSIP         TVC"AVIRPSGAVVTLEC"V         C236;C250         NCF1         0.00         same           QPY314         NOSIP         DLSNATPC"AVLRPSGAVVTLEC"V         C236;C250         NCF1         0.00         same           QPY314         NOSIP         DLSINATPC"AVLRPSGAVTLEC"V         C236;C250         NC71         0.00         same           QPY314         NOSIP         DLSINATPC"AVLRPSGAVTLEC"V         C236;C250         NC71         0.00         same           QPY314         NOSIP         DLSINATPC"AVLRPSGAVTLEC"V         C236;C250         NC01         0.00         same               QPY446.2         PKP3 </td <td>Q9UQR1</td> <td>ZNF148</td> <td>SHVC*EHC*NAAFR</td> <td>C173;C176</td> <td>NCF1</td> <td>0.00</td> <td></td> <td>same</td> <td></td>	Q9UQR1	ZNF148	SHVC*EHC*NAAFR	C173;C176	NCF1	0.00		same	
Options         NORS         LINEC+INFLATE         Club         NCF2         0.00         0.00         same           QPV2X3         NOP58         LINEC+INFLATE         Club         NCK1         0.00         same           QPV2X9         ZNF281         TC*GEVIVK         C367         NCF2         0.00         same           QPV314         NOSIP         TV*C*NTR         C185         NCF2         0.00         same           QPV314         NOSIP         TV*C*AVTR         C238         C220         NCF2         0.00         same           QPV314         NOSIP         TV*C*AVTR         C238         C250         NCF2         0.00         same           QPV314         NOSIP         DKNATC*AVLRPSGAVVTLEC*V         C236         C250         NCF1         0.00         same           QPV314         NOSIP         DK*NATC*AVLRPSGAVVTLEC*V         C236         C250         NOX01         0.00         same           QPV314         NOSIP         DK*NATC*AVLRPSGAVVTLEC*V         C236         C250         NOX01         0.00         same           QPV314         NOSIP         DK*ATC*AVLRPSGAVVTLEC*V         C236         C250         NOX01         0.00         same	Q9Y2U8	LEMD3	LAQLAGDHEC~GSSSQR	C547	NCF1	100.00	100.00	same	
QPY233         NOP58         LK1SCTHEPV/NELMR         C106         NOK01         0.00         same           QPY239         ZKP281         TC*GEVIVK         C367         NCF1         15.33         15.27         same           QPY239         ZKP281         TC*GEVIVK         C367         NCF1         0.00         same           QPY314         NOSIP         TVTC*PNSGPLR         C185         NCF2         0.00         0.00         same           QPY314         NOSIP         DELSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCF2         0.00         0.00         same           QPY314         NOSIP         DELSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NOX1         0.00         same           QPY314         NOSIP         NCFTGAVTYTHEK         C286;C250         NOX01         0.00         same           QPY314         NOSIP         NC*TGAVTYTHEK         C48         NOX01         10.40         0.00         same           QPY314         NOSIP         NC*TGAVTYTHEK         C48         NOX01         10.40         same           QPY446         PKP3         SAVDLSC*SR         C144         NCF1         0.00         same           QPY446         PKP3	Q912A3 O0V2X3	NOP58	LNLSC HSP V VNELMR	C106	NCF1 NCF2	0.00	0.00	same	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Q912X3	NOP58	LNLSC*IHSPVVNELMB	C106	NOXO1	0.00	0.00	same	
QY280         ZKP281         TC*CERVIVK         C367         NCF2         0.00         same           QY314         NOSIP         TUTC*PNSGRPLR         C185         NCF1         0.00         same           QY314         NOSIP         TUTC*PNSGRPLR         C185         NCF2         0.00         same           QY314         NOSIP         DELSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCF2         0.00         0.00         same           QY314         NOSIP         DELSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCF2         0.00         0.00         same           QY314         NOSIP         NCF1GAVTYTHEK         C8         NCF1         0.00         4.12         same           QY314         NOSIP         NC*GC#APYER         C48         NCS1         10.26         same           QY314         NOSIP         NC*GC#APYER         C48         NCS1         10.36         12.26         same           QY314         RPL36         EVC*GFAPYER         C48         NCS1         10.56         same           QY446-2         PKP3         SAVDLSC*SR         C144         NCF2         0.00         same           QY446-2         PKP3         SAVDLSC*FAR	Q9Y2X9	ZNF281	TC*GEVIVK	C367	NCF1	15.33	15.27	same	
Q9y314         NOSIP         TVTC*PMSGKPLR         C185         NCF1         0.00         0.00         same           Q9y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236,C250         NCF1         0.00         0.00         same           Q9y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236,C250         NCF2         0.00         0.00         same           Q9y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236,C250         NOC71         0.00         same           Q9y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236,C250         NOX01         0.00         same           Q9y314         NOSIP         DC*TAGAVYTYHEK         C8         NCF2         0.00         4.42         same           Q9y318         RPL36         EVC*GPAPYER         C48         NOX01         10.80         12.26         same           Q9y446-2         PKP3         SAVDLSC*SR         C144         NOX01         12.81         11.05         same           Q9y446-2         PKP3         SAVDLSC*SR         C144         NOX01         12.62         same           Q9y446-2         PKP3         SVDLSC*SR         C144         NOX01         12.62         same	Q9Y2X9	ZNF281	TC*GEVIVK	C367	NCF2		0.00	same	
Q9Y314         NOSIP         YUC*AVTR         C233         NCF2         81.36         same           Q9Y314         NOSIP         DELSMATPC*AVLRPSGAVVTLEC*V         C236;C250         NCF1         0.00         0.00         same           Q9Y314         NOSIP         DELSMATPC*AVLRPSGAVVTLEC*V         C236;C250         NCC1         0.00         0.00         same           Q9Y314         NOSIP         EK         C236;C250         NCC1         0.00         0.00         same           Q9Y314         NOSIP         EX         C48         NCC1         0.00         0.00         same           Q9Y315         RPL36         EVC*GPAPYER         C48         NCC1         0.00         same           Q9Y446-2         PKP3         SAVDL5C*SR         C144         NCP1         0.00         same           Q9Y446-2         PKP3         SAVDL5C*SR         C144         NCP2         6.02         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NCP2         6.00         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NCP2         6.00         same           Q9Y446-2         PKP3         DLAGAPPGEVCG*FTPQSR	Q9Y314	NOSIP	TVTC*PMSGKPLR	C185	NCF1	0.00	0.00	same	
Q9Y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V EK         C236;C250         NCF1         0.00         0.00         same           Q9Y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V PAVLRPSGAVVTLEC*V         C236;C250         NCF2         0.00         0.00         same           Q9Y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCK01         0.00         same           Q9Y314         NOSIP         DSLSNATPC*AVLRPSGAVVTLEC*V         C236;C250         NCK01         0.00         same           Q9Y314         NOSIP         DC*TAGAVYTYHEK         C48         NCF1         0.00         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCF1         0.00         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCY01         12.34         11.05         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCY01         0.00         same         same           Q9Y446-2         PKP3         SVENAVCVLR         C544         NCX01         37.50         38.91         same           Q9Y446-2         PKP3         SVENAVCVLR         C544         NCX01         0.00         same	Q9Y314	NOSIP	YVC*AVTR	C223	NCF2	81.36		same	
Q9Y314         NOSIP         DSLENATPC*AVLRPSGAVVTLEC*V EK         C236;C250         NCF2         0.00         0.00         same           Q9Y314         NOSIP         DSLENATPC*AVLRPSGAVVTLEC*V DSLENATPC*AVLRPSGAVVTLEC*V         C236;C250         NOXO1         0.00         0.00         same           Q9Y314         NOSIP         DSLENATPC*AVLRPSGAVVTLEC*V         C236;C250         NOXO1         0.00         0.00         same           Q9Y314         NOSIP         DSCTAGAVYTYHEK         C8         NCF1         0.00         0.00         same           Q9Y318         RPL36         EVC*GFAPYER         C48         NCC1         0.00         0.00         same           Q9Y446-2         PKF3         SAVDLSC*SR         C144         NCF1         0.00         same           Q9Y446-2         PKF3         SVENAVC*VLR         C544         NCF2         0.00         same           Q9Y446-2         PKF3         SVENAVC*VLR         C544         NCF2         0.00         same           Q9Y446-2         PKF3         SVENAVC*VLR         C544         NCF1         0.00         same           Q9Y446-2         PKF3         DLAGAPPGEVVCC*FTPQSR         C554         NCF2         0.00         same	Q9Y314	NOSIP	DSLSNATPC*AVLRPSGAVVTLEC*V EK	C236;C250	NCF1	0.00	0.00	same	
Q97314         NOSIP         DSLSNATEC-AVLIDESAVVILECV         C236/C250         NOX01         0.00         same           Q97314         NOSIP         NCTAGAVTTYHEK         C8         NCF2         0.00         0.42         same           Q97314         RPL36         EVC*GAPYER         C48         NCF2         0.00         4.42         same           Q97315         RPL36         EVC*GAPYER         C48         NCF1         0.80         1.2.6         same           Q97416-2         PKP3         SAVDLSC*SR         C144         NCF1         0.80         1.2.3         same           Q97446-2         PKP3         SAVDLSC*SR         C144         NCK01         0.00         same           Q97446-2         PKP3         SVENAVC*VLR         C362         NOX01         0.00         same           Q97446-2         PKP3         SVENAVC*VLR         C544         NCF2         0.00         same           Q97446-2         PKP3         SVENAVC*VLR         C544         NCF2         0.00         same           Q97446-2         PKP3         DLACAPPGEVVCC*FTPQSR         C544         NCF1         0.00         same           Q97446         USP15         IGNILDC*TALSALSGIPADK <td>Q9Y314</td> <td>NOSIP</td> <td>DSLSNATPC*AVLRPSGAVVTLEC*V EK</td> <td>C236;C250</td> <td>NCF2</td> <td>0.00</td> <td>0.00</td> <td>same</td> <td></td>	Q9Y314	NOSIP	DSLSNATPC*AVLRPSGAVVTLEC*V EK	C236;C250	NCF2	0.00	0.00	same	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Q9Y314	NOSIP	DSLSNATPC*AVLRPSGAVVTLEC*V EK	C236;C250	NOXO1	0.00	0.00	same	
Q91305         RFL30         EVC GFAPTER         C48         NCF2         0.00         4.42         same           Q9Y305         RPL36         EVC GFAPTER         C48         NOK01         10.00         12.26         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCF1         0.00         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCV1         11.05         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NCV2         6.00         same           Q9Y446-2         PKP3         CYSDAAK         C32         NOXO1         0.00         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NCF2         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NCF1         0.00         same           Q9Y445         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF2         0.00         same           Q9Y448         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF2         0.00         same           Q9Y441         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF2	Q9Y314	NOSIP DDL 26	NC*TAGAVYTYHEK EVC*CEADVED	C8	NCF1	0.00	0.00	same	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Q91308	RPL30 DDI 26	EVC*GFAPYER EVC*CEADVED	C48	NOF2	10.00	4.42	same	
GY44-2         PKP3         SAVDLSC*SR         C144         NCP2         6.88         0.9.25         same           Q9Y446-2         PKP3         SAVDLSC*SR         C144         NOXO1         12.34         11.05         same           Q9Y446-2         PKP3         TTSRPEAGVC*SLALPSDLQLDR         C33         NOXO1         2.62         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NOCP2         60.02         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NOCP1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NOCP1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NOCP1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NOCP1         0.00         same           Q9Y448         USP15         IGNILDC*TALSALSGIPADK         C506         NCF1         0.00         same           Q9Y448         USP15         IGNILDC*TALSALSGIPADK         C506         NCF2         14.72         9.92         same           Q9Y441         AIM1         ISVQPI	Q91308 Q9Y446-2	PKP3	SAVDLSC*SB	C148	NCE1	0.00	0.00	same	
Opvide2         PKP3         SAVDLSC*SR         Cl44         NOXO1         12.34         11.05         same           Q9V446-2         PKP3         C*YSDAAAK         C32         NOXO1         21.62         same           Q9V446-2         PKP3         C*YSDAAAK         C362         NOXO1         0.00         same           Q9V446-2         PKP3         SVENAVC*VLR         C544         NCP2         60.02         same           Q9V446-2         PKP3         SVENAVC*VLR         C544         NCP2         0.00         same           Q9V446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NCF1         0.00         same           Q9V446-2         PKP3         DLAGAPPGEVVGC*FTPQSR         C584         NCF1         0.00         same           Q9V445         USP15         IGNILDLC*TALSALSCIPADK         C506         NCF1         0.00         same           Q9V448         USP15         IGNILDLC*TALSALSCIPADK         C506         NCF2         0.00         same           Q9V448         USP15         IGNILDLC*TALSALSCIPADK         C506         NCF1         12.12         16.01         same           Q9V441         AIM1         SEVQPIC*LDSFTGPR         C1404 <td>Q9Y446-2</td> <td>PKP3</td> <td>SAVDLSC*SR</td> <td>C144</td> <td>NCF2</td> <td>6.88</td> <td>19.25</td> <td>same</td> <td></td>	Q9Y446-2	PKP3	SAVDLSC*SR	C144	NCF2	6.88	19.25	same	
<sup>i</sup> <sup>1</sup>	Q9Y446-2	PKP3	SAVDLSC*SR	C144	NOXO1	12.34	11.05	same	
Q9Y446-2       PKP3       C*YSDAAAK       C362       NOX01       0.00       0.00       same         Q9Y446-2       PKP3       SVENAVC*VLR       C544       NOX01       37.50       38.91       same         Q9Y446-2       PKP3       DLAGAPPGEVVGC*FTPQSR       C584       NCF1       0.00       0.00       same         Q9Y446-2       PKP3       DLAGAPPGEVVGC*FTPQSR       C584       NCF2       0.00       same         Q9Y446-2       PKP3       DLAGAPPGEVVGC*FTPQSR       C584       NCK1       0.00       0.00       same         Q9Y446-2       PKP3       DLAGAPPGEVVGC*FTPQSR       C584       NCK1       0.00       0.00       same         Q9Y446-2       PKP3       DLAGAPPGEVVGC*FTPQSR       C584       NCK01       0.00       0.00       same         Q9Y448       USP15       IGNILDLC*TALSALSGIPADK       C506       NCF2       0.00       0.00       same         Q9Y4K1       AIM1       ISSVQPIC*LDSFTGPR       C1404       NCF1       12.12       16.01       same         Q9Y4K1       AIM1       SPEAVGSEC*PSR       C541       NCF2       26.48       21.31       same         Q9Y4K1       AIM1       SPEAVGSEC*PSR       <	Q9Y446-2	PKP3	TTSRPEAGVC*SLALPSDLQLDR	C33	NOXO1	21.62		same	
Q9Y446-2         PKP3         SVENAVC*VLR         C544         NCF2         60.02         same           Q9Y446-2         PKP3         SVENAVC*VLR         C544         NCO1         37.50         38.91         same           Q9Y446-2         PKP3         DLAGAPPGEVVCC*FTPQSR         C584         NCF1         0.00         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVCC*FTPQSR         C584         NCC1         0.00         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVCC*FTPQSR         C584         NOXO1         0.00         0.00         same           Q9Y48         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF1         0.00         0.00         same           Q9Y481         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF1         5.59         15.65         same           Q9Y4K1         CRYBG1         ISSVQPIC*LDSFTGPR         C1404         NCF2         14.72         9.92         same           Q9Y4K1         CRYBG1         SPEAVGSEC*PSR         C541         NCF1         12.12         16.01         same           Q9Y4K1         CRYBG1         SPEAVGSEC*PSR         C541         NOXO1         0.00	Q9Y446-2	PKP3	C*YSDAAAK	C362	NOXO1	0.00	0.00	same	
Q9Y446-2         PKP3         SVENAVC*VLR         C544         NOXO1         37.50         38.91         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*PTPQSR         C584         NCF1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*PTPQSR         C584         NCF1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*PTPQSR         C584         NOX01         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*PTPQSR         C584         NOX01         0.00         same           Q9Y446         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF1         0.00         same           Q9Y4K1         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF2         14.72         9.92         same           Q9Y4K1         AIM1         SPEAVGSEC*PSR         C541         NCF1         12.12         16.01         same           Q9Y4K1         AIM1         SPEAVGSEC*PSR         C541         NCF2         26.48         21.31         same           Q9Y4K1         AIM1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4K1	Q9Y446-2	PKP3	SVENAVC*VLR	C544	NCF2	60.02		same	
Q91440-2         PKP3         DLAGAPPGEVVGC*TPQSR         C584         NCF1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*TPQSR         C584         NOXO1         0.00         same           Q9Y446-2         PKP3         DLAGAPPGEVVGC*TPQSR         C584         NOXO1         0.00         same           Q9Y485         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF2         0.00         same           Q9Y484         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF2         0.00         same           Q9Y4K1         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF1         5.59         15.65         same           Q9Y4K1         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF1         12.12         16.01         same           Q9Y4K1         AIM1         SPEAVGSEC*PSR         C541         NCF2         26.48         21.31         same           Q9Y4K1         AIM1         SPEAVGSEC*PSR         C541         NOXO1         0.00         same           Q9Y4K1         AIM1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4K1         AIM	Q9Y446-2	PKP3 DKD2	SVENAVC*VLR	C544	NOXO1	37.50	38.91	same	
Q91440-2         IARDS         DLAGAPPGEVVGC*ITPQSR         C504         NOX21         0.00         same           Q9Y445         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF1         0.00         0.00         same           Q9Y485         USP15         IGNILDLC*TALSALSGIPADK         C506         NCF2         0.00         0.00         same           Q9Y481         GRYBG1         ISSVQPIC*LDSFTGPR         C1404         NCF1         5.59         15.65         same           Q9Y4K1         AIM1         ISSVQPIC*LDSFTGPR         C1404         NCF1         12.12         16.01         same           Q9Y4K1         CRYBG1         SPEAVGSEC*PSR         C541         NCF2         26.48         21.31         same           Q9Y4K1         AIM1         SPEAVGSEC*PSR         C541         NOX01         0.00         same           Q9Y4K1         CRYBG1         SPEAVGSEC*PSR         C541         NOX01         0.00         same           Q9Y4K1         AIM1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4K1         AIM1         SNLPNC*ANSDTDFMGLFK         C334         NCF1         0.00         same <t< td=""><td>Q9Y446-2</td><td>PKP3 PKP3</td><td>DLAGAPPGEVVGC*FTPQSR DLAGAPPGEVVCC*FTPOSB</td><td>C584 C584</td><td>NCF1</td><td>0.00</td><td>0.00</td><td>same</td><td></td></t<>	Q9Y446-2	PKP3 PKP3	DLAGAPPGEVVGC*FTPQSR DLAGAPPGEVVCC*FTPOSB	C584 C584	NCF1	0.00	0.00	same	
Q9Y4ES       USP15       IGNILDLC*TALSALSGIPADK       C506       NCF1       0.00       0.00       same         Q9Y4ES       USP15       IGNILDLC*TALSALSGIPADK       C506       NCF1       0.00       0.00       same         Q9Y4ES       USP15       IGNILDLC*TALSALSGIPADK       C506       NCF1       0.00       0.00       same         Q9Y4K1       AIM1       ISSVQPIC*LDSFTGPR       C1404       NCF1       5.59       15.65       same         Q9Y4K1       CRYBG1       ISSVQPIC*LDSFTGPR       C1404       NCF1       12.12       16.01       same         Q9Y4K1       CRYBG1       SPEAVGSEC*PSR       C541       NCF1       12.12       16.01       same         Q9Y4K1       CRYBG1       SPEAVGSEC*PSR       C541       NCF2       26.48       21.31       same         Q9Y4K1       CRYBG1       SPEAVGSEC*PSR       C541       NOX01       0.00       same         Q9Y4K1       CRYBG1       SNLPNC*ANSDTDFMGLFK       C976       NCF2       0.00       0.00       same         Q9Y4K1       CRYBG1       SNLPNC*ANSDTDFMGLFK       C334       NCF1       0.00       same         Q9Y4W2       LASIL       VEC*VLAELK       C306	Q91440-2 Q9Y446-2	PKP3	DLAGAPPGEVVGC*FTPQSR	C584	NOXO1	0.00	0.00	same	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q9Y4E8	USP15	IGNILDLC*TALSALSGIPADK	C506	NCF1	0.00	0.00	same	
Q9Y4K1AIM1 CRYBG1ISSVQPIC*LDSFTGPRC1404NCF15.5915.65sameQ9Y4K1AIM1 CRYBG1ISSVQPIC*LDSFTGPRC1404NCF214.729.92sameQ9Y4K1CRYBG1 CRYBG1SPEAVGSEC*PSRC541NCF112.1216.01sameQ9Y4K1AIM1 CRYBG1SPEAVGSEC*PSRC541NCF226.4821.31sameQ9Y4K1AIM1 CRYBG1SPEAVGSEC*PSRC541NOX010.00sameQ9Y4K1CRYBG1SNLPNC*ANSDTDFMGLFKC976NCF20.000.00sameQ9Y4K1CRYBG1SNLPNC*ANSDTDFMGLFKC976NCF20.000.00sameQ9Y4K1LASILVEC*VLAELKC306NCF10.00sameQ9Y4W2LASILVEC*VLAELKC306NCF10.00sameQ9Y4W2LASILVEC*VLAELKC306NOX010.00sameQ9Y5B9SUPT16HSYC*SNLVRC283NCF10.00sameQ9Y5B9SUPT16HINFC*PGSALGRC574NCF10.00sameQ9Y5X1SNX9GFLGC*FPDIIGTHKC502NCF10.00sameQ9Y624F11RLVC*YNNKC74NCF10.00sameQ9Y624F11RLVC*YNNKC74NCF10.00sameQ9Y629MTCH2LC*SGVLGTVVHGKC79NCF2100.00sameQ9Y619TEX264LFTESC*SISPKC68NCF1100.00same<	Q9Y4E8	USP15	IGNILDLC*TALSALSGIPADK	C506	NCF2	0.00	0.00	same	
Q9Y4K1         AIM1 CRYBG1         ISSVQPIC*LDSFTGPR         C1404         NCF2         14.72         9.92         same           Q9Y4K1         CRYBG1 CRYBG1         SPEAVGSEC*PSR         C541         NCF1         12.12         16.01         same           Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NCF2         26.48         21.31         same           Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NOX01         0.00         same           Q9Y4K1         AIM1 CRYBG1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4K1         AIM1 CRYBG1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4K2         LAS1L         VEC*VLAELK         C306         NCF1         0.00         same           Q9Y4W2         LAS1L         VEC*VLAELK         C306         NOX01         0.00         same           Q9Y5B9         SUPT16H         SYC*SNLVR         C283         NCF1         0.00         same           Q9Y5B9         SUPT16H         INFYC*PGSALGR         C574         NCF1         0.00         same           Q9Y5K6<	Q9Y4K1	AIM1 CBVBC1	ISSVQPIC*LDSFTGPR	C1404	NCF1	5.59	15.65	same	
Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NCF1         12.12         16.01         same           Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NCF2         26.48         21.31         same           Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NOX01         0.00         same           Q9Y4K1         AIM1 CRYBG1         SPEAVGSEC*PSR         C541         NOX01         0.00         same           Q9Y4K1         CRYBG1         SNLPNC*ANSDTDFMGLFK         C976         NCF2         0.00         0.00         same           Q9Y4W1         LASIL         VEC*VLAELK         C306         NCF1         0.00         same           Q9Y4W2         LASIL         VEC*VLAELK         C306         NCF1         0.00         same           Q9Y4W2         LASIL         VEC*VLAELK         C306         NCF1         0.00         same           Q9Y5B9         SUPT16H         INFYC*SALGR         C574         NCF1         0.00         same           Q9Y5B9         SUPT16H         INFYC*PGSALGR         C574         NCF1         0.00         same           Q9Y5K6         CD2AP         AQIIELLC*IVEALKK	Q9Y4K1	AIM1 CBYBG1	ISSVQPIC*LDSFTGPR	C1404	NCF2	14.72	9.92	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q9Y4K1	AIM1 CRYBG1	SPEAVGSEC*PSR	C541	NCF1	12.12	16.01	same	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q9Y4K1	AIM1 CRYBG1	SPEAVGSEC*PSR	C541	NCF2	26.48	21.31	same	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q9Y4K1	AIM1 CRYBG1	SPEAVGSEC*PSR	C541	NOXO1	0.00		same	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Q9Y4K1	AIM1 CRYBG1	SNLPNC*ANSDTDFMGLFK	C976	NCF2	0.00	0.00	same	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q9Y4P8-1	WIPI2	NIC*SLATIQK	C334	NCF1	0.00	0.55	same	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Q9Y4W2	LASIL	VEC*VLAELK	C306	NCF1	0.00	0.00	same	
Q914W2         LASIL         VEC VLAELK         C300         NOAO1         0.00         0.00         same           Q9Y5B9         SUPT16H         SVC*SNLVR         C283         NCF1         0.00         same           Q9Y5B9         SUPT16H         INFYC*PGSALGR         C574         NCF1         0.00         same           Q9Y5B6         CD2AP         AQIIELLC*IVEALKK         C595         NCF1         0.00         0.00         same           Q9Y5K6         CD2AP         AQIIELLC*IVEALKK         C595         NCF1         0.00         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same         DISULFID           Q9Y624         F11R         LVC*YNNK         C74         NCF2         0.00         same         DISULFID           Q9Y629         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same           Q9Y619         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q9Y4W2	LASIL	VEC*VLAELK VEC*VLAELE	C306	NCF2	0.00	0.00	same	
Q9Y5B9         SUPTION         INFOSMUT         C205         NCF1         0.00         same           Q9Y5B9         SUPTIGH         INFYC*PGSALGR         C574         NCF1         0.00         0.00         same           Q9Y5B6         CD2AP         AQIIELLC*IVEALKK         C595         NCF1         0.00         0.00         same           Q9Y5X1         SNX9         GFLGC*FPDIIGTHK         C502         NCF1         0.00         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF2         0.00         0.00         same           Q9Y6C9         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same           Q9Y619         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q914W2	LASIL SUPT16U	VEC'VEAEEK SVC*SNLVB	C300 C382	NOAUI	0.00	0.00	same	
Q9Y5K6         CD2AP         AQIIELLC*IVEALKK         C555         NCF1         0.00         Same           Q9Y5K1         SNX9         GFLGC*FPDIIGTHK         C502         NCF1         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same         DISULFID           Q9Y6C9         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same         DISULFID           Q9Y619         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q9Y5B9	SUPT16H	INFYC*PGSALGR	C574	NCF1	0.00	0.00	same	
Q9Y5X1         SNX9         GFLGC*FPDIIGTHK         C502         NCF1         0.00         same           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same         DISULFID           Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same         DISULFID           Q9Y624         F11R         LVC*YNNK         C74         NCF2         0.00         same         DISULFID           Q9Y609         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same           Q9Y619         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q9Y5K6	CD2AP	AQIIELLC*IVEALKK	C595	NCF1	0.00	0.00	same	
Q9Y624         F11R         LVC*YNNK         C74         NCF1         0.00         same         DISULFID           Q9Y624         F11R         LVC*YNNK         C74         NCF2         0.00         0.00         same         DISULFID           Q9Y629         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same         DISULFID           Q9Y619         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q9Y5X1	SNX9	GFLGC*FPDIIGTHK	C502	NCF1	0.00		same	
Q9Y624         F11R         LVC*YNNK         C74         NCF2         0.00         same         DISULFID           Q9Y6C9         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same         JUSULFID           Q9Y6I9         TEX264         LFTESC*SISPK         C68         NCF1         100.00         same	Q9Y624	F11R	LVC*YNNK	C74	NCF1	0.00	0.00	same	DISULFID
Q9Y6C9         MTCH2         LC*SGVLGTVVHGK         C79         NCF2         100.00         same           Q9Y6I9         TEX264         LFTESC*SISPK         C68         NCF1         100.00         100.00         same	Q9Y624	F11R	LVC*YNNK	C74	NCF2	0.00	0.00	same	DISULFID
QUIDIN 1EA204 LFTESUTSISPK C68 NCF1 100.00 100.00 same	Q9Y6C9	MTCH2	LC*SGVLGTVVHGK	C79	NCF2	100.00	100.00	same	
• • • • • • • • • • • • • • • • • • • •	231013	1 £A204	Continued	on post r	11041	100.00	100.00	same	

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Accession	Protein	Sequence	Positions	Bait	(-) CAT	(+) CAT	Different	Function
Q9Y6I9	TEX264	LFTESC*SISPK	C68	NOXO1		100.00	same	
Q9Y6Y8	SEC23IP	SIIEC*VDDFR	C467	NCF1	0.00	0.00	same	

**Table 5A.1:** ionFinder and envoMatch output from 200 PSMs from synthetic deaminated andcitrullinated peptides.

Sequence	Reference sequence	Ground truth	Scan	Parent file	Contains Cit	Env. score	Good env.	Det	Amb	DetNI	ArtNL
GFGrGGAESHTFK	GFGrGGAESHTFK	True	17824	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Likely	1.00	True	1	11	0	0
EDHGrGYFEYIEE NKYSR	EDHGrGYFEYIEE NKYSR	True	32954	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.94	True	4	10	3	0
AEGGGGGGGrPGAP AAGDGK	AEGGGGGGGrPGAP AAGDGK	True	7190	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	True 1	0.99	True	1	6	2	0
GDFSSANNrDNTY NR	GDFSSANNrDNTY NR	True	15436	02207a_BA10-TUM_ mod_citrullination_ l_10_01_01-DDA-1h-R	True 1	0.99	True	0	21	6	0
SGQSEDrQPVPGQ QMTLK	SGQSEDrQPVPGQ QMTLK	True	24935	02207a_BB4-TUM_ mod_citrullination_ l_16_01_01-DDA-1h-R	True	0.94	True	0	20	4	2
KGPGPGGPGGAGV ArGGAGGGPSGD	KGPGPGGPGGAGV ArGGAGGGPSGD	True	13576	02207a_BB10-TUM_ mod_citrullination_ l_22_01_01-DDA-1h-R	True	0.99	True	11	19	10	0
sSAHFNrGPAYGL SAEVK	sSAHFNrGPAYGL SAEVK	True	33818	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	True	0.97	True	0	17	6	0
YYGGGSEGGrAPK	YYGGGSEGGrAPK	True	11256	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	True	1.00	True	11	10	10	0
EGrGESENAGTNQ ETR	EGrGESENAGTNQ ETR	True	5754	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	True	0.99	True	3	15	4	0
rSYVSSGEMmVGG LAPGR	rSYVSSGEMmVGG LAPGR	True	33252	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.99	True	3	14	2	0
EQTEGEYSSLEHE SArGVIEcLK	EQTEGEYSSLEHE SArGVIEcLK	True	38470	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.85	True	2	8	2	0
IGGGIDVPVPrHS VGVVIGR	IGGGIDVPVPrHS VGVVIGR	True	40271	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.99	True	3	16	2	0
McrTLEDQLSELK	McrTLEDQLSELK	True	40126	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Likely	0.99	True	0	9	1	0
rGMDDDRGPR	rGMDDDRGPR	True	6275	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Likely	0.99	True	0	3	1	0
MAAPIDrVGQTIE R	MAAPIDrVGQTIE R	True	35805	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.98	True	1	17	5	0
GLDrVQDEYSR	GLDrVQDEYSR	True	22441	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R1	True	0.99	True	2	11	5	1
DSYSSrDYPSSR	DSYSSrDYPSSR	True	14464	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.99	True	3	9	5	0
rKGTDVNVFNTIL TTR	rKGTDVNVFNTIL TTR	True	43883	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	Likely 1	0.99	True	1	9	0	0
ITPGArGAFSEEY K	ITPGArGAFSEEY K	True	26922	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.99	True	4	8	4	0
DYYSSrSQSGGYS DR	DYYSSrSQSGGYS DR	True	17335	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	True 1	1.00	True	2	17	7	0
sIHFSSPVFTSrS AAFSGR	sIHFSSPVFTSrS AAFSGR	True	45213	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True	0.98	True	8	13	7	0
IAYQrNDDDEEEA AR	IAYQrNDDDEEEA AR	True	12176	02207a_BD3-TUM_ mod_citrullination_ s_3_01_01-DDA-1h-R1	Likely	0.99	True	0	10	1	0
LrNEDLGLPPLFP PR	LrNEDLGLPPLFP PR	True	52932	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	True 1	0.97	True	1	19	5	0
YFDrINENDPEYI R	YFDrINENDPEYI R	True	34873	02207a_BA9-TUM_ mod_citrullination_ l_9_01_01-DDA-1h-R1	True	1.00	True	2	12	3	0
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Table 5A.	L - continued	from	previous	page

Sequence	Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetN	ÍnArtNL
rVFImDScDELIP EYLNFIR	rVFImDScDELIP EYLNFIR	True	59872	02207a_BB8-TUM_ mod_citrullination_ l_20_01_01-DDA-1h-F	True	0.94	True	6	15	2	0
DYYDrGYDR	DYYDrGYDR	True	21011	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R:	True 1	0.99	True	3	7	3	0
DYTYrDYGHSSSR	DYTYrDYGHSSSR	True	18102	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R:	True 1	0.98	True	4	11	6	0
TAWrLDcAQLK	TAWrLDcAQLK	True	35879	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R	True 1	1.00	True	3	12	7	1
rDYDDmSPR	rDYDDmSPR	True	8427	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R	Likely 1	0.99	True	1	7	1	0
VSAQrLQEAGILS AEELQR	VSAQrLQEAGILS AEELQR	True	43341	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-F	True {1	0.98	True	0	26	9	0
rGETESEEFEK	rGETESEEFEK	True	18337	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R3	Likely 1	1.00	True	2	10	1	0
TVLSNVQEELDrM TR	TVLSNVQEELDrM TR	True	53722	02207a_BA12-TUM_ mod_citrullination_ l_12_01_01-DDA-1h-F	True {1	0.98	True	5	16	9	0
ErDFTSLENTVEE R	ErDFTSLENTVEE R	True	37968	02207a_BA9-TUM_ mod_citrullination_ l_9_01_01-DDA-1h-R3	Likely 1	0.96	True	2	12	1	1
ITrLQEKEDLQEL NDR	ITrLQEKEDLQEL NDR	True	28335	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-F	True {1	0.99	True	2	14	3	0
SLEKQrQDLANLQ K	SLEKQrQDLANLQ K	True	24354	02207a_BA9-TUM_ mod_citrullination_ l_9_01_01-DDA-1h-R3	True 1	1.00	True	0	20	9	0
EEKErLEQDLQQm QAK	EEKErLEQDLQQm QAK	True	23335	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-F	Amb 81	0.99	True	0	5	0	0
GGTSrEGGQTAPA STR	GGTSrEGGQTAPA STR	True	5823	02207a_BA12-TUM_ mod_citrullination_ l_12_01_01-DDA-1h-F	True {1	1.00	True	1	16	5	0
rDLEGSDIDTR	rDLEGSDIDTR	True	22464	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R3	Likely 1	0.99	True	3	10	1	0
rGEEGHDPKEPEQ LR	rGEEGHDPKEPEQ LR	True	11178	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-F	True	0.98	True	1	7	2	0
SQSGGYSDrSSGG SYR	SQSGGYSDrSSGG SYR	True	10179	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R	True 1	0.98	True	7	14	9	0
EVTINQSLLAPLr LDADPSLQR	EVTINQSLLAPLr LDADPSLQR	True	54701	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R	True 1	0.98	True	0	23	6	0
WGDrDSEGTWR	WGDrDSEGTWR	True	28509	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R:	True 1	0.99	True	2	9	2	0
YEELQVTAGrHGD DLR	YEELQVTAGrHGD DLR	True	25997	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R	True 1	0.87	True	4	11	4	0
LQTESGEFSrQLD EKEALVSQLSR	LQTESGEFSrQLD EKEALVSQLSR	True	42615	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R	Amb 1	0.96	True	0	18	0	0
ELDrNYLNYGEEG APGK	ELDrNYLNYGEEG APGK	True	31930	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-F	True {1	0.99	True	1	18	7	0
DSYSSrDYPSSR	DSYSSrDYPSSR	True	14852	02207a_BA6-TUM_ mod_citrullination_ l_6_01_01-DDA-1h-R:	True 1	1.00	True	7	10	7	0
rDLEEATLQHEAT AATLR	rDLEEATLQHEAT AATLR	True	33016	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-F	Likely 1	0.42	False	0	8	1	0
ENAAAPSPVrAPA PSPAK	ENAAAPSPVrAPA PSPAK	True	21552	02207a_BB8-TUM_ mod_citrullination_ l_20_01_01-DDA-1h-F	True	0.99	True	6	9	5	1
LTrDAQSPDESKT NEK	LTrDAQSPDESKT NEK	True	6579	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-F	True	0.99	True	2	14	2	0

Table 5A.1 – continued from	n previous page
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Sequence	Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetNI	nArtNL
SSGGGYSGDrSGG	SSGGGYSGDrSGG	trutti		02207a_BD2-TUM_	Cit	score	env.				
GYGGDR	GYGGDR	True	11986	mod_citrullination_ s_2_01_01-DDA-1h-R1	True	1.00	True	5	13	4	0
GGGYGGDrGGGYG GDR	GGGYGGDrGGGYG GDR	True	12990	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	True 1	1.00	True	5	10	5	0
rSPESLPAGPGAA ALEGGTR	rSPESLPAGPGAA ALEGGTR	True	32287	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R	True 1	0.98	True	4	10	3	0
ENPrNFSDNQLQE GK	ENPrNFSDNQLQE GK	True	21467	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	Amb	0.98	True	0	6	0	0
MGAGLGHGMDrVG SEIER	MGAGLGHGMDrVG SEIER	True	30187	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	Likely 1	1.00	True	2	14	1	0
sNPrSLEEEKYDm SGAR	sNPrSLEEEKYDm SGAR	True	23417	02207a_BB3-TUM_ mod_citrullination_ l 15 01 01-DDA-1h-R	True	0.97	True	0	20	5	0
TTEYQLSTLEErD IKK	TTEYQLSTLEErD IKK	True	30672	02207a_BB1-TUM_ mod_citrullination_ l 13 01 01-DDA-1h-R	True	0.90	True	6	11	3	0
TAENFrALSTGEK	TAENFrALSTGEK	True	26464	02207a_BD1-TUM_ mod_citrullination_ s 1 01 01-DDA-1h-R1	True	0.98	True	2	14	7	1
SESrSASEHSSSA ESER	SESrSASEHSSSA ESER	True	3948	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R	Likely 1	0.93	True	0	9	1	0
LTrGEADRDTYR	LTrGEADRDTYR	True	11326	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	Amb	1.00	True	0	3	0	0
DYSrGFGGR	DYSrGFGGR	True	19235	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	1.00	True	3	7	4	0
YLYLrNNQIDHID EK	YLYLrNNQIDHID EK	True	33054	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.98	True	0	15	6	0
DKDAYSSFGSrSD SR	DKDAYSSFGSrSD SR	True	18250	02207a_BA12-TUM_ mod_citrullination_ l_12_01_01-DDA-1h-R	True	1.00	True	7	8	6	0
APQVLVLAPTrEL ANQVSK	APQVLVLAPTrEL ANQVSK	True	47052	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.99	True	0	23	6	0
DrDYSDHPSGGSY R	DrDYSDHPSGGSY R	True	10900	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	True	3	11	4	0
SHrSYScQVTHEG STVEK	SHrSYScQVTHEG STVEK	True	12181	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	Likely	0.99	True	1	7	1	0
SSGGGYSGDrSGG GYGGDR	SSGGGYSGDrSGG GYGGDR	True	12143	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.97	True	2	11	2	0
KATDNEPSQFSEP rK	KATDNEPSQFSEP rK	True	14689	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	True 1	1.00	True	4	12	5	0
aDFDTYDDrAYSS FGGGR	aDFDTYDDrAYSS FGGGR	True	42767	02207a_BB4-TUM_ mod_citrullination_ l_16_01_01-DDA-1h-R	Likely 1	0.78	False	1	11	1	0
YDDYSSSrDGYGG SR	YDDYSSSrDGYGG SR	True	16409	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.99	True	7	12	9	0
LEVErDNLAQDLA TVR	LEVErDNLAQDLA TVR	True	42781	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.98	True	2	20	9	0
DKADrTQTGHVLG NPQR	DKADrTQTGHVLG NPQR	True	12503	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	Likely	0.81	True	0	10	1	0
SrGSGGLGGAcGG AGFGSR	SrGSGGLGGAcGG AGFGSR	True	22289	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True 1	1.00	True	12	17	8	0
QEMQEVQSSrSGR	QEMQEVQSSrSGR	True	10670	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	True	1.00	True	3	10	8	0
TAQLErSLQEEHV AVAQLR	TAQLErSLQEEHV AVAQLR	True	36953	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	Amb 1	0.95	True	0	14	0	0

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Table	5A.1 –	continued	from	previous	page

Sequence	Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetN	InArtNL
SGGGYGGDrGGGY GGDR	SGGGYGGDrGGGY GGDR	True	12023	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	env. True	5	13	5	0
SrAEAESWYQTK	SFAEAESWYQTK	True	25825	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	True	1.00	True	5	10	4	0
EDSLEAGLPLQVr GYPEEK	EDSLEAGLPLQVr GYPEEK	True	43378	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.99	True	2	15	3	0
GGTSrEGGQTAPA STR	GGTSrEGGQTAPA STR	True	5517	02207a_BA12-TUM_ mod_citrullination_ l_12_01_01-DDA-1h-R	True	0.99	True	3	16	4	0
AQLrELNITAAK	AQLrELNITAAK	True	32606	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	True	0	14	5	0
SSGGSYrDSYDSY ATHNE	SSGGSYrDSYDSY ATHNE	True	22050	02207a_BD3-TUM_ mod_citrullination_ s_3_01_01-DDA-1h-R1	Amb	0.96	True	0	7	0	0
GGSrGEEVGELSR	GGSrGEEVGELSR	True	20171	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Likely	0.98	True	1	9	1	0
VIVDKYrDGTK	VIVDKYrDGTK	True	13928	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	True	2	5	2	0
TVEMrDGEVIK	TVEMrDGEVIK	True	24613	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	True	4	10	8	0
DYTYrDYGHSSSR	DYTYrDYGHSSSR	True	17957	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	True	0.99	True	4	11	7	0
GIAGrQDILDDSG YVSAYK	GIAGrQDILDDSG YVSAYK	True	38875	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True 1	0.99	True	1	19	4	0
EEAPSLrPAPPPI SGGGYR	EEAPSL <sub>T</sub> PAPPPI SGGGYR	True	33391	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True 1	0.98	True	3	14	4	0
TGTYrQLFHPEQL ITGK	TGTYrQLFHPEQL ITGK	True	42389	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R	True 1	0.99	True	0	16	3	0
LGrQGNLSSSGNQ EGSQK	LGrQGNLSSSGNQ EGSQK	True	10841	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	True 1	0.92	True	1	17	2	0
YQDDFLLDESEcr VVK	YQDDFLLDESEcr VVK	True	41854	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R	True 1	0.87	True	7	7	5	0
EDHGrGYFEYIEE NK	EDHGrGYFEYIEE NK	True	34667	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	Likely	0.80	False	0	11	1	0
SGGGYGGDrSGGG YGGDR	SGGGYGGDrSGGG YGGDR	True	12449	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.98	True	5	10	4	0
TTEYQLSTLEErD IK	TTEYQLSTLEErD IK	True	35499	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	True 1	0.99	True	7	14	9	0
SSGGSYrDSYDSY ATHNE	SSGGSYrDSYDSY ATHNE	True	21466	02207a_BB10-TUM_ mod_citrullination_ l_22_01_01-DDA-1h-R	True 1	0.99	True	0	15	2	0
ITPGArGAFSEEY KR	ITPGArGAFSEEY KR	True	22906	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	1.00	True	4	10	3	0
AAQDrDQIYR	AAQDrDQIYR	True	16675	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.99	True	0	11	5	0
GVVDSEDLPLNIS rEMLQQSK	GVVDSEDLPLNIS rEMLQQSK	True	51608	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	True	0.95	True	0	19	3	0
HSATGrGQASSAV SDR	HSATGrGQASSAV SDR	True	6812	02207a_BA12-TUM_ mod_citrullination_ l_12_01_01-DDA-1h-R	True 1	1.00	True	2	15	4	0
SGGYGGSrDYYSS R	SGGYGGSrDYYSS R	True	17850	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	True	0.98	True	4	11	4	0
SGGGYGGDrSSGG GYSGDR	SGGGYGGDrSSGG GYSGDR	True	11709	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True 1	0.99	True	4	15	5	0

Table 5A.1 – continued from	previous page
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Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetNI	nArtNL
SGGGYGGDrSGGG YGGDR	True	11694	02207a_BB4-TUM_ mod_citrullination_ l_16_01_01-DDA-1h-R1	True	0.97	env. True	6	15	7	0
AKPALEDLRqGLL PVLESFK	False	57372	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R1	Amb	0.99	True	0	4	0	0
EDHGRGYFEYIEE nK	False	31936	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R1	Amb	0.99	True	0	1	0	0
ILNEMRDqYEK	False	22741	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R1	Amb	1.00	True	0	14	0	0
SKEEEQQRLINDL TAqR	False	30437	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R1	Amb	1.00	True	0	3	0	0
IETIEVMEDRqSG K	False	31899	02207a_BA9-TUM_ mod_citrullination_ l_9_01_01-DDA-1h-R1	Amb	1.00	True	0	2	0	0
AHAAIREnPVYEK	False	18332	$\begin{array}{l} 02207a\_BA7\text{-}TUM\_\\ mod\_citrullination\_\\ l\_7\_01\_01\text{-}DDA\text{-}1h\text{-}R1 \end{array}$	True	0.99	True	2	18	10	0
ALSRqLSSGVSEI R	False	30063	$\begin{array}{l} 02207a\_BA9\text{-}TUM\_\\ mod\_citrullination\_\\ l\_9\_01\_01\text{-}DDA\text{-}1h\text{-}R1 \end{array}$	True	0.98	True	1	15	2	0
ESGSEqERVSK	False	4973	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R1	True	0.99	True	2	9	5	0
DDEFRKnFDK	False	15889	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	Amb	1.00	True	0	7	0	0
ERnGLSLAALK	False	34972	02207a_BA4-TUM_ mod_citrullination_ l_4_01_01-DDA-1h-R1	Amb	1.00	True	0	10	0	0
LGRqGNLSSSGNQ EGSQK	False	11134	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R1	Amb	0.99	True	0	5	0	0
DVTILAATnRPDR	False	30196	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	Amb	1.00	True	0	3	0	0
YAFDFARqSK	False	35297	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	True	1.00	True	0	14	6	0
RSYESVEGnIKQG mSmR	False	19361	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R1	Likely	0.99	True	1	6	0	0
DDEFRKnFDK	False	20483	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Amb	1.00	True	0	7	0	0
SGQAQERqESHEQ EVNR	False	5517	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	Amb	0.97	True	0	11	0	0
SYLSRLMLAnR	False	45765	$\begin{array}{l} 02207a\_BA4\text{-}TUM\_\\ mod\_citrullination\_\\ l\_4\_01\_01\text{-}DDA\text{-}1h\text{-}R1 \end{array}$	Amb	0.97	True	0	2	0	0
VQDNHDPPNQSGL qRFVIR	False	33276	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R1	Amb	0.98	True	0	5	0	0
SGTASVVcLLNnF YPREAK	False	51701	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R1	Amb	0.91	True	0	3	0	0
DYnGRNQGGYDR	False	9397	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Amb	1.00	True	0	8	0	0
RAPPPPGSGPPVq DK	False	11796	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R1	Amb	1.00	True	0	2	0	0
ERqELGSPEER	False	14414	02207a_BA1-TUM_ mod_citrullination_ l_1_01_01-DDA-1h-R1	Amb	0.99	True	0	6	0	0
EKAEnRVVQIEK	False	15204	02207a_BA6-TUM_ mod_citrullination_ l_6_01_01-DDA-1h-R1	Likely	0.99	True	0	8	1	0
SGRDPnHFRPAGL	False	18762	02207a_BB1-TUM_ mod_citrullination_	Amb	0.95	True	0	3	0	0
	Reference sequence SGGGYGGDrSGGG AKPALEDLRqGLL PVLESFK IDHGRGYFEYIEE CDHGRGYFEYIEE SKEEEQQRLINDL SKEEEQQRLINDL GXAAR ALSRQLSGVSEI CODEFRKNFDK CODEFRKNFDK CODEFRKNFDK CODEFRKNFDK CODEFRKNFDK CODEFRKNFDK CODEFRKNFDK SGQAQERQESHEQ CODEFRKNFDK SGQAQERQESHEQ CODEFRKNFDK SGTASVVCLLNNF SGTASVVCLLNNF CONGRNQGGYDR CAPPPPGSGPPVQ CANPOPAGSPER CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR CODEFR 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truthSGGGYGGDrSGGGTrueAKPALEDLRqGLLFalsemKFalseILNEMRDqYEXFalseSKEEEQQRLINDLFalseKFalseIETIEVMEDRqSGFalseAHAAIRENPVYEKFalseALSRqLSSGVSEIFalseDDEFRKNFDKFalseICTILAATNRPDRFalseVAFDFARqSKFalseSGQAQERqESHEQFalseSGYASTFalseSQLARQERQESHEQFalseSQLARQERQESHEQFalseSQLARQERQESHEQFalseQNNHDPPNQSGLFalseQNARDRAQGYDRFalseGYARDRAQGYDRFalseSQLARQERQESHEQFalseGARPPPCSGPPVQFalseFANPPPCSGPPVQFalseSGNDNHFRPAGLFalse	Reference sequenceGround truthScan truthSGGGYGGDrSGGGTrue11694AKPALEDLRqGLLFalse57372EDHGRGYFEYIEEFalse31936ILNEMRDqYEKFalse22741SKEEEQQRLINDLFalse30437IETIEVMEDRqSGFalse31899AHAAIREnPVYEKFalse18322ALSRqLSSGVSEIFalse30063ESGSEqERVSKFalse4973DDEFRKnFDKFalse15889ERnGLSLAALKFalse30196VAFDFARqSKFalse30196YAFDFARqSKFalse31936SQQAQERqESHEQFalse1134SGQAQERqESHEQFalse3276SYLSRLMLANRFalse3276QDNHDPPNQSGLFalse3170QTASTASVVCLLNNFFalse3170GTASVVCLNNFFalse3170CTASVVCLNNFFalse1173ERQELGSPEERFalse1176ERARLRYVQIEKFalse1270	Reference sequence YGGDR     Ground Tuth     Sequence Tuth     Parent file Tuth       SGGCYGGDrSGGC YGDR     True     11694     mod_citrullination_ [16_0]_01-DDA.1h.R]       AKPALEDLRqGLL PVLESFK     False     5737     20207a_BBJ-TUM_ mod_citrullination_ [1_10_0]_01-DDA.1h.R]       EDHGRGYFEVIEE nK     False     31936     02207a_BA1T-UM_ mod_citrullination_ [1_10_0]_01-DDA.1h.R]       SKEEEQQRLINDL K     False     2207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       SKEEEQQRLINDL K     False     30437     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       AHAAIREnPVYEK     False     31836     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       ALSRqLSSGVSEI R     False     31836     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       DDEFRKnFDK     False     18382     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       DUFGRKnFDK     False     18589     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       Q207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       DUFGRNnFDK     False     18589     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       Q207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1h.R]       SGGSQA     False     31936     20207a_BAJ-TUM_ mod_citrullination_ [1_0_0]_01-DDA.1	Reference sequence yGGDR         Ground Tue         Scan (2077_BB4-TUM_ (166)         Contains (2077_BB4-TUM_ (166)         Contains (2077_BB4-TUM_ (166)         Contains (2077_BB4-TUM_ (160)         Contains (2077_BB4-TUM_ (160)         Contains (2077_BB4-TUM_ (160)         Tue (160)         Contains (2077_BB4-TUM_ (160)         Tue (160)         Contains (2077_BB4-TUM_ (160)         Tue (160)         Contains (2077_BB4-TUM_ (160)         Tue (160)         Contains (2077_BB4-TUM_ (160)         Amb           EDHGRGYFEYIEE nK         False         2711         02207a_BB3-TUM_ (160)         Amb         Amb           LINEMRDqYEK TAqR         False         2711         02207a_BA3-TUM_ (160)         Amb         Amb           SKEEEQQRLINDL TAqR         False         31899         02207a_BA3-TUM_ (160)         Amb         Amb           ALSRqLSSGVSEI R         False         18832         mod_citrullination_ (160)         True         True           ESGSEqERVSK         False         13899         02207a_BA3-TUM_ (160)         True         True           DDEFRKnFDK         False         13899         02207a_BA3-TUM_ (160)         True         Amb           LGRqGNLSSSGNQ EGSQK         False         1369         02207a_BA3-TUM_ (160)         True         Amb           LGRqGNLSSSGNQ EGSQK         False         1369         <	Reference sequence         Ground         Scan         Parent file         Contains         Enver- train and server- server of the server of the	Reference sequence trut         Ground ( $1000000000000000000000000000000000000$	Reference sequence         Ground         Scan         Parent file         Contains         Ew.         Good         n.Det           SGGCYGGD-SGGG         True         1169         mod_climilination         Tue         0.97         True         0           AKPALEDLRGLL         False         5737         mod_climilination         Amb         0.99         True         0           ILNEMRDQYEK         False         3136         02207a_BA1T-UM         Amb         0.99         True         0           ILNEMRDQYEK         False         3136         02207a_BA1-TUM         Amb         1.00         True         0           INTERVEDRQRSG         False         30437         mod_climulination         Amb         1.00         True         0           INTERVEDRQRSG         False         31899         mod_climulination         Amb         1.00         True         0           ALAAREAPVYEK         False         31899         mod_climulination         Amb         1.00         True         0           ALSRqLSSGVSEI         False         31899         mod_climulination	Reference sequence         Ground Scan         Parent file         Comman         Ew.         Geod able in Ambiana           SGGYQGDPSGGG         True         11694         modcitrallination	Reference sequence         Ground Scan         Parent file         Contains         Env.         Good nDst         Andb         DDetNI           SGGGYQGD-SGGG         True         1169         mod_citrulination

Table 5A.1	– continued	from	previous	page
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<b>Table 5A.1</b> – continued from previous page											
Sequence	Reference sequence	Ground truth	Scan	Parent file	Contains Cit	Env. score	Good env.	nDet	nAmb	nDetNI	nArtNL
ATMQNLNDrLASY LDK	ATMQNLnDRLASY LDK	False	46872	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R:	True 1	0.99	True	1	1	2	0
ISELIErNQR	ISELIERnQR	False	23509	02207a_BA6-TUM_ mod_citrullination_ l_6_01_01-DDA-1h-R1	Likely	0.99	True	1	4	1	0
DITSDTSGDFrNA LLSLAK	DITSDTSGDFRnA LLSLAK	False	56941	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R:	Amb 1	1.00	True	0	9	0	0
DnTYNrVSEDLR	DNTYnRVSEDLR	False	30104	02207a_BD1-TUM_ mod_citrullination_ s_1_01_01-DDA-1h-R1	Likely	0.99	True	1	7	1	0
DDEFrKNFDK	DDEFRKnFDK	False	20170	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Amb	1.00	True	0	7	0	0
NSLLLMQrK	NSLLLMqRK	False	30062	02207a_BA1-TUM_ mod_citrullination_ l_1_01_01-DDA-1h-R1	True	0.99	True	1	9	3	1
SYrYALQDmDK	SYRYALqDmDK	False	20036	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	$\operatorname{Amb}$	1.00	True	0	8	0	0
rYYFLSEEAEEGD ELQQR	RYYFLSEEAEEGD ELqQR	False	32860	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R:	Likely 1	0.92	True	1	2	0	0
QEYDESGPSIVHr K	qEYDESGPSIVHR K	False	16205	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Likely	0.99	True	1	2	0	0
AKPALEDLrQGLL PVLESFK	AKPALEDLRqGLL PVLESFK	False	56859	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R3	Amb 1	0.98	True	0	10	0	0
LrVLQFIR	LRVLqFIR	False	42374	02207a_BA1-TUM_ mod_citrullination_ l_1_01_01-DDA-1h-R1	Likely	1.00	True	1	6	0	0
DnTYNrVSEDLR	DnTYNRVSEDLR	False	26621	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	Amb	0.94	False	0	5	0	0
QrLEELQLFK	qRLEELQLFK	False	46146	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	Amb	0.99	True	0	8	0	0
LTGITYQALrPDP LR	LTGITYqALRPDP LR	False	38941	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	Amb 1	0.96	True	0	5	0	0
QTQEATNDQNrGT ETHGQGR	QTqEATNDQNRGT ETHGQGR	False	2916	02207a_BB9-TUM_ mod_citrullination_ l_21_01_01-DDA-1h-R3	Amb 1	0.97	True	0	1	0	0
TAQLErSLQEEHV AVAQLR	TAQLERSLQEEHV AVAqLR	False	32717	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R3	Amb 1	0.98	True	0	7	0	0
LMEEcDELVEIIQ QrK	LMEEcDELVEIIQ qRK	False	47188	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R:	True 1	0.83	True	1	17	2	0
YAFDFArQSK	YAFDFARqSK	False	35592	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	True	0.97	True	0	12	4	0
DGPPLrGSNMDFR EPTEEER	DGPPLRGSnMDFR EPTEEER	False	27900	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R3	Amb 1	0.98	True	0	7	0	0
LTMQNLNDrLASY LDK	LTMQnLNDRLASY LDK	False	48895	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R:	Amb 1	0.99	True	0	5	0	0
QrLEELQLFK	qRLEELQLFK	False	41481	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	$\operatorname{Amb}$	0.99	True	0	11	0	0
NDGKLYDAYVVYP rNYK	NDGKLYDAYVVYP RnYK	False	34324	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R:	Likely 1	0.89	True	0	10	1	0
SKEEEQQrLINDL TAQR	SKEEEQqRLINDL TAQR	False	31402	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R:	Amb 1	0.98	True	0	4	0	0
DDEFrKNFDK	DDEFRKnFDK	False	21437	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Amb	1.00	True	0	7	0	0
DITSDTSGDFrNA LLSLAK	DITSDTSGDFRnA LLSLAK	False	56909	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	Likely	0.97	True	0	16	1	0

Sequence	Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetN	InArtNL
		truth		02207 PP0 TUM	Cit	score	env.				
WSGSASrNHLGSA WEQSR	WSGSASRnHLGSA WEQSR	False	22655	mod_citrullination_ l_21_01_01-DDA-1h-R	Likely 1	1.00	True	1	11	0	0
$\begin{array}{l} {\rm GELDcHQLADSFr} \\ {\rm E} \end{array}$	GELDcHqLADSFR	False	31280	02207a_BB10-TUM_ mod_citrullination_ l_22_01_01-DDA-1h-R	Amb	0.97	True	0	10	0	0
rAPPPPGSGPPVQ DK	RAPPPPGSGPPVq DK	False	12569	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	Likely	0.99	True	1	2	0	0
rAPPPPGSGPPVQ DK	RAPPPPGSGPPVq DK	False	12104	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	False	1.00	True	0	0	0	0
mETLSNASGTFAI rLLK	mETLSnASGTFAI RLLK	False	50827	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R	Likely	0.44	False	1	1	0	0
VLLTVQrK	VLLTVqRK	False	21089	02207a_BA1-TUM_ mod_citrullination_ l_1_01_01-DDA-1h-R1	Amb	1.00	True	0	10	0	0
rYYFLSEEAEEGD ELQQR	RYYFLSEEAEEGD ELQqR	False	36132	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	Likely	0.99	True	1	1	0	0
rLEALAAEFSSNW QK	RLEALAAEFSSNW qK	False	42591	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	Amb	0.98	True	0	1	0	0
NQPArFKNYAELT IMK	NQPARFKnYAELT IMK	False	34336	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	Amb 1	0.98	True	0	11	0	0
QAGDLrSVIR	qAGDLRSVIR	False	25856	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	Amb	0.99	True	0	7	0	0
ArYnAqcqETIR	ARYNAQcqETIR	False	14390	02207a_BA6-TUM_ mod_citrullination_ l_6_01_01-DDA-1h-R1	Amb	0.81	False	0	6	0	0
rFPEVSGYcHcAD SQGR	RFPEVSGYcHcAD SqGR	False	21960	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R	Amb 1	0.89	True	0	2	0	0
ErQELGSPEER	ERqELGSPEER	False	11317	02207a_BA1-TUM_ mod_citrullination_ l_1_01_01-DDA-1h-R1	Likely	1.00	True	1	13	0	0
YGVQADrVDK	YGVqADRVDK	False	14209	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	Amb	0.96	True	0	8	0	0
DDEFrKNFDK	DDEFRKnFDK	False	32249	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Amb	0.96	True	0	4	0	0
SGrDPNHFRPAGL PEK	SGRDPnHFRPAGL PEK	False	22310	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	Amb 1	0.93	True	0	3	0	0
ALArEVDLKDYED QQK	ALAREVDLKDYED qQK	False	25583	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-R	Likely 1	1.00	True	1	3	0	0
rcEScAPGYEGNP IQPGGK	RcEScAPGYEGNP IqPGGK	False	20813	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R	False	0.99	True	0	0	0	0
rTIAQDYGVLK	RTIAqDYGVLK	False	29418	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	Amb	1.00	True	0	11	0	0
TEELNrEVAGHTE QLQMSR	TEELnREVAGHTE QLQMSR	False	26556	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R	Amb 1		False	0	13	0	0
rEPWLLPSQHNDI IR	REPWLLPSQHnDI IR	False	36718	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R	Amb	0.99	True	0	4	0	0
QrIAEETILK	qRIAEETILK	False	25999	02207a_BA2-TUM_ mod_citrullination_ l_2_01_01-DDA-1h-R1	Amb	0.99	True	0	16	0	0
SGTASVVcLLNNF YPrEAK	SGTASVVcLLNnF YPREAK	False	52133	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R	True	0.96	True	3	12	6	0
WSGSASrNHLGSA WEQSR	WSGSASRnHLGSA WEQSR	False	22491	02207a_BB9-TUM_ mod_citrullination_ l_21_01_01-DDA-1h-R	Amb	0.99	True	0	10	0	0
mETLSNASGTFAI rLLK	mETLSnASGTFAI RLLK	False	57647	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R	Likely	-0.11	False	3	1	0	0
		(	Conti	inued on next p	age						

Table 5A.1 – continued from previous page

Table 5A.1 – continu	ued from previous page
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<b>Table 5A.1</b> – continued from previous page											
Sequence	Reference sequence	Ground truth	Scan	Parent file	Contains Cit	Env. score	Good env.	nDet	nAmb	nDetNI	nArtNL
DGPPLrGSNMDFR EPTEEER	DGPPLRGSnMDFR EPTEEER	False	28048	02207a_BB7-TUM_ mod_citrullination_ l_19_01_01-DDA-1h-R1	Amb l	0.99	True	0	8	0	0
GLArLALQFTTNP K	GLARLALQFTTnP K	False	42216	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	$\operatorname{Amb}$	0.98	True	0	2	0	0
ISELIErNQR	ISELIERNqR	False	23976	02207a_BA6-TUM_ mod_citrullination_ l_6_01_01-DDA-1h-R1	True	1.00	True	0	13	5	0
SKEEEQQrLINDL TAQR	SKEEEQqRLINDL TAQR	False	35520	02207a_BB3-TUM_ mod_citrullination_ l_15_01_01-DDA-1h-R3	Amb	0.99	True	0	5	0	0
VQDNHDPPNQSGL QrFVIR	VQDNHDPPnQSGL QRFVIR	False	32907	02207a_BB9-TUM_ mod_citrullination_ l_21_01_01-DDA-1h-R3	Amb	0.97	True	0	5	0	0
ELEDrFASEASGY QDNIAR	ELEDRFASEASGY QDnIAR	False	32539	02207a_BB6-TUM_ mod_citrullination_ l_18_01_01-DDA-1h-R3	Likely	0.96	True	2	4	0	0
DTASSRcQScSEr EEAGK	DTASSRcqScSER EEAGK	False	4973	02207a_BB4-TUM_ mod_citrullination_ l_16_01_01-DDA-1h-RI	Amb l	0.97	True	0	6	0	0
LMEEcDELVEIIQ QrK	LMEEcDELVEIIQ qRK	False	45074	02207a_BB1-TUM_ mod_citrullination_ l_13_01_01-DDA-1h-RI	Amb l	0.94	True	0	1	0	0
MAEVGYDrNNK	MAEVGYDRnNK	False	12406	02207a_BA3-TUM_ mod_citrullination_ l_3_01_01-DDA-1h-R1	Amb	1.00	True	0	17	0	0
TSQPNYrPQGmEG FLKSDER	TSQPnYRPQGmEG FLKSDER	False	22758	02207a_BB9-TUM_ mod_citrullination_ l_21_01_01-DDA-1h-RI	Amb l	0.98	True	0	9	0	0
rYYFLSEEAEEGD ELQQR	RYYFLSEEAEEGD ELQqR	False	35252	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R1	Amb l	0.92	True	0	1	0	0
GGGGNFGPGPGSN FrGGSDGYGSGR	GGGGNFGPGPGSn FRGGSDGYGSGR	False	27417	02207a_BD2-TUM_ mod_citrullination_ s_2_01_01-DDA-1h-R1	Likely	0.98	True	1	8	0	0
DSEINrLRSELK	DSEInRLRSELK	False	24501	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	Amb	0.98	True	0	4	0	0
rSYESVEGNIKQG mSmR	RSYESVEGnIKQG mSmR	False	19663	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-RI	Amb l	0.99	True	0	5	0	0
rLYQSTLLQDGLK	RLYQSTLLqDGLK	False	34699	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Amb	1.00	True	0	1	0	0
VGVSSrINEWLTK	VGVSSRInEWLTK	False	44135	02207a_BA7-TUM_ mod_citrullination_ l_7_01_01-DDA-1h-R1	Likely	0.99	True	0	3	1	0
ITMQNLNDrLASY LDK	ITMqNLNDRLASY LDK	False	44155	02207a_BB9-TUM_ mod_citrullination_ l_21_01_01-DDA-1h-RI	Amb l	0.99	True	0	10	0	0
QWTSLSLrVTAK	qWTSLSLRVTAK	False	36711	02207a_BA5-TUM_ mod_citrullination_ l_5_01_01-DDA-1h-R1	Amb	0.93	True	0	4	0	0
DYSGYQrDGYQQN FK	DYSGYqRDGYQQN FK	False	25947	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R1	Likely l	0.98	True	0	3	1	0
rEALVKGNPPIYR	REALVKGnPPIYR	False	21146	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	$\operatorname{Amb}$	0.99	True	0	6	0	0
LLErPPEFTLPLY NK	LLERPPEFTLPLY nK	False	46516	02207a_BA11-TUM_ mod_citrullination_ l_11_01_01-DDA-1h-R1	Amb l	0.98	True	0	3	0	0
VNNLISDQDFFAL rSIK	VNNLISDqDFFAL RSIK	False	48718	02207a_BB2-TUM_ mod_citrullination_ l_14_01_01-DDA-1h-R1	Amb l	0.99	True	0	10	0	0
AALEALLGrLQAE R	AALEALLGRLqAE R	False	51189	02207a_BA8-TUM_ mod_citrullination_ l_8_01_01-DDA-1h-R1	Likely	1.00	True	1	3	0	0
LLGrSQAIQVGTS WK	LLGRSqAIQVGTS WK	False	38724	02207a_BA9-TUM_ mod_citrullination_ l_9_01_01-DDA-1h-R1	True	0.97	True	1	17	4	0
IGArVYALPEDLV EVNPK	IGARVYALPEDLV EVnPK	False	43405	02207a_BB4-TUM_ mod_citrullination_ l 16 01 01-DDA-1h-R1	Likely	0.99	True	1	2	0	0

				r		r	<b>D</b> ~				
Sequence	Reference sequence	Ground	Scan	Parent file	Contains	Env.	Good	nDet	nAmb	nDetN	nArtNL
		$\operatorname{truth}$			Cit	score	env.				
GWLrDPSASPGDA GEQAIR	GWLRDPSASPGDA GEqAIR	False	30924	02207a_BB5-TUM_ mod_citrullination_ l_17_01_01-DDA-1h-R3	False 1	0.98	True	0	0	0	0

Table 5A.1 – continued from previous page

Accession	Protein	Description	Sequence	Residue	Spectral
B5ME19	EIFCL	Eukaryotic translation initiation factor 3	QTALASR*FLK	R255	2
		subunit C-like protein			
O00193	SMAP	Small acidic protein	FLR*LMGAGK	R43	3
O00422	SAP18	Histone deacetylase complex subunit SAP18	AVESR*VTQEEIKK	R6	1
O00422	SAP18	Histone deacetylase complex subunit SAP18	MAVESR*VTQEEIK	R6	1
O00422	SAP18	Histone deacetylase complex subunit SAP18	AVESR*VTQEEIK	R6	2
000567	NOP56	Nucleolar protein 56	EAMVQAEEAAAEITR*K	R437	1
000571	DDX3X	ATP-dependent RNA helicase DDX3X	SDYDGIGSR*GDR*SGFGK	R110 R113	1
014654	IRS4	Insulin receptor substrate 4	LYFCVDR*GATK	R661	2
O14787-2	TNPO2	Isoform 2 of Transportin-2	GDVEEDEAVPDSEQDIKPR*F HK	R336	1
O14979	HNRDL	Heterogeneous nuclear ribonucleoprotein D-like	LLESR*YHQIGSGK	R294	2
O14979-2	HNRDL	Isoform 2 of Heterogeneous nuclear ribonucleoprotein D-like	LLESR*YHQIGSGK	R175	2
O15042-2	SR140	Isoform 2 of U2 snRNP-associated SURP motif-containing protein	TFVR*GGVVNAAKEEHETDEK	R137	1
O15042-2	SR140	Isoform 2 of U2 snRNP-associated SURP motif-containing protein	TFVR*GGVVNAAK	R137	2
O43290	SNUT1	U4/U6.U5 tri-snRNP-associated protein 1	ADDLLPLGDQTQDGDFGSR*L	R438	1
O43809	CPSF5	Cleavage and polyadenylation specificity	SVVPPNR*SQTGWPR	R8	1
060216	B 4 D 21	factor subunit 5	DVIDEPIIEEPSR*LQESVME	B450	1
000210	IIAD21	homolog	ASR DTVATOI SE AVDATR*C AVOS	11450	1
O60664-4	PLIN3	Isoform 4 of Perilipin-3	GVDK	R143	1
O60749	SNX2	Sorting nexin-2	AVNTQALSGAGILR*MVNK	R283	2
O60763	USO1	General vesicular transport factor p115	MNFLR*GVMGGQSAGPQHTEA ETIQK	R5	2
O60841	IF2P	Eukaryotic translation initiation factor 5B	ADR*ETVAVKPTENNEEEFTS	R76	1
			ĸ		
O75521	ECI2	Enoyl-CoA delta isomerase 2, mitochondrial	WLSDECTNAVVNFLSR*K	R390	1
O75533	SF3B1	Splicing factor 3B subunit 1	MNAR*TYMDVMR	R150	2
O75533	SF3B1	Splicing factor 3B subunit 1	IWDPTPSHTPAGAATPGR*GD	B270	2
010000	51 01 1	opnoing factor of subants 1	TPGHATPGHGGATSSAR	10210	-
O75534-3	CSDE1	Isoform 3 of Cold shock domain-containing	AVAAPRPDR*LVNR	R767	1
O75643	U520	U5 small nuclear ribonucleoprotein 200 kDa	ADVTAR*SLQYEYK	R7	2
075662	TIDDI	TID 41 lile	VACAFEWOESD*TECEUSZ	DOF	1
O75940	SPF30	Survival of motor neuron-related-splicing	WQQFNNR*AYSK	R184	1
O94776	MTA2	Metastasis-associated protein MTA2	GTTEPHSRGHLSR*PEAQSLS	R428	1
O94826	TOM70	Mitochondrial import receptor subunit	TPEGR*ASPAPGSGHPEGPGA	R89	1
O95218-2	ZRAB2	TOM70 Isoform 2 of Zinc finger Ban-binding	HLDMNSLDR SB*GLFSANDWOCK	R.61	1
005010-2	ZD A DO	domain-containing protein 2		D7	-
095218-2	ZRAB2	domain-containing protein 2	NFR*VSDGDWICPDKK	R7	1
O95232	LC7L3	Luc7-like protein 3	MISAAQLLDELMGR*DR	R14	1
O95757	HS74L	Heat shock 70 kDa protein 4L	SAVSDKQDR*LNQTLK	R567	1
P02769	ALBU	Serum albumin	AWSVAR*LSQK	R241	2
P04350	TBB4A	Tubulin beta-4A chain	MR*EIVHLQAGQCGNQIGAK	R2	2
P04350	TBB4A	Tubulin beta-4A chain	LEFFMPGFAPLISK*GSQQYR	R276	4
P06576	<b>∆</b> TDD	ATP synthese subunit both mitashand-i-1	VAAAPASCALE*R	B18	1
P07437	TRRS	Tubulin beta chain	GHYTEGAELVDSVUDVVR*V	B121	1
P07437	TBB5	Tubulin beta chain	MR*EIVHOAGOCGNOIGAK	R2	2
P07437	TBB5	Tubulin beta chain	LHFFMPGFAPLTSR*GSQQYR	R276	4
P07900-2	HS90A	Isoform 2 of Heat shock protein HSP	GVVDSEDLPLNISR*EMLQQS K	R522	6
P07900-2	HS90A	90-alpha Isoform 2 of Heat shock protein HSP	AQALR*DNSTMGYMAAK	R742	2
P07910-2	HNRPC	90-alpha Isoform C1 of Heterogeneous nuclear	DYYDR*MYSYPAR	R122	3
P07910-2	HNRPC	ribonucleoproteins C1/C2 Isoform C1 of Heterogeneous nuclear	VPPPPPIAR*AVVPSKR	R138	4
P07910-2	HNRPC	ribonucleoproteins C1/C2 Isoform C1 of Heterogeneous nuclear	VPPPPPIAR*AVVPSK	R138	7
P07910-2	HNRPC	ribonucleoproteins C1/C2 Isoform C1 of Heterogeneous nuclear	R*SAAEMYGSSFDLDYDFQR	R99	1
Docos	HOARD	ribonucleoproteins C1/C2	GVVDSEDLPLNISR*EMLOOS	Daga	0
P08238	HS90B	Heat shock protein HSP 90-beta	K	R392	6
P08238	HS90B	Heat shock protein HSP 90-beta	LVSSPCCIVTSTYGWTANMERIMK	R604	1
P08238	HS90B	Heat shock protein HSP 90-beta Continued on	next page	R612	2

### Table 5A.2: Unique sites of citrullination identified in the HEK-PAD2 citrullinome.

Accession	Protein	Description	Sequence	Residue	Spectral
		•	•		counts
P08243-2	ASNS	Isoform 2 of Asparagine synthetase	WINATDPSAR*TLTHYK	R529	2
Doocol	DUIT	[glutamine-hydrolyzing]		Daga	1
P08621 P08621	RU17 DU17	UI small nuclear ribonucleoprotein 70 kDa	VDFD*DCDSDI DUD	R222 R222	1
P08670	VIME	Vimentin	NTB*TNEKVELOELNDB	R100	1
P08670	VIME	Vimentin	SB*LGDLYEEEMB	B145	1
P08670	VIME	Vimentin	DVR*QQYESVAAK	R273	1
P08670	VIME	Vimentin	FADLSEAANR*NNDALR	R304	5
P08670	VIME	Vimentin	FADLSEAANRNNDALR*QAK	R310	1
D08670	VIME	Vimentin	LLEGEESR*ISLPLPNFSSLN	P410	1
F08070	VINE	vimentin	LR	<b>h</b> 410	1
P08670	VIME	Vimentin	ISLPLPNFSSLNLR*ETNLDS	R424	1
			LPLVDTHSK TVFTP*DCOVINFTCOUUDDI		
P08670	VIME	Vimentin	IVEIR*DGQVINEISQHHDDL	R450	5
			E		
P08670	VIME	Vimentin	SSAVR*LR*SSVPGVR	R69 R71	1
P09651-2	ROA1	Isoform A1-A of Heterogeneous nuclear	IEVIEIMTDR*GSGK	R140	3
		ribonucleoprotein Al	CONFCOD*SSODVCCCCOVEA		
P09651-2	ROA1	Isoform A1-A of Heterogeneous nuclear	VDD	R284	2
		ribonucleoprotein A1	KI II		
P09651-2	BOA1	Isoform A1-A of Heterogeneous nuclear	SSGPYGGGGQYFAKPRNQGGY	B318	3
1 00001 2	100111	ribonucleoprotein A1	GGSSSSSSYGSGR*R	10010	0
<b>D</b> 40000	GIIIAA		LVQDVANNTNEEAGDGTTTAT	<b>D</b> 4 4 4	
P10809	CH60	60 kDa heat shock protein, mitochondrial	VLAR*SIAK	R121	2
D10800	CHEO	60 kDa haat shask protein mitashandrial	EDD*CVICDVEINTSK	D 9 9 1	1
P10208	IMDH2	Inosine 5' monophosphate debydrogenase 2	I PIVNEDDEI VAILAB*TDLK	R221	1
P13639	EF2	Elongation factor 2	FSVSPVVB*VAVEAK	R506	2
P14866	HNRPL	Heterogeneous nuclear ribonucleoprotein L	IEYAKPTR*LNVFK	B272	2
			MAAAGGGGGGGGR*YYGGGSEG	D ( ol D F o	
P14866	HNRPL	Heterogeneous nuclear ribonucleoprotein L	GR*APK	R46 R56	1
D15211	F7DI	Farin	EKEEI MI D*I ODVEEK	D250	1
P15311	EZRI	Ezrin	EREELMEN EQUIEER	R405	1
P16104	H2AX	Histone H2AX	SSB*AGLOFPVGB	R21	1
P16615	AT2A2	Sarcoplasmic/endoplasmic reticulum calcium	SMSVYCTPNKPSR*TSMSK	R505	3
		ATPase 2			
P17844	DDX5	Probable ATP-dependent RNA helicase	ENYDR*GYSSLLK	R516	3
		DDX5			
P20338	RAB4A	Ras-related protein Rab-4A	LQIWDTAGQER*FR	R74	2
P20340-2	RAB6A	Isoform 2 of Ras-related protein Rab-6A	LQLWDTAGQER*FR	R74	1
P20700	LMNB1	Lamin-B1	MGSR*AGGPTTPLSPTR	R14	3
P20700	LMNBI	Lamin-B1	SMYEEEINETR*R	R220	1
P20700	LMNBI	Lamin-B1	LENAR*LSSEMNTSTVNSAR	R276 D207	1
P20700	LIMIND1	Lamin B1	LOCOCCO*VTVCO*ACCCO	D207 D402	1
P22626	ROA2	Heterogeneous nuclear ribonucleoproteins	IDTIEUTDB*OSCK	R1402	3
1 22020	ItOA2	A2/B1	ib Hillifbit Qook	10147	5
			GGGGNFGPGPGSNFR*GGSDG		
P22626	ROA2	Heterogeneous nuclear ribonucleoproteins	YGSGR	R228	1
		A2/B1	SONECCED*NMCCDVCCCNVC		
P22626	ROA2	Heterogeneous nuclear ribonucleoproteins	PGGSGGSGGYGGB	R325	2
		A2/B1	radbadbadradit		
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	ANLSLLR*RPGEK	R286	2
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	DKLESEMEDAYHEHQANLLR*	R536	1
	•		QDLMR		
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	QREESYSR*MGYMDPR	R599	1
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	EESYSR*MGYMDPR	R599	2
P23246	SFPO	Splicing factor proline- and glutamine-rich	ER*DMRMGGGGAMNMGDPYGS	B608	1
1 202 10	011.46	opinoing ideality promite and graduining from	GGQK	10000	-
D00046	GEDO		ER*DMR*MGGGGAMNMGDPYG	DCOOLDC11	1
P23240	SFPQ	Splicing factor, proline- and glutamine-rich	SGGQK	R008 R011	1
			FRDMR*MCCCCAMNMCDPVCS		
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	GGOK	R611	1
P23246	SFPQ	Splicing factor, proline- and glutamine-rich	FPPLGGGGGGGGYEANPGVPPA	R663	1
	•		TMSGSMMGSDMR*TER		
D02046	SEDO	Splicing feator, proline, and glutamine righ	FGQGGAGPVGGQGPR*GMGPG	D691	2
F 23240	SFFQ	Splicing factor, profine- and glutamine-rich	TPAGYGR	R081	2
			EDDSSASTSOSTB*AASIEGG		
P23588	IF4B	Eukaryotic translation initiation factor 4B	AKPVDTAAR	R356	3
P26373	RL13	60S ribosomal protein L13	LATQLTGPVMPVR*NVYK	R158	1
P26373	RL13	60S ribosomal protein L13	ANAR*LFGIR	R190	1
P27635	RL10	60S ribosomal protein L10	LQTGMR*GAFGKPQGTVAR	R116	1
P27635	RL10	60S ribosomal protein L10	R*LIPDGCGVK	R189	1
P27635	RL10	60S ribosomal protein L10	IR*IFDLGR	R32	1
P27708	PYR1	CAD protein	IHR*ASDPGLPAEEPK	R1857	1
P27816	MAP4	Microtubule-associated protein 4	TTTTLSGTAPAAGVVPSR*VK	R888	1
P27816	MAP4	Microtubule-associated protein 4	LSR*LATNTSAPDLK	R922	3
P29692-2	EFID	Isotorm 2 of Elongation factor 1-delta	ATAPQTQHVSPMR*QVEPPAK	K502	1
P20602 3	EF1D	Isoform 3 of Elongation factor 1 delta	ΔΤΔΡΟΤΟΗΥΣΡΜΒ*ΟΥΕΡΡΔΥ	B112	1
1 20092-0	EF ID	isotorm 5 or mongation factor 1-delta	MIAI WI WILL DI WILL WEEFFAK	11112	T
		Continued on	novt page		
		Continued on	next page		

	Protein	Description	Sequence	Residue	Spectral
P31350	RIR2	Ribonucleoside-diphosphate reductase	GLSLVDKENTPPALSGTR*VL ASK	R41	1 counts
P31943	HNRH1	subunit M2 Heterogeneous nuclear ribonucleoprotein H	FGR*DLNYCFSGMSDHR	R262	2
P32322-3	PSCRI	Isoform 3 of Pyrroline-5-carboxylate reductase 1, mitochondrial	LLPR*SLAPAGKD	R338	1
P33992 P33993	MCM5 MCM7	DNA replication licensing factor MCM5	GOTAR*TORPADVIFATVR	R48 R653	2
P35579	MYH9	Myosin-9	ELEDATETADAMNR*EVSSLK	R1912	1
P35580-3	MYH10	Isoform 3 of Myosin-10	AQR*TGLEDPER	R4	1
P36551	HEM6	Oxygen-dependent coproporphyrinogen-III oxidase, mitochondrial	HR	R109	1
P36578	RL4	60S ribosomal protein L4	GHR*IEEVPELPLVVEDK	R143	1
P36578	RL4	60S ribosomal protein L4	MINTDLSR*ILK	R291	2
P37802 P38159	RBMX	Transgelin-2 RNA-binding motif protein. X chromosome	GPPSR*GGHMDDGGYSMNFNM	R12 R125 R144	2
P40227	TCPZ	T-complex protein 1 subunit zeta	SSSR*GPLPVK GLODVLB*TNLGPK	B35	1
P42166	LAP2A	Lamina-associated polypeptide 2, isoform	LREQGTESR*SSTPLPTISSS	R157	1
P42166	LAP2A	alpha Lamina-associated polypeptide 2, isoform	AENIR LASER*NLFISCK	R274	1
		alpha	LBEOGTESR*SSTPLPTISSS		
P42167	LAP2B	Lamina-associated polypeptide 2, isoforms beta/gamma	AENTR	R157	1
P42167	LAP2B	Lamina-associated polypeptide 2, isoforms beta/gamma	HASPILPITEFSDIPR*R	R319	1
P42167	LAP2B	Lamina-associated polypeptide 2, isoforms beta/gamma	EMFPYEASTPTGISASCR*RP IK	R364	1
P42167	LAP2B	Lamina-associated polypeptide 2, isoforms	GAAGR*PLELSDFR*MEESFS SK	R373 R381	1
P43243	MATR3	beta/gamma Matrin-3	GPLPLSSQHR*GDADQASNIL	R102	1
P/32/3	MATR3	Matrin 3	ASFGLSAR DI DELSB*VPEDK	B127	2
P43243	MATR3	Matrin-3	TEEGPTLSYGR*DGR*SATR	R160 R163	2
P43243	MATR3	Matrin-3	GPSLNPVLDYDHGSR*SQESG YYDR	R207	1
P43243	MATR3	Matrin-3	FDSEYER*MGR	R252	1
P43243	MATR3	Matrin-3	FDSEYER*MGR*GPGPLQER	R252 R255	1
P43243	MATR3	Matrin-3	GPGPLQER*SLFEK	R263	2
P43243	MATR3	Matrin-3	GNLGAGNGNLQGPR*HMQK OELGB*VIHLSNLPHSGYSDS	R387	4
P43243	MATR3	Matrin-3	AVLK	R496	1
P43243	MATR3	Matrin-3	LVLR*IPNR*GIDLLK	R578 R582	1
P43243	MATR3	Matrin-3	IPNR*GIDLLKK	R582	1
P46087-2	NOP2	Isoform 2 of Probable 28S rRNA (cytosine(4447)-C(5))-methyltransferase	GPQPPTVSPIR*SSRPPPAK	R785	1
P46776	RL27A	60S ribosomal protein L27a	TGAAPIIDVVR*SGYYK	R105	3
P46776	RL27A	60S ribosomal protein L27a	LWTLVSEQTR*VNAAK	R87	1
P46781	RS9	40S ribosomal protein S9	PVAR*SWVCR CLECERDAR*LTR	R5	1
P49005	DPOD2	DNA polymerase delta subunit 2	VILAGNLLSHSTOSR*DSINK	R110 R255	1
P49368	TCPG	T-complex protein 1 subunit gamma	KGESQTDIEITR*EEDFTR	R260	1
P49756	RBM25	RNA-binding protein 25	R*FPVAPLIPYPLITK	R247	1
P49756	RBM25	RNA-binding protein 25	EDINAIEMEEDKR*DLISR	R274	1
P49790 P49790	NU153 NU153	Nuclear pore complex protein Nup153 Nuclear pore complex protein Nup153	RIPSIVSSPLNSPLDR*SGID	R279 R342	1
P49792	BBP2	E3 SUMO-protein ligase BanBP2	ITDFQAK FGQGDLPKPINSDFR*SVFST	B1473	2
P49915	GUAA	GMP synthase [glutamine-hydrolyzing]	K VINAAHSFYNGTTTLPISDED	R317	2
PE0402	EMD	Emorin	R*TPR	D115	1
P50454	SERPH	Serpin H1	LGSR*LYGPSSVSFADDFVR	R133	1
P50454	SERPH	Serpin H1	LYGPSSVSFADDFVR*SSK	R148	1
P51610-4	HCFC1	Isoform 4 of Host cell factor 1	FR*VAGINACGR	R1909	1
P51991	ROA3	Heterogeneous nuclear ribonucleoprotein A3	IETIEVMEDR*QSGK SSGSPYGGGYGSGGGSGGYGS	R161	1
P51991	ROA3	Heterogeneous nuclear ribonucleoprotein A3	R*R	R376	2
P51991 P51991-2	ROA3 ROA3	Heterogeneous nuclear ribonucleoprotein A3 Isoform 2 of Heterogeneous nuclear ribonucleoprotein A3	MEVKPPPGR*PQPDSGR IETIEVMEDR*QSGK	R9 R139	1 1
P51991-2	ROA3	Isoform 2 of Heterogeneous nuclear ribonucleoprotein A3	SSGSPYGGGYGSGGGSGGYGS R*R	R354	2
	HNRPM	Heterogeneous nuclear ribonucleoprotein M	FGSGMNMGR*INEILSNALK	R371	1
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MGPGIDR*LGGAGMER	R410	2
P52272 P52272	INDDY	TT 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			4
P52272 P52272 P52272 P52272 P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M Heterogeneous nuclear ribonucleoprotein M	MGLVMDR*MGSVER	R429 R443	3
P52272 P52272 P52272 P52272 P52272 P52272	HNRPM HNRPM HNRPM	Heterogeneous nuclear ribonucleoprotein M Heterogeneous nuclear ribonucleoprotein M Heterogeneous nuclear ribonucleoprotein M	MGAGLOHGMDR*VGSEIER MGLVMDR*MGSVER MGSGIER*MGPLGLDHMASSI ER	R429 R443 R456	$\frac{4}{3}$

Accession	Protein	Description	Sequence	Residue	Spectral counts
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MAAPIDR*VGQTIER	R503	5
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MGSGVER*MGPAIER MCDAIED*MCI SMED	R517 R524	1
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MUPAGMGAGLER*MGPVMDR	R543	1
1 02212	1111101 101	neterogeneous nucleur risonucleoprotein ni		10010	-
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MGPVMDR*MATGLER	R550	3
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MGANNLER*MGLER	R565	1
P52272 P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	MGLER <sup>*</sup> MGANSLER CONB*FEDVANDTK	R570 R60	4
P52272	HNRPM	Heterogeneous nuclear ribonucleoprotein M	GGNR*FEPYANPTKR	R60	1
DE0070	IINDDM	II-t	AIEMER*GNFGGSFAGSFGGA	D697	- 1
F 32272	HINGPIN	Heterogeneous nuclear ribonucleoprotein M	GGHAPGVAR	R027	1
P52597	HNRPF	Heterogeneous nuclear ribonucleoprotein F	FMSVQR*PGPYDRPGTAR	R206	1
P52597	HNRPF	Heterogeneous nuclear ribonucleoprotein F	FMSVQRPGPYDR*PGTAR	R212	2
P52597	HNRPF	Heterogeneous nuclear ribonucleoprotein F	FMSVQRPGPYDR*PGTAR*R*	B212 B217 B218	1
			YIGIVK		
P52948-5	NUP98	Isoform 5 of Nuclear pore complex protein	TR*SLVGGLLQSK	R1025	2
DE1996	DECS	Nup98-Nup96	I D*HEII I SOSVD	D109	1
P55072	TERA	Transitional endoplasmic reticulum ATPase	KYEMFAOTLOOSB*GEGSFB	R128 R766	2
P55196-5	AFAD	Isoform 5 of Afadin	FRPDMR*MLSSPK	R84	1
P55795	HNRH2	Heterogeneous nuclear ribonucleoprotein H2	FGR*DLNYCFSGMSDHR	R262	2
P61106	RAB14	Ras-related protein Rab-14	LQIWDTAGQER*FR	R72	2
P61978-2	HNRPK	Isoform 2 of Heterogeneous nuclear	GGDLMAYDR*R	R325	1
D61079 9	UNDDV	ribonucleoprotein K	CCDI MAVDR*R*CRPCDR	D205 D206	1
F01978-2	INNER	ribonucleoprotein K	GGDEMATDA A GALGDA	n325 n320	1
P61978-2	HNRPK	Isoform 2 of Heterogeneous nuclear	SR*NTDEMVELR	R37	1
		ribonucleoprotein K			
P61978-3	HNRPK	Isoform 3 of Heterogeneous nuclear	GGDLMAYDR*R	R301	1
P61978-3	HNRPK	ribonucleoprotein K Isoform 3 of Heterogeneous nuclear	CCDLMAYDB*B*CBPCDB	B301/B302	1
101010-0		ribonucleoprotein K	doblambit it ditt obit	1001/1002	1
P61978-3	HNRPK	Isoform 3 of Heterogeneous nuclear	SR*NTDEMVELR	R37	1
<b>D</b> 00000000	QUED	ribonucleoprotein K		5.50	
P62633-2	CNBP	Isoform 2 of Cellular nucleic acid-binding protein	DCDLQEDACYNCGR*GGHIAK	R72	1
P62701	RS4X	40S ribosomal protein S4, X isoform	LTGVFAPR*PSTGPHK	R30	1
P62753	RS6	40S ribosomal protein S6	EDDVR*QYVVR	R154	1
P62753	RS6	40S ribosomal protein S6	IQRLVTPR*VLQHK	R183	1
P62753	RS6	40S ribosomal protein S6	LVTPR*VLQHK	R183	1
P62753	RS6	40S ribosomal protein S6	R*MATEVAADALGEEWK	R31	1
P62820	RAB1A	Ras-related protein Rab-1A	LQIWDTAGQER*FR	R72	2
P62854	RS26	40S ribosomal protein S26	FVIR*NIVEAAAVR	R42	1
P62917	RL8	60S ribosomal protein L8	VISSANR*AVVGVVAGGGR	R163	1
P62917	RL8	60S ribosomal protein L8	VISSANRAVVGVVAGGGR*ID	R174	2
P67809	VBOX1	Nuclease-sensitive element-hinding protein 1	KFILK WENVB*NGYGEINB*NDTK	B69 B77	1
107803	TBOXI	Nuclease-sensitive element-binding protein 1	DGNASGTTLLEALDCILPPTR	105/1077	1
P68104	EF1A1	Elongation factor 1-alpha 1	PTDKPLR*LPLQDVYK	R247	1
<b>D</b> 00404			KDGNASGTTLLEALDCILPPT	5045	
P68104	EF1A1	Elongation factor 1-alpha 1	RPTDKPLR*LPLQDVYK	R247	1
			SGDAAIVDMVPGKPMCVESFS		
P68104	EF1A1	Elongation factor 1-alpha 1	DYPPLGR*FAVR	R423	1
D69104	EE141	Elementian frates 1 alaba 1	EAVE*DMEOTVAVCVIK	D 497	1
P68104 P68104	EFIA1 EF1A1	Elongation factor 1 alpha 1	DMB*OTVAVCVIK	R427 R430	1
P68104	EF1A1	Elongation factor 1 alpha 1	VVVTIDAPCHB*DFIK	R06	2
P68366 2	TBAAA	Isoform 2 of Tubulin alpha 4A chain	FDA ANNVA B*CHVTICK	R00	2
P68371	TBB4B	Tubulin beta-4B chain	GHYTEGAELVDSVLDVVB*K	B121	4
P68371	TBB4B	Tubulin beta-4B chain	MB*EIVHLOAGOCGNOIGAK	B2	2
P68371	TBB4B	Tubulin beta-4B chain	LHFFMPGFAPLTSR*GSQQYR	R276	4
P78347-2	GTF2I	Isoform 2 of General transcription factor II-I	RPELLTHSTTEVTQPR*TNTP	R514	1
		•	VKEDWNVR		
P78371	TCPB	T-complex protein 1 subunit beta	IFGSR*VR*VDSTAK	R255 R257	2
P83731	RL24	60S ribosomal protein L24	FQR*AITGASLADIMAK	R80	1
P84098	RL19	60S ribosomal protein L19	R*LASSVLR*CGK MUD*DSCDLDCV	R9 R16	1
P84103-2	SRSF3	factor 3	MHR DSCFEDCK	R3	2
P98175-5	RBM10	Isoform 5 of RNA-binding protein 10	LPLGTR*LDQQTLPLGGR	R317	2
000341	VICLN	Vigilin	SSVAVLTQESFAEHR*SGLVP	<b>B</b> 16	1
Q00341	VIGLIN	viginii	QQIK	1(10	1
Q00839	HNRPU	Heterogeneous nuclear ribonucleoprotein U	SSGPTSLFAVTVAPPGAR*QG	R204	2
000000	IINDET	TT. (		D.055	0
Q00839	HNRPU	Heterogeneous nuclear ribonucleoprotein U	EDHGR*GYFEYIEENK	R255	3
000839	HNDDU	Heterogeneous nuclear ribonucleoprotein U	FIEIAAR*K	rt 558 R 579	2
400039	IINTLO	neterogeneous nuclear ribonucleoprotein U	SSGPTSLFAVTVAPPGAR*OG	n972	4
Q00839-2	HNRPU	Isoform 2 of Heterogeneous nuclear	QQQAGGDGK	R204	5
Q00839-2	HNRPU	Isoform 2 of Heterogeneous nuclear	EDHGR*GYFEYIEENK	R236	3
		ribonucleoprotein U			<u> </u>
Q00839-2	HNRPU	Isoform 2 of Heterogeneous nuclear	LNTLLQR*APQCLGK	R539	2
		ribonucleoprotein U			
		Continued on t	next page		

Accession	Protein	Description	Sequence	Residue	counts
Q00839-2	HNRPU	Isoform 2 of Heterogeneous nuclear ribonucleoprotein U	FIEIAAR*K	R553	2
Q02878	RL6	60S ribosomal protein L6	VLATVTKPVGGDKNGGTR*VV K	R105	1
Q02878	RL6	60S ribosomal protein L6	NPVLVR*GIGR	R52	1
Q03252 Q04637-4	IF4G1	Lamin-B2 Isoform C of Eukaryotic translation	LSPSPSSR*VTVSR ITKPGSIDSNNQLFAPGGR*L SWGK	R411 R1003	5 5
Q04637-4	IF4G1	initiation factor 4 gamma 1 Isoform C of Eukaryotic translation	TPLRPLDPTR*LQGINCGPDF TPSFANLGR	R569	2
Q04637-4	IF4G1	initiation factor 4 gamma 1 Isoform C of Eukaryotic translation	LQGINCGPDFTPSFANLGR*T TI STR	R588	1
Q04637-4	IF4G1	initiation factor 4 gamma 1 Isoform C of Eukarvotic translation	GGPPGPPISR*GLPLVDDGGW	R955	1
Q05639	EF1A2	initiation factor 4 gamma 1 Elongation factor 1-alpha 2	NTVPISK FAVR*DMRQTVAVGVIK	R427	1
Q05639 Q07666-3	EF1A2 KHDR1	Elongation factor 1-alpha 2 Isoform 3 of KH domain-containing, RNA-binding, signal transduction-associated	DMR*QTVAVGVIK SGSMDPSGAHPSVR*QTPSR	R430 R31	2 1
Q07666-3	KHDR1	Isoform 3 of KH domain-containing, RNA-binding, signal transduction-associated protein 1	GAYR*EHPYGR*Y	R397 R403	1
Q07812-2 Q08211	BAX DHX9	Isoform Beta of Apoptosis regulator BAX ATP-dependent RNA helicase A	TGALLLQGFIQDR*AGR ILTTEGR*NALIHK	R34 R1018	$2 \\ 2$
Q08211	DHX9	ATP-dependent RNA helicase A	QISRPSAAGINLMIGSTR*YG DGPRPPK	R1154	1
Q08211	DHX9	ATP-dependent RNA helicase A	AENNSEVGASGYGVPGPTWDRG	ANLR141	5
Q12931	TRAP1	Heat shock protein 75 kDa, mitochondrial	FEDR*SPAAECLSEK	R567	2
Q12931	TRAP1	Heat shock protein 75 kDa, mitochondrial	R	R619	1
Q12931	TRAP1	Heat shock protein 75 kDa, mitochondrial	HFLR*MQQLAK TR*EEECHFYAGGQVYPGEAS	R623	2
Q13162	PRDX4	Peroxiredoxin-4	R	R47	2
Q13247-3	SRSF6	Isoform SRP55-3 of Serine/arginine-rich splicing factor 6	DGYSYGSR*SGGGGYSSR	R85	1
Q13263	TIF1B	Transcription intermediary factor 1-beta	IVAERPGTNSTGPAPMAPPR* APGPLSK	R427	1
Q13428-2	TCOF	Isoform 2 of Treacle protein	ILQVR*AASAPAK GVEGI IDIENPNR*VAOTTK	R224	2
Q13442 Q13442	HAP28	28 kDa heat- and acid-stable phosphoprotein 28 kDa heat- and acid-stable phosphoprotein	KGVEGLIDIENPNR*VAQTTK	R88	1
Q13492-2	PICAL	Isoform 2 of Phosphatidylinositol-binding	SGQSLTDR*ITAAQHSVTGSA VSK	R9	1
Q13541	4EBP1	Eukaryotic translation initiation factor	SGGSSCSQTPSR*AIPATR	R13	5
Q13541	4EBP1	Eukaryotic translation initiation factor 4E-binding protein 1	FLMECR*NSPVTK	R63	2
Q13573	SNW1	SNW domain-containing protein 1	GMDSGFAGGEDEIYNVYDQAW R*GGK	R438	1
Q13838-2	DX39B	Isoform 2 of Spliceosome RNA helicase	ILVATNLFGR*GMDIER	R364	1
Q13885	TBB2A	Tubulin beta-2A chain	GHYTEGAELVDSVLDVVR*K	R121	4
Q13885 Q13885	TBB2A TBB2A	Tubulin beta-2A chain Tubulin beta-2A chain	MR*EIVHIQAGQCGNQIGAK LHFFMPGFAPLTSR*GSQQYR	R2 R276	$\frac{2}{4}$
Q13895	BYST	Bystin	HAPLADQILAGNAVR*AGVR	R30	1
Q14008-2	CKAP5	Isoform 2 of Cytoskeleton-associated protein $5$	LNQAR*SMSGHPEAAQMVR	R1468	2
Q14126	DSG2	Desmoglein-2	VVPSFLPVDQGGSLVGR*NGV GGMAK	R684	1
Q14152	EIF3A	Eukaryotic translation initiation factor 3 subunit $\Lambda$	GLDEDR*GSWR	R1026	1
Q14152	EIF3A	Eukaryotic translation initiation factor 3	LGDDEDREPSLRPDDDR*VPR	R956	1
Q14152	EIF3A	Eukaryotic translation initiation factor 3 subunit A	GADDDRPSWR*NTDDDRPPR	R990	2
Q14247-3	SRC8 BMS1	Isoform 3 of Src substrate cortactin Bibosome biogenesis protein BMS1 homelog	HCSQVDSVR*GFGGK LEB*IOCOK	R119 R1260	1
Q14692	BMS1	Ribosome biogenesis protein BMS1 homolog	AGLSPANCQSDR*VNLEK	R560	1
Q14739	LBR	Delta(14)-sterol reductase	ETPLILKPFGNSISK*YNGEP EHIER	R131	1
Q14739	LBR	Delta(14)-sterol reductase	LTPLILKPFGNSISRYNGEPE HIER*NDAPHK	R141	2
Q14739 014839 2	LBR CHD4	Delta(14)-sterol reductase	ELAVR*TFEVTPIR NILSB*LANB	R195 B1923	1
Q14039-2	011D4	Chromodomain-helicase-DNA-binding	MIDIC LAINE	111923	2
Q14839-2	CHD4	protein 4 Isoform 2 of Chromodomain-helicase-DNA-binding protein 4	ENEFSFEDNAIR*GGK	R829	2
		Continued on	next page		

Table 5	6A.2 -	continued	from	previous	page
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Accession	Protein	Description	Sequence	Residue	Spectral
Q14C86-3	GAPD1	Isoform 3 of GTPase-activating protein and	LSAQAQVAEDILDKYR*NAIK	R1010	1
Q15020	SART3	VPS9 domain-containing protein 1 Squamous cell carcinoma antigen recognized	VLSR*AVAAATYK	R41	1
Q15056-2	IF4H	by T-cells 3 Isoform Short of Eukaryotic translation	ADFDTYDDR*AYSSFGGGR	R10	3
Q15056-2	IF4H	Isoform Short of Eukaryotic translation	DGPPLR*GSNMDFREPTEEER	R171	1
Q15056-2	IF4H	Initiation factor 4H Isoform Short of Eukaryotic translation initiation factor 4H	AQR*PR*LQLKPR	R188 R190	1
Q15058	KIF14	Kinesin-like protein KIF14	VLGTGNLYHR*SIGK	R257	1
Q15233	NONO	Non-POU domain-containing octamer-binding protein	FGQAATMEGIGAIGGTPPAFN R*AAPGAEFAPNKR	R456	5
Q15286	RAB35	Ras-related protein Rab-35	LQIWDTAGQER*FR	R69	2
Q15417 015428	CNN3 SF3A2	Calponin-3 Splicing factor 3A subunit 2	GMSVYGLGR*QVYDPK MDFOHB*PGGK	R265 B6	1
Q15637-5	SF01	Isoform 5 of Splicing factor 1	EDDNR*ILRPWQSSETR	R385	1
Q15637-5	SF01	Isoform 5 of Splicing factor 1	ILRPWQSSETR*SITNTTVCT	R396	1
Q15637-6	SF01	Isoform 6 of Splicing factor 1	EDDNR*ILRPWQSSETR	R260	1
Q15637-6	SF01	Isoform 6 of Splicing factor 1	ILRPWQSSETR*SITNTTVCT	R271	1
Q15637-6	SF01	Isoform 6 of Splicing factor 1	K YACGLWGLSPASR*K	R467	1
Q15717	ELAV1	ELAV-like protein 1	SNGYEDHMAEDCR*GDIGR	R14	3
Q15717	ELAVI	ELAV-like protein 1	NVALLSQLYHSPAR*R NVALLSQLYHSPARR*FGGPV	R205	2
Q15717	ELAV1	ELAV-like protein 1	HHQAQR	R206	1
Q15836	VAMP3	Vesicle-associated membrane protein 3	K	R30	1
Q16777 Q3ZCQ8	H2A2C TIM50	Histone H2A type 2-C Mitochondrial import inner membrane translocase subunit TIM50	SSR*AGLQFPVGR QNLFLGSLTSR*LWPR	R21 R345	$\frac{1}{4}$
Q4VCS5	AMOT	Angiomotin	SLSER*LMQMSLATSGVK	R177	1
Q52LJ0-2 Q5JSH3-2	FA98B WDR44	Isoform 2 of Protein FAM98B Isoform 2 of WD repeat-containing protein	VLMGR*VPDR HLAEEYGER*AINK	R304 R449	$\frac{1}{1}$
050NW6-2	H9B9F	44 Isoform 2 of Histone H2B type 2-F	IAGEASB*LAHVNK	B 80	3
Q6DN03	H2B2C	Putative histone H2B type 2-C	IAGEASR*LAHYNK	R80	3
Q6P1J9	CDC73	Parafibromin	APEQRPAPNAAPVDPTLR*TK	R281	1
Q6P2E9	EDC4	Enhancer of mRNA-decapping protein 4	ASCASIDIEDATQHLR*DILK	R17	1
Q6PJT7-2	ZC3HE	Isoform 2 of Zinc finger CCCH domain-containing protein 14	LCEPEVLNSLEETYSPFFR*N NSEK	R278	1
Q6PKG0	LARP1	La-related protein 1	KSEESR*FSHLTSLPQQLPSQ QLMSK	R578	1
Q71U36-2 Q71U36-2	TBA1A TBA1A	Isoform 2 of Tubulin alpha-1A chain Isoform 2 of Tubulin alpha-1A chain	HVPR*AVFVDLEPTVIDEVR AVFVDLEPTVIDEVR*TGTYR	R29 R44	$\frac{1}{5}$
Q71U36-2	TBA1A	Isoform 2 of Tubulin alpha-1A chain	TGTYR*QLFHPEQLITGK	R49	1
Q71U36-2	TBA1A	Isoform 2 of Tubulin alpha-1A chain	EDAANNYAR*GHYTIGK	R70	3
Q7Z2W4 Q7Z2W4	ZCCHV	Zinc finger CCCH-type antiviral protein 1 Zinc finger CCCH-type antiviral protein 1	KFTYLGSQDR*ARPPSGSSK FTYLGSODB*ABPPSGSSK	R305 B305	1 2
Q7Z434	MAVS	Mitochondrial antiviral-signaling protein	LPINSTR*AGMVPSK	R355	2
Q7Z7F7-2	RM55	Isoform 2 of 39S ribosomal protein L55, mitochondrial	KEYEQELSDDLHVER*YR	R154	1
Q86U42-2	PABP2	Isoform 2 of Polyadenylate-binding protein $2$	AAAAAAAAAAAGAAGGR*GSGP GR	R17	1
Q8IWS0	PHF6	PHD finger protein 6	GLSEDTR*STSSHGTDEMESS SYR	R180	1
Q8IX01-4	SUGP2	Isoform 4 of SURP and G-patch domain-containing protein 2	YSLSGSVAHSR*DAGR	R73	1
Q8IYB3-2	SRRM1	Isoform 2 of Serine/arginine repetitive matrix protein 1	MDAGFFR*GTSAEQDNR	$\mathbf{R7}$	1
Q8N1F7 Q8N684-3	NUP93 CPSF7	Nuclear pore complex protein Nup93 Isoform 3 of Cleavage and polyadenylation specificity factor subunit 7	ASVLLGSR*GLDISHISQR TPAILYTYSGLR*NR	R67 R121	$\frac{2}{1}$
Q8N7H5-3	PAF1	Isoform 3 of RNA polymerase II-associated factor 1 homolog	TEYISTEFNR*YGISNEKPEV K	R133	1
Q8NC51	PAIRB	Plasminogen activator inhibitor 1 BNA-hinding protein	EFDR*HSGSDR*SSFSHYSGL K	R195 R201	2
Q8NC51	PAIRB	Plasminogen activator inhibitor 1 RNA-binding protein	HSGSDR*SSFSHYSGLK	R201	2
Q8NC51	PAIRB	Plasminogen activator inhibitor 1 RNA-binding protein	VEFNIR*KPNEGADGQWK	R309	1
Q8NC51-3	PAIRB	Isoform 3 of Plasminogen activator inhibitor	EFDR*HSGSDR*SSFSHYSGL K	R195 R201	2
Q8NC51-3	PAIRB	Isoform 3 of Plasminogen activator inhibitor 1 RNA-binding protein	HSGSDR*SSFSHYSGLK	R201	2
Q8NC51-3	PAIRB	Isoform 3 of Plasminogen activator inhibitor 1 RNA-binding protein	VEFNIR*KPNEGADGQWK	R294	1
Q8NCF5	NF2IP	NFATC2-interacting protein	SSLR*LIPDDLSLLK	R135	2
		Continued on	next nage		

Table 5A	A.2 -	continued	from	previous	page
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Accession	Protein	Description	Sequence	Residue	Spectral counts
Q8ND56-2	LS14A	Isoform 2 of Protein LSM14 homolog A	DFDFESANAQFNKEEIDR*EF HNK	R312	1
Q8WWM7-2 Q92597	ATX2L NDRG1	Isoform 2 of Ataxin-2-like protein Protein NDRG1	YIPLPQR*VR YFVQGMGYMPSASMTR*LMR	R355 R322	1 1
Q92665 Q92841	RT31 DDX17	28S ribosomal protein S31, mitochondrial Probable ATP-dependent RNA helicase	SELLSQLQQHEEESR*AQR LMQLVDHR*GGGGGGGGGR	R189 R555	1 1
Q92841-3	DDX17	Isoform 4 of Probable ATP-dependent RNA helicase DDX17	LMQLVDHR*GGGGGGGK	R476	1
Q92922	SMRC1	SWI/SNF complex subunit SMARCC1	EKPVDLQNFGLR*TDIYSK	R602	1
Q92945 Q92945	FUBP2 FUBP2	Far upstream element-binding protein 2 Far upstream element-binding protein 2	VPDGMVGLIIGR*GGEQINK DAFADAVOB*AB*OIAAK	R162 B80 B82	1
002072.2	TNPO1	Leeform 2 of Transportin 1	GDVEEDETIPDSEQDIRPR*F	D229	2
Q92973-2	EUDD1	Isoform 2 of Transportin-1	HR	R338	2
Q96AE4 Q96AE4-2	FUBP1 FUBP1	Isoform 2 of Far upstream element-binding	NEYGSR*IGGNEGIDVPIPR NEYGSR*IGGNEGIDVPIPR	R271 R270	1
Q96C36	P5CR2	Pyrroline-5-carboxylate reductase 2	LLTR*SLALGGK	R311	3
Q96E39	RMXL1	RNA binding motif protein, X-linked-like-1	GPPSR*GGHMDDGGYSMNFNM SSSR*GPLPVK	R125 R144	4
Q96HA1-2	P121A	Isoform 2 of Nuclear envelope pore membrane protein POM 121	FSR*SAIPEQIISSTLSSPSS NAPDPCAK	R19	1
Q96I24	FUBP3	Far upstream element-binding protein 3	AEGFVDALHR*VR	R25	1
Q96I24	FUBP3	Far upstream element-binding protein 3	AEGFVDALHR*VRQIAAK	R25	1
Q99459 Q99733-2	NP1L4	Isoform 2 of Nucleosome assembly protein	EHLR*LGLLGLPAPK LTDQVMQNPR*VLAALQER	R477 R36	1
Q99961	SH3G1	Endophilin-A2	IAASSSFR*SSDKPIR	R290	3
Q9BQE3	TBA1C	Tubulin alpha-1C chain	EDAANNYAR*GHYTIGK	R105	3
Q9BQE3 O9BOE3	TBA1C TBA1C	Tubulin alpha-1C chain Tubulin alpha-1C chain	HVPR*AVFVDLEPTVIDEVR AVFVDLEPTVIDEVR*TGTYR	R64 B79	1
49D410	10/110	Tubuni alpha-re chain		1010	0
Q9BQE3 Q9BU76-4	TBA1C MMTA2	Tubulin alpha-1C chain Isoform 4 of Multiple myeloma	TGTYR*QLFHPEQLITGK GVDR*LLGLGSASGSVGR	R84 R117	$\frac{1}{2}$
Q9BUF5	TBB6	tumor-associated protein 2 Tubulin beta-6 chain	${\rm LHFFMPGFAPLTSR}^*{\rm GSQQYR}$	R276	4
Q9BUJ2-2	HNRL1	Isoform 2 of Heterogeneous nuclear ribonucleoprotein U-like protein 1	RPYEENR*GR*GYFEHR	R179 R181	2
Q9BVA1	TBB2B	Tubulin beta-2B chain	GHYTEGAELVDSVLDVVR*K	R121	4
Q9BVA1 Q9BVA1	TBB2B TBB2B	Tubulin beta-2B chain Tubulin beta-2B chain	MR*EIVHIQAGQCGNQIGAK LHFFMPGFAPLTSR*GSQQYR	R2 R276	$\frac{2}{4}$
Q9BWJ5	SF3B5	Splicing factor 3B subunit 5	TDR*YTIHSQLEHLQSK	R4	1
Q9BZE4	NOG1	Nucleolar GTP-binding protein 1	VNEVLNR*LHLAIPTR	R359	1
Q9C005	DPY30	Protein dpy-30 homolog	MEPEQMLEGQTQVAENPHSEY GLTDNVER*IVENEK	R29	1
Q9GZT3-2	SLIRP	Isoform 2 of SRA stem-loop-interacting RNA-binding protein, mitochondrial	AASAAR*GAAALR	R7	2
Q9H0U4 Q9H0U4	RAB1B RAB1B	Ras-related protein Rab-1B Ras-related protein Rab-1B	MGPGAASGGER*PNLK LQIWDTAGQER*FR	R183 R69	$^{3}_{2}$
Q9H1E3	NUCKS	Nuclear ubiquitous casein and	VVDYSQFQESDDADEDYGR*D	R28	1
0011207	DIMIN	cyclin-dependent kinase substrate 1		De	0
Q9H307 Q9H307	PININ	Pinin	DLEGAVSR*LGGER	R85	1
Q9H910	JUPI2	Jupiter microtubule associated homolog 2	TSDIFGSPVTATSR*LAHPNK	R104	2
Q9H910	JUPI2	Jupiter microtubule associated homolog 2	PK GSGIFDESTPVQTR*QHLNPP GGK	R81	1
Q9NNW5	WDR6	WD repeat-containing protein 6	AR*AGAGAPVVGSGSSGGGNA FTGLGPVSTLPSLHGK	R535	1
Q9NPD8	UBE2T	Ubiquitin-conjugating enzyme E2 T	ADEEEMLDNLPEAGDSR*VHN STOK	R173	1
Q9NR30	DDX21	Nucleolar RNA helicase 2	LR*SDAGLESDTAMK	R6	1
Q9N1F8-2	BCLF1	Isoform 2 of Bcl-2-associated transcription factor 1 Isoform 2 of Bcl-2-associated transcription	VFLLDR*GNTR	R350	2
	D GT D4	factor 1			Ē
Q9NYF8-2	BCLFI	Isoform 2 of Bcl-2-associated transcription factor 1	SFATASHR*NTEEEGLK	R427	1
Q9N YF 8-2	BCLFI	factor 1	EIGIVVER <sup>*</sup> PSIIK	R408	1
Q9NYF8-2	BCLF1	Isoform 2 of Bcl-2-associated transcription factor $1$	LKETGYVVER*PSTTK	R468	2
Q9NYF8-2	BCLF1	Isoform 2 of Bcl-2-associated transcription factor 1	DR*LLASTLVHSVK	R567	2
Q9NYF8-2	BCLF1	Isoform 2 of Bcl-2-associated transcription factor 1	LAGEER*VFKEENQK	R671	3
Q9NYF8-2	BCLF1	Isoform 2 of Bcl-2-associated transcription factor 1	LR*CDSADLR*HDIDR	R685 R692	1
Q9NYV4-2	CDK12	Isoform 2 of Cyclin-dependent kinase 12	FAR*VPLALHPVVGQPFLK	R1398	2
		Continued on	next page		

Accession	Protein	Description	Sequence	Residue	Spectral counts
Q9P258	RCC2	Protein RCC2	AAAAAWEEPSSGNGTAR*AGP R	R22	2
Q9UID3	VPS51	Vacuolar protein sorting-associated protein 51 homolog	AAAAAAGPSPGSGPGDSPEGP EGEAPER*R	R29	1
Q9UK61-3	TASOR	Isoform 3 of Protein TASOR	FLYSAPR*NK	R593	1
Q9UKM9-2	RALY	Isoform 1 of RNA-binding protein Raly	LFAR*STAVTTSSAK	R153	1
Q9UKM9-2	RALY	Isoform 1 of RNA-binding protein Raly	VLAGQTLDINMAGEPKPDR*P K	R97	1
Q9UKV3	ACINU	Apoptotic chromatin condensation inducer in the nucleus	EFKEEGEEIPR*VKPEEMMDE RPK	R313	1
Q9UKV3	ACINU	Apoptotic chromatin condensation inducer	TRSQEQEVLER*GGR	R336	1
Q9UKY7	CDV3	Protein CDV3 homolog	AETEER*SLDNFFAK	R7	1
Q9UQ35	SRRM2	Serine/arginine repetitive matrix protein 2	MSQVPAPVPLMSLR*TAPAAN LASR	R2221	1
Q9Y262-2	EIF3L	Isoform 2 of Eukaryotic translation initiation factor 3 subunit L	QDLAYER*QYEQQTYQVIPEV IK	R38	1
Q9Y266	NUDC	Nuclear migration protein nudC	LSDLDSETR*SMVEK	R284	2
Q9Y2W1	TR150	Thyroid hormone receptor-associated protein 3	NFR*VTAYK	R522	1
Q9Y2W1	TR150	Thyroid hormone receptor-associated protein 3	R*NREEEWDPEYTPK	R863	1
Q9Y2W1	TR150	Thyroid hormone receptor-associated protein 3	R*NR*EEEWDPEYTPK	R863 R865	1
Q9Y2W1	TR150	Thyroid hormone receptor-associated protein $\frac{3}{3}$	RNR*EEEWDPEYTPK	R865	1
Q9Y2W2	WBP11	WW domain-binding protein 11	TSAYGPPTR*AVSILPLLGHG VPR	R178	1
Q9Y2W2	WBP11	WW domain-binding protein 11	AEITR*FVPTALR	R577	1
Q9Y2W2	WBP11	WW domain-binding protein 11	FVPTALR*VR	R584	1
Q9Y3B9	RRP15	RRP15-like protein	AAAAPDSR*VSEEENLKK	R9	1
Q9Y450	HBS1L	HBS1-like protein	R*DKPSVEPVEEYDYEDLK	R45	1
Q9Y520-7	PRC2C	Isoform 7 of Protein PRRC2C	IDNR*LLEKPYVR	R1318	1
Q9Y520-7	PRC2C	Isoform 7 of Protein PRRC2C	SAR*DHAISLSEPR	R796	1
Q9Y570-4	PPME1	Isoform 4 of Protein phosphatase methylesterase 1	SMHLGR*LPSRPPLPGSGGSQ SGAK	R12	1
Q9Y5M8	SRPRB	Signal recognition particle receptor subunit beta	GGR*GDVGSADIQDLEK	R252	2

 $Table \ 5A.2 - {\rm continued \ from \ previous \ page}$