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RIBONOMIC CONTROL DURING GLOBAL BRAIN ISCHEMIA AND REPERFUSION

by

HAIHUI WANG

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2014

MAJOR: PHYSIOLOGY

Approved by:

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Advisor Date

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DEDICATION

This dissertation is dedicated to family and friends who have given me courage and support in the exploration of science.

To my twin sister, Haizhi, you are the best friend one can ever get. Thank you for taking this PhD journey together with me. Thank you for always getting what I feel and standing beside me.

To my husband, Yanda, thank you for being so patient, kind, warm and tolerant. Thank you for making me laugh when I was frustrated with experiments and for always having my back. This would not work out without your support.

To my parents and grandparents far away in China, thank you for your unconditional love, support and for always believing in me.

ACKNOWLEDGMENTS

I would like to acknowledge NIH NINDS Grants No. NS057167 (D.J.D.), NS081347 (D.J.D.), Wayne State University IBS Fellowship and Rumble E. fellowship.

I would like to thank all the animals sacrificed in the experiments.

I would like to thank my committee members, who have always been nice and supportive, Dr. Donald J. DeGracia, Dr. Xuequn Chen, Dr. Bhanu P. Jena, and Dr. David Evans. I would like to pay special thanks to Dr. Chen, whose expertise is essential in the Proteomics work.

I would like to thank Joanne Kaiser, Oneita Hunt, and Christine Cupps for helping me with ordering animals, procard and other administrative work.

I would like to thank Jie Wang, who has patiently taught me the 2VO/HT surgery, and has helped me so much in this journey. I would like to thank Dr. C. P. Lee for her positive energy and advice. I would like to thank Dr. Jeff Szymanski, who has helped training me with the sucrose gradient, 2-D gel and basically all lab procedures, and who has kept an excellent record of all the lab notes and inventory which proved to be super helpful. I would like to thank Dr. Jill Jamison for patiently taught me how to do FISH/IF stain and all other help. I would like to thank Fika for her help on the polysomes microarray experiments and other lab chores.

Finally, I would like to thank Dr. DeGracia who has guided and supported throughout the journey. Thank you for being honest and open about your view of science. You are an amazing teacher and advisor.

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LIST OF ABBREVIATIONS

2VO/HT, bilateral carotid artery occlusion and hypovolemic hypotension

4VO, four-vessel occlusion

4E-BP, eIF4E-binding protein

AMPA, 2-amino-3- (5-methyl-3-oxo-1, 2- oxazol-4-yl) propionate

ARE, adenine and uridine- rich element

BDNF, brain derived neurotrophic factor

CA, Cornu Ammonis (Ammon's horn) (for CA1 & CA3)

CamKII, Ca^{2+} calmodulin kinase II

CHX, cycloheximide

CLIP, ultraviolet crosslinking and immunoprecipitation

CNS, central nervous system

COX-2, cyclooxygenase-2

DND, delayed neuronal death

eIF2, eukaryotic initiation factor-2

eIF2B, eukaryotic initiation factor-2 B

eIF2(αP), eukaryotic initiation factor-2 (phosphorylated α subunit)

eIF2α, eukaryotic initiation factor-2 (α subunit)

eIF4, eukaryotic initiation factor-4

eIFs, eukaryotic initiation factors

FISH, fluorescence *in situ* hybridization

FMRP, fragile X mental retardation protein

HIF1α, hypoxia inducible factor 1 α

hnRNP, heterogeneous nuclear ribonucleoprotein complex

HSP, heat shock protein

ICU, intensive care unit

IEG, immediate early genes

iNOS, inducible nitric oxide synthase

IP, immunoprecipitation

I/R, ischemia and reperfusion

IRE, iron response element

IRES, internal ribosome entry sites

iTRAQ, isobaric tag for relative and absolute quantitation

LC, liquid chromatography

m^7G cap, 7-methylguanylate cap

MAP, mean arterial pressure

Met-tRNAi, methionyl-containing initiator tRNA

mRNP, mRNA ribonucleoprotein particle

MS, mass spectrometry

Na^+-K^+ ATPase, sodium potassium ATPase

NIC, non-ischemic control

NMDA, N-methyl-D-aspartic acid

nNOS, neuronal nitric oxide synthase

NO, nitric oxide

PA, protein aggregates

PABP, poly (A) binding protein

PIC, protein initiation complex

PKC, protein kinase C

PLA_2, phospholipase A_2

PMS, post mitochondrial supernatant

PNS, post nuclear supernatant

POMA, paraneoplastic opsoclonus myoclonus ataxia

RIP, Ribonucleoprotein-immunoprecipitation

RISC, RNA-inducing silencing complex

RBP, mRNA binding protein

ROS, reactive oxygen species

RRM, RNA recognition motifs

SDS-PAGE, sodium dodecyl sulfate polyacrylamide gel electrophoresis

SGs, Stress Granules

TA, translation arrest

ternary complex, complex of eIF2/GTP/$tRNA_i^{met}$

TIA-1, T cell internal antigen

TIAR, TIA-1 related protein

TNF-α, tumour necrosis factor α

tPA, tissue plasminogen activator

TTP, tristetraprolin

UTR, untranslated region

USER, untranslated sequence elements for regulation

WB, Western blot

CHAPTER 1: BACKGROUND

This dissertation focuses on the response of neurons to global brain ischemia/reperfusion (I/R) injury. Brain I/R injury affects millions of individual and costs billions of dollars in healthcare and loss of productivity worldwide. However, all treatments designed to prevent neuron death have failed in clinical trials, and therefore the underlying mechanisms are still not clear. This work proposes to investigate novel mechanisms underlying the selective vulnerability of Cornu Ammonis 1 (CA1) neurons in I/R injury compared with resistant CA3 neurons. The proposed studies are ultimately intended to contribute to the development of effective therapies that could prevent the death of ischemic sensitive neurons during I/R injury.

The main focus of this prospectus is on the posttranscriptional control of gene expression in neurons following I/R injury. It has been known since 1971 that protein synthesis is inhibited in neurons after I/R[1]. Several lines of investigation have shown that this translation arrest (TA) is linked to post-transcriptional regulation of neuronal stress responses. In the Background section I discuss previous investigations of: (1) translation initiation factors, (2) selective translation of stress proteins, and (3) sequestration of ribosomes into cytoplasmic particles. From this evidence, it is now clear that a transient TA is linked to stress gene expression and survival of resistant post-ischemic neurons. However, prolonged TA is pathological and correlates to death of selectively vulnerable neurons. Previous work from our lab implicates post-transcriptional regulation of mRNA in the form of mRNA granules that are reversible in surviving neurons and irreversible in vulnerable neurons. mRNA regulation is today understood in terms of the ribonomic network, which consists of subcellular structures that regulate mRNAs. My experimental plan aims to investigate ribonomic regulation after I/R injury in CA1 and CA3 neurons. Biochemical fractionation, proteomics and microarrays were used to detect whether different mRNA protein binding complexes correlate with vulnerability of neurons after I/R

injury by comparing hippocampal regions CA1 and CA3.

Brain ischemia and reperfusion

Ischemia is the decrease or cessation in blood supply to an organ or tissue, caused by constriction or obstruction of blood vessels. Reperfusion is the restoration of blood flow to the previously ischemic organ or tissue. There are two types of brain ischemia: focal and global ischemia. Focal brain ischemia affects a circumscribed area of the brain, whereas global brain ischemia results in decreased or cessation of blood flow to the entire brain. In humans, focal brain I/R occurs as stroke, and global brain I/R manifests as cardiac arrest and resuscitation. Focal and global brain ischemia both results in severe mortality and morbidity from brain damage.

Significant consequence of brain ischemia

Focal brain ischemia from stroke is the fourth leading cause of death in U.S. according to the latest report[2] and a leading cause of long-term disability[3]. The estimated direct and indirect cost of stroke added up to around $34.3 billion annually in U.S.[4].

Global brain ischemia from cardiac arrest is also a major contributor to death: irreversible brain damage starts after only 5 min of cardiac arrest. With the increase of the duration of cardiac arrest to 30 min and above, drastic CNS damage with necrosis would occur with very low long-term survival rate. With approximate 200,000 hospitalized patients suffering cardiac arrest annually in U.S.[5], only 35.0% of the children and 23.1% of the adults survive to discharge[4]. In the case of out-of-hospital cardiac arrest, survival rate is even lower, ranging from 4.6% to 6.4%[6,7]. Cardiac arrest causes cessation of blood flow to the whole brain resulting in dysfunction ranging from mild to severe to lethal. In a U.K. study aiming to determine the major mode of death in intensive care unit (ICU) patients after cardiac arrest, neurological injury contributes two thirds of the death of patients who suffered out-of-hospital cardiac arrest and one

fourth of death of patients who suffered in-hospital cardiac arrest[8]. In other studies of out-of-hospital cardiac arrest patients' survival, only around 6% of the cardiac arrest patients survive to hospital discharge with satisfactory neural-function status measured as modified Rankin scale, with the rest of the patients ranging from severe disability to death[9, 10].

Current treatment: unsatisfactory

Due to the short time frame from the onset of ischemia to neuronal damage, the application of revascularization therapy is limited. Early restoration of blood flow within 3 hrs by tissue plasminogen activator (tPA) is the only FDA-approved treatment for restoring blood flow in stroke patients[11]. However, due to the stringent application window and risk of hemorrhage, less than 10% of patients are candidates for tPA treatment. Acute treatment with hypothermia after brain I/R injury has been reported to have beneficial effect, but long-term outcomes reports are still sparse, and the mechanism of this protection is still unclear[12, 13].

Brain ischemia treatment is an area of intense research. However, all large scale clinical trials of neuroprotectants have failed[14]. Out of the 1026 drugs that prevented neuron death in preclinical animal models of brain ischemia by the year 2006, 114 drugs were tested in clinical trial, and all failed to improve outcome[14].

With few effective therapies, brain ischemia is still killing and mutilating millions of people. Failure of those neuron-protection clinical trials suggests that the problem is more complex and the understanding is not clear yet. To date, many injury mechanisms have been identified, and below I provide a brief description.

Experimental models of I/R injury

There are various biological models for both global and focal brain I/R injury: from cell culture system, *in vitro* brain slices to whole animal models. Although cell culture system is simpler and better controlled, whole animal models are superior. Culture systems cannot fully

model I/R injury *in vivo* because culture systems lack the diversity of cell types, CNS architecture, blood flow dynamics, immune system effects, inflammatory responses, and the physical environment of neurons[15].

Focal brain ischemia animal models are achieved by introducing an occluding filament into the middle cerebral artery, the most common site of occlusion during ischemic stroke[15]. Due to the significant gradation of ischemia level from the inner core to the ischemia boundary in focal ischemia, the global brain ischemia model is a much cleaner model with less variability and better consistency[15]. Global brain ischemia is achieved via (1) four-vessel occlusion (4-VO), (2) two-vessel occlusion combined with hypotension (2-VO/HT) or (3) cardiac arrest models in rats[15]. In Dr. DeGracia's lab, 2-VO/HT global brain ischemia rat model is used. Details about this model will be discussed later. The model causes less damage to peripheral organs compared with the 4-VO and the cardiac arrest models, so that the rats are able to survive and be observed to a longer duration. The model generates transient global brain ischemia, which reproducibly induces delayed neuronal death in ischemia vulnerable neurons such as the CA1 regions in the hippocampus while leaving ischemia resistant neurons such as the CA3 regions in the hippocampus alive.

The fact that both CA1 and CA3 neurons are pyramidal neurons, in the same brain structure (hippocampus), and experience the same ischemia insult, but have drastically different outcomes after transient global ischemia suggests that this model is ideal for investigating the different intrinsic defense response of neurons towards I/R injury. The research proposed below will focus on the hippocampal neuron populations.

Mechanisms for ischemia reperfusion damage of neurons

Introduction

Brain I/R injury is a complex protracted process, which can cause necrosis during or soon

after the insult, or can progress over days, called delayed neuronal death (DND). Many mechanisms have been established to contribute to the I/R injury, and they are collectively referred to as the "ischemic cascade" (Figure 1).

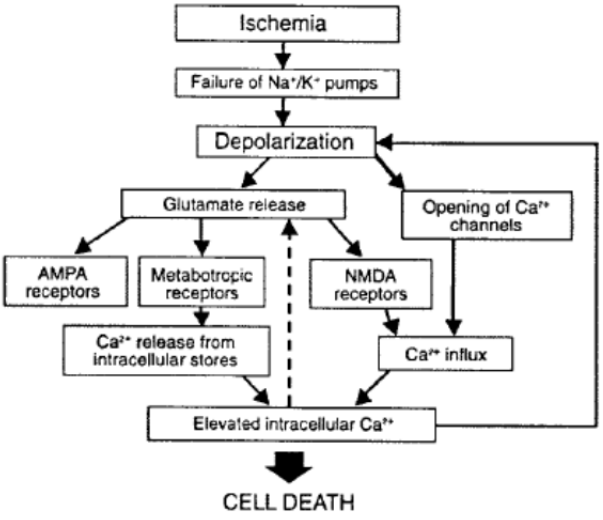

Figure 1. Overview of ischemic cascade adopted from Lyden, 2000[16].

With the cessation of blood flow, glucose and oxygen delivery to the neurons in that area stops, leading to energy deprivation. With the failing of energy dependent pump and the subsequent dissipation of ion gradients, neurons get depolarized, opening voltage-gated calcium channels, and excitatory amino acid neurotransmitters, such as glutamate, are released. Glutamate release causes further depolarization and increase of calcium ions. Subsequent lipolysis, proteolysis, and free radical damage are all activated. Inflammatory responses also play an important role in focal brain ischemia animal models. But in transient global brain ischemia models, inflammatory responses are not as important[15].

Loss of energy and excitotoxicity

In the rat global brain ischemia 2-VO/HT model, with the cessation of blood flow, ATP level drops to 50% control level in the first minute of ischemia, and then drops to 6% control level after 5 min ischemia[15]. Lactate level goes up with cell pH level decreasing[17]. Without energy supply, the sodium potassium ATP pump (Na^+-K^+ ATPase) fails to keep the ion gradient

across cell membranes, which is vital for normal neuron activity. Sodium and potassium ion thus equilibrate across the neuron membrane during ischemia, leading to failure of the transport of glucose and amino acids and depolarization of the neurons[18]. Depolarization induces calcium influx from open voltage-gated calcium channel and the endoplasmic reticulum, leading to further neurotransmitter release. The influx of calcium is able to drop extracellular calcium level from a starting concentration of 1.2 mM to less than 100 nM after 1 min of global ischemia in rats[18,19]. Calcium overload in ischemic neurons then activates many enzymes leading to downstream effects, which will be discussed in more detail below. A large increase of extracellular glutamate was observed during transient global brain ischemia[20]. Glutamate released from depolarized neurons will act on 2-amino-3- (5-methyl-3-oxo-1, 2- oxazol-4-yl) propionate (AMPA) and N-methyl-D-aspartic acid (NMDA) ionotropic glutamate receptors and causes further depolarization[21]. Depolarization leads to further calcium influx and neurotransmitter release, thus perpetuating the cycle, known as excitotoxicity.

Calcium overload

Calcium ions play important roles in many processes, such as signal transduction, membrane potential, enzyme activity, etc. Thus calcium ion is strictly regulated. Calcium ion overload during I/R activates many enzymes, which contributes to the deleterious effects of ischemia.

Calpains, a family of cysteine proteases, get activated by increased intracellular calcium, either micromolar (μ-calpain) or millimolar (m-calpain)[15,22]. Calpain activity is increased in both focal and global brain ischemia rat models. Substrates of calpain include eukaryotic initiation factor eIF-4G and eIF-4E, two important factors in translation initiation[15,23].

Phospholipase A2 (PLA_2) is activated by increased intracellular calcium ions, and PLA2 releases free fatty acid from the second carbon of glycerol in the phospholipids[24]. The

arachidonic acid liberated from triglycerides by PLA2 can be converted to pro-inflammatory prostaglandins and leukotrienes by the inducible cyclooxygenase-2 (COX-2) and downstream enzymes[25]. COX-2 is induced globally in both neuronal and glial cells, in the infarct core, the periinfarct region, and the homologous region of the contralateral hemisphere after stroke in human post mortem samples[25]. But in the acute phase, COX-2 is concentrated near the ischemic core, and this suggests that PLA2 and COX-2 may play a role in the deleterious reactions[25]. Inhibition of prostaglandin production by COX inhibitor is correlated with a reduction of early infarct size in rat focal I/R model[26].

Other enzymes activated by increased calcium ions during neurons I/R injury include protein kinase C (PKC) and calcium/calmodulin-dependent kinase II-alpha (CaMKII)[27]. Both PKC and CaMKII are serine/threonine protein kinases, deregulation of which is likely to compromise the integrity of neuronal signaling system.

Neuronal nitric oxide synthase (nNOS) is induced by increased calcium. The activation of nNOS is associated with the generation of the highly active peroxynitrite free radicals[28]. Inhibition of either nNOS or inducible nitric oxide synthase (iNOS) is shown to mitigate ischemic cell death in animal models[15]. Free radicals from many sources are produced during I/R.

Free radicals and reperfusion

Restoration of blood flow is called reperfusion. Reperfusion not only brings glucose and oxygen, but also generates free radicals or reactive oxygen species (ROS). At 4 hr of reperfusion after 30 min global brain ischemia in rats, nitric oxide, superoxide, and peroxynitrite are all elevated in both cerebral hemisphere during reperfusion[29]. Free radicals come from many sources in I/R neurons. Mitochondria are an important source of free radicals. Calcium overload in mitochondria during ischemia permeabilize the inner membrane of mitochondria, which leaks

superoxide during reperfusion[30]. Oxidative metabolism of arachidonic acid, which is released from phospholipid, also leads to superoxide production, via either the COX or the lipoxygenase pathway[15]. Xanthine oxidase generates superoxide by acting on hypoxanthine from the breakdown of adenine nucleotide during reperfusion[31]. Neutrophils accumulated after focal I/R injury are also a contributor to the superoxide production via oxidizing NADPH, and both nNOS and iNOS contribute to the production of NO[15].

Numerous consequences follow the over-production of free radicals. They affect structures of lipids and proteins. Lipid peroxidation changes membrane permeability and fluidity[32]. Several important enzymes are inhibited after modification by ROS, including plasmalemma Na^+ and Ca^{2+} pump, and creatine kinase[15]. Free radicals also lead to dysfunctional mitochondria, protein synthesis inhibition, and DNA cleavage[15].

Protein synthesis malfunction during I/R injury

Neuron subpopulations have different threshold towards I/R injury. Some neurons are selectively vulnerable to I/R injury and die in the form of delayed neuronal death (DND) after transient ischemia attack. Prolonged protein synthesis inhibition, or translation arrest (TA), is an early marker of the vulnerable neurons.

Delayed neuronal death and selective vulnerability

After brain I/R injury, neurons either survive or die. There are two forms of death: necrotic cell death and DND. Necrosis forms the core of focal ischemia, and also appears in global brain ischemia when the duration of ischemia is long. Necrosis appears during or shortly after ischemia[15]. Necrotic neurons are not salvageable, and are not the attention of clinical therapy. This prospectus will focus on DND, which is the target of rescue in research.

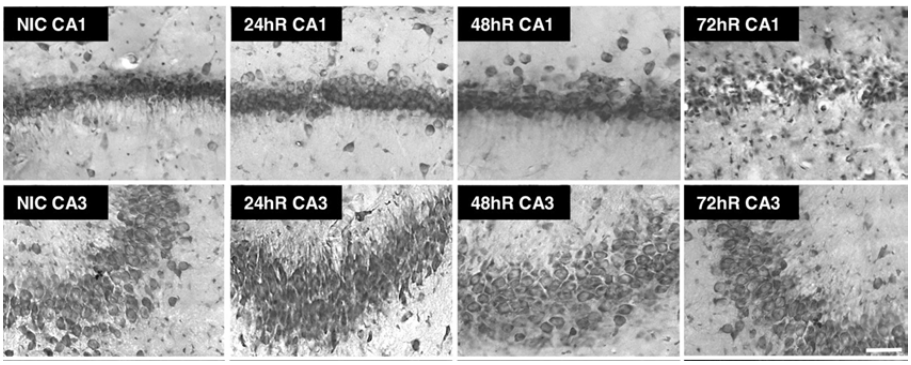

Figure 2. Selective vulnerability of CA1 neurons compared with CA3 neurons after 10 min ischemia via 2VO/HT model, shown by Toluidine blue staining adopted from Jamison, 2008[33].

Distinct neuron populations have different response to ischemia, and transient ischemia can cause selective neurons to die in the form of DND. DND was first documented in rats by Pulsinelli and Brierly[34] and in gerbils by Kirino[35]. DND depends on both the insult duration and the cell population. In DND, the substantial delay between the transient ischemia insult until neuron death is generally between 12 hrs and several days. But the longer the duration of the ischemia, the shorter the delay[15]. Both in rats and gerbils, CA1 neurons in the hippocampus are selectively killed by DND after transient global brain I/R injury, and this pattern is also consistent with the findings in human postmortem after ischemic event[36]. Hippocampus is vital in functional declarative memory[36] and DND of CA1 in hippocampus after transient ischemia results in compromised memory. In humans, enduring memory deficits were reported to be associated with destruction limited to bilateral CA1 neurons[37]. Increasing the duration of ischemia leads to accelerated DND of vulnerable CA1, and other neuron populations will show DND as well, such as CA4 and CA3 regions in the hippocampus and cortex layer II and V[15].

Isolated DND restricted to CA1 neurons with surviving CA3 neurons has been successfully modeled after transient global brain ischemia in Dr. DeGracia's lab using 2-VO/HT rat model (Figure 2). The basis for the selective DND of CA1, or alternatively, the selective survival of CA3, is not understood. We hope that research using this model will further our understanding of the intrinsic response of different neuron populations.

Translation Arrest and selective vulnerability

Protein synthesis is a complex biological function, which is essential for life. In the context of cell injury, translation is required for the expression of stress response transcripts that protect neurons after I/R injury. It was first discovered in 1971 that protein synthesis was inhibited (translation arrest, TA) during brain I/R injury[1]. After 30 min complete cerebral ischemia followed by 30 min reperfusion, cat brain homogenates showed a significant decrease in radioactive amino acid incorporation. Polysomes were found to be intact during ischemia, but dissociated during reperfusion[1]. TA is concomitant with the disaggregation of polyribosomes into monosomes[1]. It was inferred that there was inhibition predominantly affecting the protein synthesis initiation phase during reperfusion[1]. Later in rhesus monkeys, rats, mice and other species, similar findings of TA were reported[15,17,38].

Protein synthesis recovers over time in most post-ischemic neurons[1]. However, an important discovery in the brain I/R field was that in neurons destined to die after transient ischemia, TA is persistent and protein synthesis is not recovered (Figure 3). The fact that protein synthesis remains halted in ischemic vulnerable neurons but recovered in ischemic resistant neurons[39] differentiates CA1 from CA3 neurons at a much earlier stage than the appearance of classical morphological changes of ischemic cell death[15]. It was thus proposed that persistent TA contributes to or even causes DND after transient ischemia in vulnerable neurons. Below, mechanism of protein synthesis initiation and translational control will be discussed in more details.

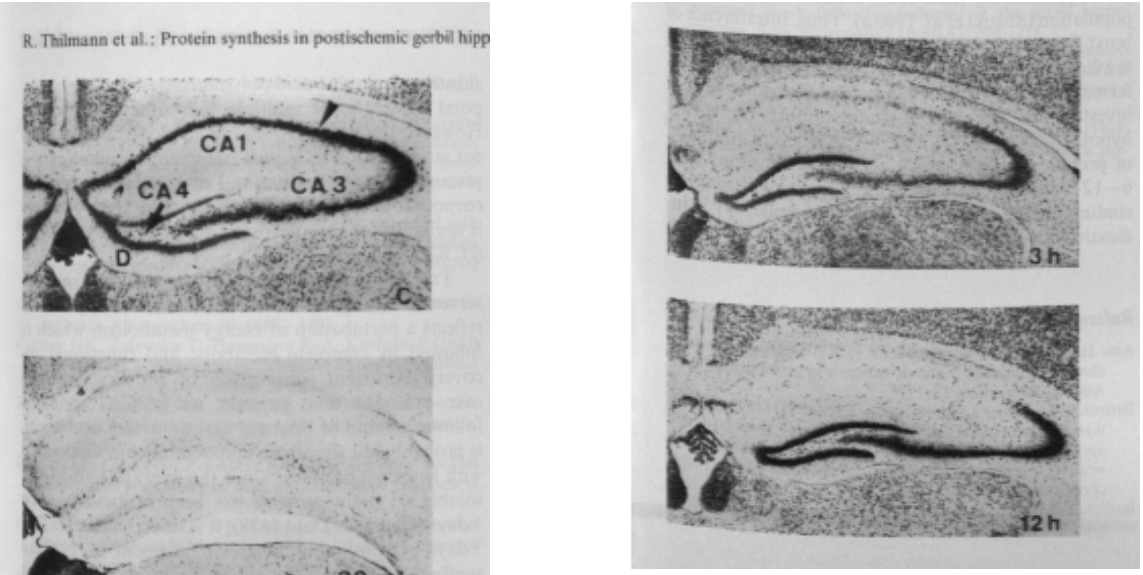

Figure 3. Radioactive tyrosine incorporation after 5 min global brain. This shows prolonged translation arrest in selective vulnerable CA1 neurons in gerbil hippocampus at various reperfusion durations as listed in each panel adopted from Thilmann, 1986[40].

Posttranscriptional control and TA in reperfused neurons

Expression of protein-coding genes is controlled at multiple levels, which include transcriptional, posttranscriptional and translational levels of regulation. Below I will discuss the background of these processes and the three stages of research evaluating prolonged TA in ischemic sensitive neurons: (1) translation initiation, (2) stress protein synthesis, and (3) ribosomal sequestration.

Translation initiation and TA under normal and I/R condition

To initiate translation, cells need to bring together four components: the 40S ribosomal subunit, the 60S ribosomal subunit, the mRNA chosen to be translated, and the methionyl-containing initiator tRNA. Initiation of protein synthesis can be divided into 3 stages: (1) binding of the initiator tRNA (Met-tRNAi), eIF2, GTP to form the ternary complex, followed by

binding of other initiation factors and 40S ribosomal subunit to form the 43S preinitiation complex (PIC); (2) 43S PIC binds to mRNA and other initiation factors, with mRNA migrating to the correct AUG start codon, forming 48S PIC; recognition of the start codon triggers the hydrolysis of the eIF2 bound GTP and subsequent release of the initiation factors and (3) the addition of 60S ribosomal subunit at the start codon to form the 80S initiation complex (monosome), with nascent polypeptide chain begin to be synthesized[41]. The polypeptides elongates as the mRNA is read in the 5' to 3' direction until it reaches a stop codon, and termination occurs.

There are two rate limiting steps in the translation initiation stage[42]. The first step involves eukaryotic initiation factor 2 (eIF2), which delivers the initiator tRNA to the 40S ribosomal subunit. The second step involves the eukaryotic initiation factor 4 (eIF4/eIF4F), which delivers mRNA to the 48S PIC. The cells control global rate of protein synthesis via the activity of eIF2 and fine tune how much mRNA and which mRNA will be translated via the activity of eIF4. The abbreviated steps are shown (Figure 4).

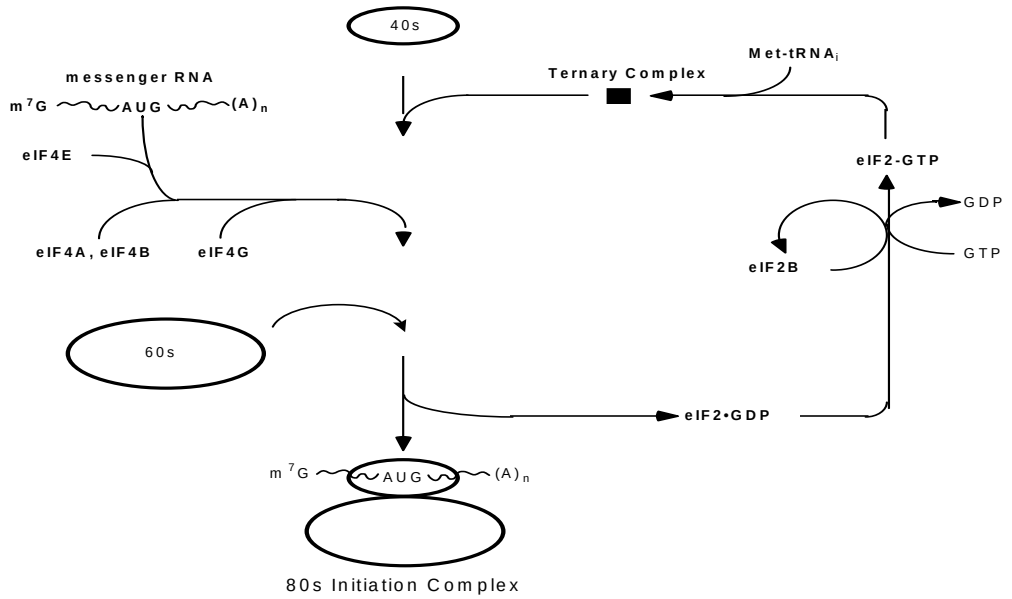

Figure 4. Abbreviated steps in translation inhibition, showing eIF2 and eIF4 steps, adopted from DeGracia, 2002[43].

eIF2

eIF2 is a GTP binding protein, a complex consisting of three polypeptide chains: two catalytic subunits, eIF2 beta, eIF2 gamma and one regulatory subunit, eIF2 alpha (eIF2α). In the initiation stage of protein synthesis, eIF2 binds GTP and Met-tRNA$_i$ to form the ternary complex, which is then brought to the 40S ribosomal subunits with other initiation factors, and they together forms the 43S PIC. The 43S PIC is brought to the 5' untranslated region (5'UTR) of mRNA, promoted by eIF4, forming the 48S PIC. The PIC scans the mRNA until it reaches the start codon, AUG. Once the start codon is found, the scan stops, with a conformational change in eIF2 resulting in the hydrolysis of eIF2-asscociated GTP, followed with the release of eIF2-GDP complex[44].

Prior to subsequent round of translation initiation, the GDP bound with eIF2 must be exchanged for GTP, a reaction catalyzed by eukaryotic initiation factor 2B (eIF2B), a guanine nucleotide exchange factor[45]. Recycling of GDP to GTP is blocked by phosphorylation of eIF2α at serine 51[46]. Upon this phosphorylation, there is a 150-fold increase in binding affinity between eIF2α and eIF2B compared with its unphosphorylated counterpart of eIF2α[46]. Thus, eIF2 is converted from a substrate into a competitive inhibitor of eIF2B[47] and the global protein translation initiation is decreased. The stoichiometry of eIF2 to eIF2B is around 5:1 in most cells[48,49]. Thus, it takes only 20% of eIF2α to be phosphorylated to shut down all translation initiation in cells[41].

In neuron I/R injury, eIF2 plays an important role in TA. Almost 30% of eIF2α is phosphorylated at 90 min reperfusion following 10 min of global brain ischemia[42] and eIF2α phosphorylated at serine 51 is increased 20-fold at 10 min and 90 min reperfusion[50].

However, evidence shows that eIF2α phosphorylation doesn't correlate with prolonged TA. After focal I/R injury, eIF2α(P) markedly increased after 1 hr reperfusion, but normalized

after 6 hr recirculation in spite of the depressed protein synthesis[51]. After transient global brain I/R injury, at 4 to 6 hr reperfusion, the level of eIF2α(P) gradually declines in all brain regions, and, eIF2α(P) level returns back to control level despite of the ongoing TA[52]. Similar results were observed in Dr. DeGracia's lab in that eIF2α(P) returned to control level at 4 hr reperfusion after transient global brain ischemia while protein synthesis remained low[53]. Together the data indicates that the phosphorylation of eIF2α only contributes to the early phase of translation arrest and cannot explain the prolonged TA[54].

eIF4F

The other rate limiting step of translation initiation involves eIF4F, which is a heterotrimer consisting of eIF4E, eIF4G and eIF4A. eIF4F delivers the mRNA to the 43S PIC and loads the start codon onto the P site of the ribosome. Specifically, eIF4E binds to the 7-methylguanylate (m^7G) cap at the 5' end of mRNA, and eIF4G acts as a scaffolding protein linking eIF4E with other initiation factors, while eIF4A working as a helicase unwinding the secondary structure of mRNA[41]. Regulation of eIF4 enables the cell to control how much and which mRNAs are translated. In addition, eIF4G also binds with poly (A) binding protein (PABP), which has a high affinity to the 3' end of the poly (A) tail of mRNA, and thus the interaction between eIF4G and PABP promotes the circularization of mRNA, which is associated with improved translation efficiency[55]. There is a family of proteins that bind with eIF4E and exclude it from the eIF4F complex, called eIF4E binding proteins[41]. Phosphorylation of eIF4E-BPs release the eIF-4E to be incorporated into initiation machinery thus promote protein synthesis[56].

eIF4G is partially degraded during global brain ischemia[42] by μ-calpain, activated by increased cellular calcium level[23]. eIF4E level decreases during reperfusion[57] while eIF4E-BP is dephosphorylated during ischemia[58]. Degradation of eIF4F components requires ischemia

longer than needed to induce DND, and other changes correlate with transient but not prolonged TA.

Gene activation and TA

In order to adapt to environmental stresses, eukaryotic cells have evolved genetically-encoded stress responses. Integral to stress responses is the shutting down of protein synthesis. This serves to conserve energy for the repair and provide time to change the pattern of gene expression via transcription. TA is selective: translation of constitutive transcripts is turned off, but translation of stress-induced genes is maintained.

Both heat-shock response and the unfolded protein response are activated in brain I/R injury[59]. While there is global TA, specific proteins are selectively translated. The expression pattern of these protein is not uniform in all neurons, leading to the inference: protein expressed in resistant neurons and not in vulnerable neurons is protective, and that the absence of the expression of that protein is important in the development of DND[15].

Heat shock protein (HSP) family is one of those translated during brain I/R injury. HSPs are induced in a variety of physiochemical insults. Induced HSP helps prevent protein aggregation and the misfolding of polypeptides[60]. Polysomes isolated from reperfused rat brain after global I/R and then subjected to *in vitro* protein synthesis generate heat shock proteins from the HSP70, HSP90, HSP110 families[61]. Below the discussion will focus on HSP70, the most extensively studied HSP family member.

HSP70 (also known as the HSP72) is the induced form of 70 kDa stress protein. HSP70 is usually not detectable under normal conditions, but is induced at high level after a variety of CNS insults. HSP70 functions as a chaperone, binding to denatured proteins to restore their structure and function[60]. Overproduction of HSP70 *in vitro* in cell culture[62] or by gene transfer into wild-type animals via direct cerebral injection yields protective effect on neuron survival[60].

In focal cerebral I/R, HSP70 expression is only seen in neurons at the infarct penumbra, at the endothelial cells in the infarction, but not in the neurons in the infarction which are necrotic[63].

After transient global I/R, both vulnerable CA1 and resistant CA3 neurons show large increase of *hsp70* mRNA at 8 hr reperfusion, 160- and 50- fold respectively[59]. *hsp70* mRNA

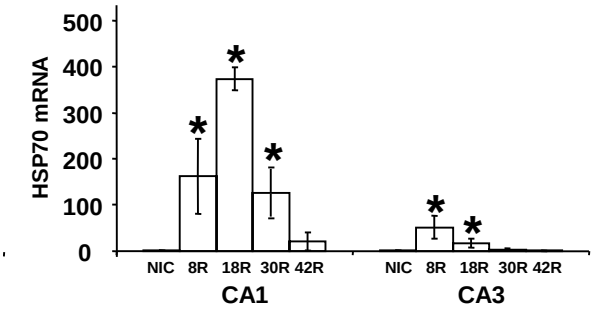

Figure 5. *hsp70* mRNA after 10min global brain ischemia and reperfusion time indicated in CA1 and CA3 neurons adopted from Roberts, 2007[59].

peaks at 8 hr in CA3 neurons and returned to control by 30 hr reperfusion, but peak at 18 hr in CA1 neurons and remain high even at 42 hr reperfusion (Figure 5)[59]. However, there is a disjunction between the transcription and the translation of HSP70 in CA1 neurons. HSP70 protein expression is delayed in CA1 neurons compared with CA3 neurons by a gap of 28 hrs[33]. Expression of the HSP70 protein is pronounced in CA3 neurons already at 8 hr reperfusion after 10 min global brain ischemia, while HSP70 translation in CA1 neurons only begins after 36 hr of reperfusion (Figure 6)[33]. This leads to the reasoning that translation of HSP70 early contributes to the survival in CA3 neurons, and that

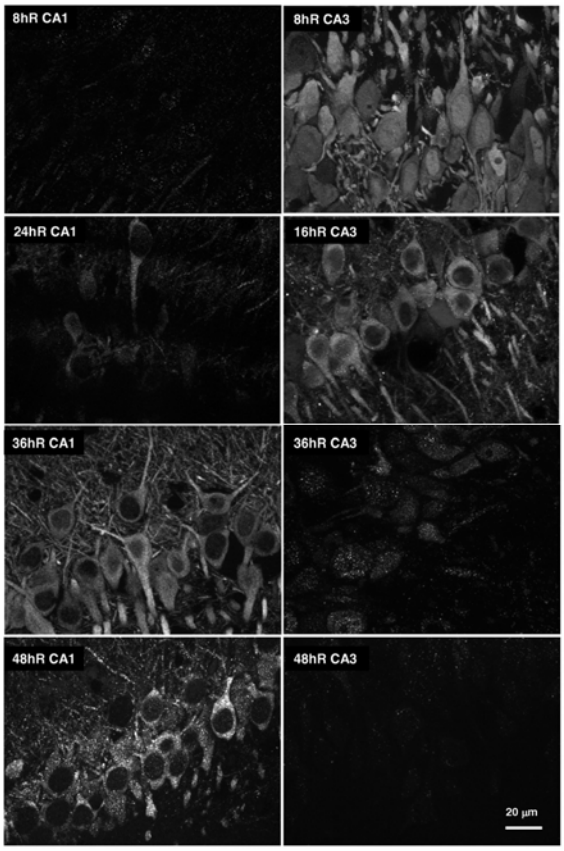

Figure 6. HSP70 stain by immunofluorescence microscopy showing CA1 and CA3 regions of hippocampus in rat after 10 min global brain ischemia and indicated reperfusion time, from Jamison, 2008[33].

the inability to translate HSP70 contributes to the death in CA1 neurons. The disjunction of transcription and translation of HSP70 will be the focus in current studies.

c-Fos and c-Jun are nuclear proto-oncogenes, and they are members of the immediate early genes (IEG), which are activated transiently and rapidly after a wide variety of stimuli, including brain I/R. Both of the product proteins are activated at a much earlier stage in I/R before the expression of HSP70. In the gerbil hippocampus, expression of c-FOS was seen 1-6 hrs after 15 min global ischemia in CA3 and CA4 regions, and expression of c-JUN was seen 4-48 hrs in the same area. The induction of both c-FOS and c-JUN protein expression was negligible or absent in CA1[64].

Other proteins are also induced or down-regulated in brain I/R injury. After global brain I/R in rats, brain derived neurotrophic factor (BDNF) is decreased significantly in CA1 neurons, with little change in CA3 neurons[65]. The bcl-2 and bcl-x-long proto-oncogenes have been shown to suppress apoptosis in neurons in *in vitro* systems[66] and neuron cell lines[67]. After transient global brain I/R in rats, their mRNA is up regulated in both CA1 and CA3 neurons, but the protein expression only occurs in CA3 neurons[68].

As discussed previously, polysomes remain intact during brain ischemia, and they dissociate during reperfusion[1,38]. Since the dissociated polysomes are inhibited at the initiation state, how the polysomes get reassembled and how specific transcripts are selectively translated in I/R resistant neurons is unknown and is a topic addressed by this thesis research.

Ribosomal sequestration and TA

Further investigations into the cause of prolonged TA discovered that brain I/R injury causes ribosomes sequestration into cytoplasmic complexes, which prevents translation[69]. Both mRNA and translation machinery can be sequestered into cytoplasmic inclusions, and both conditions will lead to TA. The particles can be viewed under light microscopy and studied by

fluorescence immunohistochemistry. Two general classes of particles have been identified in reperfused neurons: (i) structures related to protein ubiquitination and (ii) structures related to mRNA metabolism[70].

Particles containing ubiquitin include ubiquitinated protein clusters and protein aggregates (PA)[69], both of which accumulate during I/R and explain the robust heat shock response. Ubiquitin is a small highly conserved regulatory protein which marks protein for degradation or proteolysis by proteasome system[69]. These particles are aggregates of denatured proteins whose rate of production exceeds their rate of degradation during pathologic condition. Ubiquitinated protein clusters are present in all post ischemic neurons and are relatively large (2~5um), while PAs are only present in ischemic vulnerable CA1 neurons and are smaller (50~200nm)[69,71]. PAs sequester ribosomal subunits, initiation factors, and co-translational chaperones in reperfused neurons[72]. However, only 20% of ribosomal subunits are held in PAs and cannot fully explain the persistent TA in CA1 neurons[70].

Around a dozen particles have been identified in mRNA regulation. I will first generally describe mRNA regulatory complexes and then discuss the role they play in reperfused neurons[70]. The general study of mRNA regulation is termed “ribonomics”.

Ribonomics operon model

Ribonomics is the study of mRNA regulation. It is well known that mRNA is transcribed and processed in the nucleus, and it is transported out of the nucleus to be translated on polyribosomes. From synthesis to degradation, mRNA is bound to a variety of different messenger ribonucleoprotein particles (mRNPs). The function of the mRNPs includes biogenesis, transportation, silencing, translation and degradation of mRNAs[73, 74]. mRNPs are collections of mRNA and protein, which regulate the bound mRNA. Many mRNPs have been identified including heterogeneous nuclear ribonucleoprotein complexes (hnRNPs), polysomes,

RNA granules, stress granules, RNA-inducing silencing complex (RISC), processing bodies, and etc[70]. Thus it is not surprising that the mRNA set in a cell does not correlate with the protein set in a cell[75]. Regulation of mRNA stability and expression depends both on the various structure elements on the mRNA and the different mRNA binding proteins.

Structure of mRNA

A fully processed eukaryotic mRNA typically contains a 5' cap, 5' untranslated region (UTR), coding sequence, 3' UTR, and a poly-A tail.

The 5' 7-methylguanosine cap is found at the 5' end of mRNA, and it is connected to the mRNA via a 5' to 5' triphosphate linkage. This 7-methylguanalyte cap provides the mRNA resistance to 5' exonucleases. It is recognized by eIF4E, which together with eIF4G and eIF4A, functions at positioning the ribosome at the start codon of the mRNA[76].

The 5'UTR is a non-coding region with variable length of nucleotides and contains regulatory elements that play important roles in mRNA regulation[77]. The most famous is the internal ribosomal entry sites (IRES) in the 5'UTR, which mediates cap-independent translation initiation[78]. The IRES sequence is identified in many key regulatory genes such as c-myc, BIP, eIF4G, whose protein products play important roles in processes during which cap-dependent translation is silenced or reduced, such as in viral infection[79] in mitotic cycle[80] and in DNA damage genotoxic stress[81]. Many transcripts that contain IRES sequence can also be translated via the cap-dependent manner, thus IRES provide a switch that allow selective expression of essential protein in cell crisis[77]. Small structural elements in the 5'UTR are also involved in mRNA regulation, and the best studied example is the iron response element (IRE), which is essential in iron homeostasis, and mutation of which has been implicated in human disease[77]. Long 5'UTR can form secondary structure, which can affect cap-dependent translation. The size, stability and position relative to the 5' cap of the secondary structure determine the extent

of the effect. Many mRNAs containing highly structured 5'UTRs are involved in growth control and are in general translational suppression[77].

The 3'UTR follows termination codon and is also involved in mRNA regulation. Adenine Uridine-rich elements (AREs) are regions with frequent adenine and uridine bases in the 3' UTR in mRNA. They are commonly divided into five groups based on the number of motifs in the ARE[82]. AREs are closely associated with mRNA degradation and stability[82]. ARE containing mRNAs are short lived, and the ARE is considered a potent mRNA destabilizing factor[83]. Those mRNAs containing the ARE element include proto-oncogenes (*c-fos*), cytokines, and transcription factors[83]. ARE-binding proteins bind to the ARE region and regulates mRNA stability, for example, HuR, and this will be further discussed below.

Most mRNAs in eukaryotic cells contain a 3' poly (A) tail. Poly (A) tails are bound with the poly A- binding protein (PABP), which protects mRNAs from ribonuclease degradation[84]. The poly (A) tail also acts with the 5' cap to increase translation initiation efficiency by forming a closed loop structure through the interaction between PABP and eIF4G subunit of eIF4F[85]. However, not all poly (A) tails are created equal. Alternative polyadenylation results in 3'UTR of different length, and it is associated with different stages of cell proliferation and transformation[86]. Deadenylation of mRNA is the common first step in mRNA degradation and is also a way to store mRNA in a stable and translation silenced manner, which occurs during embryogenesis[86,87].

mRNA binding proteins (RBPs)

Cell function depends heavily on the ability to regulate mRNAs and coordinate between transcriptional and posttranscriptional events. RBPs are at the core of posttranscriptional control, and they regulate the function and fate of their target mRNAs. RBPs are involved in both nuclear and cytoplasmic RNA processing. They regulate exportation, localization, translation

and stability of target mRNAs. RBPs contain RNA binding domain and interact with mRNAs cis-acting sequences. These cis-acting regulatory RNA elements can be found in any region along the mRNA molecule, frequently the 5'UTR and 3'UTR. Genome wide in-situ hybridization in developing mouse brain reveals that some RBPs are expressed in a neuron specific pattern, and most RBPs are expressed in a region specific pattern, suggesting their important regulatory role[88].

Mutation in RBPs have been implicated in many neurological diseases such as Fragile X syndrome, spinal muscular atrophy, paraneoplastic neurological syndromes, myotonic dystrophy, Fragile X tremor ataxia syndrome, and etc[89]. For example, Fragile X syndrome is caused by the absence of RNA binding by fragile X mental retardation (FMR) protein, and the polysome-bound mRNA population is changed drastically in fragile X cells compared with control cells[90]. Nova protein, is essential for neuronal viability and regulates mRNA flow, and is targeted in paraneoplastic opsoclonus myoclonus ataxia (POMA), an autoimmune neurologic disease[91].

Eukaryotic mRNA operon or regulon view

Increasing evidence indicates that many RBPs associate with many mRNA targets[92] in a combinatorial fashion. This property has led to the mRNA operon model, proposed by Jack Keene's group, where it is suggested that RBPs regulate mRNA as subpopulations analogous to DNA operons in prokaryotic cells[92]. Prokaryotic organisms cluster genes into operons, which are under the influence of a single regulatory signal, thus allowing efficient and coordinate production of functionally linked genes in groups[93]. In the mRNA operon model, eukaryotic monocistronic mRNAs are clustered into the functional equivalent of prokaryotic operons by binding to RBPs via common sequence. Any given mRNA can also bind with other different RBPs, thus combinatorial regulation can occur in response to different stimuli, providing a flexibility and coordination analogous to prokaryotic operons (Figure 7)[92,94].

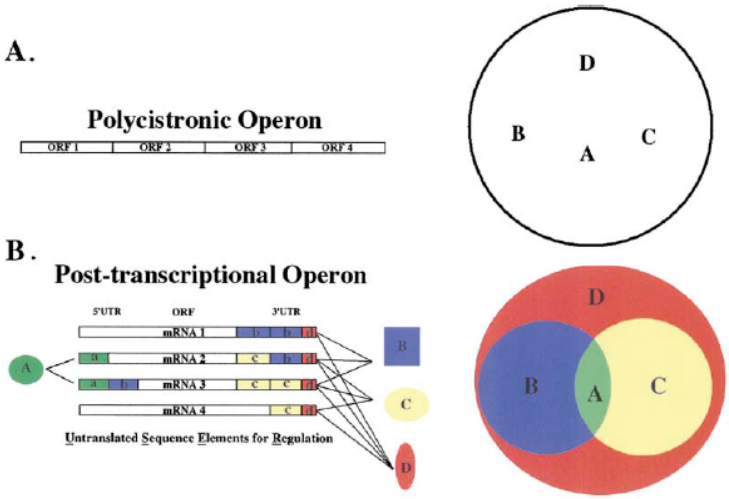

Figure 7. Diagrammatic representation of combinatorial organization of mRNA subpopulations in eukaryotic ribonucleoproteins. A, prokaryotic polycistronic mRNA with four open reading frame; B, eukaryotic monocystronic mRNA containing combinatorial untranslated sequence elements for regulation (USER), adopted from Keene, 2002[92].

Both ribonucleoprotein-immunoprecipitation (RIP) and UV crosslinking and immunoprecipitation (CLIP), followed by microarray analysis of bound mRNAs, revealed that different RBP bind to distinct subsets of mRNA in yeast, fruit fly and mammalian cells[74,95,96] and these target mRNA subsets are functionally related[96-98]. Further, mRNAs from different functional classes have distinct turnover rates[99,100]. Transcription factor mRNAs have increased decay rates, while mRNAs for biosynthetic proteins have decreased decay rates[100,101]. Even more, the stability or half-life of distinct mRNA subsets changes in coordination upon cell stimulus[101,102].

Normal neuronal development and organization requires coordination of RBPs and mRNA, thus it is highly likely that the neurons exhibit operon control. I will now discuss two well-studied mRNPs: stress granules and HuR granules that have been shown in Dr. DeGracia's lab to play a role during I/R injury.

Stress granules

Stress granules (SGs) are rapidly induced cytosolic structures into which mRNAs are sorted in mammalian cells in response to environmental stress (such as heat, UV irradiation, hypoxia)[103]. SGs can be observed under fluorescence microscopy as small (< 1 μm), circular

cytoplasmic foci with colocalization of poly (A) mRNA and mRNA binding protein T cell internal antigen (TIA-1) and TIA-1 related protein (TIAR)[103]. SGs function as triage centers to route untranslated mRNA to other mRNA mRNPs.

Components of SGs include the stalled 48S preinitiation complexes, which include the 40S subunit with translation initiation factor eIF2, eIF3, eIF4E and eIF4G[104] whereas 60S subunit is absent[103]. It is estimated by *in situ* hybridization that approximately 50% of all poly (A) mRNA is sequestered in SGs during stress[105]. SGs sequester housekeeping mRNAs, but exclude mRNAs coding stress protein[105]. Thus SGs allow general suppression on translation of housekeeping genes, but foster selective translation of stress induced genes. In addition, SGs contain many RNA-binding proteins that regulate RNA function, including HuR, tristetraprolin (TTP), staufen, TIA-1, TIAR, PABP1, FMRP, and etc[73].

The assembly of SGs is in close relation to translation inhibition during stress. Phosphomimetic eIF2α mutant (a mutant that mimics phosphorylated eIF2α, which as mentioned above, prevents the assembly of 43S PIC and leads to translation arrest) is sufficient to induce SGs formation in unstressed cells, while nonphosphorylated eIF2α mutant prevents and alleviates SGs formation even in the arsenite treated stress cells[103]. TIA-1 plays important role in the assembly of SGs, as mutant TIA-1 which is incapable of binding RNA inhibits SGs formation[103]. Proteins enter and leave SGs all the time, with rates ranging from milliseconds to seconds[106]. The assembly of SGs, which is characterized as shuttling of TIA-1 and PABP, is in equilibrium with polysomes. The assembly is inhibited by drugs that stabilize polysomes (ementine, cycloheximide), and is promoted by drugs that destabilize polysomes (puromycin)[106].

Whether SGs is reversible or not correlates with the severity of stress and the fate of the stressed cells. SGs is reversible in DU145 cells subject to sub-lethal arsenite stress, but irreversible in cells under lethal stress[103].

SGs were evaluated in rat hippocampal formation in different global brain ischemia models, and the results were animal model-dependent. In the thoracic compression method of cardiac arrest model, after 10 min global ischemia, SGs formed at 10 min reperfusion, but were reversible and returned to control values by 90 min reperfusion in resistant neurons (CA3, DG, and hilus). However, SGs persisted in CA1 neurons, and the S6 (40S marker) was sequestered within SGs at 4 hr reperfusion[107]. Due to the fact that animals with cardiac arrest model have very poor survival rate, and that very few rats would survive further than 4 hr reperfusion, in order to look at further time points of reperfusion, 2VO/HT model was used as the model for global brain ischemia. But sequestration of 40S did not occur following global brain ischemia via 2VO/HT model, and thus SGs behavior was model-dependent and not a common denominator of persistent TA[33,108]. But in the 2VO/HT model, SGs did increase in number within 15 min reperfusion[70] and there is convergence of SGs and PA at 2 day reperfusion after 10 min global ischemia only in CA1, but not in CA3, which may contribute to the persistent TA in vulnerable neurons[108].

Hu granules and mRNA granules

Hu granules are also mRNA containing structures, and they appear during cell stress and differentiation[109]. HuR proteins are components of the Hu granules. HuR belongs to the Hu RNA binding protein family, which contains the ubiquitous HuR (also called HuA) and the neuronal specific HuB (also called Hel-N1), HuC, and HuD protein[110]. Hu proteins shuttle between nucleus and cytoplasm[111] and are implicated in many biological functions, including neuronal development, neuronal plasticity, memory, and stress response. The functions result from their ability to bind specific mRNAs.

HuR consists of two N-terminal RNA recognition motifs (RRM1-2), a hinge region, and a C-terminal RRM (RRM3), and in most cases binds to adenine and uridine rich element (ARE)

on the 3'UTR of mRNA, promoting mRNA stability[112]. HuR binds to the ARE sequence in the 3'UTR of mRNA in many early response genes[113,114]. Its expression is essential in progenitor cell survival in mice, and postnatal global deletion is lethal[115].

Besides increasing mRNA stability, HuR is also implicated in mRNA translation. HuR binding to the 3' ARE can increase recruitment of mRNA to polysomes, promoting translation initiation. Examples are the translation of cytochrome c[116] and p53[117]. HuR also binds to the 3' UTR of hypoxia-inducible factor 1 α (HIF1α) mRNA and promote its association with active polysomes and thus translation[118]. Facilitating the export of mRNA from nucleus to cytoplasm is another mechanism by which HuR is able to up-regulate certain protein translation, and examples include CD83, C/EBP β, and prothymosin α[110].

In reperfused neurons, mRNA granules were observed to form by 1 hr reperfusion as distinct granular structure. Visualized by fluorescence *in situ* hybridization (FISH) microscopy, mRNA granules were a rearrangement of the cytoplasmic poly (A) mRNAs[33]. The granules did not co-localize with TIA-1, S6 or TTP, indicating that mRNA granules are not SGs. However, colocalization of mRNA granules with antisera that detected all 4 forms of Hu proteins suggested they were forms of Hu granules. Using the 2VO/HT model, the reperfused hippocampus was observed out to 3 days after 10 min global brain ischemia. The mRNA granules formed by 1 hr reperfusion in CA1 and CA3 neurons, and they abated in CA3 neurons after 16 h reperfusion, but persisted in CA1 neurons out to 48 h reperfusion (Figure 8). *In vivo* protein synthesis measurements correlated with the mRNA granules, and thus mRNA granules offered a mechanism of prolonged TA in vulnerable neurons: mRNA is compartmentalized away from ribosomes.

More confirming, pretreatment with cycloheximide (CHX), a drug which prevents the release of deacylated tRNA from the elongating ribosome[119] freezing mRNA in place with the

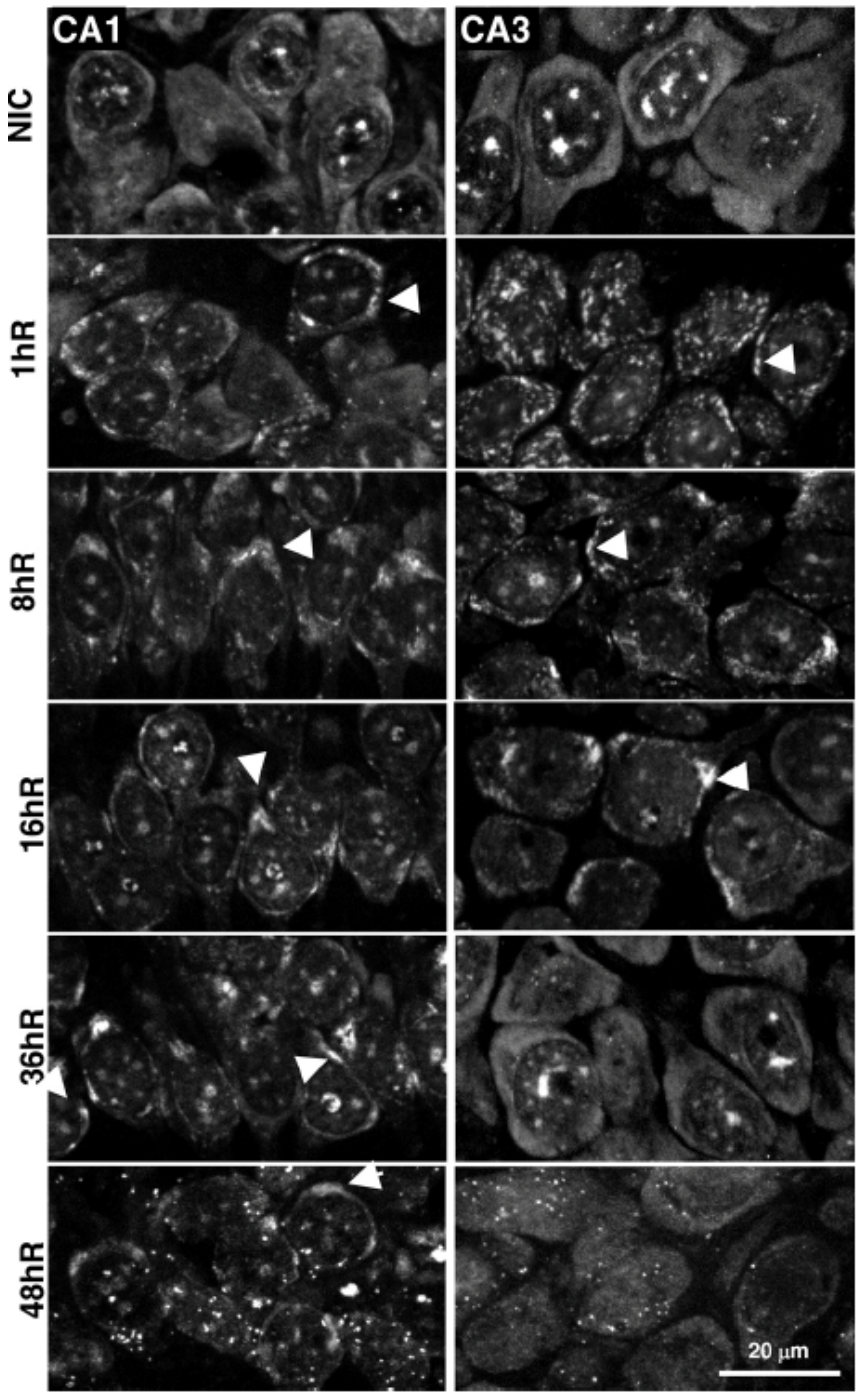

Figure 8. FISH microscopy picture showing mRNA granules (arrowheads) in CA1 and CA3 neurons in rat hippocampus after 10 min global brain ischemia and reperfusion time as indicated, adopted from Jamison, 2008[33].

polysomes, inhibited the formation of mRNA granules at 1 hr reperfusion, if given 15 min before induction of ischemia. However, CHX treatment at 15 min reperfusion, after polysomes had dissociated, had no effect on mRNA granule formation[120], supporting that mRNA from polysomes were required to form the mRNA granules.

In both CA1 and CA3 neurons, Hu proteins were observed to colocalize with mRNA granules. However, there is a delay of colocalization of Hu proteins and mRNA granules in CA1 neurons compared with CA3 for at least 35 hrs, and this colocalization correlated with HSP70 translation. Further characterization of the mRNA granules showed no colocalization with endoplasmic reticulum, cis- or trans-Golgi apparatus, mitochondria, microtubules, intermediate filaments and 60S ribosomal subunits[121]

Hu proteins and reperfused neurons

hsp70 mRNA contains ARE element in the 3' UTR[122]. Hu proteins bind ARE sequences and colocalize with mRNA granules which correlated with HSP70 translation in reperfused neurons[33]. This lead us to hypothesize that Hu proteins somehow promote the translation of HSP70 in reperfused neurons and thus provide protection in resistant neurons.

To address this issue, our lab studied Hu proteins in reperfused neurons[123]. We showed that Hu proteins bind to *hsp70* mRNA but do not regulate its nuclear export; nor is there a change in the levels specifically of Hu associated with polysomal fractions during reperfusion[123]. However, this latter observation does not rule out the possibility that Hu proteins may associate with different binding partners on polysomes during I/R, and is something we proposed below to directly test.

Translational state analysis, in which polysomes are isolated and the bound mRNAs identified by microarrays, of CA1 and CA3 after 10 min ischemia and 8 hr reperfusion indicated that CA1 and CA3 neurons were enriched in ARE-containing mRNA, suggesting potential ribonomic control[123]. In this analysis, it was observed that the most abundant mRNA on polysomes at 8 hr reperfusion in CA1 and CA3 was *hsp70* mRNA. In total, 30 ARE-containing mRNAs were bound to polysomes in CA1 and CA3 at 8 hr reperfusion, and represented 4.5% of all polysome-bound mRNAs compared to non-ischemic controls. In contrast, it is estimated that

2% of all mRNAs in the rat transcriptome contain ARE sequences[123]. Therefore, there was an overall enrichment of ARE-containing mRNAs at 8 hr reperfusion, compared to controls, and this, along with the fact that *hsp70* was the most abundant polysome-bound transcript, suggests that Hu protein regulation of selective translation occurs during I/R. Below I describe experiments to further understand the role of Hu proteins in selective translation during brain I/R.

Summary of background

I have reviewed different mechanism investigated in neuron I/R injury, and focused on correlation of prolonged TA with DND in ischemic vulnerable CA1 neurons. I reviewed posttranscriptional regulation related to TA after I/R injury, including initiation factor studies, selective stress gene expression, ribosomal sequestration, and studies of SGs and Hu granules (mRNA granules). I summarized the view of mRNA operon regulation. These discussions show that posttranscriptional control of mRNA flow is closely related to prolonged-TA in CA1 neurons. The mechanism to survive and resume protein translation in ischemic resistant CA3 cells after I/R injury compared with ischemic vulnerable CA1 cells may lie within the ability to coordinately regulate mRNA flow. However, many details are still unclear.

At present, the knowledge of translation regulation, based mainly on results from the 2VO/hypotension model of global brain I/R, is summarized in Figure 9. During ischemia, polysomes are kept intact because loss of ATP stops elongation. Within minutes of reperfusion, eIF2α is phosphorylated and this causes polysomes to disaggregate by preventing translation initiation. Breakdown of polysomes frees mRNA molecules, which cause formation of SGs within 10-15 min of reperfusion. SGs return to control levels by 90 min reperfusion[107], but by 1 hr reperfusion, mRNA granules form in the neurons[33]. In CA3, mRNA granules colocalize with Hu proteins and translate HSP70 protein and the mRNA granules disappear after 16 hr

reperfusion. In CA1, Hu proteins do not colocalize with the mRNA granules until 36 hr reperfusion. At this time the neurons are observed to translate HSP70[33]. The selective translation occurs early in reperfusion in CA3 and late in CA1. This time difference is thought to promote survival in CA3 and death in CA1. The directing force behind the accessibility of stress gene mRNAs to polysomes, and what is preventing Hu proteins from acting in CA1 neurons as they do in CA3 neurons needs to be further investigated and forms the subject of the following hypotheses.

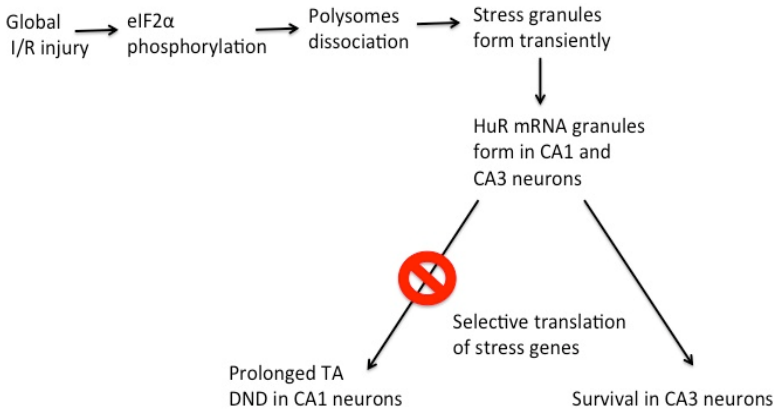

Figure 9. Summary of translation regulation in neurons after brain I/R.

Hypotheses

I therefore propose to investigate the following three hypotheses:

Hypothesis 1: mRNA regulatory complexes bound to polysomes will differ in CA1 and CA3 neurons at 8 hr reperfusion.

This hypothesis will be tested by performing mass spectrometry (MS) proteomics on polysome pellets from microdissected CA1 and CA3 at 8 hr of reperfusion to detect RBP complexes interacting with polysomes, providing clues to the regulation of translation at this time point.

Hypothesis 2: HuR binds to different mRNA binding proteins in CA1 and CA3 neurons at 8 hr of reperfusion.

This hypothesis will be tested by performing MS proteomics on co-precipitating proteins

from HuR immunoprecipitation (IP) to compare HuR binding partners between vulnerable CA1 and resistant CA3 to gain insight into the possible combinatorial interaction between RBPs.

Hypothesis 3: mRNAs bound to polysomes isolated after reperfusion will indicate ARE regulation of selectively translated mRNAs.

This hypothesis will be tested by running microarrays on mRNAs extracted from polysome pellets isolated from non-ischemic controls and 8 hr reperfused CA1 and CA3 dissections.

CHAPTER 2: INVESTIGATION OF POLYSOME PROTEOMICS AT 8 HOURS OF REPERFUSION

Hypothesis 1: mRNA regulatory complexes bound to polysomes will differ in CA1 and CA3 neurons at 8 hr reperfusion.

Rationale

At 8 hr reperfusion, global translation is still inhibited but selective translation of HSP70 is detected in CA3 but not CA1[33]. The posttranscriptional regulation of mRNA determines which mRNAs get access to the polysomes. In cultured human medulloblastoma cells, HuB (Hel-N1), a neuron specific form of Hu protein, co-purified with polysomes[109]. Therefore it is of interest to determine the proteins that co-purify with polysomes to look for clues to mRNA regulatory events. To study hypothesis 1, polysomes were purified by the sucrose pad method and assessed for the presence of RBPs by proteomics. Because this procedure was worked-up for the present studies, a number of pilot and control studies will also be described along with the main findings.

Experiment design overview

The overall design is shown in Figure 10. Aim 1 was tested using microdissected CA1 and CA3 neurons from nonischemic controls (NIC) and at 8 hr reperfusion after 10 min global brain ischemia (8R), using n = 15 animals per experimental group. CA subregions from n = 5 animals were dissected and randomly pooled as one replicate for polysome pellet isolation, providing 3 pooled replicates per region per experimental group. Polysome pellets from each replicate were isolated using ultracentrifugation. The polysomal pellet was then resuspended, proteins extracted, and subject to either iTRAQ or LC-MS proteomics.

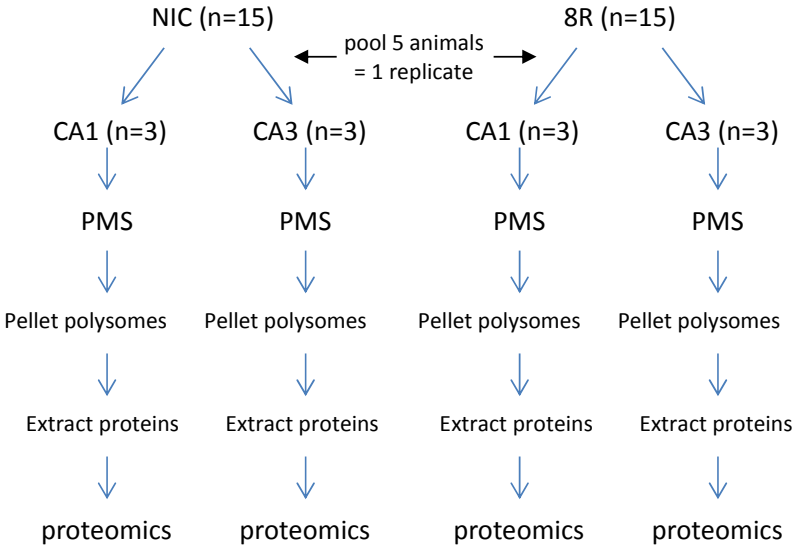

Figure 10. Experimental design for Aim 1 proteomics of polysomes in CA1 and CA3 neurons from NIC and 8hR animals.

The choice of the total number of animals and the number to be pooled per experimental group was based on the need to constitute 350 µl of PMS to be loaded on the pad with the homogenization ratio unchanged. Five pooled CA1 or CA3 were required to generate PMS of that much volume.

Materials and methods

Materials

Antisera for PABP (ab21060), pyruvate dehydrogenase (ab110330), COX IV (ab16056), and cytochrome C (ab13575) were purchased from Abcam (Cambridge, MA, USA). Antisera for S6 (2217 cell signaling) was purchased from cell signaling technology (Beverly, MA, USA). Antiserum for ribosome P antigen (RPA) (HPO-0100) was purchased from ImmunoVision (Springdale, AR, USA). Antiserum for PDI (MA3-019) was purchased from Thermo Scientific (Rockford, IL, USA). Antiserum for NeuN (MAB377) was purchased from Merk Millipore (Billerica, MA, USA). SYBR® Gold Nucleic Acid Gel Stain was purchased from Life technologies (Carlsbad, CA, USA). HSP-70 (SPA-812) antiserum was purchased from Enzo Life Sciences (Farmingdale, NY, USA). RNase inhibitor (AM 2684), TRIzol® Reagent (15596-

018), and RNaseZap® RNase Decontamination WipesZapwipe (AM9786) were purchased from Life technology (Carlsbad, CA, USA). iTRAQ® kit (4390811) was purchased from AB Siex (Framingham, MA, USA). Protease inhibitor cocktail (P8340) and Diethyl pyrocarbonate (DEPC) (40718) was purchased from Sigma Aldrich (St. Louis, MO, USA). All other chemicals were reagent grade. Mass spectrometry related chemicals were MS grade.

Animals

All animal experimental protocols were approved by the Wayne State University Animal Investigation Committee and were conducted following the Guide for the Care and Use of Laboratory Animals (National research Council, revised 2011). All efforts were made to reduce animal suffering and minimize the total number of animal used. Male Long Evans rats are used in this study. I am approved to perform the rat surgery under Protocol # A01-03-12, with Dr. DeGracia as PI on this protocol.

Surgery: 2VO/HT Model

Global brain ischemia was induced in experimental group animals via the 2VO/HT model of of Smith et al[124]. Rats were induced with 5% halothane and anesthesia maintained at 2% halothane in 100% O_2 using nose cone throughout the duration of the surgery. Body temperature was monitored via rectal temperature probes. A homeostatic blanket was used to maintain rat body temperature (37 ± 0.5°C) based on the readings of the rectal probe. One catheter was introduced in the tail artery to measure mean arterial pressure (MAP) in real time. Both common carotid arteries were isolated and lassoed. One catheter was introduced in the right femoral artery. B efore the induction of ischemia, rats were first heparinized and 150 IU/kg heparin was administered via the right femoral artery. After 5 min of steady state period after heparin injection, blood was withdrawn from the right femoral artery into a 10 ml syringe to produce a MAP of 50 mm Hg, and both isolated common carotid arteries were clamped using

microanueysm clips. MAP was maintained at 50 mm Hg in the ischemic period of 10 min by either withdrawing or infusing blood through the right femoral artery. For a rat of 350 g, it took 8 to 10 ml of blood on average. At the end of 10 min ischemia, the clips on the common carotids were released, and blood was infused back to the rat at a rate of 5 ml/min. All wounds were sutured and halothane was discontinued. Temperature control was maintained for 1 hr following surgery. All post surgical animals were housed in a 12 hr light/dark cycle, and food and water access was provided in the reperfusion period. At 8 hr of reperfusion rats were sacrificed and the brain was dissected. Tissue processing and brain dissection is further described below.

Microdissection of CA1, CA3 and forebrain

RNAse contamination was minimized in all procedures by the following steps: consumables were RNAse-free and containers and surfaces were treated with RNase Zap (Invitrogen, Carlsbad, CA) then rinsed 5 times with DEPC-H_2O. All solutions were prepared with DEPC-H_2O. Procedures were performed under a laminar flow hood whenever possible. Masks and gloves were worn in all the procedures.

Experimental and control animals were anesthetized with 5% halothane, decapitated, and the brains quickly dissected with a rongeur. The whole brain was quickly rinsed in DEPC-H_2O and snap frozen in dry ice-ethanol bath for 10 seconds. Brains were then put in a brain blocker and allowed to thaw for five seconds. A coronal section of the brain was taken at -2.44 mm to -4.78 mm posterior to Bregma[125,126]. The slice was then snap frozen again in dry ice-ethanol bath for about 5 seconds. Hippocampal CA1 and CA3 were dissected on a dissecting stage under a dissecting microscope from the semi-frozen coronal slice. The slice was maintained at a semifrozen state by application of dry ice to the dissecting stage.

The CA3 region was separated by a vertical cut slightly medial to the curve of the CA3. The CA3 region was then isolated following its natural demarcation between hippocampus,

corpus callosum and cortex. The CA1 region was separated by a horizontal cut just above the dentate gyrus and isolated following its natural demarcation. For a single rat, bilateral dissection of CA1 and CA3 gave ~20 mg total wet wt. The dissected CA1 and CA3 subregions were weighed in RNAse-free Eppendorf tubes and immediately frozen in dry ice-ethanol bath. Cerebral cortex (CTX) was taken from the rostral tissue of the slice. All tissues were stored at -80 °C until used for further processing.

Validation of reperfusion by Western blot

All reperfused animals were validated for translation of HSP70 in the CTX samples isolated during brain dissection. CTX was homogenized at 1:10 (w/v) in cold buffer containing 50 mM HEPES, pH 7.4, 150 mM NaCl, 1 mM EDTA, 25 mM DTT, 1% (v/v) Triton X-100, 10% (v/v) glycerol, 5.2 µl/ml protease inhibitor cocktail (Sigma). Nuclei and mitochondria were pelleted by 9000 g centrifugation for 15 min at 4 °C to generate post-mitochondrial supernatant (PMS). Protein concentration was determined by Lowry assay. 50 µg of samples were loaded onto each lane on 10% SDS-PAGE gels, and electrophoresis was run at 25 mA/gel at constant current. The gel was then transferred to nitrocellulose at a constant current of 100 mA overnight.

Western blot condition were as follow: rabbit anti-HSP70 (SPA-812), 1:1000, 1hr, room temperature; horseradish peroxidase linked donkey anti-rabbit (NA934), 1:15,000, 45 min, room temperature. Antibodies were incubated in Tris buffered saline with 2% Tween-20 (TTBS).

Polysomes pellets

All procedures were performed on ice and the measures described above were taken to prevent RNAse contamination. Microdissected samples from 5 animals were pooled as one replicate and hand homogenized in a glass dounce at 1:8.5 (w/v) in cold homogenization buffer of 340 mM sucrose, 50 mM Tris, pH 7.4, 25mM NaCl, 5mM $MgCl_2$, 300mM cycloheximide, 1mM DTT, 5.2 µl/ml protease inhibitor cocktail (Sigma), and 80U/ml RNase inhibitor

(Invitrogen). The glass dounce has a 150 μm clearance and to prevent nuclear rupture, only the A pestle was used. Nuclei and mitochondria were pelleted by 9000 g centrifugation for 15 min at 4 °C to generate PMS. PMS was adjusted to have 1% final concentration of NP-40. In a Beckman 800 μl ultracentrifuge tube, 350 μl of adjusted PMS was loaded carefully onto a 350 μl sucrose pad containing 20% w/v sucrose, 50 mM Tris, pH 7.4, 25 mM NaCl, 5 mM $MgCl_2$, 300 mM CHX, 1 mM DTT, 5.2 μl/ml protease inhibitor cocktail (Sigma), and 80 U/ml RNase inhibitor (Invitrogen). The tubes were loaded in the SW55 rackets with adapters and centrifuged at 29,400 rpm for 1.5 hr at 4 °C (Beckman SW55 rotor). After ultracentrifugation, the supernatant was carefully taken out by glass Pasteur pipets and discarded. The pellet was either resuspended overnight for WB or agarose gel confirmation or further processed for MS proteomics as described below.

Validation of polysomes pellet by Western blot

To validate the polysomes pellet protocol, aliquot of crude homogenate (50 μg), post-mitochondrial supernatant (5 μg), liquid above the pad (5 μg), and the resuspended polysomes pellet (5 μg) were run per lane on 10% SDS-PAGE gels, electroblot transferred to nitrocellulose. Protein concentration was determined by Lowry assay. Nitrocellulose was stained for ribosomal markers: anti-ribosomal P antigen (1/300 in 5% milk, overnight at 4 °C), anti-S6 (1/1000 in 5% milk, overnight at 4 °C), anti-HuR (1/200 w/o block, 1 hr, room temperature) and anti-PABP (1ug/ml w/o block, overnight at 4 °C). Nitrocellulose was also stained for organelle markers: anti-NeuN (1/1000 in 5% milk, overnight at 4 °C), anti-PDI (1/1000 in 2% milk, overnight at 4 °C), anti-pyruvate dehydrogenase (1/1000 w/o block, overnight at 4 °C), anti-cytochrome C (1/1000 w/o block, overnight at 4 °C), and anti-COX IV (1/1000 in 5% milk, overnight at 4 °C). The nitrocellulose was stripped between antibody staining.

iTRAQ and LC-MS proteomics

Mass spectrometry (MS) proteomics using the isobaric tag for relative and absolute quantitation (iTRAQ) method was used to analyze polysomes pellets. Polysomes pellets were resuspended in 100 mM triethylammonium bicarbonate (TEAB), protein concentration measured with Bradford assay, reduced with tris (2-carboxyethyl)phosphine (TCEP), cysteines blocked with methyl methanethioulfonate (MMTS) and then trypsin digested at 37 °C overnight[127,128]. To quantitatively compare protein abundance in different samples, tryptic digests from 20 μg of polysomes pellet were labeled with iTRAQ reagents[129]. iTRAQ proteomics does not require gel electrophoresis and allows detection and quantification of 8 samples simultaneously. One fourth of the labeled tryptic digest were mixed and subjected to the first iTRAQ analysis using LC-MS/MS with parameters as described above. The rest were mixed and subjected to the second iTRAQ analysis. For the second iTRAQ analysis, the iTRAQ-labeled peptide mixture was fractionated on SCX MicroSpin columns with sequential elution in 5 salt steps. Salt fractions were analyzed by LC-MS/MS. Finally, on the third attempt, the unlabeled tryptic digest of polysomes pellet was fractionated on SCX MicroSpin columns individually with sequential elution in 5 salt steps. Salt fractions were analyzed as the first two iTRAQ analysis by LC-MS/MS in the reversed-phase C18 chromatography coupled to tandem mass spectrometry using an Ultimate nano-LC system and a QSTAR XL mass spectrometer. Reverse-phase chromatography is performed using a PepMap100 C18 analytical column (flow rate = 150 nl/min). The QSTAR XL is operated in acquisition mode with 1s MS scans (400–1600 m/z) followed by 4s product ion scans (100–1580 m/z). QSTAR raw files are processed in MASCOT Distiller v2.3 and searched in Mascot against NCBI and SWISS-Prot databases.

Gene ontology analysis

Gene ontology (GO) analysis was performed in the Cytoscape plug-in ClueGo[130]. This

software allows the user to test GO using the Gene Ontology Consortium, Kyoto Encyclopedia of Genes and Genomes (KEGG) and Reactome databases simultaneously. For testing of proteomics, the Gene Ontology Consortium category of "cellular component" only was used. Statistical test was for hypergeometric sorting to the right, which represents enrichment of proteins in a category, and Bonferroni step-down correction of p values (the default settings). Number of genes per category was set to 10, and percent of genes in category compared to total number of genes in a category was set to 10%, to identify a category as statistically significant. For a given term accepted as statistically significant, the corrected p value was generally less than 10^{-7}.

Results

Pilot studies and workup of polysome pellet procedure in cerebral cortex

I began these studies using the sucrose gradient method to isolate polysome-containing fractions. However, preliminary iTRAQ proteomics of the pooled polysomal fractions showed they contained only 4% in CA1 and 7% in CA3 of ribosomal subunit proteins (Table 1). For counting "ribosomal proteins", the 40S and 60S subunits, cotranslational chaperones, and ribosome-associated ubiquitination proteins were used.

Table 1. Several pilot studies of ribosomal protein proteomics.

Method	REGION	total proteins	# RPs	% RPs
suc grad	CA1	192	7	4%
suc grad	CA3	173	12	7%
suc pad	Cortex - 6/14/13	69	41	59%
suc pad	CA1 - 7/26/13	171	38	22%
suc pad	CA3 - 7/26/13	163	29	18%
suc pad	CA1 - 8/22/13	153	46	30%
suc pad	CA3 - 8/22/13	136	38	28%
suc pad	Cortex 9/15/13	153	57	37%

Rows 1 and 2 used sucrose gradient method on CA1 and CA3 dissections. The remaining columns used sucrose pad method to isolate pp and tested either cortex or CA1 and CA3 dissections. RP = ribosomal proteins. Protein lists for each row are in Appendix 1.

Since the aim was to study polysome-associated proteins, a better method of concentrating polysomes was needed. I found high-speed centrifugation to obtain polysome pellets gave more concentrated polysomes. Below is preliminary data that polysome pellets: (1) contain ribosomal proteins by Western blot, (2) contains rRNAs by agarose electrophoresis, (3) were not contaminated by organelles protein determined by Western blots, and (4) consisted of ~30% ribosomal proteins by proteomics.

For first pilot studies I used cerebral cortex from NIC animals since it provided abundant wet weight of tissue as input material. Figure 11 shows in two separate purifications that the polysomal pellet (pp) from the sucrose pad is enriched in ribosomal proteins by Western blot, including poly (A) binding protein (PABP), 60S protein ribosome P antigen (RPA), 40S protein S6. The Hu proteins also came down in the cortical pp (Figure 11).

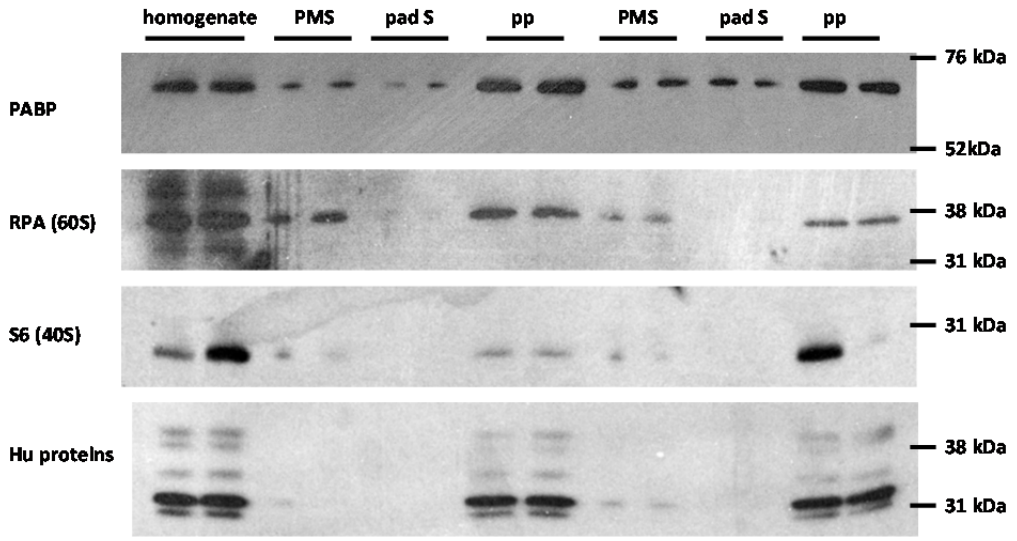

Figure 11. WB for ribosomal protein from pilot studies of cerebral cortex: S6 (40S subunit marker), RPA (60S subunit marker) and PABP. Ribosomal protein is enriched in the resuspended polysomes pellet.

In addition to ribosome proteins, Western blots were run for organelle markers to detect for organelle contamination (Figure 12), including protein disulfide isomerase (PDI) for endoplasmic reticulum (ER) and NeuN (Fox-3) for nucleus. Since mitochondrial contamination

was a main worry, three markers were tested: mitochondrial pyruvate dehydrogenase, cytochrome oxidase subunit IV, and cytochrome C. As seen in Figure 12, the organelle markers were not detected in Western blots of pp from cerebral cortex.

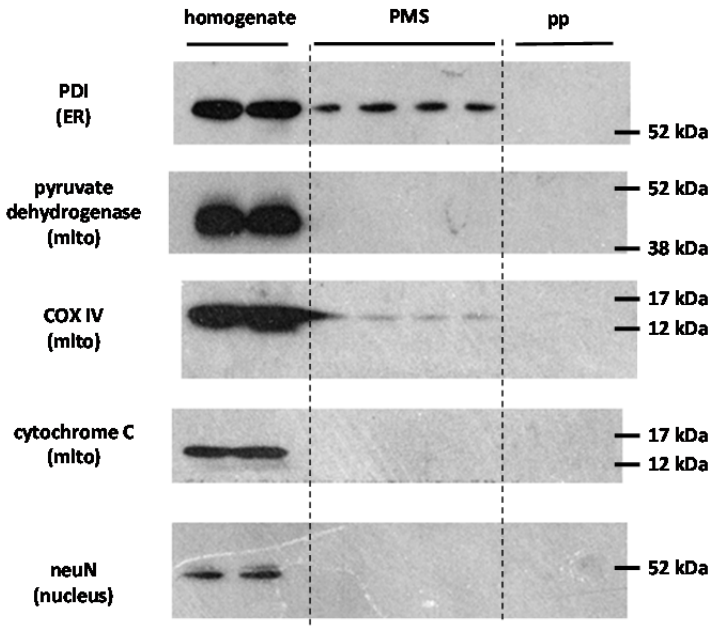

Figure 12: Western blot tests for organelle contamination in polysome pellets pilot studies from cerebral cortex.

To further demonstrate that the pellet contained polysomes, RNA was TRIzol extracted from the resuspended pellet from cortex of NIC animals, and ran on non-denaturing agarose gel (Figure **13**). The two prominent 18S and 28S bands shows that the pellet has a major component of rRNA, and the background smear of mRNA in the lanes shows the pellet enriches polysomes.

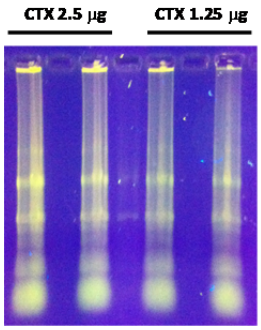

Figure 13: RNA TRIzol extracted from NIC cortical pp.

The cortical polysome pellet was subjected to MS analysis (Table 1, cortex 6/14/13 row). Sixty-nine proteins were detected by MS, of which 41 (59%) were ribosomal proteins, a large

improvement compared with the sucrose gradient method. Complete lists of proteins detected in all pilot studies summarized in Table 1 are included in Appendix 1.

Scaling down polysome pellet procedure for CA subregions

Having validated polysome pellets from cerebral cortex, I was required to scale down the procedure for lesser weight of input material of CA subregions (~100 mg total wet weight of input tissue). This required switching from the Beckman SW41 rotor to the SW55 rotor and from 10 ml tubes to 800 µl tubes using tube adaptors. The ultracentrifuge time was also adjusted based on keeping the k factor constant. With this scaled down protocol, RNA using resuspended pellet from CA subregions showed the prominent 18S and 28S bands (Figure 14).

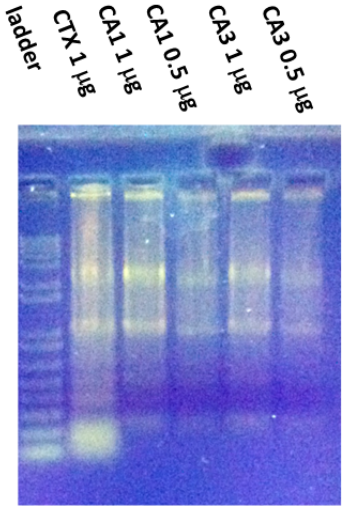

Figure 14. Non-denaturing RNA agarose gel stained by SYBR gold, showing the prominent 18S and 28S rRNA bands. The input is the resuspended polysomes pellet from the CA subregions based on RNA concentrations determined from A_{260} readings.

Given the small amount of obtained polysome pellets (~10 µg per resuspended pellet), Western blot validation was not performed on CA1 and CA3 polysome pellet isolations. Instead, a series of pellets from CA subregions were analyzed by MS proteomics to determine ribosomal enrichment (Table 1). The first test gave 22% and 18% ribosomal proteins (RP) for CA1 and CA3, respectively. Adjusting centrifugation run time and speed to account for the smaller tube radii, led to an increase of 30% and 28% of RP isolated from CA1 and CA3, respectively. With

the scaled down method, a last test of cerebral cortex gave 37% RP. Again, the complete lists of proteins detected in all pilot studies summarized in Table 1 are included in Appendix 1.

Therefore I concluded the scaled down procedure required for isolating polysome pellets from CA1 and CA3 produced results comparable to cerebral cortex and allowed assessing polysome pellets proteomics between CA1 and CA3 after brain I/R.

iTRAQ polysome proteomics after brain ischemia and reperfusion

After obtaining confidence in the scaled down sucrose pad procedure for isolating polysome pellets, polysome pellets were isolated from experimental groups as shown in Figure 10.

The first experiment on the isolated polysome pellets performed iTRAQ proteomics. Because of the number of samples, two 8-plex iTRAQ labelings were required (groups A and B). The first labeling detected 31% of proteins as RPs in group A, and detected 37% RPs in group B. In spite of the high percent of RPs, iTRAQ labeling did not detect any mRNA binding proteins (RBPs).

Because the first iTRAQ run failed to detect any RBPs, the samples were subjected to additional strong cation exchange fractionation and the elutes were rerun through mass spec. The second run detected 25% RPs in both groups A and B, and in addition detected several RBPs (Table 2). hnRNP Q and PABP were detected in both groups. Group A also notably detected hnRNP D, also known as AUF1, an RBP that binds ARE-mRNAs and destabilizes them for degradation[131]. The complete list of the 2nd iTRAQ run of groups A and B is provided in Appendix 2. None of the proteins listed in Table 2 were quantified by iTRAQ and therefore it could not be determined in which samples the proteins appeared.

Table 2. RNA binding proteins detected in 2nd iTRAQ run following additional liquid chromato-graphy fractionation.

Group	ID	Name	Description
A	HNRPD_RAT	Heterogeneous nuclear ribonucleoprotein	AUF1; destabilizes ARE mRNAs
A	PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein	Regulation of mRNA stability
A	PRIO_RAT	Major prion protein	Prion protein; component of stress granules
A	**HNRPQ_RAT**	Heterogeneous nuclear ribonucleoprotein Q	Complex mRNA functions
A	**PABP1_RAT**	Polyadenylate-binding protein 1	Binds pA tail of mRNAs
B	FA98A_RAT	Protein FAM98A	Human form binds polyA mRNAs
B	HENMT_RAT	Small RNA 2'-O-methyltransferase	Modifies piRNAs
B	HNRPM_RAT	Heterogeneous nuclear ribonucleoprotein M	Pre-mRNA binding protein
B	PRC2A_RAT	Protein PRRC2A	Regulation of pre-mRNA splicing
B	**HNRPQ_RAT**	Heterogeneous nuclear ribonucleoprotein Q	Complex mRNA functions
B	**PABP1_RAT**	Polyadenylate-binding protein 1	Binds pA tail of mRNAs

Red fonts are RBPs detected in both groups A and B.

LC-MS of polysome pellet proteins

Given the serious limitations of the iTRAQ runs described above, the remaining individual samples of polysome pellet protein were subjected to LC-MS individually to determine the occurrence of RBPs by experimental group.

All of the remaining samples gave ms detections of proteins. The complete lists of the individual sample LC-MS runs are provided in Appendix 3. Counts of percent RPs are shown in Table 3. Percent of RPs ranged from 17.6% to 35.1%. When the percent of RBs per experimental group were tested by ANOVA, the p value = 0.11, indicating that the percent was not statistically different between groups. The overall average %RP for all experimental groups was 25% $\pm$ 4%.

Table 3. Counts of ribosomal proteins (RPs) in individual samples of polysome pellets from experimental groups as indicated.

Sample	RPs	total	Percent	AVE	Stdev
N12	79	449	17.6%		
N13	66	301	21.9%	21.3%	3.4%
N14	71	292	24.3%		
N31	42	177	23.7%		
N32	49	190	25.8%	28.2%	6.1%
N34	33	94	35.1%		
R11	39	166	23.5%		
R12	33	142	23.2%	22.8%	1.0%
R13	34	157	21.7%		
R31	34	133	25.6%		
R32	39	140	27.9%	28.0%	2.5%
R33	37	121	30.6%		

Table 4 shows the detection of RBPs by individual sample. No specific RBP was detected in all samples. However, two RBPs were highly represented across the samples. First was PAIRB_RAT, plasminogen activator inhibitor 1 RNA-binding protein, also known as SERBP1. SERBP1 is thought to regulate mRNA stability and has been shown to be a component of stress granules[132]. PAIRB_RAT was present in all NIC CA1 samples, and in two of the three 8R CA3 samples; this protein was also detected in the 2nd iTRAQ run (Table 2).

Table 4. Left: RBPs detected in individual samples of polysome pellet proteins following LC-MS. Right: Descriptions of detected RBPs.

Sample	Hu Proteins	RBP
N12		PAIRB_RAT
N13		CELF2_RAT, AGO2_RAT, PAIRB_RAT
N14	ELAV4_RAT	HNRH2_RAT, RBM20_RAT, PAIRB_RAT
N31		
N32	ELAV2_RAT	ROA2_RAT
N34	ELAV2_RAT	
R11		
R12	ELAV2_RAT	RBM43_RAT, HNRPD_RAT
R13		PARK7_RAT
R31		ROA2_RAT
R32	ELAV2_RAT	PAIRB_RAT, PRIO_RAT
R33		PAIRB_RAT, PRIO_RAT

ID	Description
AGO2_RAT	RNA-mediated gene silencing
CELF2_RAT	CUGBP Elav-like family member 2
ELAV2_RAT	HuB; neuron specific Hu form
ELAV4_RAT	HuD; neuron specific Hu form
HNRH2_RAT	Pre-mRNA processing
HNRPD_RAT	AUF-1
PAIRB_RAT	A: regulation of mRNA stability
PARK7_RAT	DJ-1, mRNA binding, peptidase
PRIO_RAT	Prion protein: dysfunctional mRNA complexes
RBM20_RAT	Nuclear mRNA splicing
RBM43_RAT	RNA binding protein
ROA2_RAT	Localized in cytoplasmic mRNP granules

The second RBP found in many samples was ELAV2_RAT, a neuronal specific Hu protein, HuB, also known as Hel-N1 (human) or Rel-N1 (rat), which has been extensively studied in Dr. Keene's lab at Duke University. HuB was present in all the groups except NIC CA1. In NIC CA1, the Hu protein HuD was detected in one sample. Several other mRNA binding proteins were detected including AUF1 (hnRNP D), DJ-1, and prion protein. DJ-1[133,134] and prion[135] have both been implicated in dysfunctional mRNA binding in neurological disorders.

Background contaminants of polysome pellet preparations

Above I showed that Western blot for organelle markers indicated that ER, nucleus and mitochondria did not contaminate the polysome pellets obtains from the sucrose pad method (Figure 12). However, as seen in Table 3, 75% of proteins detected by LC-MS were not classified as ribosomal proteins. I performed gene ontology (GO) analysis to classify the background hits. Using the software ClueGo I performed GO using the "cellular component" category.

Representative NIC and 8R samples are shown in Figure 15. There are several cell component categories, but they are reduced to a few broad categories. These are: neuronal debris (growth cone, axonal growth cone, myelin sheath, neuronal projection, etc.), cytoskeleton (microtubule plus end, microtubule, cortical cytoskeleton, and etc.), internal membrane systems and plasma membranes of the cell (melanosome, clathrin-coated vesicle, perikaryon, membrane coat), and cytoplasmic contaminants.

None of the markers used to work up the sucrose pad procedure tested for these possible contaminants. Therefore, it is concluded that, even though accepted methods to determine purity of the polysome pellets was used, the proteomics revealed the full extent of sample contamination.

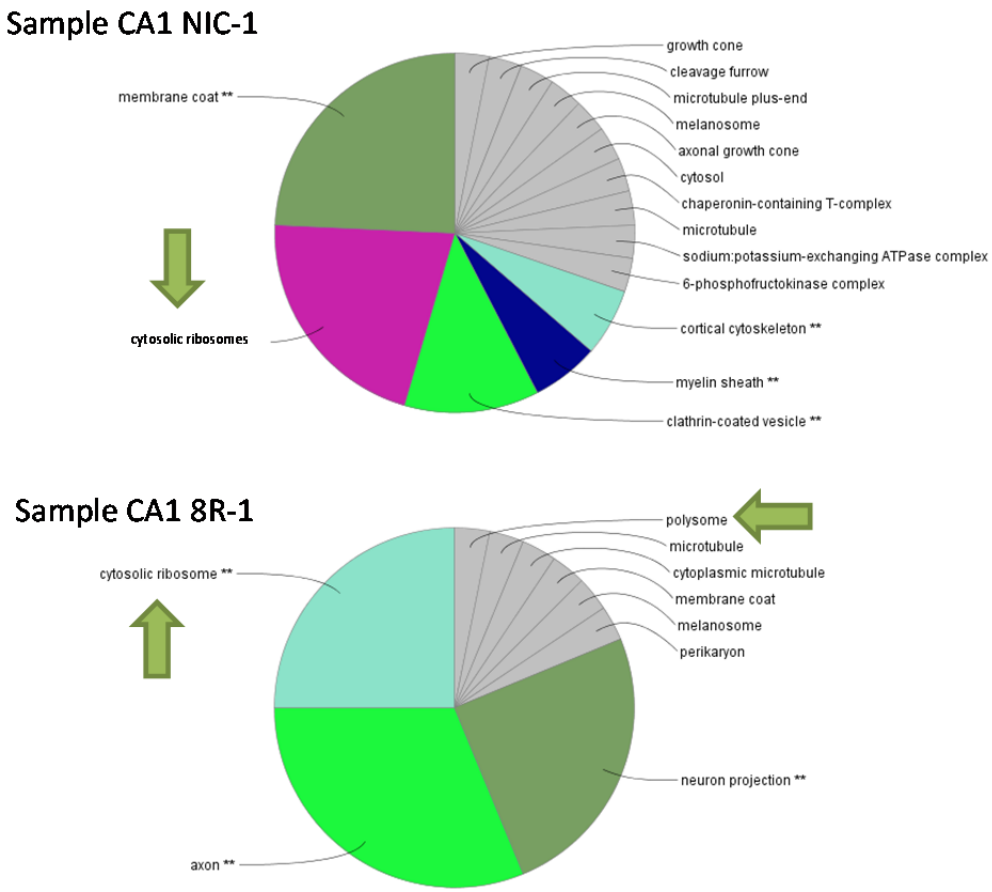

Figure 15. Gene ontology analysis using "cellular component" to classify hits of representative samples from NIC and 8R groups. Arrows point to ~ 25% of ribosomal proteins detected by LC-MS.

CHAPTER 3: INVESTIGATION OF HU IMMUNOPRECIPITATES AT 8 HOURS OF REPERFUSION

Hypothesis 2: Hu proteins bind with different mRNA binding proteins in CA1 and CA3 neurons at 8 hr of reperfusion.

Rationale

Hu proteins are mRNA binding protein with a sequence preference for ARE element[112] which is present in *hsp70* mRNA[122]. HuR RIP result showed that HuR binds with *hsp70* mRNA from I/R brain homogenates[121]. The colocalization of HuR with mRNA granules correlates with the translation of HSP70 protein[121] which is related with the survival of neurons. Given the combinatorial theory of mRNA regulation discussed in the Introduction, it is thus hypothesized that differences in HuR colocalization patterns at 8 hr reperfusion in CA1 and CA3 (Figure 16) is due to HuR binding different sets of proteins in each cell type. This was in correlation with whether the stress genes are translated. Hu binding proteins will be identified by immunoprecipitating Hu proteins, and identify co-precipitating proteins by MS proteomics.

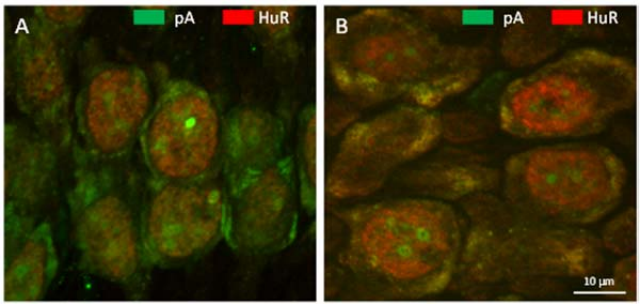

Figure 16. Hu proteins colocalize with mRNA in CA3 but not CA1 at 1 hr reperfusion[33].

Overall experiment design

The overall protocol for Aim 2 is outlined in Figure 17 and is similar to the design of Aim 1. Brain I/R was induced in male Long Evans rats utilizing the 2VO/HT model. Experimental groups were again 8R and NIC (n = 15 rats/experimental group). CA1 and CA3 were microdissected and pooled. Regions were homogenized and post-mitochondrial

supernatant (PMS) prepared under conditions to preserve mRNAs. Dynabeads (magnetic beads) covalently coupled with anti-HuR antiserum were used to immunoprecipitate Hu proteins under conditions that retain Hu protein-mRNA interactions[123,136]. The eluted protein complexes were subject to iTRAQ and LC-MS proteomics analysis. Dynabeads covalently coupled with anti-histone (an unrelated nuclear protein that should not be present in PMS), or lacking primary antibody, served as negative controls.

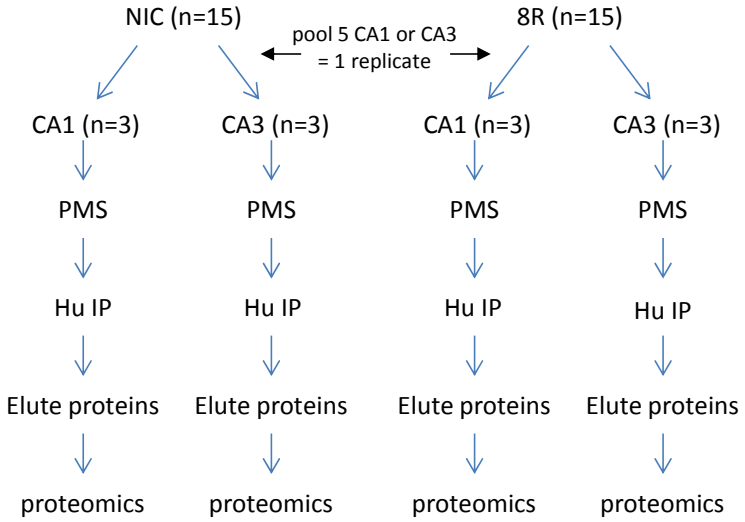

Figure 17. Experimental design for aim #2 proteomics for HuR RIP between NIC and 8hR animals.

Materials and methods

Materials

HuR (sc-5261), hnRNP M (sc-20001), hnRNP K (sc-25373) antisera were purchased from Santa Cruz Biotechnology, Inc. (Santa Cruz CA, USA). Histone (ab1791), hnRNP D (ab61193), anti-phospho-serine (ab1603) and anti-phospho-serine (ab6639) were purchased from Abcam (Cambridge, MA, USA). Anti-phospho-threonine (9381) was purchased from Cell signaling technology (Beverly, MA, USA). HSP-70 (SPA-812) antiserum was purchased from Enzo Life Sciences (Farmingdale, NY, USA). Dynabeads co-immunoprecipitation kit (14321D), SUPERase• In™ RNase Inhibitor (AM2694), RNase inhibitor (AM 2684), TRIzol® Reagent

(15596-018), and RNaseZap® RNase Decontamination WipesZapwipe (AM9786) was purchased from Life technology (Carlsbad, CA, USA). iTRAQ® kit (4390811) was purchased from AB Siex (Farmingham, MA, USA). PlusOne Silver staining kit (17-1150-01) was purchased from GE Healthcare Life Sciences (Pittsburgh, PA, USA). Protease inhibitor cocktail (P8340) and Diethyl pyrocarbonate/DEPC (40718) was purchased from Sigma Aldrich (St.Louis, MO, USA). All other chemicals were reagent grade. Mass spectrometry related chemicals were MS grade. Anti-mouse secondary antisera and mouse serum were purchased from Sigma Chemical Co. (St. Louis, MO, USA).

Surgery: 2VO/HT Model

The induction of ischemia and reperfusion are exactly as described in Methods of Chapter 2.

Microdissection of CA1, CA3 and forebrain

The microdissection of CA1 and CA3, and isolation of cerebral cortex are exactly as described in Methods of Chapter 2.

Validation of reperfusion by Western blot

The validation of the ischemia and reperfusion surgery by Western blot for HSP70 protein are exactly as described in Methods of Chapter 2.

Hu protein immunoprecipitation

To prevent downstream contamination of primary antibody with mass spectrometry, this protocol used dynabeads to be covalently bound to primary antibody. The dynabeads were prepared beforehand following manufacture protocol (Life technology). Dynabeads were coupled with mouse anti-HuR (sc5261) and mouse anti-histone (ab1791) antibody (negative control) at 5 μg antibody per mg dynabeads. According to manufacturer specifications sheet, anti-HuR (sc5261) detects all four forms of Hu proteins: HuA (most often called HuR), HuB

(Rel-N1), HuC and HuD. Therefore, I will refer to the specific antisera as "HuR" but refer to what it detects as "Hu proteins". Dynabeads with no antibody coupled, anti-histone antibody coupled (two negative control) and mouse serum coupled (negative control) were also prepared in the same manner as those with antibody coupled dynabeads. The beads were stored at 4 °C until use.

All procedures were performed on ice or in cold room, and measures were taken to prevent RNAse contamination as described above.

Microdissected CA1 and CA3 from n = 5 or 6 animals were pooled randomly to get one sample of around 100 mg weight. The samples were pooled separately from NIC and 8R groups and were homogenized at 9:1 v/w ratio (0.9 ml) with extraction buffer B in glass Kontes dounce tissue grinder with 127 μm clearance to preserve the nuclear membrane. To maximally preserve the ribonucleoprotein complex, extraction buffer B contained 1X IP buffer (from Life technology, Dynabeads co-IP kit), 200 mM NaCl, 2 mM $MgCl_2$, 1 mM DTT, 5.2 ul/ml protease inhibitor cocktail (Sigma, P8340), 80 U/ml Rnase I (Life technology, AM 2684), and 160U/ml Superase RnaseI (Life technology, AM 2694). Nucleus was pelleted by 2500 g centrifugation for 15 min, and the supernatant was then subjected to 25,000 g centrifugation for 25 min to pellet the mitochondria. Post-mitochondria supernatant (PMS) from each 100 mg starting tissue was used as input for one IP reaction. For each IP reaction, 1.5 mg of antibody coated dynabeads were used, and they were washed with extraction buffer B first and then incubated with the PMS for 10 min on rotator at 4 °C. The liquid was put on magnet for one min, and the supernatant was removed and discarded. For washes and elution of dynabeads, extraction buffer B was used. Following 3 times washes in extraction buffer B. First wash contained proteinase inhibitor cocktail, RNaseI and Superase RnaseI; the second and third did not. The fourth and final wash used LWB buffer (provided in kit) with 0.02% Tween 20. Ribonucleoprotein complex was then

eluted with 60 µl of EB buffer (provided in kit). Eluted proteins were then subjected to acetone precipitation. For one volume of eluted protein containing liquid, it was mixed with 6 volume of acetone chilled at -20 °C and incubated overnight at -20°C. The mixture was then centrifuged at 13,500 rpm for 10 min, and the precipitate was washed with cold acetone, air dried and stored at -80 °C before subjected to further preparation.

Hu protein immunoprecipitation and Western blot

For IP-Western blot confirmation after proteomics, eluted protein from each IP reaction was run per lane on 10% SDS-PAGE, electroblot transferred to nitrocellulose and Western blotted with HuR antiserum (1/200 in TTBS, 1 hr, room temperature), hnRNP K (1/100 in TTBS, 2 hr, room temperature), hnRNP M (1/250 in TTBS, 2 hr, room temperature), hnRNP D (1/250 in TTBS 2 hr, room temperature). Nitrocellulose was stripped between antibody stain at 55°C using strip solution of 100 mM 2-mercaptoethanol, 2% SDS, 62.5 mM Tris-HCl, pH 6.7.

iTRAQ and LC-MS/MS proteomics

Mass spectrometry (MS) proteomics using the iTRAQ method was used to analyze the Hu protein IP elutions. Protein samples were washed with cold acetone twice, air-dried, then resuspended in 100 mM triethylammonium bicarbonate (TEAB), protein concentration measured with Bradford assay, reduced with tris(2-carboxyethyl)phosphine (TCEP), cysteines blocked with methyl methanethiosulfonate (MMTS) and then trypsin digested at 37 °C overnight[127,128]. Bradford result suggested that total protein in each pellets ranged from 1.7 µg to 2.7 µg. The protein amount limited the number of fractions obtained from strong cation exchange (SCX). The tryptic digest of HuR IP elution was labeled with iTRAQ reagent. One third of the labeled digest from each sample was taken and mixed.

For liquid chromatography (LC)-MS/MS analysis, the iTRAQ-labeled peptide mixture were analyzed by reversed-phase C18 chromatography coupled to tandem mass spectrometry

using an Ultimate nano-LC system and a QSTAR XL mass spectrometer. The parameters of LC-MS/MS were set as described above in Chapter 2. The remaining two thirds of the labeled digest were not mixed and run individually in LC-MS/MS.

Gene ontology analysis

Gene ontology analysis was performed exactly as described in Methods of Chapter 2.

Results

Pilot studies to validate and optimize IP procedures

Hu IP using magnetic dynabeads was tested and confirmed with Western blot that no primary antibody eluted from the covalently linked dynabeads and this was tested in two buffer conditions: RIP buffer or the kit-supplied IP buffer. No heavy or light IgG chains at 55 and 25 kDa were observed (lanes "IP PMS" Figure 18A). In contrast, Hu protein IP using Protein A Sepharose beads showed elution of primary antibody, with the heavy and light chains seen at 55 and 25 kDa (Figure 18B). Therefore, using dynabeads eliminated contamination by IgG for subsequent proteomics.

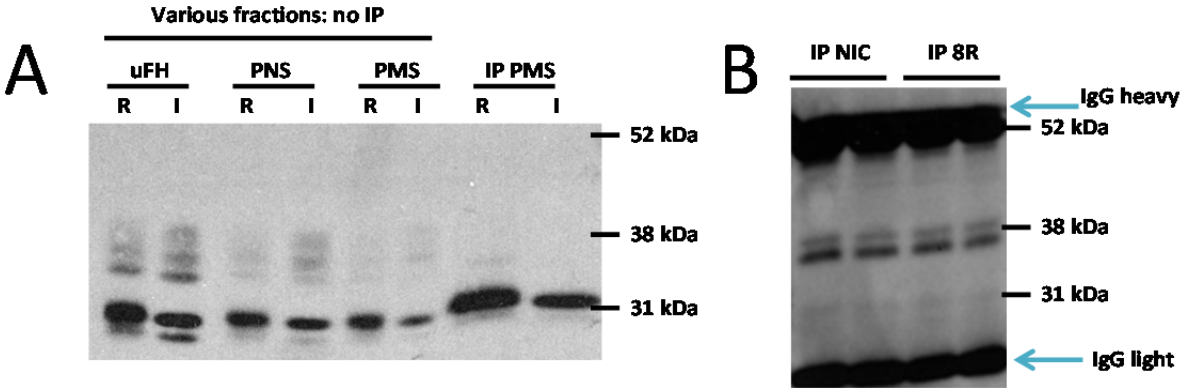

Figure 18. (A) Western blot for Hu IP (IP PMS) from cerebral cortex, showing no primary antibody contamination in the elution of IP from dynabeads. Lanes 1-6 are not IPs but show Hu proteins staining in various fractions: uFH: unfractionated homogenate; PNS: post-nuclear supernatant; PMS, post-mitochondrial supernatant. (B) Hu IP from NIC and 8R cortex using Sepharose beads, showing eluted IgG heavy and light chains.

In additions, several other controls were performed to optimize the Hu protein IP

conditions to obtain maximum recovery of Hu proteins, and to test various buffers to optimize extraction of Hu proteins from the beads and to ensure the extraction buffer was compatible with subsequent proteomic procedures. All of control experiments are shown in Figure 19.

First was shown covalent binding of an unrelated antisera (anti histone) did not precipitate Hu proteins. As seen in Figure 19A, anti-histone did not precipitate Hu proteins from PMS, but did do so from unfractionated homogenate. Therefore, PMS was always used as input to IP reactions.

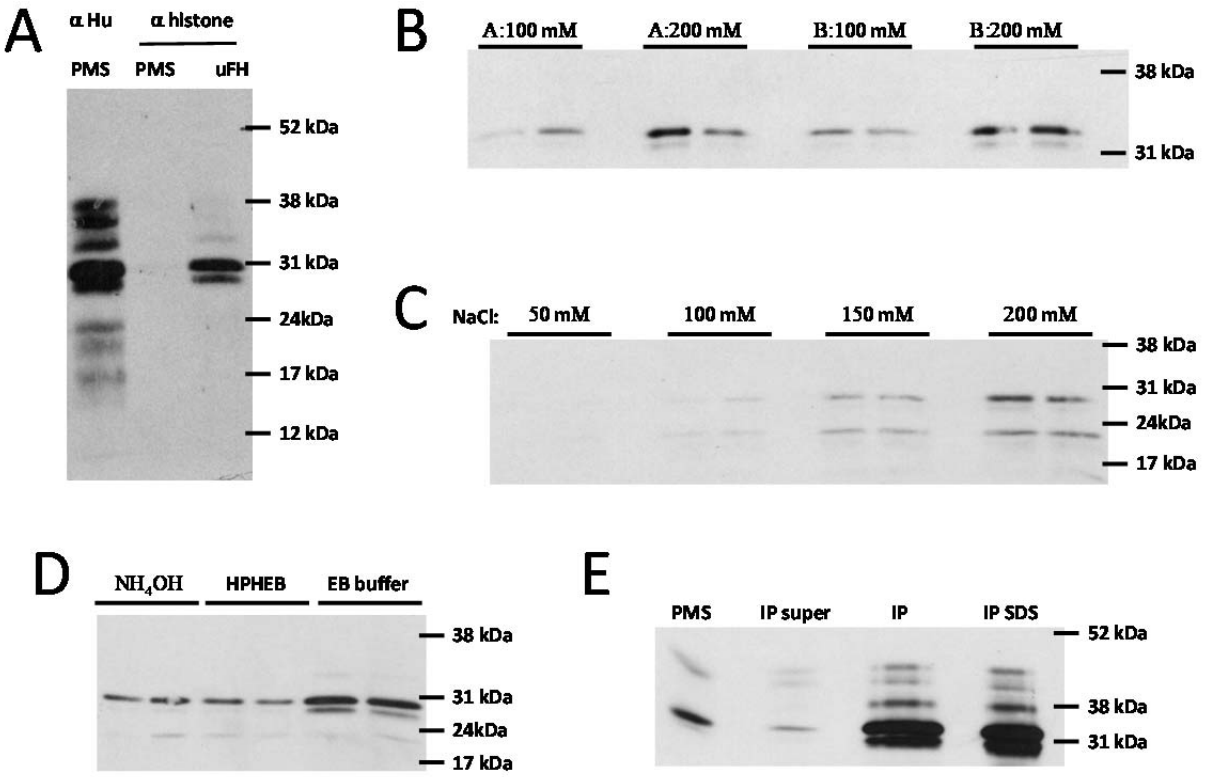

Figure 19. Various controls and optimization for Hu protein immunoprecipitation. All Western blots in A-E are Hu Westerns using Hu antisera sc-5261. (A) Dynabeads covalently linked to anti-histone did not pull down Hu Proteins from PMS but did so from unfractionated homogenate (uFH). (B) Test of whether buffers A or B in combination with 100 mM or 200 mM NaCl led to best Hu protein recovery. (C) Test of NaCl concentration in buffer B to obtain highest Hu protein recovery. (D) Test of elution buffers compatible with subsequent proteomics: EB buffer obtained best quantitative recovery. (E) Test of Hu protein recovery in IP supernatant (IP super) vs bead elution (IP), and whether SDS added to buffer EB eluted dynabeads could still recover Hu proteins.

Next, based on the manufacture protocol for Dynabeads co-IP (Life technology), IP

buffer condition (A or B) was first tested. The difference between buffer A and buffer B is that buffer B contained 2 mM $MgCl_2$ and 1mM DTT, while buffer A did not. They were tested at NaCl concentration of 100 mM. The elution from anti HuR bound dynabeads under both IP condition was run on SDS-PAGE, and the gel was silver stained. Silver stain suggested that the yield of bands of buffer A and B are similar (not shown here), as did Hu IP Western (Figure 19B). Since buffer B contained DTT and $MgCl_2$, which is a common component in RNA immunoprecipitation buffer[136], we decided to choose buffer B over buffer A.

Once buffer B was chosen, the NaCl concentration was investigated to optimize the ionic stringency of the IP reaction. Figure 19C shows that 200 mM NaCl gave the strongest yield of Hu proteins compared to 50, 100 and 150 mM NaCl.

After incubation conditions were optimized, I tested which was the best buffer to elute the dynabead-bound Hu proteins, including ammonium hydroxide (NH_4OH 0.5 M), HPH EB (NH_4OH 0.5 M, EDTA 0.5 mM) and EB buffer (from dynabeads kit). As seen in Figure 19D, EB buffer eluted the greatest amount of Hu protein, from IP reactions that all had been loaded with equal amount of input PMS protein.

Finally, after determining EB to be the optimal elution buffer, I tested whether having 0.01% SDS in the elution buffer increased the yield. As seen in Figure 19E, after the dynabeads were eluted with EB buffer, SDS was still able to elute some Hu down. In addition, it was observed that very little Hu protein remained in the IP supernatant compared to that recovered from the dynabeads (Figure 19E, compare lanes “IP super” to “IP”).

Pilot MS was run to determine if acetone precipitation could clean SDS from the solution so that SDS would not interfere with MS detection. However, samples eluted with SDS had very bad signal in MS even after acetone precipitation compared with sample eluted with only EB buffer (data not shown). Thus EB buffer was finally chosen as the elution buffer.

Therefore, from the conducting of the various controls shown here, we were confident the IP was optimized to yield the highest recovery of Hu proteins from the IP incubation and after when the proteins were extracted from the dynabeads without interference of MS detection.

Hu protein phosphorylation at 8 hr reperfusion

Because it is known that the phosphorylation status of Hu proteins can regulate their function[137], once the Hu protein IP had been optimized, a pilot study tested by phospho-threonine (pT) and phospho-serine (pS) antisera if we could detect changes in Hu protein phosphorylation. Hu proteins were immunoprecipitated from NIC and 8R cerebral cortex (n = 2 per group). We evaluated cerebral cortex initially because there was abundant tissue. Also, cortex survives 10 min ischemia like CA3, so the test would give an indication of what is likely to occur in CA3. Eluted proteins were run on SDS-PAGE and stained for Hu proteins, pT and pS, with stripping of the membrane at 55°C in SDS and beta mercaptoethanol solution between Western blots. The results are shown in Figure 20 where no change in phosphorylation patterns was seen between

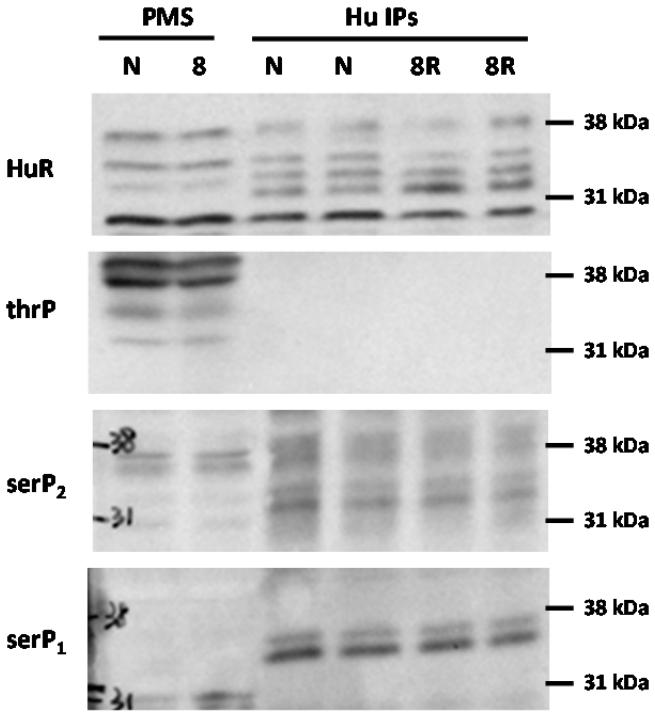

Figure 20. Western blots of Hu protein IPs for pT (thrP) and with two different pS (serP 1 and 2) antisera. PMS from cerebral cortex (50 μg); Hu IPs are dynabead elutions after Hu IP. The two NIC (N) and 8 hr reperfused (8R) samples came from different animals.

the NIC and 8R samples in either the PMS or after Hu IP for pS and pT had no signal after Hu IP. To conclude, no gross change in Hu protein phosphorylation occurred after brain I/R.

Pilot proteomics of Hu immunoprecipitations

After optimizing Hu IPs as described above, the last test was to determine if the Hu IP provided enough protein to successfully do proteomics. Therefore, a pilot study was undertaken using cerebral cortex PMS as input to the Hu IP, and using a quantity of tissue comparable to hippocampal dissections (100 mg wet weight, the weight of 5 pooled CA1 or CA3). As mentioned above what was also evaluated was if adding SDS to the elution buffer with subsequent acetone precipitation aided or hindered the subsequent proteomics. IPs were performed and run through LC-MS/MS. The result of this pilot study was that no-SDS elution resulted in ~150 proteins detected by mass spec verses ~60 proteins detected when SDS was included. The no-SDS samples also detected known RBPs, including hnRNP D, hnRNP K and hnRNP A2, and these were not detected in the SDS containing elutions. Therefore, it was concluded to omit SDS from the elution step and that enough protein was IP'd to be detected by proteomics.

Proteomics of Hu immunoprecipitations from experimental groups

Experimental groups for NIC and 8R were performed and processed as shown in the flow chart and design of Figure 17. In addition to the Hu IPs of the experimental animals, two negative control IPs were performed: (1) an IP lacking antisera, and (2) an IP where anti-histone was bound to the dynabeads. Ten additional NIC animals were sacrificed to give enough CA1 and CA3 PMS that both negative controls could be done for NIC CA1 and NIC CA3, giving a total of four negative controls. No negative controls were performed for the 8R group as all the samples were used for Hu IPs.

The proteins eluted from Hu IPs were subjected to iTRAQ labeling, followed by mass

spec proteomics. However, the amount of protein eluted from Hu IPs (~2 μg per sample) was below the recommended protein concentration for iTRAQ labeling (~10 μg per sample). In spite of recommendation, it was attempted to run the iTRAQ labeling.

After the labeling reaction, 1/3rd of each of the individual iTRAQ-labeled samples was mixed to give two eight-plex samples (group A containing NIC and 8R CA1 samples and the two negative NIC CA1 controls, and group B containing NIC and 8R CA3 samples and the two negative NIC CA3 controls). The mixed eight-plexes were run on mass spec. But after mass spec, no iTRAQ labeling was detected. Therefore, I was unable to successfully perform iTRAQ proteomics of the Hu IPs of CA1 and CA3 because not enough protein could be isolated from the Hu IPs to be labeled by the iTRAQ reagent.

Since there was still 2/3^{rds} of the original iTRAQ-labeled samples, these were used to perform LC-MS on each individual sample. At this point, two poolings were necessary to ensure enough material for LC-MC: (1) NIC CA3-1 and -3 were pooled and (2) 8R CA1-1 and -3 were also pooled.

The LC-MS runs on the individual samples were successful. The results now described are those of LC-MS of the Hu IPs.

Counting detected proteins for LC-MS of Hu IPs

The number of detected proteins in Hu IP samples and negative controls are shown in Table 5. Reactions lacking primary antibody gave 108 and 140 hits in CA1 and CA3, respectively. The anti-histone negative controls gave 150 and 185 detected proteins in CA1 and CA3, respectively. In CA1, 63 of the background proteins were identical between no primary and anti-histone. In CA3, 79 of the background proteins were identical between no primary and anti-histone. The two lists were combined for each region to give background lists, which contained 258 proteins for CA1 and 325 for CA3.

Table 5. Counting protein hits after LC-MS/MS of Hu IPs

Negative Controls

CA1	# proteins	unique	overlap			CA3	# proteins	unique	overlap	
no primary	108	45	63			no primary	140	61	79	
anti-histone	150	87	63			anti-histone	185	106	79	
unique bkgrnd hits	258						325			

Hu IP Samples

Samples CA1	# proteins	unique	-bkgrnd	% unique/total		Samples CA3	# proteins	unique	-bkgrnd	% unique/total
N11	91	40	51	44.0%		N31+N33	134	35	99	26.1%
N12	159	66	93	41.5%		N32	199	68	131	34.2%
N13	182	82	100	45.1%		R31	196	68	128	34.7%
R11+R13	170	77	93	45.3%		R32	188	58	130	30.9%
R12	220	106	114	48.2%		R33	163	51	112	31.3%
			AVE	44.8%					AVE	31.4%

The total numbers of proteins detected ("# proteins" column) in the Hu IPs for each individual sample are shown in Table 5. When proteins on the respective background lists were subtracted from each individual sample, this gave the number of unique hits for each sample. Dividing the number of unique hits by the total gave very similar proportions for samples in each brain region. CA1 averaged 44.8% $\pm$ 2.4%, and CA3 averaged 31.4% + 3.4%. These were statistically different by ANOVA ($p = 9.7 \times 10^{-5}$). Therefore, CA3 had more background than CA1 (~ 69% vs 56% of detected proteins, respectively). All 14 protein hit lists are provided in Appendix 4.

Gene ontology of background proteins from Hu IPs

To understand the background lists, gene ontology was performed using the GO classification of "cellular component". The background lists between CA1 and CA3 and between no primary and the histone primary antisera were similar. Similar to the polysome profile background contamination, there was neuronal debris (axon, synaptic vesicles, melanosomes, SNARE components), internal membranes (coated vesicles, sodium-potassium exchanger), mitochondrial membrane (proton transport proteins) and cytoskeleton (brush border membrane, intermediate filaments). The extent of contamination in the Hu IPs is explained further in the next section.

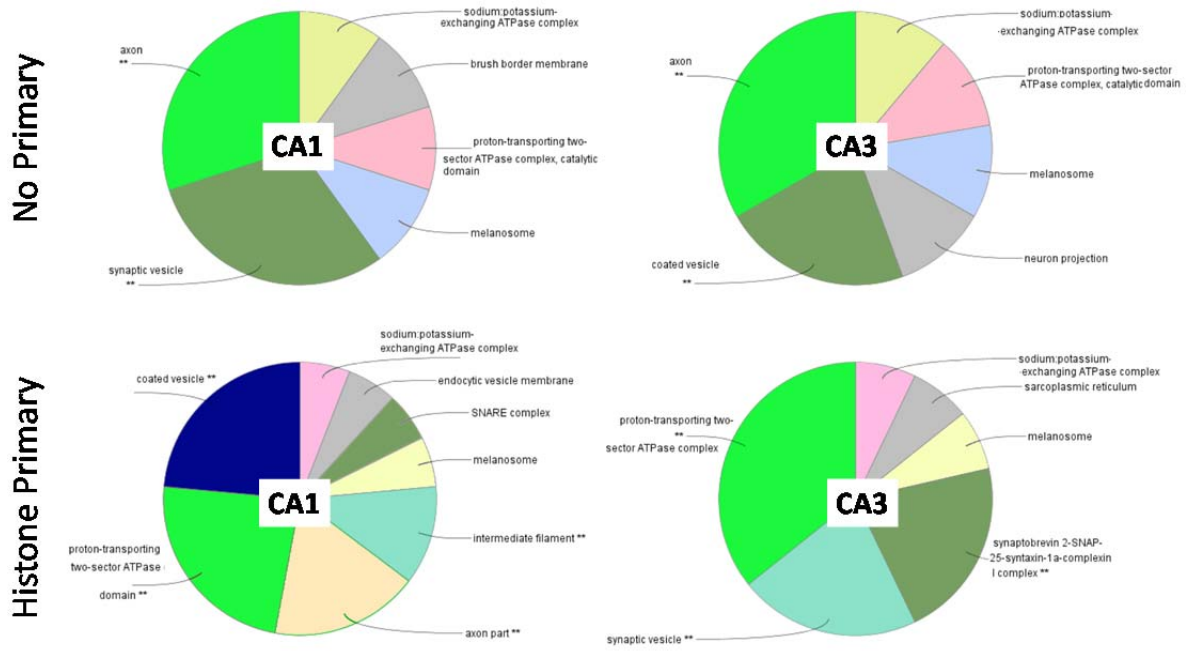

Figure 21. Gene ontology analysis of background hit lists in CA1 and CA3, as indicated. For "No primary" colors are similar and for "histone primary" colors are similar.

Qualitative identification of RBPs detected after LC-MS of Hu IPs

There were no RBPs on the background lists. When the unique lists for the individual samples were inspected for RBPs, the lists shown in Table 6 were found.

Table 6. Proteomic identification of RBPs from Hu IPs, along with descriptions of detected RBPs.

CA1 Hu IP

N11	N12	N13	R11+R13	R12
	RBM22_RAT	ROA3_RAT	ELAV2_RAT	ELAV2_RAT
				ELAV4_RAT
				HNRPD_RAT
				RBMX2_RAT

CA3 Hu IP

N31+N33	N32	R31	R32	R33
ELAV2_RAT	ELAV2_RAT	ELAV2_RAT	ELAV2_RAT	ELAV2_RAT
CSDE1_RAT	PATL1_RAT	HNRPK_RAT	CSDE1_RAT	KS6A1_RAT

ID	Description
CSDE1_RAT	RBP involved in translationally coupled mRNA turnover.
HNRPD_RAT	AUF1; Destablizes ARE-mRNAs
HNRPK_RAT	Major pre-mRNA-binding proteins
PATL1_RAT	RBP involved in deadenylation-dependent decapping of mRNAs
RBM22_RAT	Involved in the first step of pre-mRNA splicing.
RBMX2_RAT	RNA-binding motif protein, X-linked 2
ROA3_RAT	Cytoplasmic trafficking of RNA. Binds cis-acting response element, A2RE.

HuB (ELAV2_RAT) was the main Hu protein detected in the sample IPs. The main observation of this study was that HuB was present in all samples except the NIC CA1 samples. This is an amazing finding when it is considered that the samples were IP'd for Hu proteins. For one sample 8R CA1-2, HuD (ELAV4_RAT) was also found.

In addition to HuB, several other RBPs were found. The specific RBPs and short descriptions are listed in Table 6. No specific RPB was found in more than one sample. The unique hits ranged from 35 to 106 amongst the samples. But RBPs ranged from zero to four in the samples. Therefore, the contamination ranged from 100% in NIC CA1-1 (N11 in Table 6) to 96% in CA1 8R-2 (R12 in Table 6).

IP/Western of Hu IPs

Since HuB or any other Hu isoform was not detected in NIC CA1 samples following Hu protein IP, it was necessary to confirm this result by IP/Western. Therefore, 10 additional NIC and 10 additional 8R rats had CA1 and CA3 dissected, and pooled PMS from 5 rats per sample were subject to Hu protein IP, followed by SDS-PAGE and Western blot.

The results are shown in Figure 22. Normally when staining with the Hu protein antisera, three bands are detected at molecular weights (MW) of 36, 38, and 42 kDa. For NIC CA3 and 8R CA1 and CA3, all three bands were observed. However, the 38 kDa and 42 kDa bands were absent in NIC CA1, consistent with both the polysome pellet and Hu IP proteomics that failed to detect HuB in any NIC CA1 samples.

Based on amino acid sequences from rat gene sequences obtained from Uniprot, HuR has a calculated MW of 36 kDa, HuB and HuC have calculated MWs of 39.5 kDa, and HuD has calculated MW of 41 kDa. This would suggest the middle band is HuB and the top band is HuD. However, different labs show variability in MWs for Hu proteins, depending on cell type,

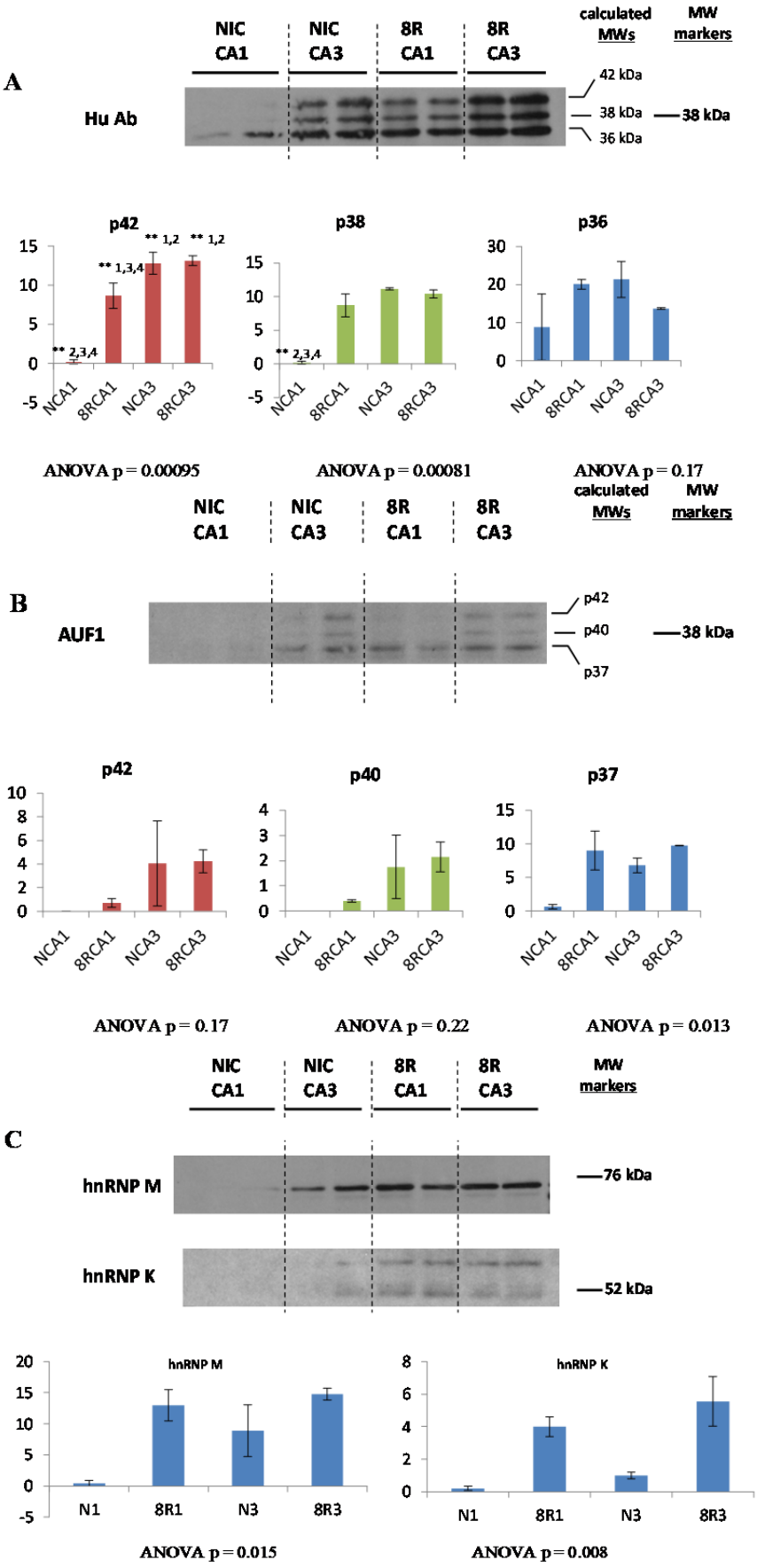

Figure 22: Western blots for Hu proteins (A), AUF1/hnRNP D (B), hnRNP M and hn RNP K (C) after Hu protein IP with corresponding densitometry analysis results by ANOVA and Tukey post hoc test.

species, or tissue, suggesting post-translational modifications affect the apparent MW of Hu proteins separated by SDS-PAGE. Furthermore, Dr. Keene's lab has shown that HuB in rat has a specific alternative splicing isoform that is about 2 kDa difference in size, based on predicted amino acid sequence. Therefore, these uncertainties in the literature prevent unambiguous assignment of the two bands lacking in CA1 NIC following Hu protein IP. The most conservative conclusion is that loss of the two bands is consistent with lack of detection of HuB by proteomics of the Hu IPs (Table 6) and the polysome pellets (Table 4).

Co-IP of RPBs with Hu protein IP

Following Hu Western blot, the membrane was stripped and reprobed three times with antisera directed against AUF1, hnRNP M and hnRNP K (Figure 22). All three proteins were detected at the expected MWs of ~38 kDa (AUF1), 72/72 kDa (hnRNP M) and 65 kDa (hnRNP K), indicating these proteins co-IPs with the Hu proteins. In support of this conclusion, each of the three signals was missing from the NIC CA1 samples.

In addition, AUF1 is known to have 3 bands on SDS-PAGE, where the p37 band is most destabilizing to ARE-mRNAs and the p42 band is least destabilizing[138] . In 8R CA1, only p37 was observed, but all three AUF1 forms were observed in NIC CA3 and 8R CA3. Finally, as mentioned the signal for hnRNP K is absent in NIC CA1, but is also weak in NIC CA3, and is stronger in both the 8R CA1 and CA3 samples.

Therefore, in spite of large backgrounds shown by proteomics, the combined data from the proteomics and IP/Western suggest that Hu proteins are bound differentially to the 3 detected RBPs between the NIC and 8R condition and between CA1 and CA3, where HuB, and the three RBPs were absent.

CHAPTER 4: INVESTIGATION OF MRNAS BOUND TO POLYSOMES AT 8 HR REPERFUSION

Hypothesis 3: mRNAs bound to polysomes isolated after brain ischemia and reperfusion will indicate ARE regulation of selectively translated mRNAs.

Rationale

RBPs regulate all aspects of mRNAs which include transcription, transport, translation and degradation. Translation is the main function of mRNAs where genetic instructions convert into proteins and proteins carry out functions in the cells. A method to understand RBP function is to study the mRNA populations bound to the ribosomes. This tells about the end point of mRNA regulation by RBPs. There are only two studies of which mRNAs are bound to polysomes, called translational state analysis (TSA), in the brain ischemia literature.

MacManus studied TSA after focal brain ischemia[139], using a mouse model of occlusion stroke. This study looked for mRNAs with short 5' UTRs for selective translation because degrading of eIF4G would favor short 5' UTR-mRNA needing less scanning. But the mRNAs found on polysomes did not show the short 5'UTRs. This study was limited because the stroke model is heterogeneous in brain damage since blood flow makes a gradient from zero at the site of occlusion to 100% far from the occlusion. Also, the study used cerebral cortex as input, and cortex is heterogeneous with more cell types than hippocampus.

The second study was performed in the DeGracia lab by Dr. Szymanski, and I helped perform those studies[140]. Here, we were isolating polysomes using the sucrose gradient method from CA1 and CA3 at 8 hr reperfusion after 10 min global ischemia in the rat. There were two main findings: (1) ARE-mRNAs were enriched on the ribosomes, including *hsp70*, *Atf3*, and *Hmox1* mRNAs, and (2) At 8R, CA3 polysomes had 591 mRNAs increase over controls but CA1 had 186.

The previous study of TSA used the sucrose gradient preparation of polysomes but no study of proteomics on polysomes was performed. I have now measured and showed above (Table 1) that polysomes prepared from sucrose gradients contained only 4% ribosome proteins (RPs) in CA1 and 7% in CA3. Also shown above, the sucrose pad method of isolating polysomes had 25% RPs. The difference in the amount of detected RPs between the two polysome isolation methods is suggesting two possibilities: (1) both methods isolate the same polysome structures except the sucrose gradient method has more contaminations, or (2) each method is isolating different structures that contain RPs. These two possibilities can be tested by measuring the mRNAs bound to polysomes isolated from the sucrose pad method and comparing to mRNAs already identified from the sucrose gradient method. If the two methods isolated the same structure, then mRNA populations will be the same. If the two methods isolated different structures containing RPs, then the mRNA populations will not be the same.

Because the proteomics of the two methods was different, it was important to test the mRNAs isolated from both methods and the studies now describe the isolation and characterization of mRNA from polysomes isolated by the sucrose pad method. I hypothesize that the mRNA populations will be the same and that ARE-mRNAs will be concentrated on polysomes isolated from the sucrose pad method.

Overall experiment design

The overall protocol for Aim 3 is outlined in Figure 23 and is similar to the design of Aims 1 and 2. Brain I/R was induced in male Long Evans rats utilizing the 2VO/HT model. Experimental groups were again NIC and 8R (n = 15 rats/experimental group). CA1 and CA3 were microdissected and randomly pooled from n = 5 animals as one replicate for polysome pellet isolation, providing 3 pooled replicates per region per experimental group. Polysome pellets from each replicate were isolated using sucrose pad ultracentrifugation. The polysomal

pellet was then resuspended, mRNA extracted by TRIzol method, and run on Affymetrix GeneChip Rat Gene 2.0 ST microarrays.

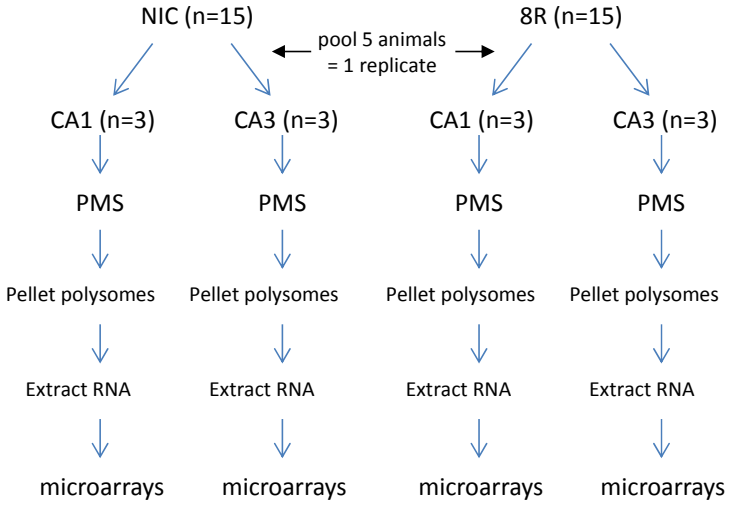

Figure 23. Overall Experimental Design for Aim 3: Translational State Analysis of CA1 and CA3 at 8 hr reperfusion.

Materials and methods

Materials

GeneChip Rat Gene 2.0 ST microarrays were purchased from Affymetrix (City, State). Rat Gene 2.0 ST array measure all 28,407 rat mRNA transcripts where each rat gene is represented by a median of 22 probes taken across the entire 5' to 3' extent of the message. TRIzol and GlycoBlue were purchased from Life Technologies (Carlsbad, CA, USA). RNeasy Mini Kit was purchased from Qiagen (Valencia, CA). All other chemicals were reagent grade.

Surgery: 2VO/HT Model

The induction of brain I/R were exactly as described in Methods of Chapter 2.

Microdissection of CA1, CA3 and forebrain

The microdissection of CA1 and CA3, and isolation of cerebral cortex were exactly as described in Methods of Chapter 2.

Validation of reperfusion by Western blot

The validation of brain I/R surgery by Western blot for HSP70 protein was exactly as described in Methods of Chapter 2.

Polysomes pellets

Polysome pellets were obtained by the sucrose pad method exactly as described in Chapter 2.

RNA extraction

RNA was extracted from resuspended polysome pellets using the methods previously described[140]. All work was done under RNAse-free conditions as described in Chapter 2. RNA extraction from polysome pellets was using the TRIzol reagent exactly as per vendor manual. For the final isopropanol precipitation, GlycoBlue co-precipitant was added as per vender instructions, to visualize RNA pellets. Following wash steps, RNA pellet was dissolved and then run thru an RNeasy mini kit exactly as manufacturer instructed. All final RNA preparations had A_{260}/A_{280} >1.8. Washed RNA pellets were suspended in sterile water and shipped to Genome Explorations (Memphis, Tennessee) overnight on dry ice.

RNA quality testing at Genome Explorations

Prior to synthesis of cDNA, RNA purity and concentrations was estimated from A_{260}/A_{280} readings on a dual beam UV spectrophotometer. In addition, integrity of RNA was assessed by capillary electrophoresis using an RNA 6000 Nano Lab-on-a-Chip kit and Bioanalyzer 2100 (Agilent Technologies, Santa Clara, CA) as per manufacturer's instructions.

Synthesis of cDNA and labeling

5-25 ng RNA/sample was converted to cDNA, amplified, fragmented, and biotin labeled by an Ovation Pico WTA, Ovation Exon Module, and Encore Biotin Module kits following exactly the instructions of the manufacturer (NuGEN, San Carlos CA).

Oligonucleotide array hybridization and analysis

Biotin-labeled fragmented cDNA was hybridized for 17 hr at 45^{o}C to GeneChip Rat Gene 2.0 ST Arrays (Affymetrix, Santa Clara CA). Arrays were then washed. Next they were stained with phycoerythrin-conjugated streptavidin (Life Technologies, Carlsbad, CA) in a Fluidics Station 450 (Affymetrix) according to manufacturer's instructions. A GCS 3000 7G high-resolution confocal laser scanner measured fluorescence intensities, which were recorded and analyzed using Affymetrix GeneChip Operating Software suite, v.3.2. Data provided by Genome Explorations included the 16-bit pixel intensity image files (DAT), and probe intensity files (CEL) generated by Affymetrix software.

Data analysis

Data analysis was performed in the DeGracia lab using Affymetrix Expression Console for preprocessing of CEL files. Preprocessing of CEL files included: probe set summarization by PLIER, PM-CGBG background correction and sketch quantile normalization. Sketch quantile uses a subset of all probes ('sketch') to shift probe values to the average ranked values for each probe set across chips. Sketch quantile maintains the original signal distributions for each chip. Expression Console was also used to generate box plots and intensity histograms of normalized and unnormalized chips.

Differential expression and class comparisons were performed in BRB-ArrayTools v.4.2.1, a free Microsoft Excel plug-in developed by BRB-ArrayTools Development Team and Dr. Richard Simon at the National Institute of Cancer. Filter criteria for class comparisons were: (1) x-fold ≥ 2; (2) univariate $p < 0.01$; and (3) exclude genes below the 75th percentile in ranked variance of log ratio of 8R/NIC (this excludes probe sets with smallest differences across chips). Starting with 29,489 probe sets, 7372 probe sets passed the three filters. Gene ontology was performed in ClueGo as described in Chapter 2. ARE-containing mRNA were determined by

searching gene lists at ARED, ARE Database (http://brp.kfshrc.edu.sa/ared/)[141].

Results

Quality control of microarrays

Representative capillary electrophoresis results are shown in Figure 24A.

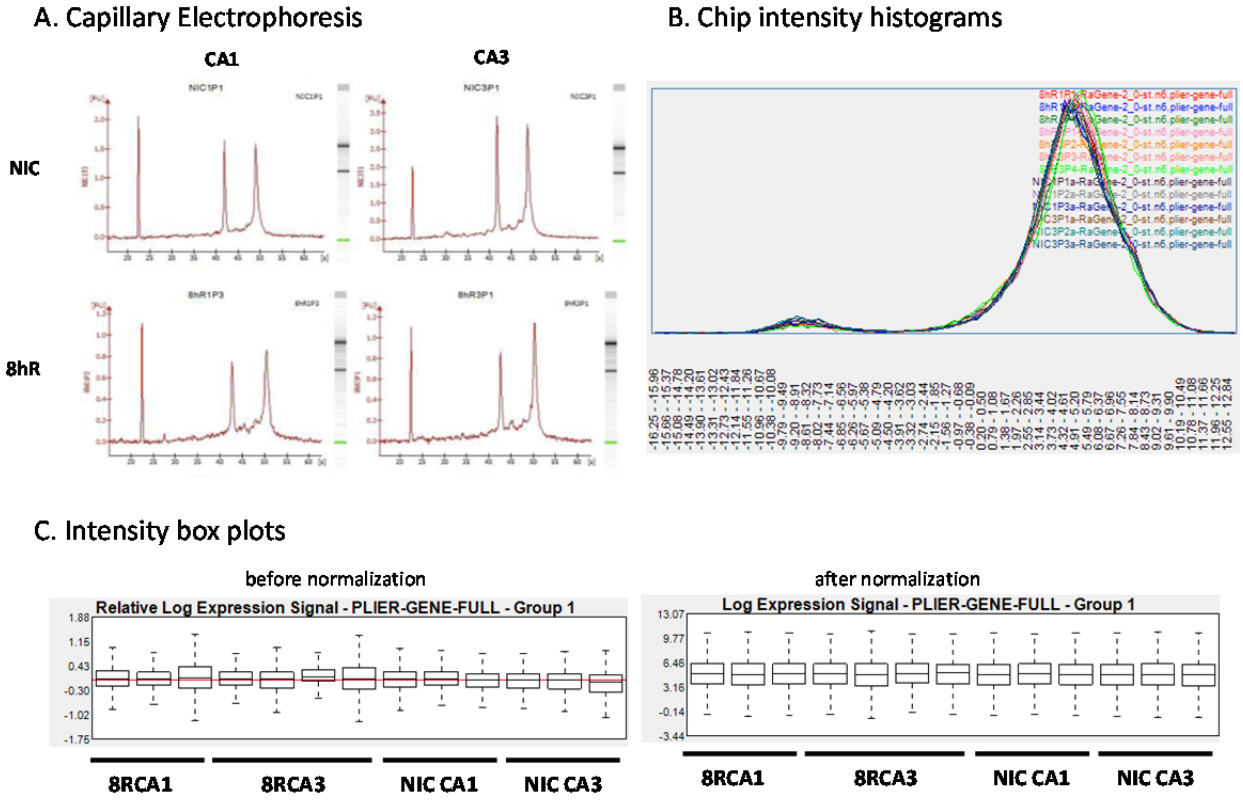

Figure 24. Quality control of microarrays. (A) Capillary electrophoresis of NIC and 8R CA1 and CA3 representative samples. (B) Intensity histograms of all microarrays after preprocessing. (C) Intensity box blots before (left) and after (right) preprocessing of chip CEL files.

RNA extracted from polysome pellets showed intact rRNA. Preprocessing of the CEL files of all chips showed same after normalizations. Intensity histograms (Figure 24B) from all chips aligned following same curves. Intensity box plots, showing the inter-quartile range, median, and maximum and minimum intensities for each chip, are an alternative way to display the chip intensity information. The chips aligned well in normalized box plots (Figure 24C).

Microarray results

For criteria of x-fold > 2 and p < 0.01, the NIC vs. 8R class comparison show results in Table 7. For mRNAs isolated from CA1 polysomes (CA1p) purified from sucrose pad method, 243 probe sets changed, with 202 increasing and 41 decreasing at 8R compared to NIC. For CA3 mRNAs (CA3p), 285 probe sets changed, with 232 increasing and 53 decreasing at 8R compared to NIC. For CA1 and CA3, 45% and 41% of hits were identified transcripts. Therefore, over half of each set were unknown transcripts. All probe sets meeting criteria are shown in volcano plots (Figure 25). The full lists of significant hits are provided in Appendix 5.

Table 7. Number of significant hits of 8R vs NIC meeting class comparison criteria

Group	# hits	increased	decreased	known	% known
CA1p	243	202	41	110	45%
CA3p	285	232	53	116	41%

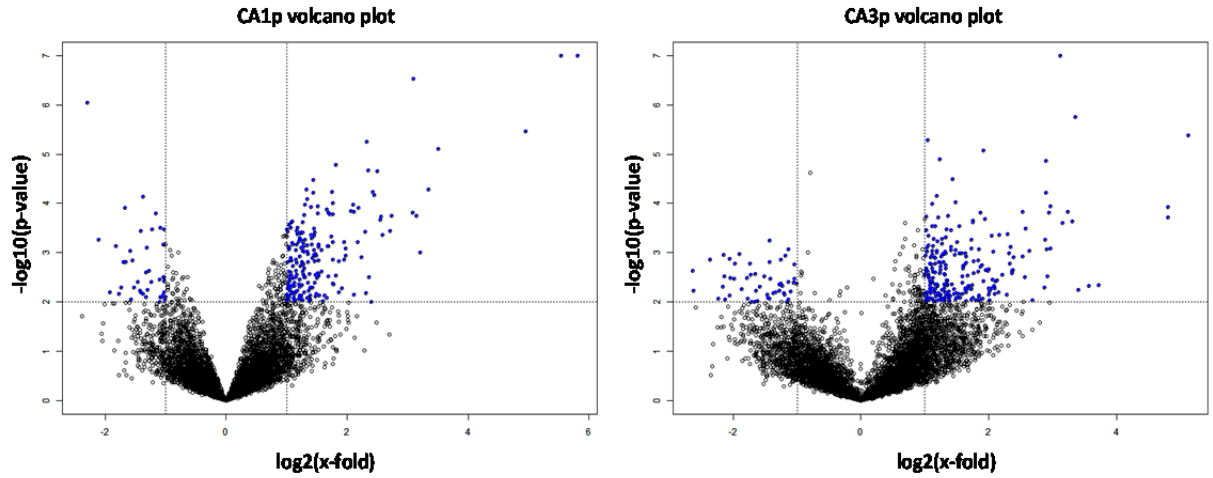

Figure 25: Volcano plots of CA1p and CA3p. Blue circles are probe sets that met class comparison criteria.

The list of the top ten hits for CA1p and CA3p are shown in Table 8.

Table 8. Top ten hits for CA1 p and CA3 p.

CA1p top ten list

x-fold	symbol	description
56.14	Hspa1b	heat shock 70kD protein 1B (mapped)
46.43	Hspa1a	heat shock 70kD protein 1A
30.93	Hspb1	Hsp27: glial response after I/R
11.42	---	---
10.19	---	---
9.26	Mt1a	metallothionein 1a
8.89	Rpl13	ribosomal protein L13
8.55	Hmox1	heme oxygenase (decycling) 1
8.46	Mt1a	metallothionein 1a
6.64	Atf3	activating transcription factor 3

CA3p top ten list

x-fold	symbol	description
34.89	Hspa1b	heat shock 70kD protein 1B (mapped)
28.04	Hspb1	Hsp27: glial response after I/R
27.99	Hspa1a	heat shock 70kD protein 1A
13.2	---	---
11.91	Rpl13	ribosomal protein L13
10.55	---	---
10.28	---	---
9.95	Atf3	activating transcription factor 3
9.46	---	---
8.9	LOC684822	like transcription elongation factor B

Highlighted transcripts are ARE-containing mRNAs.

For CA1p, two of the top ten probe sets were unidentified, and for CA3p, four were unknown. For both regions, the most highly expressed mRNA bound to polysomes was the two mRNAs for HSP70 (Hspa1a, Hspa1b). The other transcripts shared in common were Atf3, a stress-activated transcription factor[142], Rpl13, the mRNA for large ribosomal subunit 13 protein, and the mRNA for HSP27. Studies from other labs have shown HSP70 to be expressed in neurons[143] and HSP27 to be expressed in astrocytes[144] at 8 hr reperfusion.

ARE-containing transcripts on polysomes

From the top ten lists, four hits were ARE-containing mRNAs in CA1 and three were in CA3 (highlighted rows, Table 8). Each list of identified mRNAs (110 for CA1p; 116 for CA3p) were run at ARE database ARED to determine all ARE-containing mRNAs for each hits list. For CA1p and CA3p, respectively, 23 (9% of all significant hits) and 10 (4% of significant hits) ARE mRNAs were identified (Table 9). These are both enrichments over the ~ 2% of ARE-mRNAs in the entire rat genome[145]. As seen in Table 9, all ARE transcripts increased at 8R over NIC except one (Kctd4). The search results from ARED detecting ARE-mRNAs are providing in Appendix 7.

Table 9. ARE-containing mRNA from CA1p and CA3p hit lists determined form ARED search.

Region	x-fold	ProbeSet	Symbol	Name
CA1p	2.13	17711471	Aadat	aminoadipate aminotransferase
	6.64	17687609	Atf3	activating transcription factor 3
	2.43	17843026	Cdon	cell adhesion associated, oncogene regulated
	2.44	17664369	Cxadr	coxsackie virus and adenovirus receptor
	3.38	17765931	Dusp2	dual specificity phosphatase 2
	2.73	17853273	Glce	glucuronic acid epimerase
	8.55	17728071	Hmox1	heme oxygenase (decycling) 1
	46.43	17756503	Hspa1a	heat shock 70kD protein 1A
	0.4	17700161	Kctd4	K+ channel tetramerisation domain containing 4
	2.35	17827861	Kitlg	KIT ligand
	2.25	17768956	Mmp9	matrix metallopeptidase 9
	8.46	17731745	Mt1a	metallothionein 1a
	9.26	17717103	Mt1a	metallothionein 1a
	2.43	17880740	Mthfd2	methylenetetrahydrofolate dehydrogenase 2
	2.34	17684954	Pla2g4a	phospholipase A2 (cytosolic, calcium-dependent)
	2.54	17809625	Plk3	polo-like kinase 3
	4.18	17632926	Ppp1r15a	protein phosphatase 1, regulatory subunit 15A
	2.05	17833977	Ptbp1	polypyrimidine tract binding protein 1
	5.9	17680795	Ptgs2	prostaglandin-endoperoxide synthase 2
	2.72	17684906	Rgs2	regulator of G-protein signaling 2
	2.17	17679473	Serpinb2	serpin peptidase inhibitor, member 2
	3.94	17821305	Sox11	SRY (sex determining region Y)-box 11
	2.37	17661537	Stat3	signal transducer and activator of transcription 3
CA3p	2.05	17711471	Aadat	aminoadipate aminotransferase
	9.95	17687609	Atf3	activating transcription factor 3
	3.11	17765931	Dusp2	dual specificity phosphatase 2
	7.68	17728071	Hmox1	heme oxygenase (decycling) 1
	27.99	17756503	Hspa1a	heat shock 70kD protein 1A
	2.12	17745208	Il31ra	interleukin 31 receptor A
	2.13	17809625	Plk3	polo-like kinase 3
	2.13	17717140	Pter	phosphotriesterase related
	2.37	17630418	PVR	poliovirus receptor
	2.37	17821305	Sox11	SRY (sex determining region Y)-box 11

Comparing mRNA from sucrose pad and sucrose gradient RNA preparations

To compare the above results with the previously published microarrays study, the previous CEL files for the microarray data[140] were reanalyzed using the data processing steps described above. These microarrays were from RNA isolated from the sucrose gradients

method, and fractions containing ribosome proteins were pooled as shown in Figure 26.

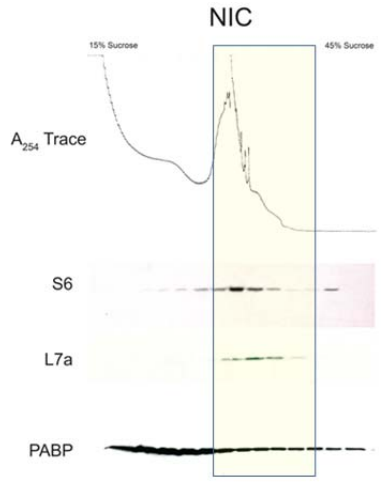

Figure 26: Illustration of fractions pooled from sucrose gradient method for isolating polysomes, and RNA extracted for microarrays in CA1 and CA3. Adopted from Dr. Szymanski's thesis[146].

Shown in Table 10 are comparison of the number of probe sets meeting class comparison criteria, numbers of increased and decreased transcripts, number of known transcripts, and number and percent of ARE-containing mRNAs between the microarrays from RNAs isolated from polysomes prepared by the sucrose pad (pink rows, Table 10) and sucrose gradient (blue rows, Table 10) methods. The numbers of hits in CA1 were comparable: 243 for Pad and 263 for Gradient. The numbers of hits from CA3 by the sucrose gradient method (683, CA3B) were greater than by the pad method (285, CA3p).

Table 10. Comparing hits from microarrays of RNA isolated from sucrose pad or sucrose gradient methods.

Method	Grp	# hits	↑	↓	known	% known	ARE	% ARE
Pad	CA1p	243	202	41	110	45%	23	9%
Gradient	CA1B	263	260	3	181	69%	38	14%
Pad	CA3p	285	232	53	116	41%	10	4%
Gradient	CA3B	683	649	34	522	76%	90	13%

CA1p and CA3p refer to results from sucrose pad method, and CA1B and CA3B refer to sucrose gradient method. Up and down arrows are increased and decreased transcripts. ARE refers to number of ARE-containing mRNAs.

For CA1 14% for gradient CA1B mRNAs were ARE verses 9% for pad CA1p. ARE-mRNAs were higher in gradient CA3B (13%) verses pad CA3p (4%). Both methods led to enrichment of ARE-mRNAs. Appendix 6 contains full hit lists for CA1B and CA3B. Appendix

7 contains ARED results for ARE-mRNAs from CA1B and CA3B.

mRNA identities compared between both polysome isolation methods

The lists of identified mRNAs were very different between the two experimental methods. For CA1 and CA3, only 19 and 17 identified transcripts were shared in common. Therefore, it is concluded that different populations of mRNAs were isolated by the two methods. Table 11 shows top 10 hits from sucrose gradient isolated mRNAs. Also shown is when an mRNA was also isolated by pad method, showing x-fold for pad and gradient method when both detected the same mRNAs. For pad method, mRNA was not from top 10 list, but could appear anywhere on hit list. For the CA1 gradient top ten, six were in common with pad method, but for CA3 gradient top 10, only three common transcripts were found for both pad and gradient methods.

Table 11. Top 10 hit lists of mRNAs identified from sucrose gradient method.

CA1	pad x-fold	grad x-fold	symbol	name
	56.14	183.77	Hspa1b	heat shock 70kD protein 1B (mapped)
	8.46	145.99	Atf3	activating transcription factor 3
	56.14	77.72	Hspa1b	heat shock 70kD protein 1B (mapped)
	3.24	63.27	Inhba	inhibin beta-A
	30.93	58.4	Hspb1	heat shock protein 1
	--	55.02	Pcdh8	protocadherin 8
	8.55	44.21	Hmox1	heme oxygenase (decycling) 1
	--	44.04	Vps37b	vacuolar protein sorting 37 homolog B (S. cerevisiae)
	3.4	43.93	Gadd45a	growth arrest and DNA-damage-inducible, alpha
	--	34.07	Wsb1	WD repeat and SOCS box-containing 1
	--			
CA1	**pad x-fold**	**grad x-fold**	**symbol**	**name**
	9.95	93.48	Atf3	activating transcription factor 3
	28.04	74.54	Hspb1	heat shock protein 1
	34.89	58.64	Hspa1b	heat shock 70kD protein 1B (mapped)
	--	37.66	Ttr	transthyretin
	--	36.23	Inhba	inhibin beta-A
	--	27.52	Tmem27	transmembrane protein 27
	--	23.13	Cdkn1a	cyclin-dependent kinase inhibitor 1A
	--	22.61	Ptgs2	prostaglandin-endoperoxide synthase 2
	--	20.47	Mfrp	membrane frizzled-related protein
	--	17.56	S100a8	S100 calcium binding protein A8

X-fold of 8R to NIC for sucrose pad (pad x-fold) and sucrose gradient (grad x-fold) are listed along with mRNA symbols and names for CA1 (top table) and CA3 (bottom table).

When x-fold were compared from pad to gradient methods, it was observed that gradient isolation of polysome RNAs always have greater x-fold in all cases. Gradient isolated mRNAs were from ~1.5-fold (Hspa1b) to ~20-fold (Inhba) range of increase over pad isolated mRNAs. Therefore, in addition to lists being different populations of mRNA, the x-fold quantity was also different between lists.

Gene ontology comparison of polysome mRNAs from sucrose pad and gradient

To compare hit lists from mRNAs isolated by sucrose pad or gradients methods, gene ontology (GO) was used to find categories of "Molecular function" for the transcripts of both lists. GO used right-side hypergeometric testing which detects enrichments of transcripts. This is justified by more than 80% of mRNAs increasing at 8R relative to NIC (Table 10). The general pattern was less GO categories were found for mRNA from sucrose pad method, and more categories for mRNA from sucrose gradients. Many categories were identified but I could group them into six main groups, shown as color key on Figure 27 and Figure 28: (1) protein folding/heat shock, (2) cell signaling, (3) DNA-related, (4) lipid metabolism, (5) miscellaneous protein-related functions, and (6) general metabolic or biochemical pathways. Figure 27 shows mRNAs from sucrose pads had predominant heat shock and cell signaling pathways, and CA1 had DNA-related mRNAs. Figure 28 shows mRNAs isolated from sucrose gradient method had more categories. This is interesting for CA1 because pad (243) and gradient (263) had about same number of significant hits. Protein folding/heat shock and cell signaling, which was over 75% of pad mRNAs, was less than 50% in mRNAs from gradient method.

GO analysis indicates more mRNAs isolated from pad method were more related to stress responses, but mRNAs from gradient method had stress responses and in addition more general cell functions. Therefore it is concluded that pad and gradient methods isolated different populations of mRNAs, and pad mRNAs were a subset of gradient mRNAs.

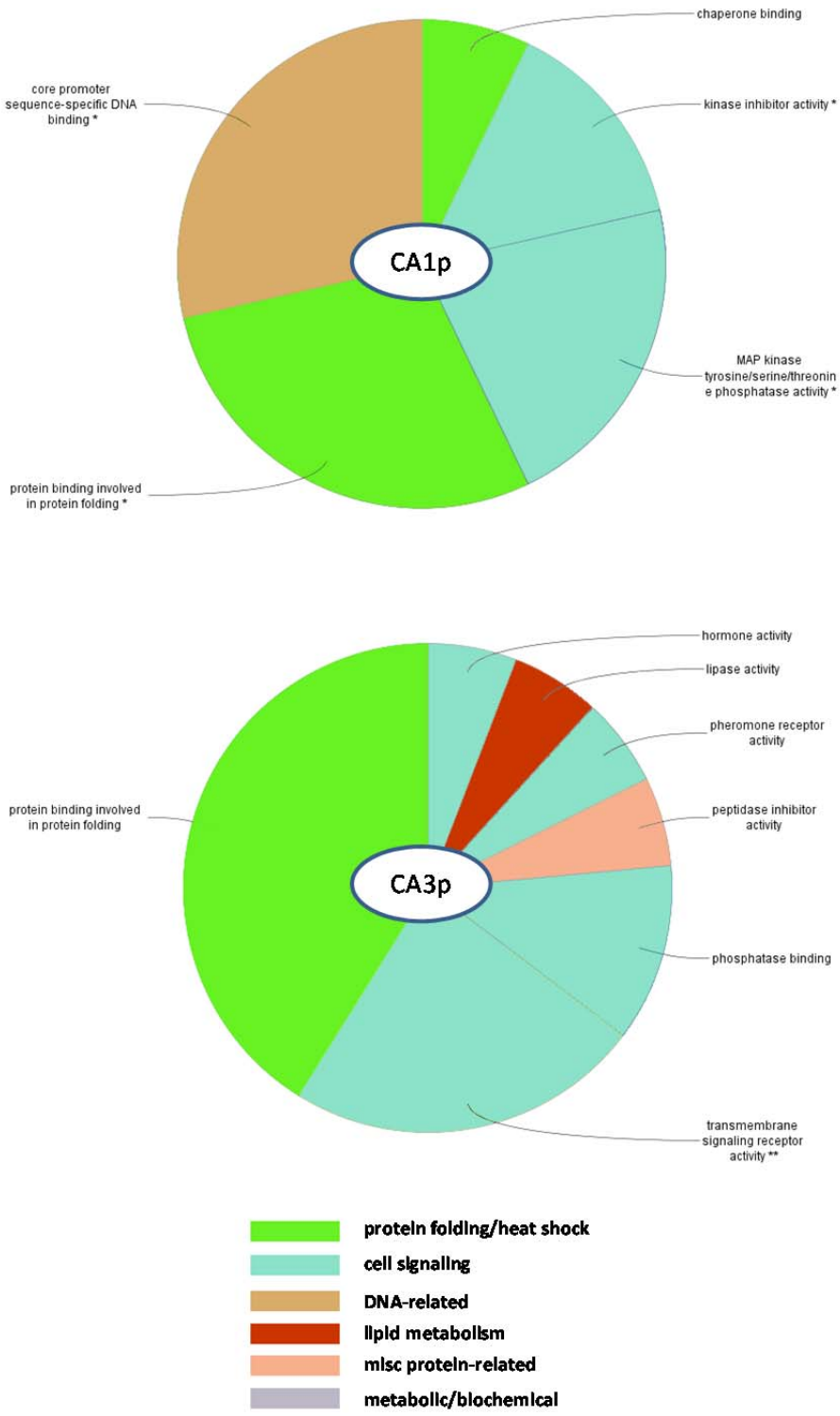

Figure 27: Gene ontology of CA1 and CA3 polysome mRNAs isolated from sucrose pad method.

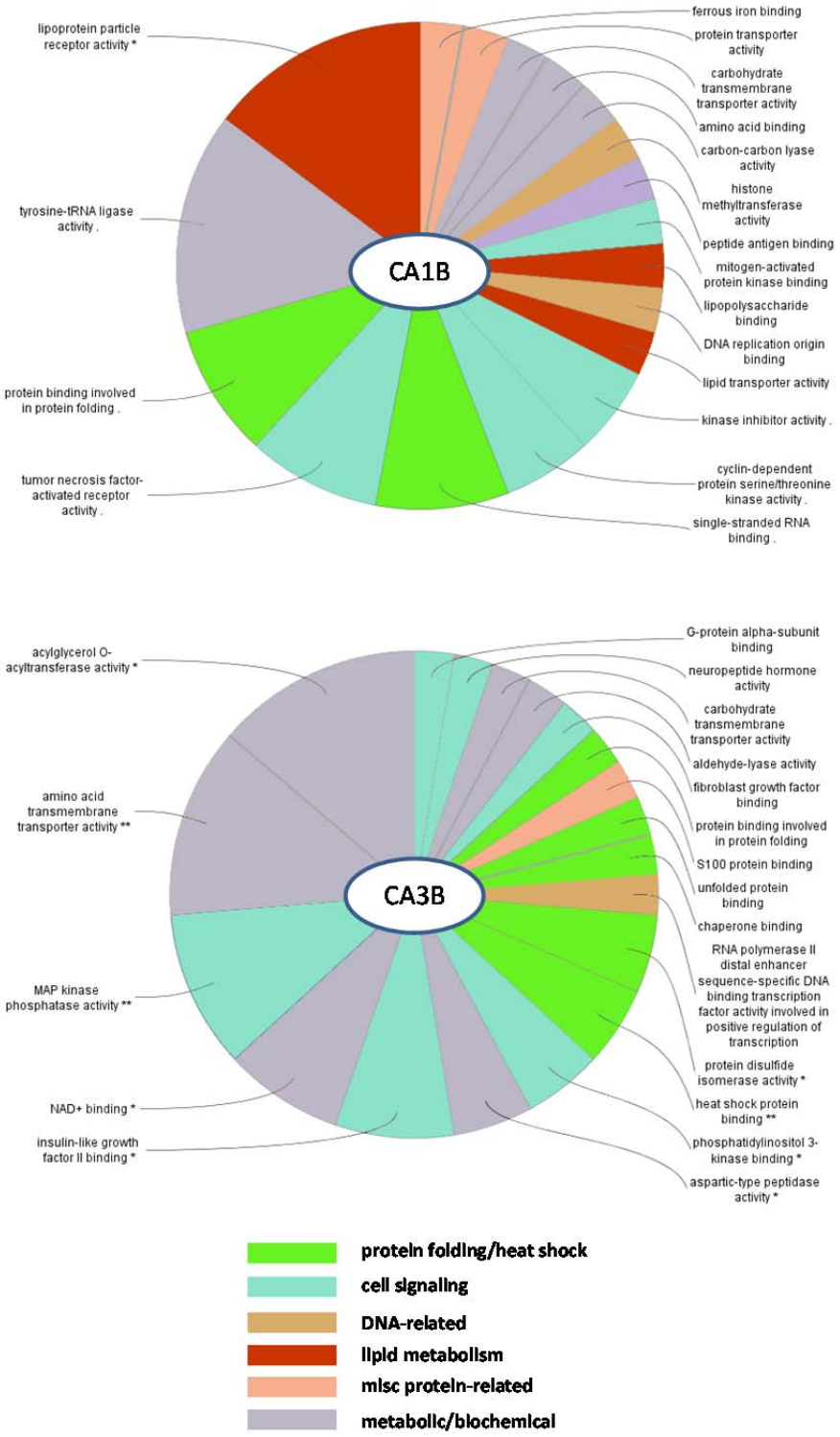

Figure 28: Gene ontology of CA1 and CA3 polysome mRNAs isolated from sucrose gradient method.

CHAPTER 5: DISCUSSION

Summary

In this study I investigated polysome and Hu protein IP proteomics and mRNA on polysomes isolated from sucrose pad method. The notable findings are now summarized. The main finding was that no Hu proteins were detected on CA1 NIC polysomes or following IP of Hu proteins, and this finding was consistent with loss of Hu-antibody reactive bands after Hu IP-Western. The second finding was that several RPBs copurified with polysomes and Hu IPs suggesting different RBP complexes occur in the NIC and 8R CA1 and CA3. The third finding was the mRNA population found on polysomes isolated from sucrose pad method was different from mRNA population found from sucrose gradient method. Below is discussed each finding.

In addition to the main findings, an important technical finding was due to proteomics. Samples that seemed pure by Western blot markers were found by proteomics to be very contaminated. This limitation and other limitations will be discussed below. Future directions to follow the studies described in this Thesis are also discussed and conclusions stated.

Discussion of findings

Lack of detection of HuB in NIC CA1

There are four members in the highly conserved ELAV/Hu family. HuB, HuC, and HuD are predominantly cytoplasmic and expressed specifically in neurons, therefore they are called neuronal Hu proteins, while HuR is primarily expressed in the nucleus ubiquitously[110,147]. Expression distribution of mRNA of the four homologs in the developing brain is widely variable[148], suggesting different function. Yet, all these homologs protein contain three RNA recognition motif with greater than 90% similarity in amino acids sequence and specifically binds to ARE in the 3'-UTR[148]. The antibody for Hu that I used in the Hu IP experiments (sc-5261) was the same used in immunofluorescence colocalization[33] , and this antibody recognizes

HuR, HuB, HuC, and HuD.

It is concluded HuB was missing from Hu IP reactions (Table 6) and polysomes (Table 4) by proteomics. Western blot showed loss of two bands that react with Hu antiserum (Figure 22). But identifying the two bands is not possible with data given here. From amino acid sequences from rat gene sequences obtained from Uniprot, HuR has a calculated MW of 36 kDa, HuB and HuC have calculated MWs of 39.5 kDa, and HuD has calculated MW of 41 kDa. This would suggest the middle band is HuB and the top band is HuD. However, different labs show variability in MWs for Hu proteins, depending on cell type or tissue, suggesting post-translational modifications affects the apparent MW of Hu proteins separated by SDS-PAGE. Furthermore, Dr. Keene's lab has shown that HuB has a specific alternative splicing isoform that is about 2 kDa difference in size, based on predicted amino acid sequence[114]. In addition, I have tried many antiserums to find the ones that can specifically detect homologs of Hu family but found no competent antiserum (data not shown). Therefore, these uncertainties in the literature prevent us to identify the two bands lacking in CA1 NIC following Hu protein IP (Figure 22). To be conservative, it is concluded that the loss of the two bands is consistent with the lack of detection of HuB by proteomics in the Hu IPs (Table 6) and the polysome pellets (Table 4).

In a 1994 paper that looked at HuB in the rat (also called Rel-N1), the Keene laboratory performed *in situ* hybridization for the mRNA of HuB and found that it was almost undetectable in CA1 compared to CA3 and dentate gyrus[149]. It was not attempted in this paper to measure the HuB protein content of the various hippocampal regions. When Dr. Keene's results are combined with my results showing that HuB is not detected by proteomics of polysome pellets or Hu IP in NIC CA1, this supports that HuB is at a much lower level in CA1 compared to CA3.

Implication of low levels of HuB in NIC CA1

The lack of HuB in NIC CA1 is considered the main finding because it may relate to

selective vulnerability of CA1 discussed in Background (see Figure 2). If HuB is required for neuron to organize mRNAs in stress response after brain I/R, it is possible low HuB slows this response. By "organize" I mean that mRNA, after exit from the nucleus, may be grouped in mRNA operon (discussed in Background) to allow selective translation and selective access to ribosomes. It is shown that mRNA for hsp70 in both CA1 and CA3 is very high by 8R (Table 8) but if HuB cannot be used for organizing mRNAs, this may explain delay in HSP70 protein translation in CA1 (Figure 6).

However, one big mystery is the two Hu bands are lacking in CA1 NIC but are observed to be present by SDS-PAGE/Western after Hu IP at 8R CA1 (Figure 22). If HuB is low in CA1 NIC, how did it get in 8R samples? The microarray data from both pad and gradient microarrays was searched for the HuB mRNA. Shown in the following table is the individual sample intensities after preprocessing but before filters:

Table 12. HuB mRNA levels from microarrays.

HuB	N-1	N-2	N-3	8R-1	8R-2	8R-3	8R-4	Nave	8Rave	x-fold
CA1p	8.117	8.071	8.083	7.837	7.803	7.098	--	8.091	7.579	0.70
CA3p	8.484	8.493	8.478	8.451	8.543	8.445	7.710	8.485	8.287	0.87
CA1B	0.002	4.891	7.381	6.711	6.331	6.051	--	4.091	6.364	4.83
CA3B	6.130	6.894	6.063	7.037	6.876	6.660	--	6.363	6.858	1.41

For the pad microarrays (CA1p, CA3p) it is seen variance of the data is very small and this gene was filtered from criteria of log ratio >75 percentile from results presented above. For gradient microarrays, CA1B NIC samples showed much variance and were filtered by $p < 0.001$. In both cases, HuB mRNA was filtered out.

When x-fold was calculated CA1 and CA3 from pad method gave 8R/NIC ~ 1.0, showing no change in mRNA for HuB and would not pass x-fold > 2 filter. However, for calculated gradient method x-fold, the CA1B sample had almost 5-fold increase in HuB mRNA.

This data suggests HuB mRNA may increase in CA1 after reperfusion and was isolated

in fractions from gradient method but not pad method. Combining with observation of return of bands at 8R in CA1 not seen in NIC CA1, this suggests HuB may actually be translated over the 8 hrs of reperfusion. Follow-up studies need to test this as discussed in Future Directions below.

If it is true that HuB must be translated during reperfusion, this could explain why there is so long time delay of Hu signal colocalizing in mRNA granules (Figure 16) and delayed transcription of the ARE-mRNA of hsp70.

The result overall can mean that CA1 starts from a weaker starting point than CA3, and this helps explaining the selective vulnerability of CA1. This is a unique conclusion to reach because all theories of why CA1 is selectively vulnerable attribute CA1 death to damage incurred during reperfusion, and not to the starting position of the control. As CA3 is subject to the exact same damage (10 min ischemia) as CA1, it is logical to consider that starting position of two cell types contributes to the outcome after I/R.

Detection of RNA binding proteins

Overall, I do not conclude that I isolated RBP complexes. Even though both polysomes and Hu IP isolated other RBPs, the results were not consistent across the experimental groups and so it is not fair to conclude definite isolation of an RBP.

Acknowledging this weakness of the data, there is still evidence that RBPs are different from all four conditions tested: NIC CA1, NIC CA3, 8R CA1 and 8R CA3. The following observations support this.

First, HuB was not detected in CA1, as discussed above, and this would be a difference in RBPs across conditions.

Second, PAI1 RNA-binding protein 1 (PAIR_RAT) was seen in all three NIC CA1 samples (Table 4) from polysome pellets and two of three 8R CA3 polysome pellets. PAIR_RAT was not detected by Hu IP indicating it may form a different RBP complex than those with Hu

proteins in them.

Third, hnRNP D (AUF1) was detected in only in 8R CA1 in one polysome sample (Table 4) and one Hu IP (Table 6). Further AUF1 p37 form only was detected in 8R CA1 by IP/Western (Figure 22), whereas in NIC and 8R CA3 all three forms of AUF1 were detected. This points to a different binding between Hu proteins and AUF 1 in 8R CA1 compared to other conditions.

Finally, the 8R CA1 and CA3 samples seemed to co-precipitate more hnRNP K than NIC CA3, and none was detected in NIC CA1. This suggests Hu proteins and hnRNP K forms a complex specifically during reperfusion. This is interesting because hnRNP K has shown to colocalize to dendritic spines[150] and a complex of Hu proteins, and hnRNP K may be involved in shuttling mRNAs to spines to express protective proteins such as hsp70 during I/R.

Taken together, the above observations suggest, but do not conclusively prove, RBPs are regulated differently after brain I/R.

Bound mRNA from two polysome isolation methods

In my studies, I attempted to replicate the microarray findings of Szymanski et al, 2013[123] using a different method of isolating polysomes. Here I used sucrose pad method vs. the pooling of fractions obtained from sucrose gradients. Overall, I did not replicate the previous results because: (1) the number of mRNAs that passed the filters in the current study was about the same for CA1 and CA3, whereas CA3 had more detections than CA1 in Szymanski et al, and (2) the mRNA populations were about 90% different. However, I replicated the previous findings showing a concentration of ARE-mRNAs on polysomes. Two factors can contribute to the different mRNA populations isolated by each method: (1) the purity of each preparation, and (2) the physical methods of separation.

First, it was shown using proteomics that the sucrose gradient method does not

concentrate ribosomal proteins (4-7%) as much as the pad method (~25%). In Figure 15 is shown GO analysis of the sucrose pad polysome prep where contamination was mainly neuron debris, cytoskeleton, internal and plasma membranes. A similar GO analysis of the proteomics of the sucrose gradient proteomics gives the following:

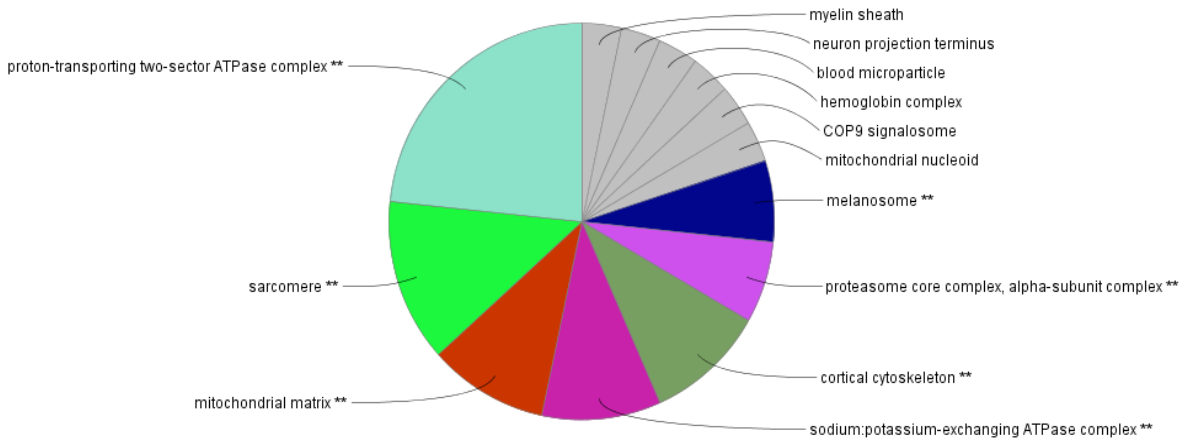

Figure 29: GO analysis of proteomics of sucrose gradient isolated polysomes.

Here is found similar items such as neuron debris, cytoskeleton and ER and plasma membranes. The main difference is evidence of whole mitochondrial contamination (mitochondrial matrix), whereas with the pad method, there was evidence only for outer mitochondrial membrane. Mitochondria have their own system of translation that could bias the results. But the number of genes translated on mitochondrial ribosomes is small and mitochondrial ribosomes were detected by proteomics. The additional contamination could provide more substrate for artificial binding sites for RNAs that might explain why a more diverse population of mRNAs was found in the microarrays of RNA from the sucrose gradient.

Second, the physical methods of separation involved might be isolating different structures that contain ribosomal proteins. The pad method is differential centrifugation where structures pellet at different times based on physical properties. The sucrose gradient is isopycnic centrifugation where structures migrate until they reach the density of sucrose matching the density of the structure and then quit migrating. For the pad-isolated RNAs the

results were similar between CA1 and CA3, but they mRNA populations were more diverse between CA1 and CA3 for the gradient method. This suggests different ribosome-containing structures were isolated by the two methods and further study is required.

Limits of the studies

This section is the discussion of limits of the IP method, proteomic, and the fact that contaminants were so high as determined by proteomics.

IP Limitations

There is a possible confounder with HuR IP studies. The Steitz lab showed that protein-mRNA complex can spontaneously form in cell[151]. They mixed lysates from FLAG-tagged HuR expressed in one cell population (lacking *c-fos*) with *c-fos* transfected in a different cell population[151]. They observed *c-fos*-FLAG-tagged HuR complexes in the mixed lysates. They showed co-IP does not always recapitulate the interaction of what is happening *in vivo* and may provide false positive results if protein-mRNA complexes form spontaneously *in vitro*[151]. From this study it is possible to imagine that protein-protein complex could also form in the homogenization step and therefore not indicate what was present *in vivo* before homogenization.

I attempted to overcome this limitation by using complimentary methods of IP detection of RBPs and detection of RBPs on polysomes. Unlike smaller protein complexes, polysomes are large intricate ribonucleoprotein complexes that will not form spontaneously in cell extracts that do not provide substrates for translation initiation. Further, polysomes present in the cell at the time of homogenization can be preserved by adding CHX to the homogenization buffer[120]. Therefore, Aim 1 complemented Aim 2 by assessing mRNA binding proteins associated with intact polysomes. As discussed above, this helped adding some consistency, for example, in the observations of AUF1, and the missing HuB in both the polysomes and Hu IPs of NIC CA1.

Proteomic limitations

Even though it is very powerful, proteomics technology has limits that were faced in the studies. The main problem was protein concentration. Because I tried to find protein complexes in small brain regions, this limited the amount of protein per animal. Five animals had to be used to make one pooled sample. Even then, for the Hu IPs, the amount of protein was below that needed for iTRAQ labeling, and the Hu IPs could not be detected by iTRAQ since the protein was too low concentration. Also, because of the high amount of contaminants detected, the failure to consistently detect RBPs could be due to them being at low concentration in the samples relative to iTRAQ-labeled contaminants.

The solutions would be to add more animals, but this becomes impractical. To double the amount of protein would require 30 animals per group instead of 15. The time and cost of animals increase much more than the amount of protein obtained. I could not use a more abundant brain region for the studies, such as cerebral cortex, because it is so heterogeneous and I then could not compare a selectively vulnerable region to a resistant region. Cell culture could be used and not have such limitation. But cell culture is artificial and cannot model real brain ischemia. Therefore, the limit of protein concentration for proteomics cannot be easily overcome. Hopefully proteomic technology will continue to improve so one day to overcome these limits.

Detection of contamination

The most serious limit was contamination of the samples. Recognizing the extent of contamination was a consequence of using the state of the art proteomics, and this does not affect only my studies, but has implications for accepted practices. For the polysomes proteomics I tested 5 antisera for 3 organelles contaminating the samples, and all showed the samples to not be contaminated. But proteomics showed the polysome pellets to only consist of 25% ribosomal

proteins. In the IP reactions, even the no-antibody control showed over 100 proteins contaminating the beads, and the negative control using anti-histone had close to 200 proteins of contamination. A number of controls were performed to optimize the IPs (Figure 19), but still such contamination was found. As stated above, one consequence of the contamination is that it made the iTRAQ reactions less efficient because iTRAQ reagent was labeling the contaminants instead of the desired molecules. Therefore, in both IPs and polysome pellets, I probably detected less than all the RBPs than were present because of interference from the contaminants.

Generally, in the literature, when such studies are performed, the accepted practice is to Western blot for contaminants to show purity. As I showed here, this does not appear to be a good criterion. It is impossible to guess beforehand all possible contaminants and then do Western blots for them. My studies suggest that proteomics should become the accepted standard for determining the extent of contamination of purified fractions, especially when the fractions are isolated from whole animal tissues. This experience has now made me very cautious when I read the literature.

Possible function of "contaminant" protein 14-3-3

14-3-3 protein family is detected in both Hu IP proteomics and polysomes proteomics. It's detected in almost every samples including negative control. It is possible that 14-3-3 may be background, but it's also possible that 14-3-3 is serving a functional role. 14-3-3 is a family of highly homologous proteins and has been implicated in vital cellular processes, such as protein trafficking, cell signaling, and apoptosis, including many settings related to mRNA regulation.

Immunoprecipitation of 14-3-3 sigma from mitotic U2OS cells, followed by mass spec, showed that many proteins involved in protein translation and RNA transcription, including initiation factors and many ribosomal proteins, were the binding targets of 14-3-3 sigma[152]. However, although many 14-3-3 proteins were detected in the proteomics results, 14-3-3 sigma

was not among them. But we cannot rule out the possibility that 14-3-3 might be of a level to low to be detected. Another study using MS on 14-3-3 zeta affinity column elute also detected many initiation factors, ribosomal proteins and RNA binding proteins[153], and 14-3-3 zeta is detected in the proteomics. Co-IP experiments have also shown that HuR binds with different isoforms of 14-3-3, and some of the binding contribute to the cellular localization of HuR[137]. Taken together, this suggests that 14-3-3 is unlikely a random background hit, but possible of functional significance.

14-3-3 has implicated in mRNA regulation by binding with RBP either promoting or inhibiting ARE-mRNA degradation. 14-3-3 sigma binds with both p37 and p40 AUF-1, the two isoforms strongly associated with ARE-mRNA decay, promotes AUF-1 transport and ARE-mRNA decay[154]. The association of 14-3-3 with the phosphorylated KSRP, which also binds to ARE-mRNA, impairs KSRP's ability to interact with the exosomes thus slows the degradation of ARE-mRNA[155]. The association of 14-3-3 with TTP excludes TTP from stress granules and inhibits TTP dependent degradation of ARE-mRNA[156].

Given this large body of evidence, it is possible 14-3-3 proteins are not contaminants but in fact copurified with both the ribosomes and Hu IPs.

Future Directions

Even with the limits discussed above, when my results are combined with other results in the literature, I believe the conclusions reached are valid. HuB is missing from CA1 NIC, but is present at 8R; different RBPs were isolated from the four experimental conditions; and the mRNA populations were different from the pad and gradient methods. Additional studies could strengthen these findings. The main purpose of my PhD dissertation work was to gain molecular insight into the mRNA granules discovered in reperfused neurons. To further this purpose and build on the work described here, the following future directions are proposed:

1. Seek to identify the two Hu antisera-reactive bands not detected in NIC CA1. One method to accomplish this goal would be to excise the bands from nitrocellulose and subject them to LC-MS. Another method is to continue to test the commercial antisera for HuA, HuB, HuC and HuD. As mentioned above, I did preliminary work with other antisera, but these will require careful study to find the right conditions to obtain successful Western blot, which I was unable to obtain.
2. The mystery of how the two bands can be absent from NIC CA1 and present in 8R CA1 requires attention. The analysis of the microarray signal for HuB mRNA suggests that it is increasing during reperfusion, although the filter criteria applied in this study eliminated it from the significant hit list.

One method to determine if HuB mRNA increases during reperfusion is to perform real-time PCR with specific primers for the HuB mRNA and directly measure this mRNA.

Another method would be to show de novo translation of HuB during reperfusion. A way to accomplish this is to administer radioactive amino acids to reperfused animals and perform Hu protein IP. If radioactive HuB can be isolated from reperfused homogenates, this is evidence it is being translated during reperfusion.

Given the result that Hu antiserum-reactive proteins are delayed in the colocalization with mRNA granules, and this correlates with HSP70 translation, such studies could determine if the colocalization signal is HuB.

3. Biochemical isolation of the mRNA granules. This is the most important goal. In the course of my PhD work, an attempt was made to isolate the mRNA granules. Cortex from 8R animals containing mRNA granules was homogenized, fixed at various steps of fractionation, spread on microscope slides, and stained for polyA mRNAs using fluorescent *in situ* hybridization. Unfortunately, these pilot studies failed to detect

granular structures. What is interesting is that, by substituting the microarray studies for the biochemical isolation of mRNA granules, I obtained the unexpected result that the sucrose pad and sucrose gradient polysome preparations isolated different mRNA populations. As discussed above, this suggested the two methods are isolating different ribosome protein-containing structures. It is possible that pad or gradients is isolating the mRNA granules.

One way to get at testing this experimentally is to study the individual fractions from the sucrose gradient instead of pooling them. They can be studied by proteomics to detect RPBs, possibly by first further purifying gradient fractions since I have now shown the gradient fractions have much contamination. A method to see if the fractions contain particles is with light scattering to see if a fraction can be isolated that has a specific size particle. Western blot of the fractions can also be used to detect proteins that have been identified to colocalize with the mRNA granules including eIF4E, eIF4G, PABP, and the Hu proteins. This is one of the most exciting lines opened up by the studies described here and has the possibility of possibly isolating the mRNA granules.

Conclusions

The studies described here sought to identify RBP complexes that distinguished reperfused CA1 from CA3, to test the hypothesis that differences in mRNA regulation contributed to selective vulnerability of CA1. The work was a qualified success. Technical limitations prevented obtaining clean experimental results. But the work I have done will make it easier for any future work along these lines.

The work produced two unexpected results: HuB is lacking in NIC CA1, which might contribute to CA1 selective vulnerability, and (2) methods that are supposed to isolate polysomes gave very different results by proteomics and microarrays. This second result may have

inadvertently found a method to study mRNA binding structures in reperfused neurons and will require further investigation.

Finally, working with proteomics showed how “messy” the IP and polysome pad method were. My work described here illustrates the important lesson that when doing science, “the devil is in the details”. This was an eye-opening result that suggests that proteomic evaluation of purity should become the accepted standard for molecular studies of tissue.

My dissertation did not solve the problem of mRNA granules, but it furthered the study of ribonomics after brain ischemia in a substantial way and moves steps closer to understanding why neurons die in a delayed fashion after brain I/R. These are important results and give optimism that we will come to understand how and why the neurons die after I/R. This will allow treating an important clinical condition that devastates the lives of millions of people worldwide every year.

APPENDIX 1: MS PROTEOMICS OF PILOT POLYSOME PELLETS

Sucrose GRADIENT CA1	
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
GABT_RAT	4-aminobutyrate aminotransferase, mitochondrial Abat PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=1 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
CAP2_RAT	Adenylyl cyclase-associated protein 2 Cap2 PE=2 SV=1
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ALDH2_RAT	Aldehyde dehydrogenase, mitochondrial Aldh2 PE=1 SV=1
ACTZ_RAT	Alpha-centractin Actr1a PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
ANXA5_RAT	Annexin A5 Anxa5 PE=1 SV=3
ANXA6_RAT	Annexin A6 Anxa6 PE=1 SV=2
AQP4_RAT	Aquaporin-4 Aqp4 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
AT5F1_RAT	ATP synthase subunit b, mitochondrial Atp5f1 PE=1 SV=1
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPD_RAT	ATP synthase subunit delta, mitochondrial Atp5d PE=1 SV=2
ATPG_RAT	ATP synthase subunit gamma, mitochondrial Atp5c1 PE=1 SV=2
ATPO_RAT	ATP synthase subunit O, mitochondrial Atp5o PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
CANB1_RAT	Calcineurin subunit B type 1 Ppp3r1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2

CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CLH_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CSN3_RAT	COP9 signalosome complex subunit 3 Cops3 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
COX41_RAT	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial Cox4i1 PE=1 SV=1
COX5B_RAT	Cytochrome c oxidase subunit 5B, mitochondrial Cox5b PE=1 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
CYH2_RAT	Cytohesin-2 Cyth2 PE=1 SV=1
DEST_RAT	Destrin Dstn PE=1 SV=3
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase, mitochondrial Dlat PE=1 SV=3
ODO2_RAT	Dihydrolipoyllysine-residue succinyltransferase, mitochondrial Dlst PE=1 SV=2
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL4_RAT	Dihydropyrimidinase-related protein 4 (Fragment) Dpysl4 PE=1 SV=1
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DCTN1_RAT	Dynactin subunit 1 Dctn1 PE=2 SV=2
DCTN2_RAT	Dynactin subunit 2 Dctn2 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYL2_RAT	Dynein light chain 2, cytoplasmic Dynll2 PE=1 SV=1
RN138_RAT	E3 ubiquitin-protein ligase RNF138 Rnf138 PE=2 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
FLOT1_RAT	Flotillin-1 Flot1 PE=2 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GLRX3_RAT	Glutaredoxin-3 Glrx3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GPDA_RAT	Glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic Gpd1 PE=1 SV=4
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
HSP74_RAT	Heat shock 70 kDa protein 4 Hspa4 PE=1 SV=1
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2

HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
HINT1_RAT	Histidine triad nucleotide-binding protein 1 Hint1 PE=1 SV=5
H12_RAT	Histone H1.2 Hist1h1c PE=1 SV=3
HPLN1_RAT	Hyaluronan and proteoglycan link protein 1 Hapln1 PE=1 SV=2
IMB1_RAT	Importin subunit beta-1 Kpnb1 PE=1 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
K2C75_RAT	Keratin, type II cytoskeletal 75 Krt75 PE=2 SV=2
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
ASGL1_RAT	L-asparaginase Asrgl1 PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MK01_RAT	Mitogen-activated protein kinase 1 Mapk1 PE=1 SV=3
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
NDUAA_RAT	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial Ndufa10
NDUA9_RAT	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial Ndufa9
NDUS1_RAT	NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial Ndufs1 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PGAM2_RAT	Phosphoglycerate mutase 2 Pgam2 PE=2 SV=2
PA1B2_RAT	Platelet-activating factor acetylhydrolase IB subunit beta Pafah1b2 PE=1 SV=1
KCND2_RAT	Potassium voltage-gated channel subfamily D member 2 Kcnd2 PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
PSA3_RAT	Proteasome subunit alpha type-3 Psma3 PE=1 SV=3
PSA4_RAT	Proteasome subunit alpha type-4 Psma4 PE=1 SV=1
PSA6_RAT	Proteasome subunit alpha type-6 Psma6 PE=1 SV=1
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1

KPCE_RAT	Protein kinase C epsilon type Prkce PE=1 SV=1
S10A1_RAT	Protein S100-A1 S100a1 PE=1 SV=3
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
GRP75_RAT	Stress-70 protein, mitochondrial Hspa9 PE=1 SV=3
STIP1_RAT	Stress-induced-phosphoprotein 1 Stip1 PE=1 SV=1
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TCPB_RAT	T-complex protein 1 subunit beta Cct2 PE=1 SV=3
TCPE_RAT	T-complex protein 1 subunit epsilon Cct5 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
THIO_RAT	Thioredoxin Txn PE=1 SV=2
TYB10_RAT	Thymosin beta-10 Tmsb10 PE=2 SV=2
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=1 SV=2
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
ECHA_RAT	Trifunctional enzyme subunit alpha, mitochondrial Hadha PE=1 SV=2
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TMOD2_RAT	Tropomodulin-2 Tmod2 PE=1 SV=1
TPM3_RAT	Tropomyosin alpha-3 chain Tpm3 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA1B_RAT	Tubulin alpha-1B chain Tuba1b PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1

TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UBP21_RAT	Ubiquitin carboxyl-terminal hydrolase 21 Usp21 PE=2 SV=1
UBP42_RAT	Ubiquitin carboxyl-terminal hydrolase 42 Usp42 PE=3 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
KCY_RAT	UMP-CMP kinase Cmpk1 PE=1 SV=2
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VDAC1_RAT	Voltage-dependent anion-selective channel protein 1 Vdac1 PE=1 SV=4
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATC1_RAT	V-type proton ATPase subunit C 1 Atp6v1c1 PE=2 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

Sucrose GRADIENT CA3

CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
ODO1_RAT	2-oxoglutarate dehydrogenase, mitochondrial Ogdh PE=1 SV=1
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA1_RAT	60S acidic ribosomal protein P1 Rplp1 PE=3 SV=1
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=1 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ACYP2_RAT	Acylphosphatase-2 Acyp2 PE=1 SV=2
CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
CAP2_RAT	Adenylyl cyclase-associated protein 2 Cap2 PE=2 SV=1
ARL8B_RAT	ADP-ribosylation factor-like protein 8B Arl8b PE=2 SV=1
ACTZ_RAT	Alpha-centractin Actr1a PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
TRY1_RAT	Anionic trypsin-1 Prss1 PE=1 SV=1
ANXA5_RAT	Annexin A5 Anxa5 PE=1 SV=3

ANXA6_RAT	Annexin A6 Anxa6 PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
PEA15_RAT	Astrocytic phosphoprotein PEA-15 Pea15 PE=1 SV=1
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPD_RAT	ATP synthase subunit delta, mitochondrial Atp5d PE=1 SV=2
ATPG_RAT	ATP synthase subunit gamma, mitochondrial Atp5c1 PE=1 SV=2
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BRCA1_RAT	Breast cancer type 1 susceptibility protein homolog Brca1 PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CDC42_RAT	Cell division control protein 42 homolog Cdc42 PE=1 SV=2
CLH_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
QCR6_RAT	Cytochrome b-c1 complex subunit 6, mitochondrial Uqcrh PE=2 SV=1
UCRI_RAT	Cytochrome b-c1 complex subunit Rieske, mitochondrial Uqcrfs1 PE=1 SV=2
COX41_RAT	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial Cox4i1 PE=1 SV=1
COX5A_RAT	Cytochrome c oxidase subunit 5A, mitochondrial Cox5a PE=1 SV=1
COX5B_RAT	Cytochrome c oxidase subunit 5B, mitochondrial Cox5b PE=1 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
CYH2_RAT	Cytohesin-2 Cyth2 PE=1 SV=1
AMPL_RAT	Cytosol aminopeptidase Lap3 PE=1 SV=1
DEST_RAT	Destrin Dstn PE=1 SV=3
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase, mitochondrial Dlat PE=1 SV=3
ODO2_RAT	Dihydrolipoyllysine-residue succinyltransferase, mitochondrial Dlst PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DBNL_RAT	Drebrin-like protein Dbnl PE=1 SV=1
DYL2_RAT	Dynein light chain 2, cytoplasmic Dynll2 PE=1 SV=1
DLRB1_RAT	Dynein light chain roadblock-type 1 Dynlrb1 PE=1 SV=3
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAZA2_RAT	F-actin-capping protein subunit alpha-2 Capza2 PE=1 SV=1
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1

FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GLRX3_RAT	Glutaredoxin-3 Glrx3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GPDA_RAT	Glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic Gpd1 PE=1 SV=4
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
HINT1_RAT	Histidine triad nucleotide-binding protein 1 Hint1 PE=1 SV=5
H12_RAT	Histone H1.2 Hist1h1c PE=1 SV=3
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MK01_RAT	Mitogen-activated protein kinase 1 Mapk1 PE=1 SV=3
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
MTPN_RAT	Myotrophin Mtpn PE=1 SV=2
NDUV2_RAT	NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial Ndufv2 PE=1 SV=2
NDUS1_RAT	NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial Ndufs1 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3

PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PA1B2_RAT	Platelet-activating factor acetylhydrolase IB subunit beta Pafah1b2 PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PSA7_RAT	Proteasome subunit alpha type-7 Psma7 PE=1 SV=1
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
NDRG2_RAT	Protein NDRG2 Ndrg2 PE=1 SV=1
PIMT_RAT	Protein-L-isoaspartate(D-aspartate) O-methyltransferase Pcmt1 PE=1 SV=2
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, , mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAB1A_RAT	Ras-related protein Rab-1A Rab1A PE=1 SV=3
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
PP2AA_RAT	Serine/threonine-protein phosphatase 2A catalytic subunit alpha isoform Ppp2ca PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
STMN1_RAT	Stathmin Stmn1 PE=1 SV=2
GRP75_RAT	Stress-70 protein, mitochondrial Hspa9 PE=1 SV=3
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SYT10_RAT	Synaptotagmin-10 Syt10 PE=2 SV=2
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPB_RAT	T-complex protein 1 subunit beta Cct2 PE=1 SV=3
TCPE_RAT	T-complex protein 1 subunit epsilon Cct5 PE=1 SV=1
TCPG_RAT	T-complex protein 1 subunit gamma Cct3 PE=1 SV=1
THIO_RAT	Thioredoxin Txn PE=1 SV=2
TYB10_RAT	Thymosin beta-10 Tmsb10 PE=2 SV=2
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=1 SV=2
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TPM3_RAT	Tropomyosin alpha-3 chain Tpm3 PE=1 SV=2
TBA1B_RAT	Tubulin alpha-1B chain Tuba1b PE=1 SV=1

TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
KCY_RAT	UMP-CMP kinase Cmpk1 PE=1 SV=2
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

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1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
RS10_RAT	40S ribosomal protein S10 Rps10 PE=2 SV=1
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS7_RAT	40S ribosomal protein S7 Rps7 PE=1 SV=1
RS8_RAT	40S ribosomal protein S8 Rps8 PE=1 SV=2
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL11_RAT	60S ribosomal protein L11 Rpl11 PE=1 SV=2
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1

RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL36A_RAT	60S ribosomal protein L36a Rpl36a PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
RL9_RAT	60S ribosomal protein L9 Rpl9 PE=1 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACTN1_RAT	Alpha-actinin-1 Actn1 PE=1 SV=1
ACTN4_RAT	Alpha-actinin-4 Actn4 PE=1 SV=2
BAF_RAT	Barrier-to-autointegration factor Banf1 PE=1 SV=1
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
CCD50_RAT	Coiled-coil domain-containing protein 50 Ccdc50 PE=2 SV=1
CELF1_RAT	CUGBP Elav-like family member 1 Celf1 PE=2 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
ROA1_RAT	Heterogeneous nuclear ribonucleoprotein A1 Hnrnpa1 PE=1 SV=3
HNRPC_RAT	Heterogeneous nuclear ribonucleoprotein C (Fragment) Hnrnpc PE=2 SV=1
ROA2_RAT	Heterogeneous nuclear ribonucleoproteins A2/B1 Hnrnpa2b1 PE=1 SV=1
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NPM_RAT	Nucleophosmin Npm1 PE=1 SV=1
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
RGPA2_RAT	Ral GTPase-activating protein subunit alpha-2 Ralgapa2 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1

1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL28_RAT	60S ribosomal protein L28 Rpl28 PE=1 SV=4
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ACYP2_RAT	Acylphosphatase-2 Acyp2 PE=1 SV=2
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1

AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=2 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
E41L1_RAT	Band 4.1-like protein 1 Epb41l1 PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BCAT1_RAT	Branched-chain-amino-acid aminotransferase, cytosolic Bcat1 PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
CANB1_RAT	Calcineurin subunit B type 1 Ppp3r1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CAMKV_RAT	CaM kinase-like vesicle-associated protein Camkv PE=1 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCA_RAT	Clathrin light chain A Clta PE=1 SV=1
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
CLUS_RAT	Clusterin Clu PE=1 SV=2
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=2 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
ES1_RAT	ES1 protein homolog, mitochondrial OS=Rattus norvegicus PE=1 SV=2
EIF3B_RAT	Eukaryotic translation initiation factor 3 subunit B Eif3b PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3

HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
IL1AP_RAT	Interleukin-1 receptor accessory protein Il1rap PE=2 SV=1
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MMEL1_RAT	Membrane metallo-endopeptidase-like 1 Mmel1 PE=1 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MLP3A_RAT	Microtubule-associated proteins 1A/1B light chain 3A Map1lc3a PE=1 SV=1
M3K12_RAT	Mitogen-activated protein kinase kinase kinase 12 Map3k12 PE=1 SV=1
MORN1_RAT	MORN repeat-containing protein 1 Morn1 PE=2 SV=1
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
MYH10_RAT	Myosin-10 Myh10 PE=1 SV=1
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PICAL_RAT	Phosphatidylinositol-binding clathrin assembly protein Picalm PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
GON1_RAT	Progonadoliberin-1 Gnrh1 PE=1 SV=1
NELL1_RAT	Protein kinase C-binding protein NELL1 Nell1 PE=2 SV=2
SC31A_RAT	Protein transport protein Sec31A Sec31a PE=1 SV=2
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1

PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
SI1L2_RAT	Signal-induced proliferation-associated 1-like protein 2 Sipa1l2 PE=2 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
GTR3_RAT	Solute carrier family 2, facilitated glucose transporter member 3 Slc2a3 PE=1 SV=1
S22A1_RAT	Solute carrier family 22 member 1 Slc22a1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TOPZ1_RAT	Testis- and ovary-specific PAZ domain-containing protein 1 Topaz1 PE=3 SV=1
THIO_RAT	Thioredoxin Txn PE=1 SV=2
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TRIL_RAT	TLR4 interactor with leucine rich repeats Tril PE=2 SV=1
TPM1_RAT	Tropomyosin alpha-1 chain Tpm1 PE=1 SV=3
TPM3_RAT	Tropomyosin alpha-3 chain Tpm3 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UCHL3_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L3 Uchl3 PE=1 SV=1
RL40_RAT	Ubiquitin-60S ribosomal protein L40 Uba52 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WIPF3_RAT	WAS/WASL-interacting protein family member 3 Wipf3 PE=1 SV=1

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1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15_RAT	40S ribosomal protein S15 Rps15 PE=1 SV=2
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3

RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS7_RAT	40S ribosomal protein S7 Rps7 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL11_RAT	60S ribosomal protein L11 Rpl11 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL22_RAT	60S ribosomal protein L22 Rpl22 PE=2 SV=2
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ACTN1_RAT	Alpha-actinin-1 Actn1 PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AINX_RAT	Alpha-internexin Ina PE=1 SV=2
TRY1_RAT	Anionic trypsin-1 Prss1 PE=1 SV=1

AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AGAP2_RAT	Arf-GAP with GTPase, ANK repeat and PH domain-containing protein 2 Agap2 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
ABCB9_RAT	ATP-binding cassette sub-family B member 9 Abcb9 PE=1 SV=1
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
CANB1_RAT	Calcineurin subunit B type 1 Ppp3r1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CCD50_RAT	Coiled-coil domain-containing protein 50 Ccdc50 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=2 SV=3
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
FRS3_RAT	Fibroblast growth factor receptor substrate 3 Frs3 PE=2 SV=3
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GFAP_RAT	Glial fibrillary acidic protein Gfap PE=1 SV=2
GRM1A_RAT	GRAM domain-containing protein 1A Gramd1a PE=2 SV=2
GBB2_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-2 Gnb2 PE=1 SV=4
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
H2A1C_RAT	Histone H2A type 1-C OS=Rattus norvegicus PE=1 SV=2
H2B1_RAT	Histone H2B type 1 OS=Rattus norvegicus PE=1 SV=2
H2B1A_RAT	Histone H2B type 1-A Hist1h2ba PE=1 SV=2
H4_RAT	Histone H4 Hist1h4b PE=1 SV=2
IP3KA_RAT	Inositol-trisphosphate 3-kinase A Itpka PE=1 SV=3
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1

K1C20_RAT	Keratin, type I cytoskeletal 20 Krt20 PE=2 SV=2
K1C25_RAT	Keratin, type I cytoskeletal 25 Krt25 PE=2 SV=1
K2C1_RAT	Keratin, type II cytoskeletal 1 Krt1 PE=2 SV=1
K2C1B_RAT	Keratin, type II cytoskeletal 1b Krt77 PE=2 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=2 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
K2C73_RAT	Keratin, type II cytoskeletal 73 Krt73 PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
M3K12_RAT	Mitogen-activated protein kinase kinase kinase 12 Map3k12 PE=1 SV=1
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
RENBP_RAT	N-acylglucosamine 2-epimerase Renbp PE=2 SV=2
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NFH_RAT	Neurofilament heavy polypeptide Nefh PE=1 SV=4
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
ORC3_RAT	Origin recognition complex subunit 3 Orc3 PE=2 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
GPR37_RAT	Probable G-protein coupled receptor 37 Gpr37 PE=2 SV=1
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
KPYR_RAT	Pyruvate kinase isozymes R/L Pklr PE=2 SV=2
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
BRX1_RAT	Ribosome biogenesis protein BRX1 homolog Brix1 PE=2 SV=1
PRP4B_RAT	Serine/threonine-protein kinase PRP4 homolog Prpf4b PE=2 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B Ppp3ca PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
T30A2_RAT	Tetratricopeptide repeat protein 30A2 Ttc30a2 PE=2 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1

TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
PLCB3_RAT	1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase beta-3 Plcb3 PE=1 SV=2
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
PSMD2_RAT	26S proteasome non-ATPase regulatory subunit 2 Psmd2 PE=2 SV=1
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL22_RAT	60S ribosomal protein L22 Rpl22 PE=2 SV=2
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
PTPS_RAT	6-pyruvoyl tetrahydrobiopterin synthase Pts PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTG_RAT	Actin, cytoplasmic 2 Actg1 PE=1 SV=1

CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=2 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
PEA15_RAT	Astrocytic phosphoprotein PEA-15 Pea15 PE=1 SV=1
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
E41L1_RAT	Band 4.1-like protein 1 Epb41l1 PE=1 SV=1
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BCAT1_RAT	Branched-chain-amino-acid aminotransferase, cytosolic Bcat1 PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CAMKV_RAT	CaM kinase-like vesicle-associated protein Camkv PE=1 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCA_RAT	Clathrin light chain A Clta PE=1 SV=1
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase component of pyruvate dehydrogenase complex, mitochondrial Dlat PE=1 SV=3
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
TFB1M_RAT	Dimethyladenosine transferase 1, mitochondrial Tfb1m PE=2 SV=1
DPOLA_RAT	DNA polymerase alpha catalytic subunit (Fragment) Pola1 PE=2 SV=1
RPA1_RAT	DNA-directed RNA polymerase I subunit RPA1 Polr1a PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=2 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
ENPL_RAT	Endoplasmin Hsp90b1 PE=1 SV=2
EIF3B_RAT	Eukaryotic translation initiation factor 3 subunit B Eif3b PE=1 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2

CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HMMR_RAT	Hyaluronan-mediated motility receptor Hmmr PE=2 SV=1
IL1AP_RAT	Interleukin-1 receptor accessory protein Il1rap PE=2 SV=1
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
KAT3_RAT	Kynurenine--oxoglutarate transaminase 3 Ccbl2 PE=2 SV=1
LRRC7_RAT	Leucine-rich repeat-containing protein 7 Lrrc7 PE=1 SV=2
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MLP3A_RAT	Microtubule-associated proteins 1A/1B light chain 3A Map1lc3a PE=1 SV=1
M3K12_RAT	Mitogen-activated protein kinase kinase kinase 12 Map3k12 PE=1 SV=1
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
O1174_RAT	Olfactory receptor 1174 Olr1174 PE=2 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRGC1_RAT	Peroxisome proliferator-activated receptor gamma coactivator 1-alpha Ppargc1a PE=2 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
NELL1_RAT	Protein kinase C-binding protein NELL1 Nell1 PE=2 SV=2
RUFY3_RAT	Protein RUFY3 Rufy3 PE=1 SV=1
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2

KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
PRPS1_RAT	Ribose-phosphate pyrophosphokinase 1 Prps1 PE=1 SV=2
ELL3_RAT	RNA polymerase II elongation factor ELL3 Ell3 PE=2 SV=1
RBM43_RAT	RNA-binding protein 43 Rbm43 PE=2 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
GTR3_RAT	Solute carrier family 2, facilitated glucose transporter member 3 Slc2a3 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPRTN_RAT	SprT-like domain-containing protein Spartan Sprtn PE=2 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TCPB_RAT	T-complex protein 1 subunit beta Cct2 PE=1 SV=3
CRYM_RAT	Thiomorpholine-carboxylate dehydrogenase Crym PE=1 SV=1
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TPM1_RAT	Tropomyosin alpha-1 chain Tpm1 PE=1 SV=3
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA1B_RAT	Tubulin alpha-1B chain Tuba1b PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RL40_RAT	Ubiquitin-60S ribosomal protein L40 Uba52 PE=1 SV=2
MYO9A_RAT	Unconventional myosin-IXa Myo9a PE=1 SV=1
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
S39A6_RAT	Zinc transporter ZIP6 Slc39a6 PE=2 SV=1

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1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1

1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL31_RAT	60S ribosomal protein L31 Rpl31 PE=2 SV=1
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
RL9_RAT	60S ribosomal protein L9 Rpl9 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ACTN1_RAT	Alpha-actinin-1 Actn1 PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
BLNK_RAT	B-cell linker protein Blnk PE=2 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3

BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BCAT1_RAT	Branched-chain-amino-acid aminotransferase, cytosolic Bcat1 PE=1 SV=1
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CAPR1_RAT	Caprin-1 Caprin1 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
CCD50_RAT	Coiled-coil domain-containing protein 50 Ccdc50 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
TOP2A_RAT	DNA topoisomerase 2-alpha Top2a PE=2 SV=1
RPA1_RAT	DNA-directed RNA polymerase I subunit RPA1 Polr1a PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=2 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HSP71_RAT	Heat shock 70 kDa protein 1A/1B Hspa1a PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HNRPK_RAT	Heterogeneous nuclear ribonucleoprotein K Hnrnpk PE=1 SV=1
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
K1C20_RAT	Keratin, type I cytoskeletal 20 Krt20 PE=2 SV=2
K2C5_RAT	Keratin, type II cytoskeletal 5 Krt5 PE=1 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
K2C75_RAT	Keratin, type II cytoskeletal 75 Krt75 PE=2 SV=2
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
LRIQ3_RAT	Leucine-rich repeat and IQ domain-containing protein 3 Lrriq3 PE=2 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3

MEGF8_RAT	Multiple epidermal growth factor-like domains protein 8 Megf8 PE=2 SV=2
MBP_RAT	Myelin basic protein S Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NUCL_RAT	Nucleolin Ncl PE=1 SV=3
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=2 SV=1
KCNT2_RAT	Potassium channel subfamily T member 2 Kcnt2 PE=1 SV=1
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
PDIA1_RAT	Protein disulfide-isomerase P4hb PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
RL37P_RAT	Putative 60S ribosomal protein L37a Rpl37a-ps1 PE=5 SV=2
KPYM_RAT	Pyruvate kinase isozymes M1/M2 Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RELN_RAT	Reelin Reln PE=2 SV=1
RHOQ_RAT	Rho-related GTP-binding protein RhoQ Rhoq PE=2 SV=1
PRS23_RAT	Serine protease 23 Prss23 PE=2 SV=1
PP1G_RAT	Serine/threonine-protein phosphatase PP1-gamma catalytic subunit Ppp1cc PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=1 SV=2
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VATC1_RAT	V-type proton ATPase subunit C 1 Atp6v1c1 PE=2 SV=1

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1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2

1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS17_RAT	40S ribosomal protein S17 Rps17 PE=1 SV=3
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS26_RAT	40S ribosomal protein S26 Rps26 PE=3 SV=3
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS7_RAT	40S ribosomal protein S7 Rps7 PE=1 SV=1
RS8_RAT	40S ribosomal protein S8 Rps8 PE=1 SV=2
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
RL10_RAT	60S ribosomal protein L10 Rpl10 PE=1 SV=3
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL11_RAT	60S ribosomal protein L11 Rpl11 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL27A_RAT	60S ribosomal protein L27a Rpl27a PE=1 SV=3
RL28_RAT	60S ribosomal protein L28 Rpl28 PE=1 SV=4
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL30_RAT	60S ribosomal protein L30 Rpl30 PE=3 SV=2
RL38_RAT	60S ribosomal protein L38 Rpl38 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3

RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
RL9_RAT	60S ribosomal protein L9 Rpl9 PE=1 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
AINX_RAT	Alpha-internexin Ina PE=1 SV=2
ANXA6_RAT	Annexin A6 Anxa6 PE=1 SV=2
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
ADDB_RAT	Beta-adducin Add2 PE=2 SV=4
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CAPR1_RAT	Caprin-1 Caprin1 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLAP2_RAT	CLIP-associating protein 2 Clasp2 PE=2 SV=1
CLUS_RAT	Clusterin Clu PE=1 SV=2
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CXCR4_RAT	C-X-C chemokine receptor type 4 Cxcr4 PE=2 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DLG4_RAT	Disks large homolog 4 Dlg4 PE=1 SV=1
DSRAD_RAT	Double-stranded RNA-specific adenosine deaminase Adar PE=2 SV=1
DCTN1_RAT	Dynactin subunit 1 Dctn1 PE=1 SV=2
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EIF3A_RAT	Eukaryotic translation initiation factor 3 subunit A Eif3a PE=2 SV=2
EIF3B_RAT	Eukaryotic translation initiation factor 3 subunit B Eif3b PE=1 SV=1
EIF3C_RAT	Eukaryotic translation initiation factor 3 subunit C Eif3c PE=2 SV=1
FAS_RAT	Fatty acid synthase Fasn PE=1 SV=3
FARP1_RAT	FERM, RhoGEF and pleckstrin domain-containing protein 1 Farp1 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
GOGA4_RAT	Golgin subfamily A member 4 Golga4 PE=1 SV=2
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
ROA3_RAT	Heterogeneous nuclear ribonucleoprotein A3 Hnrnpa3 PE=1 SV=1

HNRDL_RAT	Heterogeneous nuclear ribonucleoprotein D-like Hnrpdl PE=2 SV=1
HNRPF_RAT	Heterogeneous nuclear ribonucleoprotein F Hnrnpf PE=1 SV=3
HNRH1_RAT	Heterogeneous nuclear ribonucleoprotein H Hnrnph1 PE=1 SV=2
HNRPK_RAT	Heterogeneous nuclear ribonucleoprotein K Hnrnpk PE=1 SV=1
HNRPQ_RAT	Heterogeneous nuclear ribonucleoprotein Q Syncrip PE=2 SV=1
ROA2_RAT	Heterogeneous nuclear ribonucleoproteins A2/B1 Hnrnpa2b1 PE=1 SV=1
HPCL4_RAT	Hippocalcin-like protein 4 Hpcal4 PE=2 SV=2
INS2_RAT	Insulin-2 Ins2 PE=1 SV=1
ILF3_RAT	Interleukin enhancer-binding factor 3 Ilf3 PE=1 SV=2
JKIP1_RAT	Janus kinase and microtubule-interacting protein 1 Jakmip1 PE=1 SV=1
KALRN_RAT	Kalirin Kalrn PE=1 SV=3
K1C10_RAT	Keratin, type I cytoskeletal 10 Krt10 PE=2 SV=1
K1C20_RAT	Keratin, type I cytoskeletal 20 Krt20 PE=2 SV=2
K2C4_RAT	Keratin, type II cytoskeletal 4 Krt4 PE=2 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
LIPA3_RAT	Liprin-alpha-3 Ppfia3 PE=1 SV=2
LA_RAT	Lupus La protein homolog Ssb PE=2 SV=1
MATR3_RAT	Matrin-3 Matr3 PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NEB1_RAT	Neurabin-1 Ppp1r9a PE=1 SV=1
NFH_RAT	Neurofilament heavy polypeptide Nefh PE=1 SV=4
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NFM_RAT	Neurofilament medium polypeptide Nefm PE=1 SV=4
YBOX1_RAT	Nuclease-sensitive element-binding protein 1 Ybx1 PE=1 SV=3
NUCL_RAT	Nucleolin Ncl PE=1 SV=3
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
OSBL1_RAT	Oxysterol-binding protein-related protein 1 Osbpl1a PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=2 SV=1
AGO2_RAT	Protein argonaute-2 Ago2 PE=2 SV=2
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
PRC2A_RAT	Protein PRRC2A Prrc2a PE=1 SV=1
DHX30_RAT	Putative ATP-dependent RNA helicase DHX30 Dhx30 PE=1 SV=1
TDRD9_RAT	Putative ATP-dependent RNA helicase TDRD9 Tdrd9 PE=2 SV=3
RBMX_RAT	RNA-binding motif protein, X chromosome Rbmx PE=1 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
DCLK2_RAT	Serine/threonine-protein kinase DCLK2 Dclk2 PE=1 SV=2
MARK2_RAT	Serine/threonine-protein kinase MARK2 Mark2 PE=1 SV=1

SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
TR150_RAT	Thyroid hormone receptor-associated protein 3 Thrap3 PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TP8L2_RAT	Tumor necrosis factor alpha-induced protein 8-like protein 2 Tnfaip8l2 PE=2 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
MYO5B_RAT	Unconventional myosin-Vb Myo5b PE=1 SV=1
VIME_RAT	Vimentin Vim PE=1 SV=2
VISL1_RAT	Visinin-like protein 1 Vsnl1 PE=1 SV=2
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
ZFR_RAT	Zinc finger RNA-binding protein Zfr PE=1 SV=2

APPENDIX 2: iTAQ PROTEOMICS OF POLYSOME FRACTIONS

Polysome proteomics 2nd iTRAQ run - Group A	
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS10_RAT	40S ribosomal protein S10 Rps10 PE=2 SV=1
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS17_RAT	40S ribosomal protein S17 Rps17 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS7_RAT	40S ribosomal protein S7 Rps7 PE=1 SV=1
RS8_RAT	40S ribosomal protein S8 Rps8 PE=1 SV=2
GABT_RAT	4-aminobutyrate aminotransferase, mitochondrial Abat PE=1 SV=3
AAPK1_RAT	5'-AMP-activated protein kinase catalytic subunit alpha-1 Prkaa1 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL21_RAT	60S ribosomal protein L21 Rpl21 PE=1 SV=3
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL27A_RAT	60S ribosomal protein L27a Rpl27a PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL30_RAT	60S ribosomal protein L30 Rpl30 PE=3 SV=2
RL31_RAT	60S ribosomal protein L31 Rpl31 PE=2 SV=1
RL32_RAT	60S ribosomal protein L32 Rpl32 PE=1 SV=2
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2

ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
SAHH_RAT	Adenosylhomocysteinase Ahcy PE=1 SV=3
ACTN1_RAT	Alpha-actinin-1 Actn1 PE=1 SV=1
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AMPH_RAT	Amphiphysin Amph PE=1 SV=1
AP1B1_RAT	AP-1 complex subunit beta-1 Ap1b1 PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
IDLC_RAT	Axonemal dynein light intermediate polypeptide 1 Dnali1 PE=2 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
PUR9_RAT	Bifunctional purine biosynthesis protein PURH Atic PE=1 SV=2
BMP3_RAT	Bone morphogenetic protein 3 Bmp3 PE=2 SV=1
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CAPS1_RAT	Calcium-dependent secretion activator 1 Cadps PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
COR1B_RAT	Coronin-1B Coro1b PE=1 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CSRP1_RAT	Cysteine and glycine-rich protein 1 Csrp1 PE=2 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DYHC2_RAT	Cytoplasmic dynein 2 heavy chain 1 Dync2h1 PE=1 SV=1
DEST_RAT	Destrin Dstn PE=1 SV=3
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
DHPR_RAT	Dihydropteridine reductase Qdpr PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
TRIPC_RAT	E3 ubiquitin-protein ligase TRIP12 Trip12 PE=2 SV=1
EFHD2_RAT	EF-hand domain-containing protein D2 Efhd2 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF1G_RAT	Elongation factor 1-gamma Eef1g PE=1 SV=3

EIF3B_RAT	Eukaryotic translation initiation factor 3 subunit B Eif3b PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
GELS_RAT	Gelsolin Gsn PE=1 SV=1
G6PD_RAT	Glucose-6-phosphate 1-dehydrogenase G6pdx PE=1 SV=3
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GPX1_RAT	Glutathione peroxidase 1 Gpx1 PE=1 SV=4
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HNRPD_RAT	Heterogeneous nuclear ribonucleoprotein D0 Hnrnpd PE=1 SV=1
HNRPQ_RAT	Heterogeneous nuclear ribonucleoprotein Q Syncrip PE=2 SV=1
HPLN1_RAT	Hyaluronan and proteoglycan link protein 1 Hapln1 PE=1 SV=2
IMPA1_RAT	Inositol monophosphatase 1 Impa1 PE=1 SV=2
IP3KA_RAT	Inositol-trisphosphate 3-kinase A Itpka PE=1 SV=3
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
CRYL1_RAT	Lambda-crystallin homolog Cryl1 PE=2 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
PRIO_RAT	Major prion protein Prnp PE=1 SV=2
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE2_RAT	Microtubule-associated protein RP/EB family member 2 Mapre2 PE=2 SV=1
MK01_RAT	Mitogen-activated protein kinase 1 Mapk1 PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
NCKP1_RAT	Nck-associated protein 1 Nckap1 PE=2 SV=1
NCALD_RAT	Neurocalcin-delta Ncald PE=1 SV=3
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NFM_RAT	Neurofilament medium polypeptide Nefm PE=1 SV=4
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
NUMBL_RAT	Numb-like protein Numbl PE=1 SV=1
P2RY1_RAT	P2Y purinoceptor 1 P2ry1 PE=2 SV=1

PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PHF7_RAT	PHD finger protein 7 Phf7 PE=2 SV=1
PIPNA_RAT	Phosphatidylinositol transfer protein alpha isoform Pitpna PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PHIPL_RAT	Phytanoyl-CoA hydroxylase-interacting protein-like Phyhipl PE=2 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF3_RAT	Profilin-3 Pfn3 PE=2 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
SC31A_RAT	Protein transport protein Sec31A Sec31a PE=1 SV=2
RL37P_RAT	Putative 60S ribosomal protein L37a Rpl37a-ps1 PE=5 SV=2
PDXK_RAT	Pyridoxal kinase Pdxk PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
PP1A_RAT	Serine/threonine-protein phosphatase PP1-alpha catalytic subunit Ppp1ca PE=1 SV=1
S22AC_RAT	Solute carrier family 22 member 12 Slc22a12 PE=2 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
STIP1_RAT	Stress-induced-phosphoprotein 1 Stip1 PE=1 SV=1
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT2_RAT	Synaptotagmin-2 Syt2 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
RTCB_RAT	tRNA-splicing ligase RtcB homolog Rtcb PE=2 SV=1
TMOD2_RAT	Tropomodulin-2 Tmod2 PE=1 SV=1
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
UBP48_RAT	Ubiquitin carboxyl-terminal hydrolase 48 Usp48 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1

UBA1_RAT	Ubiquitin-like modifier-activating enzyme 1 Uba1 PE=1 SV=1
SYVC_RAT	Valine--tRNA ligase Vars PE=2 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATC1_RAT	V-type proton ATPase subunit C 1 Atp6v1c1 PE=2 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1

Polysome proteomics 2nd iTRAQ run - Group B	
1433E_RAT	14-3-3 protein epsilon
1433T_RAT	14-3-3 protein theta
1433Z_RAT	14-3-3 protein zeta/delta
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
BPNT1_RAT	3'(2'),5'-bisphosphate nucleotidase 1 Bpnt1 PE=1 SV=1
RS10_RAT	40S ribosomal protein S10 Rps10 PE=2 SV=1
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS15_RAT	40S ribosomal protein S15 Rps15 PE=1 SV=2
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS17_RAT	40S ribosomal protein S17 Rps17 PE=1 SV=3
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS26_RAT	40S ribosomal protein S26 Rps26 PE=3 SV=3
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS8_RAT	40S ribosomal protein S8 Rps8 PE=1 SV=2
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
GABT_RAT	4-aminobutyrate aminotransferase, mitochondrial Abat PE=1 SV=3
RLA1_RAT	60S acidic ribosomal protein P1 Rplp1 PE=3 SV=1
RL10_RAT	60S ribosomal protein L10 Rpl10 PE=1 SV=3
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL21_RAT	60S ribosomal protein L21 Rpl21 PE=1 SV=3
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL27A_RAT	60S ribosomal protein L27a Rpl27a PE=1 SV=3
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL31_RAT	60S ribosomal protein L31 Rpl31 PE=2 SV=1
RL32_RAT	60S ribosomal protein L32 Rpl32 PE=1 SV=2

RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL39_RAT	60S ribosomal protein L39 Rpl39 PE=1 SV=2
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
K6PP_RAT	6-phosphofructokinase type C Pfkp PE=1 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
SAHH_RAT	Adenosylhomocysteinase Ahcy PE=1 SV=3
AOXA_RAT	Aldehyde oxidase 1 Aox1 PE=1 SV=1
ALD1_RAT	Aldose reductase-related protein 1 Akr1b7 PE=1 SV=1
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
AINX_RAT	Alpha-internexin Ina PE=1 SV=2
ATAT_RAT	Alpha-tubulin N-acetyltransferase 1 Atat1 PE=3 SV=1
AMPH_RAT	Amphiphysin Amph PE=1 SV=1
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
ADDB_RAT	Beta-adducin Add2 PE=2 SV=4
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
CAPS1_RAT	Calcium-dependent secretion activator 1 Cadps PE=1 SV=1
CBPQ_RAT	Carboxypeptidase Q Cpq PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DGKB_RAT	Diacylglycerol kinase beta Dgkb PE=2 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DCTN1_RAT	Dynactin subunit 1 Dctn1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
DYH1_RAT	Dynein heavy chain 1, axonemal Dnah1 PE=2 SV=2

DYH12_RAT	Dynein heavy chain 12, axonemal Dnah12 PE=2 SV=2
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
ERAP1_RAT	Endoplasmic reticulum aminopeptidase 1 Erap1 PE=2 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
G6PD_RAT	Glucose-6-phosphate 1-dehydrogenase G6pdx PE=1 SV=3
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HNRPM_RAT	Heterogeneous nuclear ribonucleoprotein M Hnrnpm PE=1 SV=4
HNRPQ_RAT	Heterogeneous nuclear ribonucleoprotein Q Syncrip PE=2 SV=1
HPCL1_RAT	Hippocalcin-like protein 1 Hpcal1 PE=1 SV=2
H14_RAT	Histone H1.4 Hist1h1e PE=1 SV=3
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE2_RAT	Microtubule-associated protein RP/EB family member 2 Mapre2 PE=2 SV=1
MK01_RAT	Mitogen-activated protein kinase 1 Mapk1 PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
NCKP1_RAT	Nck-associated protein 1 Nckap1 PE=2 SV=1
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NUCL_RAT	Nucleolin Ncl PE=1 SV=3
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
P2RX4_RAT	P2X purinoceptor 4 P2rx4 PE=1 SV=1
PPID_RAT	Peptidyl-prolyl cis-trans isomerase D Ppid PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
SHIP2_RAT	Phosphatidylinositol 3,4,5-trisphosphate 5-phosphatase 2 Inppl1 PE=1 SV=1
PIPNA_RAT	Phosphatidylinositol transfer protein alpha isoform Pitpna PE=1 SV=2
PGAM2_RAT	Phosphoglycerate mutase 2 Pgam2 PE=2 SV=2

PROF3_RAT	Profilin-3 Pfn3 PE=2 SV=1
PRRP_RAT	Prolactin-releasing peptide Prlh PE=2 SV=1
PSB4_RAT	Proteasome subunit beta type-4 Psmb4 PE=1 SV=2
FA98A_RAT	Protein FAM98A Fam98a PE=2 SV=1 (SEE HUMAN)
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
PRC2A_RAT	Protein PRRC2A Prrc2a PE=1 SV=1
SC31A_RAT	Protein transport protein Sec31A Sec31a PE=1 SV=2
RL37P_RAT	Putative 60S ribosomal protein L37a Rpl37a-ps1 PE=5 SV=2
PDXK_RAT	Pyridoxal kinase Pdxk PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca
PP1A_RAT	Serine/threonine-protein phosphatase PP1-alpha catalytic subunit Ppp1ca PE=1 SV=1
HENMT_RAT	Small RNA 2'-O-methyltransferase Henmt1 PE=2 SV=1
NAGT1_RAT	Sodium-dependent glucose transporter 1 Naglt1 PE=2 SV=1
S22AC_RAT	Solute carrier family 22 member 12 Slc22a12 PE=2 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2B_RAT	Synaptic vesicle glycoprotein 2B Sv2b PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
RTCB_RAT	tRNA-splicing ligase RtcB homolog Rtcb PE=2 SV=1
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
VPS45_RAT	Vacuolar protein sorting-associated protein 45 Vps45 PE=1 SV=1
SYVC_RAT	Valine--tRNA ligase Vars PE=2 SV=2
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
WDR7_RAT	WD repeat-containing protein 7 Wdr7 PE=2 SV=1

APPENDIX 3: LC-MS PROTEOMICS OF POLYSOME PELLET OF INDIVIDUAL SAMPLES

NIC CA1 sample 1 LC-MS	
AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
PLCB4_RAT	1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase beta-4 Plcb4 PE=2 SV=2
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
PRS4_RAT	26S protease regulatory subunit 4 Psmc1 PE=2 SV=1
PRS6B_RAT	26S protease regulatory subunit 6B Psmc4 PE=1 SV=1
ODO1_RAT	2-oxoglutarate dehydrogenase, mitochondrial Ogdh PE=1 SV=1
HMDH_RAT	3-hydroxy-3-methylglutaryl-coenzyme A reductase Hmgcr PE=1 SV=2
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15_RAT	40S ribosomal protein S15 Rps15 PE=1 SV=2
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS24_RAT	40S ribosomal protein S24 Rps24 PE=2 SV=1
RS27_RAT	40S ribosomal protein S27 Rps27 PE=2 SV=3
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3

RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL21_RAT	60S ribosomal protein L21 Rpl21 PE=1 SV=3
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL28_RAT	60S ribosomal protein L28 Rpl28 PE=1 SV=4
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL32_RAT	60S ribosomal protein L32 Rpl32 PE=1 SV=2
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
RL9_RAT	60S ribosomal protein L9 Rpl9 PE=1 SV=1
K6PP_RAT	6-phosphofructokinase type C Pfkp PE=1 SV=2
K6PL_RAT	6-phosphofructokinase, liver type Pfkl PE=2 SV=3
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
6PGD_RAT	6-phosphogluconate dehydrogenase, decarboxylating Pgd PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP5L_RAT	Actin-related protein 2/3 complex subunit 5-like protein Arpc5l PE=1 SV=2
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACO12_RAT	Acyl-coenzyme A thioesterase 12 Acot12 PE=1 SV=1
SAHH_RAT	Adenosylhomocysteinase Ahcy PE=1 SV=3
CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
CAP2_RAT	Adenylyl cyclase-associated protein 2 Cap2 PE=2 SV=1
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ARL1_RAT	ADP-ribosylation factor-like protein 1 Arl1 PE=1 SV=1
SYAC_RAT	Alanine--tRNA ligase, cytoplasmic Aars PE=1 SV=3

AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
ALDR_RAT	Aldose reductase Akr1b1 PE=1 SV=3
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
ACTZ_RAT	Alpha-centractin Actr1a PE=1 SV=1
ENSA_RAT	Alpha-endosulfine Ensa PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AMPN_RAT	Aminopeptidase N Anpep PE=1 SV=2
AMPH_RAT	Amphiphysin Amph PE=1 SV=1
TRY1_RAT	Anionic trypsin-1 Prss1 PE=1 SV=1
ANS1B_RAT	Ankyrin repeat and sterile alpha motif domain-containing protein 1B Anks1b PE=1 SV=1
AP1B1_RAT	AP-1 complex subunit beta-1 Ap1b1 PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AQP4_RAT	Aquaporin-4 Aqp4 PE=1 SV=1
AGFG1_RAT	Arf-GAP domain and FG repeat-containing protein 1 Agfg1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATPO_RAT	ATP synthase subunit O, mitochondrial Atp5o PE=1 SV=1
E41L1_RAT	Band 4.1-like protein 1 Epb41l1 PE=1 SV=1
ARRB1_RAT	Beta-arrestin-1 Arrb1 PE=1 SV=1
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
BIN2_RAT	Bridging integrator 2 Bin2 PE=1 SV=1
BACD3_RAT	BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 3 Kctd10
CANB1_RAT	Calcineurin subunit B type 1 Ppp3r1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CPNS1_RAT	Calpain small subunit 1 Capns1 PE=1 SV=3
CALR_RAT	Calreticulin Calr PE=1 SV=1
KAPCB_RAT	cAMP-dependent protein kinase catalytic subunit beta Prkacb PE=1 SV=2
MRP3_RAT	Canalicular multispecific organic anion transporter 2 Abcc3 PE=2 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CATD_RAT	Cathepsin D Ctsd PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCA_RAT	Clathrin light chain A Clta PE=1 SV=1

CLUS_RAT	Clusterin Clu PE=1 SV=2
C2D1B_RAT	Coiled-coil and C2 domain-containing protein 1B Cc2d1b PE=1 SV=2
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNKR2_RAT	Connector enhancer of kinase suppressor of ras 2 Cnksr2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CNTP1_RAT	Contactin-associated protein 1 Cntnap1 PE=1 SV=1
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CELF2_RAT	CUGBP Elav-like family member 2 Celf2 PE=2 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CAND1_RAT	Cullin-associated NEDD8-dissociated protein 1 Cand1 PE=1 SV=1
CYTB_RAT	Cystatin-B Cstb PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
SERA_RAT	D-3-phosphoglycerate dehydrogenase Phgdh PE=1 SV=3
DEST_RAT	Destrin Dstn PE=1 SV=3
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL4_RAT	Dihydropyrimidinase-related protein 4 (Fragment) Dpysl4 PE=1 SV=1
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DLGP4_RAT	Disks large-associated protein 4 Dlgap4 PE=2 SV=1
DNJA2_RAT	DnaJ homolog subfamily A member 2 Dnaja2 PE=2 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DBNL_RAT	Drebrin-like protein Dbnl PE=1 SV=1
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DCTN1_RAT	Dynactin subunit 1 Dctn1 PE=1 SV=2
DCTN2_RAT	Dynactin subunit 2 Dctn2 PE=1 SV=1
DCTN4_RAT	Dynactin subunit 4 Dctn4 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
DYH1_RAT	Dynein heavy chain 1, axonemal Dnah1 PE=2 SV=2
DYH12_RAT	Dynein heavy chain 12, axonemal Dnah12 PE=2 SV=2
EFHD2_RAT	EF-hand domain-containing protein D2 Efhd2 PE=1 SV=1
EHD1_RAT	EH domain-containing protein 1 Ehd1 PE=1 SV=1
EHD3_RAT	EH domain-containing protein 3 Ehd3 PE=1 SV=2
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF1D_RAT	Elongation factor 1-delta Eef1d PE=1 SV=2
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2

SHLB2_RAT	Endophilin-B2 Sh3glb2 PE=2 SV=2
ERC2_RAT	ERC protein 2 Erc2 PE=1 SV=1
ERF1_RAT	Eukaryotic peptide chain release factor subunit 1 Etf1 PE=2 SV=3
EIF3A_RAT	Eukaryotic translation initiation factor 3 subunit A Eif3a PE=2 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FAS_RAT	Fatty acid synthase Fasn PE=1 SV=3
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
FABP5_RAT	Fatty acid-binding protein, epidermal Fabp5 PE=1 SV=3
FAK1_RAT	Focal adhesion kinase 1 Ptk2 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
FUMH_RAT	Fumarate hydratase, mitochondrial Fh PE=1 SV=1
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GELS_RAT	Gelsolin Gsn PE=1 SV=1
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTA2_RAT	Glutathione S-transferase alpha-2 Gsta2 PE=2 SV=2
GSTA3_RAT	Glutathione S-transferase alpha-3 Gsta3 PE=1 SV=3
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
GSTM5_RAT	Glutathione S-transferase Mu 5 Gstm5 PE=1 SV=3
GSTO1_RAT	Glutathione S-transferase omega-1 Gsto1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GNAZ_RAT	Guanine nucleotide-binding protein G(z) subunit alpha Gnaz PE=2 SV=3
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP74_RAT	Heat shock 70 kDa protein 4 Hspa4 PE=1 SV=1
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HSP72_RAT	Heat shock-related 70 kDa protein 2 Hspa2 PE=1 SV=2
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
ROA3_RAT	Heterogeneous nuclear ribonucleoprotein A3 Hnrnpa3 PE=1 SV=1

HNRH1_RAT	Heterogeneous nuclear ribonucleoprotein H Hnrnph1 PE=1 SV=2
HNRPK_RAT	Heterogeneous nuclear ribonucleoprotein K Hnrnpk PE=1 SV=1
HPCL4_RAT	Hippocalcin-like protein 4 Hpcal4 PE=2 SV=2
NKX25_RAT	Homeobox protein Nkx-2.5 Nkx2-5 PE=2 SV=1
HOME1_RAT	Homer protein homolog 1 Homer1 PE=1 SV=2
F10A1_RAT	Hsc70-interacting protein St13 PE=1 SV=1
HPLN1_RAT	Hyaluronan and proteoglycan link protein 1 Hapln1 PE=1 SV=2
GLO2_RAT	Hydroxyacylglutathione hydrolase, mitochondrial Hagh PE=1 SV=2
HPRT_RAT	Hypoxanthine-guanine phosphoribosyltransferase Hprt1 PE=1 SV=1
IMB1_RAT	Importin subunit beta-1 Kpnb1 PE=1 SV=1
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
KCNJ4_RAT	Inward rectifier potassium channel 4 Kcnj4 PE=1 SV=1
ASGL1_RAT	Isoaspartyl peptidase/L-asparaginase Asrgl1 PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
IDHG1_RAT	Isocitrate dehydrogenase [NAD] subunit gamma 1, mitochondrial Idh3g PE=2 SV=2
IDHP_RAT	Isocitrate dehydrogenase [NADP], mitochondrial Idh2 PE=1 SV=2
IVD_RAT	Isovaleryl-CoA dehydrogenase, mitochondrial Ivd PE=1 SV=2
CRYM_RAT	Ketimine reductase mu-crystallin Crym PE=1 SV=1
KLC1_RAT	Kinesin light chain 1 Klc1 PE=1 SV=2
KIF1C_RAT	Kinesin-like protein KIF1C Kif1c PE=2 SV=1
KLOT_RAT	Klotho Kl PE=1 SV=1
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LANC1_RAT	LanC-like protein 1 Lancl1 PE=2 SV=2
LRC8E_RAT	Leucine-rich repeat-containing protein 8E Lrrc8e PE=2 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MADD_RAT	MAP kinase-activating death domain protein Madd PE=1 SV=1
MARK3_RAT	MAP/microtubule affinity-regulating kinase 3 Mark3 PE=2 SV=1
MMSA_RAT	Methylmalonate-semialdehyde dehydrogenase [acylating], mitochondrial Aldh6a1 PE=1 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE3_RAT	Microtubule-associated protein RP/EB family member 3 Mapre3 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MINK1_RAT	Misshapen-like kinase 1 Mink1 PE=1 SV=2
M2OM_RAT	Mitochondrial 2-oxoglutarate/malate carrier protein Slc25a11 PE=2 SV=3
M3K11_RAT	Mitogen-activated protein kinase kinase kinase 11 Map3k11 PE=1 SV=1
MORN1_RAT	MORN repeat-containing protein 1 Morn1 PE=2 SV=1
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1

MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
MYH11_RAT	Myosin-11 (Fragments) Myh11 PE=2 SV=3
MYH9_RAT	Myosin-9 Myh9 PE=1 SV=3
MYBPH_RAT	Myosin-binding protein H Mybph PE=2 SV=1
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
RENBP_RAT	N-acylglucosamine 2-epimerase Renbp PE=2 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCKP1_RAT	Nck-associated protein 1 Nckap1 PE=2 SV=1
NPHN_RAT	Nephrin Nphs1 PE=1 SV=2
NEB1_RAT	Neurabin-1 Ppp1r9a PE=1 SV=1
NEB2_RAT	Neurabin-2 Ppp1r9b PE=1 SV=1
NCAM1_RAT	Neural cell adhesion molecule 1 Ncam1 PE=1 SV=1
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NFM_RAT	Neurofilament medium polypeptide Nefm PE=1 SV=4
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
SEPT3_RAT	Neuronal-specific septin-3 Sept3 PE=1 SV=2
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
NOG1_RAT	Nucleolar GTP-binding protein 1 Gtpbp4 PE=2 SV=3
NOL10_RAT	Nucleolar protein 10 Nol10 PE=2 SV=1
NPM_RAT	Nucleophosmin Npm1 PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
OBSL1_RAT	Obscurin-like protein 1 Obsl1 PE=2 SV=3
OXR1_RAT	Oxidation resistance protein 1 Oxr1 PE=2 SV=3
P2RX4_RAT	P2X purinoceptor 4 P2rx4 PE=1 SV=1
PARD3_RAT	Partitioning defective 3 homolog Pard3 PE=1 SV=1
FKBP4_RAT	Peptidyl-prolyl cis-trans isomerase FKBP4 Fkbp4 PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
SHIP2_RAT	Phosphatidylinositol 3,4,5-trisphosphate 5-phosphatase 2 Inppl1 PE=1 SV=1
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PI42B_RAT	Phosphatidylinositol 5-phosphate 4-kinase type-2 beta Pip4k2b PE=1 SV=1
PICAL_RAT	Phosphatidylinositol-binding clathrin assembly protein Picalm PE=1 SV=1
PGM1_RAT	Phosphoglucomutase-1 Pgm1 PE=1 SV=2
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PGAM2_RAT	Phosphoglycerate mutase 2 Pgam2 PE=2 SV=2
PHYIP_RAT	Phytanoyl-CoA hydroxylase-interacting protein Phyhip PE=2 SV=1

PHIPL_RAT	Phytanoyl-CoA hydroxylase-interacting protein-like Phyhipl PE=2 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
LIS1_RAT	Platelet-activating factor acetylhydrolase IB subunit alpha Pafah1b1 PE=1 SV=2
PA1B2_RAT	Platelet-activating factor acetylhydrolase IB subunit beta Pafah1b2 PE=1 SV=1
PLEC_RAT	Plectin Plec PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
UBB_RAT	Polyubiquitin-B Ubb PE=1 SV=1
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PSA1_RAT	Proteasome subunit alpha type-1 Psma1 PE=1 SV=2
PSA7_RAT	Proteasome subunit alpha type-7 Psma7 PE=1 SV=1
PSB2_RAT	Proteasome subunit beta type-2 Psmb2 PE=1 SV=1
AGO2_RAT	Protein argonaute-2 Ago2 PE=2 SV=2
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
JAG2_RAT	Protein jagged-2 (Fragment) Jag2 PE=2 SV=1
KPCA_RAT	Protein kinase C alpha type Prkca PE=1 SV=3
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
KPCG_RAT	Protein kinase C gamma type Prkcg PE=1 SV=1
KTU_RAT	Protein kintoun Dnaaf2 PE=2 SV=2
PPM1E_RAT	Protein phosphatase 1E Ppm1e PE=1 SV=1
PCLO_RAT	Protein piccolo Pclo PE=1 SV=1
PRRC1_RAT	Protein PRRC1 Prrc1 PE=2 SV=1
FAK2_RAT	Protein-tyrosine kinase 2-beta Ptk2b PE=1 SV=1
VAV_RAT	Proto-oncogene vav Vav1 PE=2 SV=1
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
PLPP_RAT	Pyridoxal phosphate phosphatase Pdxp PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RP3A_RAT	Rabphilin-3A Rph3a PE=1 SV=1
RPGF2_RAT	Rap guanine nucleotide exchange factor 2 Rapgef2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RAB13_RAT	Ras-related protein Rab-13 Rab13 PE=1 SV=2
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB7A_RAT	Ras-related protein Rab-7a Rab7a PE=1 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
RAB8B_RAT	Ras-related protein Rab-8B Rab8b PE=1 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
RTN4_RAT	Reticulon-4 Rtn4 PE=1 SV=1

RHG29_RAT	Rho GTPase-activating protein 29 Arhgap29 PE=2 SV=2
ARHG2_RAT	Rho guanine nucleotide exchange factor 2 Arhgef2 PE=2 SV=1
ROCK2_RAT	Rho-associated protein kinase 2 Rock2 PE=1 SV=2
UK114_RAT	Ribonuclease UK114 Hrsp12 PE=1 SV=3
ELL3_RAT	RNA polymerase II elongation factor ELL3 Ell3 PE=2 SV=1
RYR2_RAT	Ryanodine receptor 2 Ryr2 PE=1 SV=2
SEP10_RAT	Septin-10 Sept10 PE=1 SV=1
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
SEPT5_RAT	Septin-5 Sept5 PE=1 SV=2
SRR_RAT	Serine racemase Srr PE=1 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
MARK1_RAT	Serine/threonine-protein kinase MARK1 Mark1 PE=1 SV=1
PAK1_RAT	Serine/threonine-protein kinase PAK 1 Pak1 PE=1 SV=3
PAK2_RAT	Serine/threonine-protein kinase PAK 2 Pak2 PE=1 SV=1
TAOK3_RAT	Serine/threonine-protein kinase TAO3 Taok3 PE=2 SV=1
2ABA_RAT	Serine/threonine-protein phosphatase 2A 55 kDa regulatory subunit B alpha isoform Ppp2r2a
PP2AA_RAT	Serine/threonine-protein phosphatase 2A catalytic subunit alpha isoform Ppp2ca PE=1 SV=1
PP4R1_RAT	Serine/threonine-protein phosphatase 4 regulatory subunit 1 Ppp4r1 PE=2 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
TRPC2_RAT	Short transient receptor potential channel 2 Trpc2 PE=2 SV=2
SI1L1_RAT	Signal-induced proliferation-associated 1-like protein 1 Sipa1l1 PE=1 SV=1
SGTA_RAT	Small glutamine-rich tetratricopeptide repeat-containing protein alpha Sgta PE=1 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
GTR3_RAT	Solute carrier family 2, facilitated glucose transporter member 3 Slc2a3 PE=1 SV=1
S22A1_RAT	Solute carrier family 22 member 1 Slc22a1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SRCN1_RAT	SRC kinase signaling inhibitor 1 Srcin1 PE=1 SV=1
STIP1_RAT	Stress-induced-phosphoprotein 1 Stip1 PE=1 SV=1
MMP11_RAT	Stromelysin-3 Mmp11 PE=1 SV=1
SSDH_RAT	Succinate-semialdehyde dehydrogenase, mitochondrial Aldh5a1 PE=1 SV=2
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SCOT1_RAT	Succinyl-CoA:3-ketoacid coenzyme A transferase 1, mitochondrial Oxct1 PE=1 SV=1
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYN3_RAT	Synapsin-3 Syn3 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT2_RAT	Synaptotagmin-2 Syt2 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1

TAF1A_RAT	TATA box-binding protein-associated factor RNA polymerase I subunit A Taf1a PE=2 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TCPB_RAT	T-complex protein 1 subunit beta Cct2 PE=1 SV=3
TCPD_RAT	T-complex protein 1 subunit delta Cct4 PE=1 SV=3
TCPE_RAT	T-complex protein 1 subunit epsilon Cct5 PE=1 SV=1
TCPG_RAT	T-complex protein 1 subunit gamma Cct3 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
THIO_RAT	Thioredoxin Txn PE=1 SV=2
PRDX3_RAT	Thioredoxin-dependent peroxide reductase, mitochondrial Prdx3 PE=1 SV=2
TXNL1_RAT	Thioredoxin-like protein 1 Txnl1 PE=1 SV=3
SYTC_RAT	Threonine--tRNA ligase, cytoplasmic Tars PE=2 SV=1
TALDO_RAT	Transaldolase Taldo1 PE=1 SV=2
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
PTN9_RAT	Tyrosine-protein phosphatase non-receptor type 9 Ptpn9 PE=2 SV=1
U520_RAT	U5 small nuclear ribonucleoprotein 200 kDa helicase Snrnp200 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UCHL3_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L3 Uchl3 PE=1 SV=1
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
UB2L6_RAT	Ubiquitin/ISG15-conjugating enzyme E2 L6 Ube2l6 PE=2 SV=1
RL40_RAT	Ubiquitin-60S ribosomal protein L40 Uba52 PE=1 SV=2
U2D2B_RAT	Ubiquitin-conjugating enzyme E2 D2B Ube2d2b PE=1 SV=1
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
UBA1_RAT	Ubiquitin-like modifier-activating enzyme 1 Uba1 PE=1 SV=1
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
SYVC_RAT	Valine--tRNA ligase Vars PE=2 SV=2
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VISL1_RAT	Visinin-like protein 1 Vsnl1 PE=1 SV=2
VDAC1_RAT	Voltage-dependent anion-selective channel protein 1 Vdac1 PE=1 SV=4
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
WDR7_RAT	WD repeat-containing protein 7 Wdr7 PE=2 SV=1
WASF1_RAT	Wiskott-Aldrich syndrome protein family member 1 Wasf1 PE=1 SV=1
WSCD1_RAT	WSC domain-containing protein 1 Wscd1 PE=2 SV=1
ZBT18_RAT	Zinc finger and BTB domain-containing protein 18 Zbtb18 PE=2 SV=1
ZC21C_RAT	Zinc finger C2HC domain-containing protein 1C Zc2hc1c PE=2 SV=1

NIC CA1 sample 2 LC-MS

AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
PRS6B_RAT	26S protease regulatory subunit 6B Psmc4 PE=1 SV=1
RM38_RAT	39S ribosomal protein L38, mitochondrial Mrpl38 PE=2 SV=2
HCD2_RAT	3-hydroxyacyl-CoA dehydrogenase type-2 Hsd17b10 PE=1 SV=3
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15_RAT	40S ribosomal protein S15 Rps15 PE=1 SV=2
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS17_RAT	40S ribosomal protein S17 Rps17 PE=1 SV=3
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS24_RAT	40S ribosomal protein S24 Rps24 PE=2 SV=1
RS26_RAT	40S ribosomal protein S26 Rps26 PE=3 SV=3
RS27L_RAT	40S ribosomal protein S27-like Rps27l PE=1 SV=3
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1

RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL27_RAT	60S ribosomal protein L27 Rpl27 PE=2 SV=2
RL27A_RAT	60S ribosomal protein L27a Rpl27a PE=1 SV=3
RL28_RAT	60S ribosomal protein L28 Rpl28 PE=1 SV=4
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL30_RAT	60S ribosomal protein L30 Rpl30 PE=3 SV=2
RL32_RAT	60S ribosomal protein L32 Rpl32 PE=1 SV=2
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
RL9_RAT	60S ribosomal protein L9 Rpl9 PE=1 SV=1
K6PP_RAT	6-phosphofructokinase type C Pfkp PE=1 SV=2
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP5L_RAT	Actin-related protein 2/3 complex subunit 5-like protein Arpc5l PE=1 SV=2
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF2_RAT	ADP-ribosylation factor 2 Arf2 PE=2 SV=1
ARF6_RAT	ADP-ribosylation factor 6 Arf6 PE=1 SV=2
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
ACY1A_RAT	Aminoacylase-1A Acy1a PE=1 SV=1
AMPH_RAT	Amphiphysin Amph PE=1 SV=1
ANS1B_RAT	Ankyrin repeat and sterile alpha motif domain-containing protein 1B Anks1b PE=1 SV=1
AP1B1_RAT	AP-1 complex subunit beta-1 Ap1b1 PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1

AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPO_RAT	ATP synthase subunit O, mitochondrial Atp5o PE=1 SV=1
AT5SL_RAT	ATP synthase subunit s-like protein Atp5sl PE=2 SV=1
DX39A_RAT	ATP-dependent RNA helicase DDX39A Ddx39a PE=2 SV=1
ADDB_RAT	Beta-adducin Add2 PE=2 SV=4
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
C1TC_RAT	C-1-tetrahydrofolate synthase, cytoplasmic Mthfd1 PE=1 SV=3
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CTL1_RAT	Choline transporter-like protein 1 Slc44a1 PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CNTP1_RAT	Contactin-associated protein 1 Cntnap1 PE=1 SV=1
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CAND1_RAT	Cullin-associated NEDD8-dissociated protein 1 Cand1 PE=1 SV=1
GAK_RAT	Cyclin-G-associated kinase Gak PE=2 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
SERA_RAT	D-3-phosphoglycerate dehydrogenase Phgdh PE=1 SV=3
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL4_RAT	Dihydropyrimidinase-related protein 4 (Fragment) Dpysl4 PE=1 SV=1
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
TFB1M_RAT	Dimethyladenosine transferase 1, mitochondrial Tfb1m PE=2 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
HACE1_RAT	E3 ubiquitin-protein ligase HACE1 Hace1 PE=3 SV=1
EFCB3_RAT	EF-hand calcium-binding domain-containing protein 3 Efcab3 PE=2 SV=1
ELAV4_RAT	ELAV-like protein 4 Elavl4 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1

EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
EIF3I_RAT	Eukaryotic translation initiation factor 3 subunit I Eif3i PE=2 SV=1
IF2P_RAT	Eukaryotic translation initiation factor 5B Eif5b PE=1 SV=1
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FZD5_RAT	Frizzled-5 Fzd5 PE=2 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GELS_RAT	Gelsolin Gsn PE=1 SV=1
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
NMDZ1_RAT	Glutamate receptor ionotropic, NMDA 1 Grin1 PE=1 SV=1
GSTA3_RAT	Glutathione S-transferase alpha-3 Gsta3 PE=1 SV=3
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTM5_RAT	Glutathione S-transferase Mu 5 Gstm5 PE=1 SV=3
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
GSTM4_RAT	Glutathione S-transferase Yb-3 Gstm3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
GRM1A_RAT	GRAM domain-containing protein 1A Gramd1a PE=2 SV=2
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP74_RAT	Heat shock 70 kDa protein 4 Hspa4 PE=1 SV=1
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HSP72_RAT	Heat shock-related 70 kDa protein 2 Hspa2 PE=1 SV=2
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HNRH2_RAT	Heterogeneous nuclear ribonucleoprotein H2 Hnrnph2 PE=1 SV=1
DCHS_RAT	Histidine decarboxylase Hdc PE=2 SV=2
KAT6A_RAT	Histone acetyltransferase KAT6A Kat6a PE=1 SV=2
H2A1C_RAT	Histone H2A type 1-C OS=Rattus norvegicus PE=1 SV=2
H2AZ_RAT	Histone H2A.Z H2afz PE=1 SV=2
IMB1_RAT	Importin subunit beta-1 Kpnb1 PE=1 SV=1
IP3KA_RAT	Inositol-trisphosphate 3-kinase A Itpka PE=1 SV=3
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1

IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
KLH25_RAT	Kelch-like protein 25 Klhl25 PE=2 SV=1
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
KIF1C_RAT	Kinesin-like protein KIF1C Kif1c PE=2 SV=1
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LRC14_RAT	Leucine-rich repeat-containing protein 14 Lrrc14 PE=2 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MDGA1_RAT	MAM domain-containing glycosylphosphatidylinositol anchor protein 1 Mdga1 PE=1 SV=1
MARK3_RAT	MAP/microtubule affinity-regulating kinase 3 Mark3 PE=2 SV=1
MNS1_RAT	Meiosis-specific nuclear structural protein 1 Mns1 PE=2 SV=1
MERL_RAT	Merlin (Fragment) Nf2 PE=1 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MAP1B_RAT	Microtubule-associated protein 1B Map1b PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MINK1_RAT	Misshapen-like kinase 1 Mink1 PE=1 SV=2
MK01_RAT	Mitogen-activated protein kinase 1 Mapk1 PE=1 SV=3
MK07_RAT	Mitogen-activated protein kinase 7 Mapk7 PE=1 SV=1
MPDZ_RAT	Multiple PDZ domain protein Mpdz PE=1 SV=1
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MEF2A_RAT	Myocyte-specific enhancer factor 2A Mef2a PE=1 SV=1
MRLCA_RAT	Myosin regulatory light chain RLC-A Rlc-a PE=2 SV=2
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
MYH9_RAT	Myosin-9 Myh9 PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCKP1_RAT	Nck-associated protein 1 Nckap1 PE=2 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
SEPT3_RAT	Neuronal-specific septin-3 Sept3 PE=1 SV=2
NUCL_RAT	Nucleolin Ncl PE=1 SV=3
NPM_RAT	Nucleophosmin Npm1 PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
OXR1_RAT	Oxidation resistance protein 1 Oxr1 PE=2 SV=3
PARD3_RAT	Partitioning defective 3 homolog Pard3 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1

PI51A_RAT	Phosphatidylinositol 4-phosphate 5-kinase type-1 alpha Pip5k1a PE=2 SV=1
PI51B_RAT	Phosphatidylinositol 4-phosphate 5-kinase type-1 beta Pip5k1b PE=2 SV=1
PI51C_RAT	Phosphatidylinositol 4-phosphate 5-kinase type-1 gamma Pip5k1c PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PHIPL_RAT	Phytanoyl-CoA hydroxylase-interacting protein-like Phyhipl PE=2 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
HCN4_RAT	Potassium/sodium hyperpolarization-activated cyclic nucleotide-gated channel 4 Hcn4 PE=2 SV=1
PICK1_RAT	PRKCA-binding protein Pick1 PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PSA6_RAT	Proteasome subunit alpha type-6 Psma6 PE=1 SV=1
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
PCLO_RAT	Protein piccolo Pclo PE=1 SV=1
PIMT_RAT	Protein-L-isoaspartate(D-aspartate) O-methyltransferase Pcmt1 PE=1 SV=2
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
DHX30_RAT	Putative ATP-dependent RNA helicase DHX30 Dhx30 PE=1 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
ARHG2_RAT	Rho guanine nucleotide exchange factor 2 Arhgef2 PE=2 SV=1
RBM20_RAT	RNA-binding protein 20 Rbm20 PE=2 SV=1
SARDH_RAT	Sarcosine dehydrogenase, mitochondrial Sardh PE=1 SV=2
SCAM5_RAT	Secretory carrier-associated membrane protein 5 Scamp5 PE=2 SV=1
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
SEPT8_RAT	Septin-8 Sept8 PE=1 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
DCLK2_RAT	Serine/threonine-protein kinase DCLK2 Dclk2 PE=1 SV=2
MARK1_RAT	Serine/threonine-protein kinase MARK1 Mark1 PE=1 SV=1
TAOK3_RAT	Serine/threonine-protein kinase TAO3 Taok3 PE=2 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
TRPC1_RAT	Short transient receptor potential channel 1 Trpc1 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
NPT1_RAT	Sodium-dependent phosphate transport protein 1 Slc17a1 PE=2 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SPEF2_RAT	Sperm flagellar protein 2 Spef2 PE=2 SV=2

SRCN1_RAT	SRC kinase signaling inhibitor 1 Srcin1 PE=1 SV=1
STIP1_RAT	Stress-induced-phosphoprotein 1 Stip1 PE=1 SV=1
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TCPD_RAT	T-complex protein 1 subunit delta Cct4 PE=1 SV=3
TCPE_RAT	T-complex protein 1 subunit epsilon Cct5 PE=1 SV=1
TCPG_RAT	T-complex protein 1 subunit gamma Cct3 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
TXNL1_RAT	Thioredoxin-like protein 1 Txnl1 PE=1 SV=3
SYTC_RAT	Threonine--tRNA ligase, cytoplasmic Tars PE=2 SV=1
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
U2D2B_RAT	Ubiquitin-conjugating enzyme E2 D2B Ube2d2b PE=1 SV=1
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
UBA1_RAT	Ubiquitin-like modifier-activating enzyme 1 Uba1 PE=1 SV=1
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
ZNT7_RAT	Zinc transporter 7 Slc30a7 PE=2 SV=2

NIC CA1 sample 3 LC-MS

PDK4_RAT	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 4, mitochondrial Pdk4 PE=1 SV=1
AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3

1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS21_RAT	40S ribosomal protein S21 Rps21 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS24_RAT	40S ribosomal protein S24 Rps24 PE=2 SV=1
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS26_RAT	40S ribosomal protein S26 Rps26 PE=3 SV=3
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS29_RAT	40S ribosomal protein S29 Rps29 PE=1 SV=2
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL14_RAT	60S ribosomal protein L14 Rpl14 PE=1 SV=3
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL19_RAT	60S ribosomal protein L19 Rpl19 PE=1 SV=1
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1

RL27A_RAT	60S ribosomal protein L27a Rpl27a PE=1 SV=3
RL28_RAT	60S ribosomal protein L28 Rpl28 PE=1 SV=4
RL29_RAT	60S ribosomal protein L29 Rpl29 PE=1 SV=3
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL31_RAT	60S ribosomal protein L31 Rpl31 PE=2 SV=1
RL32_RAT	60S ribosomal protein L32 Rpl32 PE=1 SV=2
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL38_RAT	60S ribosomal protein L38 Rpl38 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTS_RAT	Actin, alpha skeletal muscle Acta1 PE=1 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACSM4_RAT	Acyl-coenzyme A synthetase ACSM4, mitochondrial Acsm4 PE=2 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
ALDR_RAT	Aldose reductase Akr1b1 PE=1 SV=3
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AINX_RAT	Alpha-internexin Ina PE=1 SV=2
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
ANS1B_RAT	Ankyrin repeat and sterile alpha motif domain-containing protein 1B Anks1b PE=1 SV=1
AP1B1_RAT	AP-1 complex subunit beta-1 Ap1b1 PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AGAP2_RAT	Arf-GAP with GTPase, ANK repeat and PH domain-containing protein 2 Agap2 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
SYDC_RAT	Aspartate--tRNA ligase, cytoplasmic Dars PE=2 SV=1
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ADDB_RAT	Beta-adducin Add2 PE=2 SV=4
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BCAS1_RAT	Breast carcinoma-amplified sequence 1 homolog (Fragment) Bcas1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2

BACD2_RAT	BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 2
BACD3_RAT	BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 3
CANB1_RAT	Calcineurin subunit B type 1 Ppp3r1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CSKI1_RAT	Caskin-1 Caskin1 PE=1 SV=1
CENPU_RAT	Centromere protein U Cenpu PE=2 SV=1
CHDH_RAT	Choline dehydrogenase, mitochondrial Chdh PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLAP2_RAT	CLIP-associating protein 2 Clasp2 PE=2 SV=1
STAG3_RAT	Cohesin subunit SA-3 Stag3 PE=2 SV=1
C2D1B_RAT	Coiled-coil and C2 domain-containing protein 1B Cc2d1b PE=1 SV=2
CC181_RAT	Coiled-coil domain-containing protein 181 Ccdc181 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CNTP1_RAT	Contactin-associated protein 1 Cntnap1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CX6C2_RAT	Cytochrome c oxidase subunit 6C-2 Cox6c2 PE=1 SV=3
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
SERA_RAT	D-3-phosphoglycerate dehydrogenase Phgdh PE=1 SV=3
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
UBR4_RAT	E3 ubiquitin-protein ligase UBR4 Ubr4 PE=1 SV=2
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
ENPL_RAT	Endoplasmin Hsp90b1 PE=1 SV=2
EMC3_RAT	ER membrane protein complex subunit 3 Emc3 PE=2 SV=3
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FAF1_RAT	FAS-associated factor 1 Faf1 PE=2 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
FBX43_RAT	F-box only protein 43 Fbxo43 PE=2 SV=2

FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GFAP_RAT	Glial fibrillary acidic protein Gfap PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
NADE_RAT	Glutamine-dependent NAD(+) synthetase Nadsyn1 PE=2 SV=1
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK2_RAT	Hexokinase-2 Hk2 PE=1 SV=1
KAT6A_RAT	Histone acetyltransferase KAT6A Kat6a PE=1 SV=2
HPLN1_RAT	Hyaluronan and proteoglycan link protein 1 Hapln1 PE=1 SV=2
IMB1_RAT	Importin subunit beta-1 Kpnb1 PE=1 SV=1
ITPA_RAT	Inosine triphosphate pyrophosphatase Itpa PE=3 SV=1
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
IFNG_RAT	Interferon gamma Ifng PE=2 SV=1
PRKRA_RAT	Interferon-inducible double-stranded RNA-dependent protein kinase activator A Prkra PE=1 SV=1
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LRIQ3_RAT	Leucine-rich repeat and IQ domain-containing protein 3 Lrriq3 PE=2 SV=1
LRC14_RAT	Leucine-rich repeat-containing protein 14 Lrrc14 PE=2 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE3_RAT	Microtubule-associated protein RP/EB family member 3 Mapre3 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3

MPDZ_RAT	Multiple PDZ domain protein Mpdz PE=1 SV=1
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
MYH11_RAT	Myosin-11 (Fragments) Myh11 PE=2 SV=3
MYH9_RAT	Myosin-9 Myh9 PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
RENBP_RAT	N-acylglucosamine 2-epimerase Renbp PE=2 SV=2
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NFH_RAT	Neurofilament heavy polypeptide Nefh PE=1 SV=4
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NFM_RAT	Neurofilament medium polypeptide Nefm PE=1 SV=4
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
NUCL_RAT	Nucleolin Ncl PE=1 SV=3
NPM_RAT	Nucleophosmin Npm1 PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
ORN_RAT	Oligoribonuclease, mitochondrial Rexo2 PE=2 SV=1
OXR1_RAT	Oxidation resistance protein 1 Oxr1 PE=2 SV=3
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
APR_RAT	Phorbol-12-myristate-13-acetate-induced protein 1 Pmaip1 PE=3 SV=1
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
CATH_RAT	Pro-cathepsin H Ctsh PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
P3H1_RAT	Prolyl 3-hydroxylase 1 Lepre1 PE=1 SV=1
PSA3_RAT	Proteasome subunit alpha type-3 Psma3 PE=1 SV=3
PSA6_RAT	Proteasome subunit alpha type-6 Psma6 PE=1 SV=1
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
FA98A_RAT	Protein FAM98A Fam98a PE=2 SV=1
JAG2_RAT	Protein jagged-2 (Fragment) Jag2 PE=2 SV=1
DHX30_RAT	Putative ATP-dependent RNA helicase DHX30 Dhx30 PE=1 SV=1
KPYR_RAT	Pyruvate kinase PKLR Pklr PE=2 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RP3A_RAT	Rabphilin-3A Rph3a PE=1 SV=1
RGPA2_RAT	Ral GTPase-activating protein subunit alpha-2 Ralgapa2 PE=1 SV=1
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2

RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RCBT2_RAT	RCC1 and BTB domain-containing protein 2 Rcbtb2 PE=2 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
ARHG2_RAT	Rho guanine nucleotide exchange factor 2 Arhgef2 PE=2 SV=1
UK114_RAT	Ribonuclease UK114 Hrsp12 PE=1 SV=3
SEP10_RAT	Septin-10 Sept10 PE=1 SV=1
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
KPCD1_RAT	Serine/threonine-protein kinase D1 Prkd1 PE=1 SV=2
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
TAOK3_RAT	Serine/threonine-protein kinase TAO3 Taok3 PE=2 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
SHAN1_RAT	SH3 and multiple ankyrin repeat domains protein 1 Shank1 PE=1 SV=1
SHAN2_RAT	SH3 and multiple ankyrin repeat domains protein 2 Shank2 PE=1 SV=2
SHAN3_RAT	SH3 and multiple ankyrin repeat domains protein 3 Shank3 PE=1 SV=3
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPTN2_RAT	Spectrin beta chain, non-erythrocytic 2 Sptbn2 PE=1 SV=2
SRCN1_RAT	SRC kinase signaling inhibitor 1 Srcin1 PE=1 SV=1
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
TAB2_RAT	TGF-beta-activated kinase 1 and MAP3K7-binding protein 2 Tab2 PE=2 SV=2
TXNL1_RAT	Thioredoxin-like protein 1 Txnl1 PE=1 SV=3
TSP4_RAT	Thrombospondin-4 Thbs4 PE=1 SV=1
TPPC4_RAT	Trafficking protein particle complex subunit 4 Trappc4 PE=2 SV=1
TF2B_RAT	Transcription initiation factor IIB Gtf2b PE=2 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
RTCB_RAT	tRNA-splicing ligase RtcB homolog Rtcb PE=2 SV=1
MOD2_RAT	Tropomodulin-2 Tmod2 PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1

TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
UBP21_RAT	Ubiquitin carboxyl-terminal hydrolase 21 Usp21 PE=2 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
UB2D2_RAT	Ubiquitin-conjugating enzyme E2 D2 Ube2d2 PE=1 SV=1
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1
CA177_RAT	Uncharacterized protein C1orf177 homolog OS=Rattus norvegicus PE=2 SV=1
USH2A_RAT	Usherin Ush2a PE=1 SV=1
VP26A_RAT	Vacuolar protein sorting-associated protein 26A Vps26a PE=2 SV=1
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
VGLU3_RAT	Vesicular glutamate transporter 3 Slc17a8 PE=1 SV=2
VEZA_RAT	Vezatin Vezt PE=2 SV=1
VKGC_RAT	Vitamin K-dependent gamma-carboxylase Ggcx PE=1 SV=1
CA2D3_RAT	Voltage-dependent calcium channel subunit alpha-2/delta-3 Cacna2d3 PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
WSCD1_RAT	WSC domain-containing protein 1 Wscd1 PE=2 SV=1
PEPD_RAT	Xaa-Pro dipeptidase Pepd PE=2 SV=1
ZP2_RAT	Zona pellucida sperm-binding protein 2 Zp2 PE=1 SV=1

NIC CA3 sample 1 LC-MS

AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
PLCE1_RAT	1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase epsilon-1 Plce1 PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2

RS5_RAT	40S ribosomal protein S5 Rps5 PE=1 SV=3
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
5NTD_RAT	5'-nucleotidase Nt5e PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
F263_RAT	6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3 Pfkfb3 PE=2 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
PPBT_RAT	Alkaline phosphatase, tissue-nonspecific isozyme Alpl PE=1 SV=2
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ABCB8_RAT	ATP-binding cassette sub-family B member 8, mitochondrial Abcb8 PE=2 SV=1
ARBK1_RAT	Beta-adrenergic receptor kinase 1 Adrbk1 PE=2 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
BAIP2_RAT	Brain-specific angiogenesis inhibitor 1-associated protein 2 Baiap2 PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
C1TC_RAT	C-1-tetrahydrofolate synthase, cytoplasmic Mthfd1 PE=1 SV=3

KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CHST3_RAT	Carbohydrate sulfotransferase 3 Chst3 PE=2 SV=2
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
GAK_RAT	Cyclin-G-associated kinase Gak PE=2 SV=1
CX6C2_RAT	Cytochrome c oxidase subunit 6C-2 Cox6c2 PE=1 SV=3
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
MIB2_RAT	E3 ubiquitin-protein ligase MIB2 Mib2 PE=2 SV=2
ELAV2_RAT	ELAV-like protein 2 Elavl2 PE=2 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
ERP29_RAT	Endoplasmic reticulum resident protein 29 Erp29 PE=1 SV=2
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FARP1_RAT	FERM, RhoGEF and pleckstrin domain-containing protein 1 Farp1 PE=1 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ADDG_RAT	Gamma-adducin Add3 PE=1 SV=2
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
NADE_RAT	Glutamine-dependent NAD(+) synthetase Nadsyn1 PE=2 SV=1
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
GSTM5_RAT	Glutathione S-transferase Mu 5 Gstm5 PE=1 SV=3
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
ROA2_RAT	Heterogeneous nuclear ribonucleoproteins A2/B1 Hnrnpa2b1 PE=1 SV=1
H14_RAT	Histone H1.4 Hist1h1e PE=1 SV=3
IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
IL33_RAT	Interleukin-33 Il33 PE=2 SV=1

IQUB_RAT	IQ and ubiquitin-like domain-containing protein Iqub PE=2 SV=2
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
KIF27_RAT	Kinesin-like protein KIF27 Kif27 PE=2 SV=1
KIF2C_RAT	Kinesin-like protein KIF2C Kif2c PE=2 SV=3
LEPR_RAT	Leptin receptor Lepr PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MLEC_RAT	Malectin Mlec PE=2 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
RENBP_RAT	N-acylglucosamine 2-epimerase Renbp PE=2 SV=2
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PTH2R_RAT	Parathyroid hormone 2 receptor Pth2r PE=2 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
SYFA_RAT	Phenylalanine--tRNA ligase alpha subunit Farsa PE=1 SV=1
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
FA98A_RAT	Protein FAM98A Fam98a PE=2 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RELN_RAT	Reelin Reln PE=2 SV=1
RIMS1_RAT	Regulating synaptic membrane exocytosis protein 1 Rims1 PE=1 SV=1
REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
RTN1_RAT	Reticulon-1 Rtn1 PE=2 SV=1
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
SCAM5_RAT	Secretory carrier-associated membrane protein 5 Scamp5 PE=2 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
SL9A2_RAT	Sodium/hydrogen exchanger 2 Slc9a2 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SUCO_RAT	SUN domain-containing ossification factor Suco PE=2 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3

SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2B_RAT	Synaptic vesicle glycoprotein 2B Sv2b PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
TR102_RAT	Taste receptor type 2 member 102 Tas2r102 PE=3 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TACD2_RAT	Tumor-associated calcium signal transducer 2 Tacstd2 PE=2 SV=1
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
MYO1D_RAT	Unconventional myosin-Id Myo1d PE=1 SV=3
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
VIAAT_RAT	Vesicular inhibitory amino acid transporter Slc32a1 PE=1 SV=1
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

NIC CA3 sample 2 LC-MS

AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
DECR_RAT	2,4-dienoyl-CoA reductase, mitochondrial Decr1 PE=1 SV=2
RM38_RAT	39S ribosomal protein L38, mitochondrial Mrpl38 PE=2 SV=2
RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2

RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
APBB1_RAT	Amyloid beta A4 precursor protein-binding family B member 1 Apbb1 PE=1 SV=3
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ABCA7_RAT	ATP-binding cassette sub-family A member 7 Abca7 PE=1 SV=1
ARBK1_RAT	Beta-adrenergic receptor kinase 1 Adrbk1 PE=2 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CHST3_RAT	Carbohydrate sulfotransferase 3 Chst3 PE=2 SV=2

CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
PCY1B_RAT	Choline-phosphate cytidylyltransferase B Pcyt1b PE=2 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CNTP1_RAT	Contactin-associated protein 1 Cntnap1 PE=1 SV=1
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CUL7_RAT	Cullin-7 Cul7 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DNM1L_RAT	Dynamin-1-like protein Dnm1l PE=1 SV=1
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYH7_RAT	Dynein heavy chain 7, axonemal Dnah7 PE=2 SV=2
ELAV2_RAT	ELAV-like protein 2 Elavl2 PE=2 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
GBRG3_RAT	Gamma-aminobutyric acid receptor subunit gamma-3 Gabrg3 PE=2 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HNRPF_RAT	Heterogeneous nuclear ribonucleoprotein F Hnrnpf PE=1 SV=3
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IGS10_RAT	Immunoglobulin superfamily member 10 Igsf10 PE=1 SV=1

IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
ILF2_RAT	Interleukin enhancer-binding factor 2 Ilf2 PE=2 SV=1
IQUB_RAT	IQ and ubiquitin-like domain-containing protein Iqub PE=2 SV=2
IDHP_RAT	Isocitrate dehydrogenase [NADP], mitochondrial Idh2 PE=1 SV=2
IVD_RAT	Isovaleryl-CoA dehydrogenase, mitochondrial Ivd PE=1 SV=2
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
KIF2C_RAT	Kinesin-like protein KIF2C Kif2c PE=2 SV=3
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LRIQ3_RAT	Leucine-rich repeat and IQ domain-containing protein 3 Lrriq3 PE=2 SV=1
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
PRIO_RAT	Major prion protein Prnp PE=1 SV=2
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MATR3_RAT	Matrin-3 Matr3 PE=1 SV=2
MBOA2_RAT	Membrane-bound O-acyltransferase domain-containing protein 2 Mboat2 PE=2 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MK03_RAT	Mitogen-activated protein kinase 3 Mapk3 PE=1 SV=5
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYH9_RAT	Myosin-9 Myh9 PE=1 SV=3
MYBPH_RAT	Myosin-binding protein H Mybph PE=2 SV=1
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
ORN_RAT	Oligoribonuclease, mitochondrial Rexo2 PE=2 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
PSA3_RAT	Proteasome subunit alpha type-3 Psma3 PE=1 SV=3
PSA6_RAT	Proteasome subunit alpha type-6 Psma6 PE=1 SV=1
BSN_RAT	Protein bassoon Bsn PE=1 SV=3
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
SE1L1_RAT	Protein sel-1 homolog 1 Sel1l PE=2 SV=2
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RCBT2_RAT	RCC1 and BTB domain-containing protein 2 Rcbtb2 PE=2 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
RIMS2_RAT	Regulating synaptic membrane exocytosis protein 2 Rims2 PE=1 SV=1

REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
SCAM5_RAT	Secretory carrier-associated membrane protein 5 Scamp5 PE=2 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
TAOK3_RAT	Serine/threonine-protein kinase TAO3 Taok3 PE=2 SV=1
SRP54_RAT	Signal recognition particle 54 kDa protein Srp54 PE=2 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SPAG1_RAT	Sperm-associated antigen 1 Spag1 PE=2 SV=1
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SNED1_RAT	Sushi, nidogen and EGF-like domain-containing protein 1 Sned1 PE=2 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
STXB2_RAT	Syntaxin-binding protein 2 Stxbp2 PE=2 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TCPE_RAT	T-complex protein 1 subunit epsilon Cct5 PE=1 SV=1
TCPG_RAT	T-complex protein 1 subunit gamma Cct3 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
RTCB_RAT	tRNA-splicing ligase RtcB homolog Rtcb PE=2 SV=1
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
U2D2B_RAT	Ubiquitin-conjugating enzyme E2 D2B Ube2d2b PE=1 SV=1
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
CSPG2_RAT	Versican core protein (Fragments) Vcan PE=2 SV=2
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

NIC CA3 sample 2 LC-MS

RS11_RAT	40S ribosomal protein S11 Rps11 PE=1 SV=3
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3

RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS23_RAT	40S ribosomal protein S23 Rps23 PE=1 SV=3
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
5HT6R_RAT	5-hydroxytryptamine receptor 6 Htr6 PE=1 SV=2
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
AKA12_RAT	A-kinase anchor protein 12 Akap12 PE=1 SV=1
AINX_RAT	Alpha-internexin Ina PE=1 SV=2
AMOL2_RAT	Angiomotin-like protein 2 Amotl2 PE=3 SV=1
AMHR2_RAT	Anti-Muellerian hormone type-2 receptor Amhr2 PE=2 SV=1
ATPG_RAT	ATP synthase subunit gamma, mitochondrial Atp5c1 PE=1 SV=2
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CX6C2_RAT	Cytochrome c oxidase subunit 6C-2 Cox6c2 PE=1 SV=3
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYH7_RAT	Dynein heavy chain 7, axonemal Dnah7 PE=2 SV=2
TRIPC_RAT	E3 ubiquitin-protein ligase TRIP12 Trip12 PE=2 SV=1
UBR4_RAT	E3 ubiquitin-protein ligase UBR4 Ubr4 PE=1 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1

HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
KLH10_RAT	Kelch-like protein 10 Klhl10 PE=2 SV=1
PRIO_RAT	Major prion protein Prnp PE=1 SV=2
MAGI2_RAT	Membrane-associated guanylate kinase, WW and PDZ domain-containing protein 2 Magi2 PE=1 SV=1
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MOT3_RAT	Monocarboxylate transporter 3 Slc16a8 PE=2 SV=1
MPDZ_RAT	Multiple PDZ domain protein Mpdz PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYH10_RAT	Myosin-10 Myh10 PE=2 SV=1
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NFM_RAT	Neurofilament medium polypeptide Nefm PE=1 SV=4
OPRX_RAT	Nociceptin receptor Oprl1 PE=2 SV=1
OLA1_RAT	Obg-like ATPase 1 Ola1 PE=2 SV=1
ORN_RAT	Oligoribonuclease, mitochondrial Rexo2 PE=2 SV=1
PCNA_RAT	Proliferating cell nuclear antigen Pcna PE=1 SV=1
FA98A_RAT	Protein FAM98A Fam98a PE=2 SV=1
RGPA2_RAT	Ral GTPase-activating protein subunit alpha-2 Ralgapa2 PE=1 SV=1
RMD1_RAT	Regulator of microtubule dynamics protein 1 Rmdn1 PE=2 SV=1
REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
ARHG2_RAT	Rho guanine nucleotide exchange factor 2 Arhgef2 PE=2 SV=1
SVS2_RAT	Seminal vesicle secretory protein 2 Svs2 PE=1 SV=1
KPCD1_RAT	Serine/threonine-protein kinase D1 Prkd1 PE=1 SV=2
SCNBA_RAT	Sodium channel protein type 11 subunit alpha Scn11a PE=1 SV=1
SCN2A_RAT	Sodium channel protein type 2 subunit alpha Scn2a PE=1 SV=1
SCN3A_RAT	Sodium channel protein type 3 subunit alpha Scn3a PE=1 SV=1
SCN5A_RAT	Sodium channel protein type 5 subunit alpha Scn5a PE=2 SV=1
SCN8A_RAT	Sodium channel protein type 8 subunit alpha Scn8a PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TSG10_RAT	Testis-specific gene 10 protein Tsga10 PE=1 SV=2
TF2B_RAT	Transcription initiation factor IIB Gtf2b PE=2 SV=1
EI2BB_RAT	Translation initiation factor eIF-2B subunit beta Eif2b2 PE=2 SV=1
TBA3_RAT	Tubulin alpha-3 chain Tuba3a PE=2 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
VDAC1_RAT	Voltage-dependent anion-selective channel protein 1 Vdac1 PE=1 SV=4
ZCCHV_RAT	Zinc finger CCCH-type antiviral protein 1 Zc3hav1 PE=1 SV=1

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AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1

1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL37_RAT	60S ribosomal protein L37 Rpl37 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
PPBT_RAT	Alkaline phosphatase, tissue-nonspecific isozyme Alpl PE=1 SV=2
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
AOFB_RAT	Amine oxidase [flavin-containing] B Maob PE=1 SV=3
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1

AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
BRNP2_RAT	BMP/retinoic acid-inducible neural-specific protein 2 Brinp2 PE=2 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
BACD2_RAT	BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CDYL_RAT	Chromodomain Y-like protein Cdyl PE=2 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
GAK_RAT	Cyclin-G-associated kinase Gak PE=2 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
ELAV2_RAT	ELAV-like protein 2 Elavl2 PE=2 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FBX43_RAT	F-box only protein 43 Fbxo43 PE=2 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
GBRG3_RAT	Gamma-aminobutyric acid receptor subunit gamma-3 Gabrg3 PE=2 SV=1
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
GSDMC_RAT	Gasdermin-C Gsdmc PE=3 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
GSTM5_RAT	Glutathione S-transferase Mu 5 Gstm5 PE=1 SV=3
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3

G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
KHDR2_RAT	KH domain-containing, RNA-binding, signal transduction-associated protein 2 Khdrbs2 PE=1 SV=1
KHDR3_RAT	KH domain-containing, RNA-binding, signal transduction-associated protein 3 Khdrbs3 PE=1 SV=1
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MASP2_RAT	Mannan-binding lectin serine protease 2 Masp2 PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE3_RAT	Microtubule-associated protein RP/EB family member 3 Mapre3 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NFH_RAT	Neurofilament heavy polypeptide Nefh PE=1 SV=4
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
ORN_RAT	Oligoribonuclease, mitochondrial Rexo2 PE=2 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PICAL_RAT	Phosphatidylinositol-binding clathrin assembly protein Picalm PE=1 SV=1
PACS1_RAT	Phosphofurin acidic cluster sorting protein 1 Pacs1 PE=2 SV=1
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
KCNC2_RAT	Potassium voltage-gated channel subfamily C member 2 Kcnc2 PE=1 SV=1
P3H1_RAT	Prolyl 3-hydroxylase 1 Lepre1 PE=1 SV=1
PSA6_RAT	Proteasome subunit alpha type-6 Psma6 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
F118B_RAT	Protein FAM118B Fam118b PE=2 SV=1
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RELN_RAT	Reelin Reln PE=2 SV=1
RBM43_RAT	RNA-binding protein 43 Rbm43 PE=2 SV=1
AT2A2_RAT	Sarcoplasmic/endoplasmic reticulum calcium ATPase 2 Atp2a2 PE=1 SV=1

DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
SCN1A_RAT	Sodium channel protein type 1 subunit alpha Scn1a PE=1 SV=1
SCNAA_RAT	Sodium channel protein type 10 subunit alpha Scn10a PE=1 SV=1
SCNBA_RAT	Sodium channel protein type 11 subunit alpha Scn11a PE=1 SV=1
SCN2A_RAT	Sodium channel protein type 2 subunit alpha Scn2a PE=1 SV=1
SCN4A_RAT	Sodium channel protein type 4 subunit alpha Scn4a PE=2 SV=1
SCN8A_RAT	Sodium channel protein type 8 subunit alpha Scn8a PE=1 SV=1
SCN9A_RAT	Sodium channel protein type 9 subunit alpha Scn9a PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
STXB2_RAT	Syntaxin-binding protein 2 Stxbp2 PE=2 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
SYTC_RAT	Threonine--tRNA ligase, cytoplasmic Tars PE=2 SV=1
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
SYWC_RAT	Tryptophan--tRNA ligase, cytoplasmic Wars PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
ZCCHV_RAT	Zinc finger CCCH-type antiviral protein 1 Zc3hav1 PE=1 SV=1

8R CA1 sample 2 LC-MS

PDK4_RAT	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 4, mitochondrial Pdk4 PE=1 SV=1
AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3

RS19_RAT	40S ribosomal protein S19 Rps19 PE=2 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL23_RAT	60S ribosomal protein L23 Rpl23 PE=2 SV=1
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL38_RAT	60S ribosomal protein L38 Rpl38 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL7A_RAT	60S ribosomal protein L7a Rpl7a PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
E41L1_RAT	Band 4.1-like protein 1 Epb41l1 PE=1 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
BACD2_RAT	BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1

KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CLCB_RAT	Clathrin light chain B Cltb PE=1 SV=1
CCD50_RAT	Coiled-coil domain-containing protein 50 Ccdc50 PE=2 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CNTN3_RAT	Contactin-3 Cntn3 PE=1 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYD_RAT	Dihydropyrimidine dehydrogenase [NADP(+)] Dpyd PE=2 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1a_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FAS_RAT	Fatty acid synthase Fasn PE=1 SV=3
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GLSL_RAT	Glutaminase liver isoform, mitochondrial Gls2 PE=2 SV=3
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
PPT2_RAT	Lysosomal thioesterase PPT2 Ppt2 PE=2 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MARE3_RAT	Microtubule-associated protein RP/EB family member 3 Mapre3 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1

NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
PNCB_RAT	Nicotinate phosphoribosyltransferase Naprt1 PE=2 SV=1
NOS2_RAT	Nitric oxide synthase, inducible Nos2 PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PACS1_RAT	Phosphofurin acidic cluster sorting protein 1 Pacs1 PE=2 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
SC16B_RAT	Protein transport protein Sec16B Sec16b PE=2 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
RGS3_RAT	Regulator of G-protein signaling 3 Rgs3 PE=1 SV=2
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
GTR3_RAT	Solute carrier family 2, facilitated glucose transporter member 3 Slc2a3 PE=1 SV=1
S22A1_RAT	Solute carrier family 22 member 1 Slc22a1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
MMP10_RAT	Stromelysin-2 Mmp10 PE=2 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
TKT_RAT	Transketolase Tkt PE=1 SV=1
EI2BB_RAT	Translation initiation factor eIF-2B subunit beta Eif2b2 PE=2 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
ZCH18_RAT	Zinc finger CCCH domain-containing protein 18 Zc3h18 PE=2 SV=1
ZN830_RAT	Zinc finger protein 830 Znf830 PE=2 SV=1

8R CA1 sample 3 LC-MS	
PDK4_RAT	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 4, mitochondrial Pdk4 PE=1 SV=1
AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS16_RAT	40S ribosomal protein S16 Rps16 PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL38_RAT	60S ribosomal protein L38 Rpl38 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ADCY2_RAT	Adenylate cyclase type 2 Adcy2 PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
PPBT_RAT	Alkaline phosphatase, tissue-nonspecific isozyme Alpl PE=1 SV=2
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2M1_RAT	AP-2 complex subunit mu Ap2m1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1

APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
AT2C2_RAT	Calcium-transporting ATPase type 2C member 2 Atp2c2 PE=2 SV=1
CLIP2_RAT	CAP-Gly domain-containing linker protein 2 Clip2 PE=1 SV=1
CPSM_RAT	Carbamoyl-phosphate synthase [ammonia], mitochondrial Cps1 PE=1 SV=1
CHST3_RAT	Carbohydrate sulfotransferase 3 Chst3 PE=2 SV=2
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DMRT3_RAT	Doublesex and mab-3 related transcription factor 3 Dmrt3 PE=3 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
FUMH_RAT	Fumarate hydratase, mitochondrial Fh PE=1 SV=1
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
KAD3_RAT	GTP:AMP phosphotransferase AK3, mitochondrial Ak3 PE=2 SV=2
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUC2E_RAT	Guanylyl cyclase GC-E Gucy2e PE=1 SV=1
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2

ROA2_RAT	Heterogeneous nuclear ribonucleoproteins A2/B1 Hnrnpa2b1 PE=1 SV=1
H11_RAT	Histone H1.1 Hist1h1a PE=3 SV=1
H14_RAT	Histone H1.4 Hist1h1e PE=1 SV=3
HIPK3_RAT	Homeodomain-interacting protein kinase 3 Hipk3 PE=1 SV=1
HIPK4_RAT	Homeodomain-interacting protein kinase 4 Hipk4 PE=2 SV=1
IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
ITB4_RAT	Integrin beta-4 Itgb4 PE=2 SV=1
KLH24_RAT	Kelch-like protein 24 Klhl24 PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYT1L_RAT	Myelin transcription factor 1-like protein Myt1l PE=1 SV=2
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
NPTN_RAT	Neuroplastin Nptn PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
ORC3_RAT	Origin recognition complex subunit 3 Orc3 PE=2 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PACS1_RAT	Phosphofurin acidic cluster sorting protein 1 Pacs1 PE=2 SV=1
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
UBB_RAT	Polyubiquitin-B Ubb PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
UN13C_RAT	Protein unc-13 homolog C Unc13c PE=1 SV=3
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RS10B_RAT	Radial spoke head 10 homolog B Rsph10b PE=2 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB8B_RAT	Ras-related protein Rab-8B Rab8b PE=1 SV=1
PTPRZ_RAT	Receptor-type tyrosine-protein phosphatase zeta Ptprz1 PE=1 SV=1
RELN_RAT	Reelin Reln PE=2 SV=1
RGS14_RAT	Regulator of G-protein signaling 14 Rgs14 PE=1 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
SGK3_RAT	Serine/threonine-protein kinase Sgk3 Sgk3 PE=1 SV=2
SHKB1_RAT	SH3KBP1-binding protein 1 Shkbp1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3

SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TERT_RAT	Telomerase reverse transcriptase Tert PE=2 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
TDRP_RAT	Testis development-related protein Tdrp PE=1 SV=2
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
SYWC_RAT	Tryptophan--tRNA ligase, cytoplasmic Wars PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
RL40_RAT	Ubiquitin-60S ribosomal protein L40 Uba52 PE=1 SV=2
CAC1C_RAT	Voltage-dependent L-type calcium channel subunit alpha-1C Cacna1c PE=1 SV=1
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1
ZN830_RAT	Zinc finger protein 830 Znf830 PE=2 SV=1

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AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
PSD11_RAT	26S proteasome non-ATPase regulatory subunit 11 Psmd11 PE=3 SV=2
RT15_RAT	28S ribosomal protein S15, mitochondrial Mrps15 PE=2 SV=1
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RS9_RAT	40S ribosomal protein S9 Rps9 PE=1 SV=4
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3

RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL10A_RAT	60S ribosomal protein L10a Rpl10a PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL30_RAT	60S ribosomal protein L30 Rpl30 PE=3 SV=2
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
PPBT_RAT	Alkaline phosphatase, tissue-nonspecific isozyme Alpl PE=1 SV=2
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
E41L5_RAT	Band 4.1-like protein 5 Epb41l5 PE=2 SV=2
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CACP_RAT	Carnitine O-acetyltransferase Crat PE=1 SV=1
CDYL_RAT	Chromodomain Y-like protein Cdyl PE=2 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CX6C2_RAT	Cytochrome c oxidase subunit 6C-2 Cox6c2 PE=1 SV=3
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYH7_RAT	Dynein heavy chain 7, axonemal Dnah7 PE=2 SV=2
TRI11_RAT	E3 ubiquitin-protein ligase TRIM11 Trim11 PE=2 SV=1
ELAV2_RAT	ELAV-like protein 2 Elavl2 PE=2 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4

FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FLIP1_RAT	Filamin-A-interacting protein 1 Filip1 PE=1 SV=1
FLOT2_RAT	Flotillin-2 Flot2 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
GPC1_RAT	Glypican-1 Gpc1 PE=1 SV=1
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GBB4_RAT	Guanine nucleotide-binding protein subunit beta-4 Gnb4 PE=2 SV=4
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
IMA6_RAT	Importin subunit alpha-6 Kpna5 PE=2 SV=1
IDE_RAT	Insulin-degrading enzyme Ide PE=1 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
LRC46_RAT	Leucine-rich repeat-containing protein 46 Lrrc46 PE=2 SV=1
PRIO_RAT	Major prion protein Prnp PE=1 SV=2
MARF1_RAT	Meiosis arrest female protein 1 Marf1 PE=1 SV=2
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NFL_RAT	Neurofilament light polypeptide Nefl PE=1 SV=3
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
NOS2_RAT	Nitric oxide synthase, inducible Nos2 PE=1 SV=2
NUMBL_RAT	Numb-like protein Numbl PE=1 SV=1
ORN_RAT	Oligoribonuclease, mitochondrial Rexo2 PE=2 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PLD2_RAT	Phospholipase D2 Pld2 PE=1 SV=2
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
NRG1_RAT	Pro-neuregulin-1, membrane-bound isoform Nrg1 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
FA98A_RAT	Protein FAM98A Fam98a PE=2 SV=1

GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RELN_RAT	Reelin Reln PE=2 SV=1
REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ2_RAT	Synaptojanin-2 Synj2 PE=1 SV=2
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
TERT_RAT	Telomerase reverse transcriptase Tert PE=2 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
TAB2_RAT	TGF-beta-activated kinase 1 and MAP3K7-binding protein 2 Tab2 PE=2 SV=2
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
MYO16_RAT	Unconventional myosin-XVI Myo16 PE=1 SV=1
VGFR1_RAT	Vascular endothelial growth factor receptor 1 Flt1 PE=2 SV=1
ZCCHV_RAT	Zinc finger CCCH-type antiviral protein 1 Zc3hav1 PE=1 SV=1

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PDK4_RAT	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 4, mitochondrial Pdk4 PE=1 SV=1
AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3
RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS25_RAT	40S ribosomal protein S25 Rps25 PE=2 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS30_RAT	40S ribosomal protein S30 Fau PE=1 SV=1
RS3A_RAT	40S ribosomal protein S3a Rps3a PE=1 SV=2

RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL13_RAT	60S ribosomal protein L13 Rpl13 PE=1 SV=2
RL13A_RAT	60S ribosomal protein L13a Rpl13a PE=1 SV=2
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18A_RAT	60S ribosomal protein L18a Rpl18a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL4_RAT	60S ribosomal protein L4 Rpl4 PE=1 SV=3
RL5_RAT	60S ribosomal protein L5 Rpl5 PE=1 SV=3
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ASCC3_RAT	Activating signal cointegrator 1 complex subunit 3 Ascc3 PE=3 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
AP2S1_RAT	AP-2 complex subunit sigma Ap2s1 PE=1 SV=1
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ABCB6_RAT	ATP-binding cassette sub-family B member 6, mitochondrial Abcb6 PE=2 SV=1
BRNP1_RAT	BMP/retinoic acid-inducible neural-specific protein 1 Brinp1 PE=2 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CX6C2_RAT	Cytochrome c oxidase subunit 6C-2 Cox6c2 PE=1 SV=3
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1

DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EF2_RAT	Elongation factor 2 Eef2 PE=1 SV=4
ESF1_RAT	ESF1 homolog Esf1 PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GBLP_RAT	Guanine nucleotide-binding protein subunit beta-2-like 1 Gnb2l1 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
KALRN_RAT	Kalirin Kalrn PE=1 SV=3
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
PRIO_RAT	Major prion protein Prnp PE=1 SV=2
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NEUM_RAT	Neuromodulin Gap43 PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PI4KA_RAT	Phosphatidylinositol 4-kinase alpha Pi4ka PE=1 SV=1
PGM1_RAT	Phosphoglucomutase-1 Pgm1 PE=1 SV=2
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PAIRB_RAT	Plasminogen activator inhibitor 1 RNA-binding protein Serbp1 PE=1 SV=2
PDGFD_RAT	Platelet-derived growth factor D Pdgfd PE=2 SV=1
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1

PSA7_RAT	Proteasome subunit alpha type-7 Psma7 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
KPCG_RAT	Protein kinase C gamma type Prkcg PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
TAOK3_RAT	Serine/threonine-protein kinase TAO3 Taok3 PE=2 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
GTR3_RAT	Solute carrier family 2, facilitated glucose transporter member 3 Slc2a3 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
EI2BB_RAT	Translation initiation factor eIF-2B subunit beta Eif2b2 PE=2 SV=1
TM38A_RAT	Trimeric intracellular cation channel type A Tmem38a PE=2 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA3_RAT	Tubulin alpha-3 chain Tuba3a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
ZNT7_RAT	Zinc transporter 7 Slc30a7 PE=2 SV=2

8R CA3 sample 3 LC-MS

AKCL2_RAT	1,5-anhydro-D-fructose reductase Akr1e2 PE=2 SV=1
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
OAS3_RAT	2'-5'-oligoadenylate synthase 3 Oas3 PE=2 SV=1
RT07_RAT	28S ribosomal protein S7, mitochondrial Mrps7 PE=2 SV=2
RS12_RAT	40S ribosomal protein S12 Rps12 PE=1 SV=2
RS13_RAT	40S ribosomal protein S13 Rps13 PE=1 SV=2
RS14_RAT	40S ribosomal protein S14 Rps14 PE=2 SV=3

RS15A_RAT	40S ribosomal protein S15a Rps15a PE=1 SV=2
RS18_RAT	40S ribosomal protein S18 Rps18 PE=1 SV=3
RS2_RAT	40S ribosomal protein S2 Rps2 PE=1 SV=1
RS20_RAT	40S ribosomal protein S20 Rps20 PE=3 SV=1
RS28_RAT	40S ribosomal protein S28 Rps28 PE=1 SV=1
RS3_RAT	40S ribosomal protein S3 Rps3 PE=1 SV=1
RS4X_RAT	40S ribosomal protein S4, X isoform Rps4x PE=2 SV=2
RS6_RAT	40S ribosomal protein S6 Rps6 PE=1 SV=1
RSSA_RAT	40S ribosomal protein SA Rpsa PE=1 SV=3
RLA0_RAT	60S acidic ribosomal protein P0 Rplp0 PE=1 SV=2
RL12_RAT	60S ribosomal protein L12 Rpl12 PE=2 SV=1
RL15_RAT	60S ribosomal protein L15 Rpl15 PE=1 SV=2
RL17_RAT	60S ribosomal protein L17 Rpl17 PE=2 SV=3
RL18_RAT	60S ribosomal protein L18 Rpl18 PE=2 SV=2
RL23A_RAT	60S ribosomal protein L23a Rpl23a PE=2 SV=1
RL24_RAT	60S ribosomal protein L24 Rpl24 PE=2 SV=1
RL26_RAT	60S ribosomal protein L26 Rpl26 PE=1 SV=1
RL3_RAT	60S ribosomal protein L3 Rpl3 PE=1 SV=3
RL34_RAT	60S ribosomal protein L34 Rpl34 PE=1 SV=3
RL35_RAT	60S ribosomal protein L35 Rpl35 PE=1 SV=3
RL35A_RAT	60S ribosomal protein L35a Rpl35a PE=3 SV=1
RL36_RAT	60S ribosomal protein L36 Rpl36 PE=1 SV=2
RL6_RAT	60S ribosomal protein L6 Rpl6 PE=1 SV=5
RL7_RAT	60S ribosomal protein L7 Rpl7 PE=1 SV=2
RL8_RAT	60S ribosomal protein L8 Rpl8 PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ADCY3_RAT	Adenylate cyclase type 3 Adcy3 PE=2 SV=1
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
AMHR2_RAT	Anti-Muellerian hormone type-2 receptor Amhr2 PE=2 SV=1
AP2A2_RAT	AP-2 complex subunit alpha-2 Ap2a2 PE=1 SV=3
AAK1_RAT	AP2-associated protein kinase 1 Aak1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ABCB6_RAT	ATP-binding cassette sub-family B member 6, mitochondrial Abcb6 PE=2 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
CALI_RAT	Calicin Ccin PE=1 SV=1
CAH2_RAT	Carbonic anhydrase 2 Ca2 PE=1 SV=2
PCY1B_RAT	Choline-phosphate cytidylyltransferase B Pcyt1b PE=2 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1

ADA15_RAT	Disintegrin and metalloproteinase domain-containing protein 15 Adam15 PE=2 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
CCL11_RAT	Eotaxin Ccl11 PE=3 SV=1
FPPS_RAT	Farnesyl pyrophosphate synthase Fdps PE=2 SV=2
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOB_RAT	Fructose-bisphosphate aldolase B Aldob PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
GBRG3_RAT	Gamma-aminobutyric acid receptor subunit gamma-3 Gabrg3 PE=2 SV=1
GBRR1_RAT	Gamma-aminobutyric acid receptor subunit rho-1 Gabrr1 PE=1 SV=2
CXA1_RAT	Gap junction alpha-1 protein Gja1 PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
KLC4_RAT	Kinesin light chain 4 Klc4 PE=2 SV=1
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
NCAN_RAT	Neurocan core protein Ncan PE=1 SV=1
NEUG_RAT	Neurogranin Nrgn PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PPIG_RAT	Peptidyl-prolyl cis-trans isomerase G Ppig PE=1 SV=2
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
SYFA_RAT	Phenylalanine--tRNA ligase alpha subunit Farsa PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PABP1_RAT	Polyadenylate-binding protein 1 Pabpc1 PE=1 SV=1
PTBP1_RAT	Polypyrimidine tract-binding protein 1 Ptbp1 PE=1 SV=1
PTBP2_RAT	Polypyrimidine tract-binding protein 2 Ptbp2 PE=2 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
SYGP1_RAT	Ras/Rap GTPase-activating protein SynGAP Syngap1 PE=1 SV=2
RIMS2_RAT	Regulating synaptic membrane exocytosis protein 2 Rims2 PE=1 SV=1
REL3_RAT	Relaxin-3 Rln3 PE=2 SV=1
KS6A1_RAT	Ribosomal protein S6 kinase alpha-1 Rps6ka1 PE=1 SV=1

SI1L1_RAT	Signal-induced proliferation-associated 1-like protein 1 Sipa1l1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYN3_RAT	Synapsin-3 Syn3 PE=1 SV=1
SYNJ1_RAT	Synaptojanin-1 Synj1 PE=1 SV=3
TSG10_RAT	Testis-specific gene 10 protein Tsga10 PE=1 SV=2
T10IP_RAT	Testis-specific protein 10-interacting protein Tsga10ip PE=2 SV=2
PURA_RAT	Transcriptional activator protein Pur-alpha (Fragments) Pura PE=1 SV=1
PURB_RAT	Transcriptional activator protein Pur-beta Purb PE=1 SV=3
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
SYYC_RAT	Tyrosine--tRNA ligase, cytoplasmic Yars PE=2 SV=3
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
OTUB1_RAT	Ubiquitin thioesterase OTUB1 Otub1 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

APPENDIX 4: LC-MS PROTEOMICS OF HU IPS OF INDIVIDUAL SAMPLES

HuR IP CA1 NIC sample 1	
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
AGRIN_RAT	Agrin Agrn PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AMPD3_RAT	AMP deaminase 3 Ampd3 PE=2 SV=2
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
LX12E_RAT	Arachidonate 12-lipoxygenase, epidermal-type Alox12e PE=3 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
DC1L2_RAT	Cytoplasmic dynein 1 light intermediate chain 2 Dync1li2 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DIXC1_RAT	Dixin Dixdc1 PE=2 SV=1
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FGOP2_RAT	FGFR1 oncogene partner 2 homolog Fgfr1op2 PE=2 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HSP72_RAT	Heat shock-related 70 kDa protein 2 Hspa2 PE=1 SV=2

HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MYC_RAT	Myc proto-oncogene protein Myc PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
NAA25_RAT	N-alpha-acetyltransferase 25, NatB auxiliary subunit Naa25 PE=2 SV=1
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
P4HA1_RAT	Prolyl 4-hydroxylase subunit alpha-1 P4ha1 PE=2 SV=2
ZFY27_RAT	Protrudin Zfyve27 PE=1 SV=2
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
GDIB_RAT	Rab GDP dissociation inhibitor beta Gdi2 PE=1 SV=2
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
SC11A_RAT	Signal peptidase complex catalytic subunit SEC11A Sec11a PE=2 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
GTR1_RAT	Solute carrier family 2, facilitated glucose transporter member 1 Slc2a1 PE=1 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TMM35_RAT	Transmembrane protein 35 Tmem35 PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1

TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
WIPF3_RAT	WAS/WASL-interacting protein family member 3 Wipf3 PE=1 SV=1

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
PSMD1_RAT	26S proteasome non-ATPase regulatory subunit 1 Psmd1 PE=2 SV=1
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
AK1A1_RAT	Alcohol dehydrogenase [NADP(+)] Akr1a1 PE=1 SV=2
ADDA_RAT	Alpha-adducin Add1 PE=2 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPD_RAT	ATP synthase subunit delta, mitochondrial Atp5d PE=1 SV=2

ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CALR_RAT	Calreticulin Calr PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CUL7_RAT	Cullin-7 Cul7 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
ENPL_RAT	Endoplasmin Hsp90b1 PE=1 SV=2
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP71_RAT	Heat shock 70 kDa protein 1A/1B Hspa1a PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HSP72_RAT	Heat shock-related 70 kDa protein 2 Hspa2 PE=1 SV=2
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1

K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
MYCD_RAT	Myocardin Myocd PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
ODFP2_RAT	Outer dense fiber protein 2 Odf2 PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PHAR3_RAT	Phosphatase and actin regulator 3 Phactr3 PE=2 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
AT2B4_RAT	Plasma membrane calcium-transporting ATPase 4 Atp2b4 PE=2 SV=1
PLEC_RAT	Plectin Plec PE=1 SV=2
UBB_RAT	Polyubiquitin-B Ubb PE=1 SV=1
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
RBM22_RAT	Pre-mRNA-splicing factor RBM22 Rbm22 PE=2 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1

RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8B_RAT	Ras-related protein Rab-8B Rab8b PE=1 SV=1
RELN_RAT	Reelin Reln PE=2 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SO1C1_RAT	Solute carrier organic anion transporter family member 1C1 Slco1c1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SMRD2_RAT	SWI/SNF-related matrix-associated actin-dependent regulator of chromatin subfamily D member 2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
MYO9A_RAT	Unconventional myosin-IXa Myo9a PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VP33B_RAT	Vacuolar protein sorting-associated protein 33B Vps33b PE=2 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2

NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
ZN672_RAT	Zinc finger protein 672 Znf672 PE=2 SV=1

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
GABT_RAT	4-aminobutyrate aminotransferase, mitochondrial Abat PE=1 SV=3
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
CAP1_RAT	Adenylyl cyclase-associated protein 1 Cap1 PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATPD_RAT	ATP synthase subunit delta, mitochondrial Atp5d PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CALR_RAT	Calreticulin Calr PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CCDC8_RAT	Coiled-coil domain-containing protein 8 Ccdc8 PE=2 SV=1

CPLX1_RAT	Complexin-1 Cplx1 PE=1 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
T2FA_RAT	General transcription factor IIF subunit 1 Gtf2f1 PE=2 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
GSTM4_RAT	Glutathione S-transferase Yb-3 Gstm3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GNAI3_RAT	Guanine nucleotide-binding protein G(k) subunit alpha Gnai3 PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAS2_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms short Gnas PE=1 SV=1
GNAS1_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas Gnas PE=1 SV=3
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4

HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
ROA3_RAT	**Heterogeneous nuclear ribonucleoprotein A3 Hnrnpa3 PE=1 SV=1**
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LANC1_RAT	LanC-like protein 1 Lancl1 PE=2 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
MLP3A_RAT	Microtubule-associated proteins 1A/1B light chain 3A Map1lc3a PE=1 SV=1
M3K11_RAT	Mitogen-activated protein kinase kinase kinase 11 Map3k11 PE=1 SV=1
M3K12_RAT	Mitogen-activated protein kinase kinase kinase 12 Map3k12 PE=1 SV=1
BIN1_RAT	Myc box-dependent-interacting protein 1 Bin1 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
UBB_RAT	Polyubiquitin-B Ubb PE=1 SV=1
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1

PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB4A_RAT	Ras-related protein Rab-4A Rab4a PE=2 SV=3
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
ROBO4_RAT	Roundabout homolog 4 Robo4 PE=2 SV=1
SKP1_RAT	S-phase kinase-associated protein 1 Skp1 PE=2 SV=3
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
DCLK1_RAT	Serine/threonine-protein kinase DCLK1 Dclk1 PE=2 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT5_RAT	Synaptotagmin-5 Syt5 PE=1 SV=1
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TR150_RAT	Thyroid hormone receptor-associated protein 3 Thrap3 PE=1 SV=1
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TKT_RAT	Transketolase Tkt PE=1 SV=1

TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TPM1_RAT	Tropomyosin alpha-1 chain Tpm1 PE=1 SV=3
TPM3_RAT	Tropomyosin alpha-3 chain Tpm3 PE=1 SV=2
TPM4_RAT	Tropomyosin alpha-4 chain Tpm4 PE=1 SV=3
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RL40_RAT	Ubiquitin-60S ribosomal protein L40 Uba52 PE=1 SV=2
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VP33B_RAT	Vacuolar protein sorting-associated protein 33B Vps33b PE=2 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
ZN672_RAT	Zinc finger protein 672 Znf672 PE=2 SV=1

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
FETA_RAT	Alpha-fetoprotein Afp PE=2 SV=1
MA2A1_RAT	Alpha-mannosidase 2 (Fragment) Man2a1 PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
AP4A_RAT	Bis(5'-nucleosyl)-tetraphosphatase [asymmetrical] Nudt2 PE=2 SV=3
KCC1A_RAT	Calcium/calmodulin-dependent protein kinase type 1 Camk1 PE=1 SV=2

KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DAB2P_RAT	Disabled homolog 2-interacting protein Dab2ip PE=1 SV=1
DISC1_RAT	Disrupted in schizophrenia 1 homolog Disc1 PE=1 SV=2
TOP1M_RAT	DNA topoisomerase I, mitochondrial Top1mt PE=2 SV=1
DUS6_RAT	Dual specificity protein phosphatase 6 Dusp6 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
EIF3B_RAT	Eukaryotic translation initiation factor 3 subunit B Eif3b PE=1 SV=1
FOXM1_RAT	Forkhead box protein M1 Foxm1 PE=2 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
GLP2R_RAT	Glucagon-like peptide 2 receptor Glp2r PE=2 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GPDA_RAT	Glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic Gpd1 PE=1 SV=4
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
HXK2_RAT	Hexokinase-2 Hk2 PE=1 SV=1
IRK13_RAT	Inward rectifier potassium channel 13 Kcnj13 PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
LRC8A_RAT	Leucine-rich repeat-containing protein 8A Lrrc8a PE=2 SV=1
LRC8C_RAT	Leucine-rich repeat-containing protein 8C Lrrc8c PE=2 SV=1

LRP2_RAT	Low-density lipoprotein receptor-related protein 2 Lrp2 PE=1 SV=1
KDM3A_RAT	Lysine-specific demethylase 3A Kdm3a PE=2 SV=1
PCT2B_RAT	Lysophosphatidylcholine acyltransferase 2B Lpcat2b PE=2 SV=1
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MT3_RAT	Metallothionein-3 Mt3 PE=2 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
N42L2_RAT	NEDD4-binding protein 2-like 2 N4bp2l2 PE=2 SV=1
NRX3A_RAT	Neurexin-3 Nrxn3 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
RAB10_RAT	Ras-related protein Rab-10 Rab10 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1A_RAT	Ras-related protein Rab-1A Rab1A PE=1 SV=3
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
PTPRC_RAT	Receptor-type tyrosine-protein phosphatase C Ptprc PE=2 SV=2
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
RBM47_RAT	RNA-binding protein 47 Rbm47 PE=2 SV=1
SCG3_RAT	Secretogranin-3 Scg3 PE=1 SV=1
SVS2_RAT	Seminal vesicle secretory protein 2 Svs2 PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1

AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SYNPO_RAT	Synaptopodin Synpo PE=2 SV=2
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
TEP1_RAT	Telomerase protein component 1 Tep1 PE=1 SV=1
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TGFB1_RAT	Transforming growth factor beta-1 Tgfb1 PE=1 SV=1
TGFI1_RAT	Transforming growth factor beta-1-induced transcript 1 protein Tgfb1i1 PE=1 SV=2
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UBP16_RAT	Ubiquitin carboxyl-terminal hydrolase 16 Usp16 PE=2 SV=2
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
CA043_RAT	Uncharacterized protein C1orf43 homolog OS=Rattus norvegicus PE=2 SV=1
MYO16_RAT	Unconventional myosin-XVI Myo16 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
ZRAB2_RAT	Zinc finger Ran-binding domain-containing protein 2 Zranb2 PE=1 SV=2

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
K6PP_RAT	6-phosphofructokinase type C Pfkp PE=1 SV=2
K6PL_RAT	6-phosphofructokinase, liver type Pfkl PE=2 SV=3
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1

THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SNAA_RAT	Alpha-soluble NSF attachment protein Napa PE=1 SV=2
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
AT5F1_RAT	ATP synthase F(0) complex subunit B1, mitochondrial Atp5f1 PE=1 SV=1
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPG_RAT	ATP synthase subunit gamma, mitochondrial Atp5c1 PE=1 SV=2
ATPO_RAT	ATP synthase subunit O, mitochondrial Atp5o PE=1 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
ABCBB_RAT	Bile salt export pump Abcb11 PE=1 SV=1
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
C1QA_RAT	Complement C1q subcomponent subunit A C1qa PE=1 SV=2
C1QC_RAT	Complement C1q subcomponent subunit C C1qc PE=1 SV=2
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2

BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAZA1_RAT	F-actin-capping protein subunit alpha-1 Capza1 PE=1 SV=1
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLSK_RAT	Glutaminase kidney isoform, mitochondrial Gls PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
GSTM4_RAT	Glutathione S-transferase Yb-3 Gstm3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2

HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IST1_RAT	IST1 homolog Ist1 PE=2 SV=1
K1C10_RAT	Keratin, type I cytoskeletal 10 Krt10 PE=3 SV=1
K1C13_RAT	Keratin, type I cytoskeletal 13 Krt13 PE=3 SV=1
K1C14_RAT	Keratin, type I cytoskeletal 14 Krt14 PE=2 SV=1
K1C15_RAT	Keratin, type I cytoskeletal 15 Krt15 PE=1 SV=1
K1C20_RAT	Keratin, type I cytoskeletal 20 Krt20 PE=2 SV=2
K1C25_RAT	Keratin, type I cytoskeletal 25 Krt25 PE=3 SV=1
K1C27_RAT	Keratin, type I cytoskeletal 27 Krt27 PE=3 SV=1
K2C1_RAT	Keratin, type II cytoskeletal 1 Krt1 PE=2 SV=1
K2C4_RAT	Keratin, type II cytoskeletal 4 Krt4 PE=3 SV=1
K2C5_RAT	Keratin, type II cytoskeletal 5 Krt5 PE=1 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
KIF1B_RAT	Kinesin-like protein KIF1B Kif1b PE=1 SV=2
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MT3_RAT	Metallothionein-3 Mt3 PE=2 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP4_RAT	Microtubule-associated protein 4 Map4 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MLP3A_RAT	Microtubule-associated proteins 1A/1B light chain 3A Map1lc3a PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NPTN_RAT	Neuroplastin Nptn PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2

PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PHYIP_RAT	Phytanoyl-CoA hydroxylase-interacting protein Phyhip PE=2 SV=1
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
AT2B4_RAT	Plasma membrane calcium-transporting ATPase 4 Atp2b4 PE=2 SV=1
PLEC_RAT	Plectin Plec PE=1 SV=2
UBB_RAT	Polyubiquitin-B Ubb PE=1 SV=1
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
NDRG2_RAT	Protein NDRG2 Ndrg2 PE=1 SV=1
S100B_RAT	Protein S100-B S100b PE=1 SV=2
WNT5A_RAT	Protein Wnt-5a Wnt5a PE=2 SV=2
PNPH_RAT	Purine nucleoside phosphorylase Pnp PE=1 SV=1
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYR_RAT	Pyruvate kinase PKLR Pklr PE=2 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB13_RAT	Ras-related protein Rab-13 Rab13 PE=1 SV=2
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1A_RAT	Ras-related protein Rab-1A Rab1A PE=1 SV=3
RAB26_RAT	Ras-related protein Rab-26 Rab26 PE=2 SV=2
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
PP2AA_RAT	Serine/threonine-protein phosphatase 2A catalytic subunit alpha isoform Ppp2ca PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
PP2BB_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit beta isoform Ppp3cb PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2

NAC2_RAT	Sodium/calcium exchanger 2 Slc8a2 PE=2 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
STIP1_RAT	Stress-induced-phosphoprotein 1 Stip1 PE=1 SV=1
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SIKE1_RAT	Suppressor of IKBKE 1 Sike1 PE=2 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TAGL_RAT	Transgelin Tagln PE=1 SV=2
TKT_RAT	Transketolase Tkt PE=1 SV=1
TMPS7_RAT	Transmembrane protease serine 7 Tmprss7 PE=3 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
INP4B_RAT	Type II inositol 3,4-bisphosphate 4-phosphatase Inpp4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
K895L_RAT	Uncharacterized protein KIAA0895-like Kiaa0895l PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VP33B_RAT	Vacuolar protein sorting-associated protein 33B Vps33b PE=2 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
KCAB2_RAT	Voltage-gated potassium channel subunit beta-2 Kcnab2 PE=1 SV=1

HuR IP CA1 8R samples 1 & 3 pooled	
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
ARPC5_RAT	Actin-related protein 2/3 complex subunit 5 Arpc5 PE=1 SV=3
ARP3_RAT	Actin-related protein 3 Actr3 PE=1 SV=1
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ALDR_RAT	Aldose reductase Akr1b1 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP4M1_RAT	AP-4 complex subunit mu-1 Ap4m1 PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
BAG1_RAT	BAG family molecular chaperone regulator 1 Bag1 PE=2 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
BID_RAT	BH3-interacting domain death agonist Bid PE=2 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CTL4_RAT	Choline transporter-like protein 4 Slc44a4 PE=2 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CC146_RAT	Coiled-coil domain-containing protein 146 Ccdc146 PE=2 SV=1

CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CUL5_RAT	Cullin-5 Cul5 PE=1 SV=3
COX41_RAT	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial Cox4i1 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DOPD_RAT	D-dopachrome decarboxylase Ddt PE=1 SV=3
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FINC_RAT	Fibronectin Fn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAS2_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms short Gnas PE=1 SV=1
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3

HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IGG2A_RAT	Ig gamma-2A chain C region Igg-2a PE=1 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MUC13_RAT	Mucin-13 Muc13 PE=2 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
MOG_RAT	Myelin-oligodendrocyte glycoprotein Mog PE=1 SV=1
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCALD_RAT	Neurocalcin-delta Ncald PE=1 SV=3
NOTC3_RAT	Neurogenic locus notch homolog protein 3 Notch3 PE=2 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PEX3_RAT	Peroxisomal biogenesis factor 3 Pex3 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
UBC_RAT	Polyubiquitin-C Ubc PE=1 SV=1
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROM2_RAT	Prominin-2 Prom2 PE=1 SV=1
PTVO1_RAT	Prostate tumor-overexpressed gene 1 protein homolog Ptov1 PE=2 SV=1
PSB5_RAT	Proteasome subunit beta type-5 Psmb5 PE=1 SV=3
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
UN45A_RAT	Protein unc-45 homolog A Unc45a PE=2 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB10_RAT	Ras-related protein Rab-10 Rab10 PE=1 SV=1

RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
THY1_RAT	Thy-1 membrane glycoprotein Thy1 PE=1 SV=1
TCEA1_RAT	Transcription elongation factor A protein 1 Tcea1 PE=2 SV=1
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
UBA1_RAT	Ubiquitin-like modifier-activating enzyme 1 Uba1 PE=1 SV=1
K895L_RAT	Uncharacterized protein KIAA0895-like Kiaa0895l PE=2 SV=1
CF165_RAT	UPF0704 protein C6orf165 homolog OS=Rattus norvegicus PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1

VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
ZN672_RAT	Zinc finger protein 672 Znf672 PE=2 SV=1

HuR IP CA1 8R sample 2

CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARP2_RAT	Actin-related protein 2 Actr2 PE=1 SV=1
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF3_RAT	ADP-ribosylation factor 3 Arf3 PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SNAA_RAT	Alpha-soluble NSF attachment protein Napa PE=1 SV=2
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
CABIN_RAT	Calcineurin-binding protein cabin-1 Cabin1 PE=1 SV=1
CALCR_RAT	Calcitonin receptor Calcr PE=2 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
PDE4A_RAT	cAMP-specific 3',5'-cyclic phosphodiesterase 4A Pde4a PE=1 SV=1
PDE4C_RAT	cAMP-specific 3',5'-cyclic phosphodiesterase 4C (Fragment) Pde4c PE=2 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CC146_RAT	Coiled-coil domain-containing protein 146 Ccdc146 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1

COX41_RAT	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial Cox4i1 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
C11B2_RAT	Cytochrome P450 11B2, mitochondrial Cyp11b2 PE=1 SV=1
BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
DYH1_RAT	Dynein heavy chain 1, axonemal Dnah1 PE=2 SV=2
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
ELAV4_RAT	**ELAV-like protein 4 Elavl4 PE=1 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
ENPL_RAT	Endoplasmin Hsp90b1 PE=1 SV=2
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAZA1_RAT	F-actin-capping protein subunit alpha-1 Capza1 PE=1 SV=1
CAPZB_RAT	F-actin-capping protein subunit beta Capzb PE=1 SV=1
FINC_RAT	Fibronectin Fn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
CXB5_RAT	Gap junction beta-5 protein Gjb5 PE=2 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTM2_RAT	Glutathione S-transferase Mu 2 Gstm2 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
GAS8_RAT	Growth arrest-specific protein 8 Gas8 PE=2 SV=1
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GNAI1_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-1 Gnai1 PE=1 SV=3

GNAI3_RAT	Guanine nucleotide-binding protein G(k) subunit alpha Gnai3 PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
GNA13_RAT	Guanine nucleotide-binding protein subunit alpha-13 Gna13 PE=1 SV=1
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HDGR2_RAT	Hepatoma-derived growth factor-related protein 2 Hdgfrp2 PE=2 SV=2
HNRPD_RAT	**Heterogeneous nuclear ribonucleoprotein D0 Hnrnpd PE=1 SV=1**
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IMPA2_RAT	Inositol monophosphatase 2 Impa2 PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDHC_RAT	Isocitrate dehydrogenase [NADP] cytoplasmic Idh1 PE=1 SV=1
K1C10_RAT	Keratin, type I cytoskeletal 10 Krt10 PE=3 SV=1
K1C14_RAT	Keratin, type I cytoskeletal 14 Krt14 PE=2 SV=1
K1C15_RAT	Keratin, type I cytoskeletal 15 Krt15 PE=1 SV=1
K1C20_RAT	Keratin, type I cytoskeletal 20 Krt20 PE=2 SV=2
K1C25_RAT	Keratin, type I cytoskeletal 25 Krt25 PE=3 SV=1
K1C27_RAT	Keratin, type I cytoskeletal 27 Krt27 PE=3 SV=1
K2C1_RAT	Keratin, type II cytoskeletal 1 Krt1 PE=2 SV=1
K2C1B_RAT	Keratin, type II cytoskeletal 1b Krt77 PE=3 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
K2C4_RAT	Keratin, type II cytoskeletal 4 Krt4 PE=3 SV=1
K2C5_RAT	Keratin, type II cytoskeletal 5 Krt5 PE=1 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
K2C7_RAT	Keratin, type II cytoskeletal 7 Krt7 PE=3 SV=1
K2C72_RAT	Keratin, type II cytoskeletal 72 Krt72 PE=3 SV=2
K2C73_RAT	Keratin, type II cytoskeletal 73 Krt73 PE=1 SV=1
K2C75_RAT	Keratin, type II cytoskeletal 75 Krt75 PE=3 SV=2
K2C8_RAT	Keratin, type II cytoskeletal 8 Krt8 PE=1 SV=3
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LGUL_RAT	Lactoylglutathione lyase Glo1 PE=1 SV=3
LANC1_RAT	LanC-like protein 1 Lancl1 PE=2 SV=2
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2

CNNM2_RAT	Metal transporter CNNM2 Cnnm2 PE=2 SV=1
MT3_RAT	Metallothionein-3 Mt3 PE=2 SV=1
METH_RAT	Methionine synthase Mtr PE=2 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
MOG_RAT	Myelin-oligodendrocyte glycoprotein Mog PE=1 SV=1
MYL6_RAT	Myosin light polypeptide 6 Myl6 PE=1 SV=3
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
DCX_RAT	Neuronal migration protein doublecortin Dcx PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
OLFL3_RAT	Olfactomedin-like protein 3 Olfml3 PE=2 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
SAC1_RAT	Phosphatidylinositide phosphatase SAC1 Sacm1l PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
AT2B4_RAT	Plasma membrane calcium-transporting ATPase 4 Atp2b4 PE=2 SV=1
PA1B2_RAT	Platelet-activating factor acetylhydrolase IB subunit beta Pafah1b2 PE=1 SV=1
PLEC_RAT	Plectin Plec PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
LMBD1_RAT	Probable lysosomal cobalamin transporter Lmbrd1 PE=2 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PACN1_RAT	Protein kinase C and casein kinase substrate in neurons protein 1 Pacsin1 PE=1 SV=1
S100B_RAT	Protein S100-B S100b PE=1 SV=2
TANC1_RAT	Protein TANC1 Tanc1 PE=1 SV=1
TTYH1_RAT	Protein tweety homolog 1 Ttyh1 PE=3 SV=1
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB10_RAT	Ras-related protein Rab-10 Rab10 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2

RAB14_RAT	Ras-related protein Rab-14 Rab14 PE=1 SV=3
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1A_RAT	Ras-related protein Rab-1A Rab1A PE=1 SV=3
RAB35_RAT	Ras-related protein Rab-35 Rab35 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB7A_RAT	Ras-related protein Rab-7a Rab7a PE=1 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
RBMX2_RAT	RNA-binding motif protein, X-linked 2 Rbmx2 PE=2 SV=1
SKP1_RAT	S-phase kinase-associated protein 1 Skp1 PE=2 SV=3
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
STMN1_RAT	Stathmin Stmn1 PE=1 SV=2
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STX4_RAT	Syntaxin-4 Stx4 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TXND2_RAT	Thioredoxin domain-containing protein 2 Txndc2 PE=1 SV=2
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1

TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
ALG13_RAT	UDP-N-acetylglucosamine transferase subunit ALG13 homolog Alg13 PE=1 SV=1
OGT1_RAT	UDP-N-acetylglucosamine--peptide N-acetylglucosaminyltransferase 110 kDa subunit Ogt PE=1 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
VAMP3_RAT	Vesicle-associated membrane protein 3 Vamp3 PE=1 SV=1
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
CCGL_RAT	Voltage-dependent calcium channel gamma-like subunit Tmem37 PE=2 SV=1
WDR7_RAT	WD repeat-containing protein 7 Wdr7 PE=2 SV=1
ZN672_RAT	Zinc finger protein 672 Znf672 PE=2 SV=1

HuR IP CA3 NIC samples 1 & 3 pooled

CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
AOXA_RAT	Aldehyde oxidase 1 Aox1 PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATP5E_RAT	ATP synthase subunit epsilon, mitochondrial Atp5e PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3

PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
CAPS1_RAT	Calcium-dependent secretion activator 1 Cadps PE=1 SV=1
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CSDE1_RAT	Cold shock domain-containing protein E1 Csde1 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DREB_RAT	Drebrin Dbn1 PE=1 SV=3
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EPHA3_RAT	Ephrin type-A receptor 3 Epha3 PE=2 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
CAZA1_RAT	F-actin-capping protein subunit alpha-1 Capza1 PE=1 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GNAI1_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-1 Gnai1 PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNAS2_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms short Gnas PE=1 SV=1
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HSP74_RAT	Heat shock 70 kDa protein 4 Hspa4 PE=1 SV=1
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4

INVO_RAT	Involucrin Ivl PE=2 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MYC_RAT	Myc proto-oncogene protein Myc PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PLEC_RAT	Plectin Plec PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1
PCP4_RAT	Purkinje cell protein 4 Pcp4 PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RB11A_RAT	Ras-related protein Rab-11A Rab11a PE=1 SV=3
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB35_RAT	Ras-related protein Rab-35 Rab35 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
PP1A_RAT	Serine/threonine-protein phosphatase PP1-alpha catalytic subunit Ppp1ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1

AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TENR_RAT	Tenascin-R Tnr PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1B_RAT	Tubulin alpha-1B chain Tuba1b PE=1 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
CP070_RAT	UPF0183 protein C16orf70 homolog OS=Rattus norvegicus PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VPS25_RAT	Vacuolar protein-sorting-associated protein 25 Vps25 PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
ZCH18_RAT	Zinc finger CCCH domain-containing protein 18 Zc3h18 PE=2 SV=1

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACPL2_RAT	Acid phosphatase-like protein 2 Acpl2 PE=2 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1

ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF3_RAT	ADP-ribosylation factor 3 Arf3 PE=1 SV=2
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AP2B1_RAT	AP-2 complex subunit beta Ap2b1 PE=1 SV=1
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPD_RAT	ATP synthase subunit delta, mitochondrial Atp5d PE=1 SV=2
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2
PGCB_RAT	Brevican core protein Bcan PE=1 SV=2
BUD13_RAT	BUD13 homolog Bud13 PE=2 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CATIP_RAT	Ciliogenesis-associated TTC17-interacting protein Catip PE=1 SV=1
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CPLX1_RAT	Complexin-1 Cplx1 PE=1 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
COR1A_RAT	Coronin-1A Coro1a PE=1 SV=3
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DOCK9_RAT	Dedicator of cytokinesis protein 9 (Fragment) Dock9 PE=2 SV=2
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
DHPR_RAT	Dihydropteridine reductase Qdpr PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DCTN2_RAT	Dynactin subunit 2 Dctn2 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
OPA1_RAT	Dynamin-like 120 kDa protein, mitochondrial Opa1 PE=1 SV=1

ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
ENPL_RAT	Endoplasmin Hsp90b1 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DCE2_RAT	Glutamate decarboxylase 2 Gad2 PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAS1_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas Gnas PE=1 SV=3
GNA13_RAT	Guanine nucleotide-binding protein subunit alpha-13 Gna13 PE=1 SV=1
HSP71_RAT	Heat shock 70 kDa protein 1A/1B Hspa1a PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HSP72_RAT	Heat shock-related 70 kDa protein 2 Hspa2 PE=1 SV=2
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
H14_RAT	Histone H1.4 Hist1h1e PE=1 SV=3
INVO_RAT	Involucrin Ivl PE=2 SV=1
ASGL1_RAT	Isoaspartyl peptidase/L-asparaginase Asrgl1 PE=1 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
K2C1B_RAT	Keratin, type II cytoskeletal 1b Krt77 PE=3 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
CRYM_RAT	Ketimine reductase mu-crystallin Crym PE=1 SV=1
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3

LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LPH_RAT	Lactase-phlorizin hydrolase Lct PE=2 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
MAP6_RAT	Microtubule-associated protein 6 Map6 PE=1 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
M3K12_RAT	Mitogen-activated protein kinase kinase kinase 12 Map3k12 PE=1 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
NUP98_RAT	Nuclear pore complex protein Nup98-Nup96 Nup98 PE=1 SV=2
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PTMS_RAT	Parathymosin Ptms PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
PPIB_RAT	Peptidyl-prolyl cis-trans isomerase B Ppib PE=1 SV=3
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
AT2B1_RAT	Plasma membrane calcium-transporting ATPase 1 Atp2b1 PE=2 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
AT2B4_RAT	Plasma membrane calcium-transporting ATPase 4 Atp2b4 PE=2 SV=1
PLEC_RAT	Plectin Plec PE=1 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PATL1_RAT	Protein PAT1 homolog 1 Patl1 PE=2 SV=1

PIMT_RAT	Protein-L-isoaspartate(D-aspartate) O-methyltransferase Pcmt1 PE=1 SV=2
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RB11A_RAT	Ras-related protein Rab-11A Rab11a PE=1 SV=3
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1A_RAT	Ras-related protein Rab-1A Rab1A PE=1 SV=3
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
SKP1_RAT	S-phase kinase-associated protein 1 Skp1 PE=2 SV=3
SEPT5_RAT	Septin-5 Sept5 PE=1 SV=2
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
GRP75_RAT	Stress-70 protein, mitochondrial Hspa9 PE=1 SV=3
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SNG1_RAT	Synaptogyrin-1 Syngr1 PE=2 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT2_RAT	Synaptotagmin-2 Syt2 PE=1 SV=1
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPD_RAT	T-complex protein 1 subunit delta Cct4 PE=1 SV=3
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TKT_RAT	Transketolase Tkt PE=1 SV=1
T106A_RAT	Transmembrane protein 106A Tmem106a PE=2 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2

TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
UD2B7_RAT	UDP-glucuronosyltransferase 2B7 Ugt2b7 PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3

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CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ASIC1_RAT	Acid-sensing ion channel 1 Asic1 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ADCY3_RAT	Adenylate cyclase type 3 Adcy3 PE=2 SV=1
ADCY8_RAT	Adenylate cyclase type 8 Adcy8 PE=2 SV=1
AEBP1_RAT	Adipocyte enhancer-binding protein 1 Aebp1 PE=2 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
MA2A1_RAT	Alpha-mannosidase 2 (Fragment) Man2a1 PE=1 SV=1
APOB_RAT	Apolipoprotein B-100 Apob PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
MGAT3_RAT	Beta-1,4-mannosyl-glycoprotein 4-beta-N-acetylglucosaminyltransferase Mgat3 PE=1 SV=2

ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
KCC2A_RAT	Calcium/calmodulin-dependent protein kinase type II subunit alpha Camk2a PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
ATP7A_RAT	Copper-transporting ATPase 1 Atp7a PE=1 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CLMP_RAT	CXADR-like membrane protein Clmp PE=2 SV=1
CST11_RAT	Cystatin-11 Cst11 PE=2 SV=1
DYHC1_RAT	Cytoplasmic dynein 1 heavy chain 1 Dync1h1 PE=1 SV=1
DYHC2_RAT	Cytoplasmic dynein 2 heavy chain 1 Dync2h1 PE=1 SV=1
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
TRIPC_RAT	E3 ubiquitin-protein ligase TRIP12 Trip12 PE=2 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
EXOC6_RAT	Exocyst complex component 6 Exoc6 PE=2 SV=2
FBX7_RAT	F-box only protein 7 Fbxo7 PE=2 SV=1
FACR1_RAT	Fatty acyl-CoA reductase 1 Far1 PE=2 SV=1
FARP1_RAT	FERM, RhoGEF and pleckstrin domain-containing protein 1 Farp1 PE=1 SV=2
FOXM1_RAT	Forkhead box protein M1 Foxm1 PE=2 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
TF3C1_RAT	General transcription factor 3C polypeptide 1 Gtf3c1 PE=1 SV=1
GSG1L_RAT	Germ cell-specific gene 1-like protein Gsg1l PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
GLRB_RAT	Glycine receptor subunit beta Glrb PE=1 SV=1
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAS1_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas Gnas PE=1 SV=3
GNA13_RAT	Guanine nucleotide-binding protein subunit alpha-13 Gna13 PE=1 SV=1
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3

HEP2_RAT	Heparin cofactor 2 Serpind1 PE=2 SV=1
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
HXK2_RAT	Hexokinase-2 Hk2 PE=1 SV=1
ITIH3_RAT	Inter-alpha-trypsin inhibitor heavy chain H3 Itih3 PE=2 SV=1
IL1RA_RAT	Interleukin-1 receptor antagonist protein Il1rn PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IVD_RAT	Isovaleryl-CoA dehydrogenase, mitochondrial Ivd PE=1 SV=2
K2C1_RAT	Keratin, type II cytoskeletal 1 Krt1 PE=2 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
K2C72_RAT	Keratin, type II cytoskeletal 72 Krt72 PE=3 SV=2
LZTS1_RAT	Leucine zipper putative tumor suppressor 1 Lzts1 PE=1 SV=3
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MARK3_RAT	MAP/microtubule affinity-regulating kinase 3 Mark3 PE=2 SV=1
MMP7_RAT	Matrilysin Mmp7 PE=2 SV=1
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MAST1_RAT	Microtubule-associated serine/threonine-protein kinase 1 Mast1 PE=2 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NRX1A_RAT	Neurexin-1 Nrxn1 PE=1 SV=3
NRX3A_RAT	Neurexin-3 Nrxn3 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
SLC31_RAT	Neutral and basic amino acid transport protein rBAT Slc3a1 PE=1 SV=1
NR4A1_RAT	Nuclear receptor subfamily 4 group A member 1 Nr4a1 PE=1 SV=2
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
OCTC_RAT	Peroxisomal carnitine O-octanoyltransferase Crot PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PLEC_RAT	Plectin Plec PE=1 SV=2
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAMP3_RAT	Receptor activity-modifying protein 3 Ramp3 PE=2 SV=1
OPSD_RAT	Rhodopsin Rho PE=1 SV=1

PKN2_RAT	Serine/threonine-protein kinase N2 Pkn2 PE=1 SV=2
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX12_RAT	Syntaxin-12 Stx12 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1
TSG10_RAT	Testis-specific gene 10 protein Tsga10 PE=1 SV=2
T30A2_RAT	Tetratricopeptide repeat protein 30A2 Ttc30a2 PE=2 SV=1
TLR4_RAT	Toll-like receptor 4 Tlr4 PE=2 SV=1
TSNAX_RAT	Translin-associated protein X Tsnax PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
RS27A_RAT	Ubiquitin-40S ribosomal protein S27a Rps27a PE=1 SV=2
MYO5A_RAT	Unconventional myosin-Va Myo5a PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR55_RAT	WD repeat-containing protein 55 Wdr55 PE=2 SV=1
ZC3HE_RAT	Zinc finger CCCH domain-containing protein 14 Zc3h14 PE=2 SV=1

antihistone dynabeads NIC CA3

PLCB1_RAT	1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase beta-1 Plcb1 PE=1 SV=1
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
K6PP_RAT	6-phosphofructokinase type C Pfkp PE=1 SV=2

CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATP5E_RAT	ATP synthase subunit epsilon, mitochondrial Atp5e PE=1 SV=2
ATPK_RAT	ATP synthase subunit f, mitochondrial Atp5j2 PE=1 SV=1
ATPO_RAT	ATP synthase subunit O, mitochondrial Atp5o PE=1 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
CABIN_RAT	Calcineurin-binding protein cabin-1 Cabin1 PE=1 SV=1
CAPS1_RAT	Calcium-dependent secretion activator 1 Cadps PE=1 SV=1
KCC2B_RAT	Calcium/calmodulin-dependent protein kinase type II subunit beta Camk2b PE=1 SV=1
KCC2D_RAT	Calcium/calmodulin-dependent protein kinase type II subunit delta Camk2d PE=1 SV=1
KCC2G_RAT	Calcium/calmodulin-dependent protein kinase type II subunit gamma Camk2g PE=2 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
ICAL_RAT	Calpastatin Cast PE=1 SV=3
CEP57_RAT	Centrosomal protein of 57 kDa Cep57 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
CO1A2_RAT	Collagen alpha-2(I) chain Col1a2 PE=1 SV=3
C1QA_RAT	Complement C1q subcomponent subunit A C1qa PE=1 SV=2
C1QC_RAT	Complement C1q subcomponent subunit C C1qc PE=1 SV=2
CPLX1_RAT	Complexin-1 Cplx1 PE=1 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1
COX41_RAT	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial Cox4i1 PE=1 SV=1
BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4

DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase component of pyruvate dehydrogenase complex
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
MP2K1_RAT	Dual specificity mitogen-activated protein kinase kinase 1 Map2k1 PE=1 SV=2
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
EF1A2_RAT	Elongation factor 1-alpha 2 Eef1a2 PE=2 SV=1
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
FSCN1_RAT	Fascin Fscn1 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLSK_RAT	Glutaminase kidney isoform, mitochondrial Gls PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
GSTM4_RAT	Glutathione S-transferase Yb-3 Gstm3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HBB2_RAT	Hemoglobin subunit beta-2 OS=Rattus norvegicus PE=1 SV=2
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
HXK2_RAT	Hexokinase-2 Hk2 PE=1 SV=1
HXK3_RAT	Hexokinase-3 Hk3 PE=2 SV=1
INVO_RAT	Involucrin Ivl PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1

K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
CRYM_RAT	Ketimine reductase mu-crystallin Crym PE=1 SV=1
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LAP2_RAT	Lamina-associated polypeptide 2, isoform beta Tmpo PE=1 SV=3
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAP1A_RAT	Microtubule-associated protein 1A Map1a PE=1 SV=1
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
HPCA_RAT	Neuron-specific calcium-binding protein hippocalcin Hpca PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
PGAM2_RAT	Phosphoglycerate mutase 2 Pgam2 PE=2 SV=2
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
PROF2_RAT	Profilin-2 Pfn2 PE=1 SV=3
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
PNPH_RAT	Purine nucleoside phosphorylase Pnp PE=1 SV=1
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB26_RAT	Ras-related protein Rab-26 Rab26 PE=2 SV=2
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1

RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB4A_RAT	Ras-related protein Rab-4A Rab4a PE=2 SV=3
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB7A_RAT	Ras-related protein Rab-7a Rab7a PE=1 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
SEPT7_RAT	Septin-7 Sept7 PE=1 SV=1
SEPT8_RAT	Septin-8 Sept8 PE=1 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
S6A17_RAT	Sodium-dependent neutral amino acid transporter SLC6A17 Slc6a17 PE=1 SV=1
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SYPH_RAT	Synaptophysin Syp PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT2_RAT	Synaptotagmin-2 Syt2 PE=1 SV=1
SYT5_RAT	Synaptotagmin-5 Syt5 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TYB4_RAT	Thymosin beta-4 Tmsb4x PE=2 SV=2
TR150_RAT	Thyroid hormone receptor-associated protein 3 Thrap3 PE=1 SV=1
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA1B_RAT	Tubulin alpha-1B chain Tuba1b PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1

TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
WIF1_RAT	Wnt inhibitory factor 1 Wif1 PE=2 SV=1

HuR IP CA3 8R sample 1

CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433B_RAT	14-3-3 protein beta/alpha Ywhab PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACHE_RAT	Acetylcholine receptor subunit epsilon Chrne PE=2 SV=2
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ADIP_RAT	Afadin- and alpha-actinin-binding protein Ssx2ip PE=1 SV=1
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AMPH_RAT	Amphiphysin Amph PE=1 SV=1
ANXA5_RAT	Annexin A5 Anxa5 PE=1 SV=3
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ADDB_RAT	Beta-adducin Add2 PE=2 SV=4
SNAB_RAT	Beta-soluble NSF attachment protein Napb PE=1 SV=1
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
BASP1_RAT	Brain acid soluble protein 1 Basp1 PE=1 SV=2

CALB1_RAT	Calbindin Calb1 PE=1 SV=2
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CASP6_RAT	Caspase-6 Casp6 PE=2 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CCD33_RAT	Coiled-coil domain-containing protein 33 Ccdc33 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
QCR2_RAT	Cytochrome b-c1 complex subunit 2, mitochondrial Uqcrc2 PE=1 SV=2
BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4
DOPD_RAT	D-dopachrome decarboxylase Ddt PE=1 SV=3
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase, mitochondrial Dlat PE=1 SV=3
ODO2_RAT	Dihydrolipoyllysine-residue succinyltransferase, mitochondrial Dlst PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EF1G_RAT	Elongation factor 1-gamma Eef1g PE=1 SV=3
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
FABP7_RAT	Fatty acid-binding protein, brain Fabp7 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTM1_RAT	Glutathione S-transferase Mu 1 Gstm1 PE=1 SV=2
GSTP1_RAT	Glutathione S-transferase P Gstp1 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1

GNAI1_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-1 Gnai1 PE=1 SV=3
GNAI2_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-2 Gnai2 PE=1 SV=3
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAT3_RAT	Guanine nucleotide-binding protein G(t) subunit alpha-3 Gnat3 PE=1 SV=3
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HNRPK_RAT	**Heterogeneous nuclear ribonucleoprotein K Hnrnpk PE=1 SV=1**
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
INVO_RAT	Involucrin Ivl PE=2 SV=1
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
CRYM_RAT	Ketimine reductase mu-crystallin Crym PE=1 SV=1
GGLO_RAT	L-gulonolactone oxidase Gulo PE=1 SV=3
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
LEPR_RAT	Leptin receptor Lepr PE=1 SV=1
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MTAP2_RAT	Microtubule-associated protein 2 Map2 PE=1 SV=3
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
MARCS_RAT	Myristoylated alanine-rich C-kinase substrate Marcks PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCAM1_RAT	Neural cell adhesion molecule 1 Ncam1 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
ACHB2_RAT	Neuronal acetylcholine receptor subunit beta-2 Chrnb2 PE=2 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NDKA_RAT	Nucleoside diphosphate kinase A Nme1 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
PPIB_RAT	Peptidyl-prolyl cis-trans isomerase B Ppib PE=1 SV=3
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3

PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
MPCP_RAT	Phosphate carrier protein, mitochondrial Slc25a3 PE=1 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PGM1_RAT	Phosphoglucomutase-1 Pgm1 PE=1 SV=2
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
PGAM1_RAT	Phosphoglycerate mutase 1 Pgam1 PE=1 SV=4
AT2B3_RAT	Plasma membrane calcium-transporting ATPase 3 Atp2b3 PE=2 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB2A_RAT	Ras-related protein Rab-2A Rab2a PE=1 SV=1
RAB35_RAT	Ras-related protein Rab-35 Rab35 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB43_RAT	Ras-related protein Rab-43 Rab43 PE=2 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
RTN4_RAT	Reticulon-4 Rtn4 PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
ARG28_RAT	Rho guanine nucleotide exchange factor 28 Arhgef28 PE=1 SV=1
SEPT1_RAT	Septin-1 Sept1 PE=2 SV=1
SEP11_RAT	Septin-11 Sept11 PE=1 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
SC6A1_RAT	Sodium- and chloride-dependent GABA transporter 1 Slc6a1 PE=1 SV=1

AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1B2_RAT	Sodium/potassium-transporting ATPase subunit beta-2 Atp1b2 PE=2 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
GRP75_RAT	Stress-70 protein, mitochondrial Hspa9 PE=1 SV=3
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SVEP1_RAT	Sushi, von Willebrand factor type A, EGF and pentraxin domain-containing protein 1 Svep1 PE=1 SV=1
SMRD2_RAT	SWI/SNF-related matrix-associated actin-dependent regulator of chromatin subfamily D member 2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCAIM_RAT	T-cell activation inhibitor, mitochondrial Tcaim PE=2 SV=1
TCPG_RAT	T-complex protein 1 subunit gamma Cct3 PE=1 SV=1
TRAK2_RAT	Trafficking kinesin-binding protein 2 Trak2 PE=1 SV=2
TAGL2_RAT	Transgelin-2 Tagln2 PE=2 SV=1
TERA_RAT	Transitional endoplasmic reticulum ATPase Vcp PE=1 SV=3
TKT_RAT	Transketolase Tkt PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TPM3_RAT	Tropomyosin alpha-3 chain Tpm3 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBB2B_RAT	Tubulin beta-2B chain Tubb2b PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UBE2N_RAT	Ubiquitin-conjugating enzyme E2 N Ube2n PE=1 SV=1
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
VPP1_RAT	V-type proton ATPase 116 kDa subunit a isoform 1 Atp6v0a1 PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3
HuR IP CA3 8R sample 2	
CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3

1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433T_RAT	14-3-3 protein theta Ywhaq PE=1 SV=1
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
RM46_RAT	39S ribosomal protein L46, mitochondrial Mrpl46 PE=2 SV=1
GABT_RAT	4-aminobutyrate aminotransferase, mitochondrial Abat PE=1 SV=3
K6PF_RAT	6-phosphofructokinase, muscle type Pfkm PE=2 SV=3
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
RLA2_RAT	60S acidic ribosomal protein P2 Rplp2 PE=1 SV=2
GRP78_RAT	78 kDa glucose-regulated protein Hspa5 PE=1 SV=1
THIL_RAT	Acetyl-CoA acetyltransferase, mitochondrial Acat1 PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ARC1A_RAT	Actin-related protein 2/3 complex subunit 1A Arpc1a PE=2 SV=1
ARPC2_RAT	Actin-related protein 2/3 complex subunit 2 Arpc2 PE=1 SV=1
ACTC_RAT	Actin, alpha cardiac muscle 1 Actc1 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ACBP_RAT	Acyl-CoA-binding protein Dbi PE=1 SV=3
ARF3_RAT	ADP-ribosylation factor 3 Arf3 PE=1 SV=2
ADT1_RAT	ADP/ATP translocase 1 Slc25a4 PE=1 SV=3
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2
ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
CALB1_RAT	Calbindin Calb1 PE=1 SV=2
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
AP180_RAT	Clathrin coat assembly protein AP180 Snap91 PE=1 SV=1
CLH1_RAT	Clathrin heavy chain 1 Cltc PE=1 SV=3
COF1_RAT	Cofilin-1 Cfl1 PE=1 SV=3
CSDE1_RAT	Cold shock domain-containing protein E1 Csde1 PE=2 SV=1
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CNTN1_RAT	Contactin-1 Cntn1 PE=1 SV=2
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
KCRU_RAT	Creatine kinase U-type, mitochondrial Ckmt1 PE=1 SV=1

CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
BACH_RAT	Cytosolic acyl coenzyme A thioester hydrolase Acot7 PE=1 SV=4
DHRS9_RAT	Dehydrogenase/reductase SDR family member 9 Dhrs9 PE=2 SV=1
DLDH_RAT	Dihydrolipoyl dehydrogenase, mitochondrial Dld PE=1 SV=1
ODP2_RAT	Dihydrolipoyllysine-residue acetyltransferase, mitochondrial Dlat PE=1 SV=3
ODO2_RAT	Dihydrolipoyllysine-residue succinyltransferase, mitochondrial Dlst PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL5_RAT	Dihydropyrimidinase-related protein 5 Dpysl5 PE=1 SV=1
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
EFTU_RAT	Elongation factor Tu, mitochondrial Tufm PE=1 SV=1
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
ALDOC_RAT	Fructose-bisphosphate aldolase C Aldoc PE=1 SV=3
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GLNA_RAT	Glutamine synthetase Glul PE=1 SV=3
GSTM4_RAT	Glutathione S-transferase Yb-3 Gstm3 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGL_RAT	Glycogen phosphorylase, liver form Pygl PE=1 SV=5
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1
GNAI1_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-1 Gnai1 PE=1 SV=3
GBB1_RAT	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1 Gnb1 PE=1 SV=4
GNAI3_RAT	Guanine nucleotide-binding protein G(k) subunit alpha Gnai3 PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
HS105_RAT	Heat shock protein 105 kDa Hsph1 PE=2 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3

HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IDH3A_RAT	Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial Idh3a PE=1 SV=1
IDH3B_RAT	Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial Idh3B PE=1 SV=1
K1C17_RAT	Keratin, type I cytoskeletal 17 Krt17 PE=2 SV=1
K2C1B_RAT	Keratin, type II cytoskeletal 1b Krt77 PE=3 SV=1
K2C6A_RAT	Keratin, type II cytoskeletal 6A Krt6a PE=1 SV=1
CRYM_RAT	Ketimine reductase mu-crystallin Crym PE=1 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MARF1_RAT	Meiosis arrest female protein 1 Marf1 PE=1 SV=2
TAU_RAT	Microtubule-associated protein tau Mapt PE=1 SV=3
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCAM1_RAT	Neural cell adhesion molecule 1 Ncam1 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NOS2_RAT	Nitric oxide synthase, inducible Nos2 PE=1 SV=2
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PRDX5_RAT	Peroxiredoxin-5, mitochondrial Prdx5 PE=1 SV=1
PRDX6_RAT	Peroxiredoxin-6 Prdx6 PE=1 SV=3
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3
PICAL_RAT	Phosphatidylinositol-binding clathrin assembly protein Picalm PE=1 SV=1
PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
AT2B2_RAT	Plasma membrane calcium-transporting ATPase 2 Atp2b2 PE=2 SV=2
AT2B4_RAT	Plasma membrane calcium-transporting ATPase 4 Atp2b4 PE=2 SV=1
AT12A_RAT	Potassium-transporting ATPase alpha chain 2 Atp12a PE=1 SV=1
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
AMBP_RAT	Protein AMBP Ambp PE=1 SV=1
PDIA3_RAT	Protein disulfide-isomerase A3 Pdia3 PE=1 SV=2
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
NDRG2_RAT	Protein NDRG2 Ndrg2 PE=1 SV=1
QKI_RAT	Protein quaking Qki PE=1 SV=2

S100B_RAT	Protein S100-B S100b PE=1 SV=2
WNT5A_RAT	Protein Wnt-5a Wnt5a PE=2 SV=2
ODPA_RAT	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial Pdha1 PE=1 SV=2
ODPB_RAT	Pyruvate dehydrogenase E1 component subunit beta, mitochondrial Pdhb PE=1 SV=2
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAC1_RAT	Ras-related C3 botulinum toxin substrate 1 Rac1 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB14_RAT	Ras-related protein Rab-14 Rab14 PE=1 SV=3
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB2A_RAT	Ras-related protein Rab-2A Rab2a PE=1 SV=1
RAB35_RAT	Ras-related protein Rab-35 Rab35 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB4B_RAT	Ras-related protein Rab-4B Rab4b PE=2 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB7A_RAT	Ras-related protein Rab-7a Rab7a PE=1 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
RHG29_RAT	Rho GTPase-activating protein 29 Arhgap29 PE=2 SV=2
SEPT1_RAT	Septin-1 Sept1 PE=2 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
PP2BB_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit beta isoform Ppp3cb PE=1 SV=1
PP1A_RAT	Serine/threonine-protein phosphatase PP1-alpha catalytic subunit Ppp1ca PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SPTN1_RAT	Spectrin alpha chain, non-erythrocytic 1 Sptan1 PE=1 SV=2
SUCA_RAT	Succinyl-CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial Suclg1 PE=2 SV=2
SODC_RAT	Superoxide dismutase [Cu-Zn] Sod1 PE=1 SV=2
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SMRD2_RAT	SWI/SNF-related matrix-associated actin-dependent regulator of chromatin subfamily D member 2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SV2A_RAT	Synaptic vesicle glycoprotein 2A Sv2a PE=1 SV=2
SYPH_RAT	Synaptophysin Syp PE=1 SV=1

SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
SYT5_RAT	Synaptotagmin-5 Syt5 PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
ATRX_RAT	Transcriptional regulator ATRX (Fragment) Atrx PE=1 SV=1
ECHB_RAT	Trifunctional enzyme subunit beta, mitochondrial Hadhb PE=1 SV=1
TPIS_RAT	Triosephosphate isomerase Tpi1 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
UB2V2_RAT	Ubiquitin-conjugating enzyme E2 variant 2 Ube2v2 PE=1 SV=3
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1
WDR1_RAT	WD repeat-containing protein 1 Wdr1 PE=1 SV=3

HuR IP CA3 8R sample 3

CH10_RAT	10 kDa heat shock protein, mitochondrial Hspe1 PE=1 SV=3
1433E_RAT	14-3-3 protein epsilon Ywhae PE=1 SV=1
1433F_RAT	14-3-3 protein eta Ywhah PE=1 SV=2
1433G_RAT	14-3-3 protein gamma Ywhag PE=1 SV=2
1433Z_RAT	14-3-3 protein zeta/delta Ywhaz PE=1 SV=1
CN37_RAT	2',3'-cyclic-nucleotide 3'-phosphodiesterase Cnp PE=1 SV=2
CH60_RAT	60 kDa heat shock protein, mitochondrial Hspd1 PE=1 SV=1
PLPL9_RAT	85/88 kDa calcium-independent phospholipase A2 Pla2g6 PE=1 SV=2
ACACA_RAT	Acetyl-CoA carboxylase 1 Acaca PE=1 SV=1
ACON_RAT	Aconitate hydratase, mitochondrial Aco2 PE=1 SV=2
ACTL9_RAT	Actin-like protein 9 Actl9 PE=2 SV=1
ACTA_RAT	Actin, aortic smooth muscle Acta2 PE=2 SV=1
ACTB_RAT	Actin, cytoplasmic 1 Actb PE=1 SV=1
ARF1_RAT	ADP-ribosylation factor 1 Arf1 PE=1 SV=2
ADT2_RAT	ADP/ATP translocase 2 Slc25a5 PE=1 SV=3
ENOA_RAT	Alpha-enolase Eno1 PE=1 SV=4
SYUA_RAT	Alpha-synuclein Snca PE=1 SV=1
ANKL2_RAT	Ankyrin repeat and LEM domain-containing protein 2 Ankle2 PE=2 SV=2
APOE_RAT	Apolipoprotein E Apoe PE=1 SV=2
AATC_RAT	Aspartate aminotransferase, cytoplasmic Got1 PE=1 SV=3
AATM_RAT	Aspartate aminotransferase, mitochondrial Got2 PE=1 SV=2

ATPA_RAT	ATP synthase subunit alpha, mitochondrial Atp5a1 PE=1 SV=2
ATPB_RAT	ATP synthase subunit beta, mitochondrial Atp5b PE=1 SV=2
ATP5H_RAT	ATP synthase subunit d, mitochondrial Atp5h PE=1 SV=3
ATPK_RAT	ATP synthase subunit f, mitochondrial Atp5j2 PE=1 SV=1
ABCA7_RAT	ATP-binding cassette sub-family A member 7 Abca7 PE=1 SV=1
ENOB_RAT	Beta-enolase Eno3 PE=1 SV=3
SYUB_RAT	Beta-synuclein Sncb PE=1 SV=1
CALM_RAT	Calmodulin Calm1 PE=1 SV=2
CISY_RAT	Citrate synthase, mitochondrial Cs PE=1 SV=1
CO1A2_RAT	Collagen alpha-2(I) chain Col1a2 PE=1 SV=3
CPLX2_RAT	Complexin-2 Cplx2 PE=1 SV=1
CPNE9_RAT	Copine-9 Cpne9 PE=2 SV=1
KCRB_RAT	Creatine kinase B-type Ckb PE=1 SV=2
CYC_RAT	Cytochrome c, somatic Cycs PE=1 SV=2
DPYL1_RAT	Dihydropyrimidinase-related protein 1 Crmp1 PE=1 SV=1
DPYL2_RAT	Dihydropyrimidinase-related protein 2 Dpysl2 PE=1 SV=1
DPYL3_RAT	Dihydropyrimidinase-related protein 3 Dpysl3 PE=1 SV=2
DNJC5_RAT	DnaJ homolog subfamily C member 5 Dnajc5 PE=1 SV=1
DYN1_RAT	Dynamin-1 Dnm1 PE=1 SV=2
DYN2_RAT	Dynamin-2 Dnm2 PE=1 SV=1
DYN3_RAT	Dynamin-3 Dnm3 PE=1 SV=2
ELAV2_RAT	**ELAV-like protein 2 Elavl2 PE=2 SV=1**
EF1A1_RAT	Elongation factor 1-alpha 1 Eef1a1 PE=1 SV=1
SH3G2_RAT	Endophilin-A1 Sh3gl2 PE=1 SV=2
SH3G1_RAT	Endophilin-A2 Sh3gl1 PE=1 SV=1
EPHA8_RAT	Ephrin type-A receptor 8 (Fragment) Epha8 PE=2 SV=1
EAA1_RAT	Excitatory amino acid transporter 1 Slc1a3 PE=1 SV=2
EAA2_RAT	Excitatory amino acid transporter 2 Slc1a2 PE=1 SV=2
FHL5_RAT	Four and a half LIM domains protein 5 Fhl5 PE=2 SV=1
ALDOA_RAT	Fructose-bisphosphate aldolase A Aldoa PE=1 SV=2
BODG_RAT	Gamma-butyrobetaine dioxygenase Bbox1 PE=1 SV=1
ENOG_RAT	Gamma-enolase Eno2 PE=1 SV=2
G6PI_RAT	Glucose-6-phosphate isomerase Gpi PE=1 SV=1
DHE3_RAT	Glutamate dehydrogenase 1, mitochondrial Glud1 PE=1 SV=2
GSTA5_RAT	Glutathione S-transferase alpha-5 Gsta5 PE=1 SV=2
G3P_RAT	Glyceraldehyde-3-phosphate dehydrogenase Gapdh PE=1 SV=3
G3PT_RAT	Glyceraldehyde-3-phosphate dehydrogenase, testis-specific Gapdhs PE=1 SV=1
PYGB_RAT	Glycogen phosphorylase, brain form (Fragment) Pygb PE=1 SV=3
PYGM_RAT	Glycogen phosphorylase, muscle form Pygm PE=2 SV=5
GSLG1_RAT	Golgi apparatus protein 1 Glg1 PE=1 SV=1
RAB3D_RAT	GTP-binding protein Rab-3D Rab3d PE=1 SV=2
GUAD_RAT	Guanine deaminase Gda PE=1 SV=1

GNAI2_RAT	Guanine nucleotide-binding protein G(i) subunit alpha-2 Gnai2 PE=1 SV=3
GNAO_RAT	Guanine nucleotide-binding protein G(o) subunit alpha Gnao1 PE=1 SV=2
GNAL_RAT	Guanine nucleotide-binding protein G(olf) subunit alpha Gnal PE=2 SV=2
GNAS1_RAT	Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas Gnas PE=1 SV=3
GNA12_RAT	Guanine nucleotide-binding protein subunit alpha-12 Gna12 PE=1 SV=3
HS71L_RAT	Heat shock 70 kDa protein 1-like Hspa1l PE=2 SV=2
HSP7C_RAT	Heat shock cognate 71 kDa protein Hspa8 PE=1 SV=1
TRAP1_RAT	Heat shock protein 75 kDa, mitochondrial Trap1 PE=1 SV=1
HS90A_RAT	Heat shock protein HSP 90-alpha Hsp90aa1 PE=1 SV=3
HS90B_RAT	Heat shock protein HSP 90-beta Hsp90ab1 PE=1 SV=4
HBA_RAT	Hemoglobin subunit alpha-1/2 Hba1 PE=1 SV=3
HBB1_RAT	Hemoglobin subunit beta-1 Hbb PE=1 SV=3
HXK1_RAT	Hexokinase-1 Hk1 PE=1 SV=4
IL4RA_RAT	Interleukin-4 receptor subunit alpha Il4r PE=2 SV=2
PLAK_RAT	Junction plakoglobin Jup PE=1 SV=1
KLH38_RAT	Kelch-like protein 38 Klhl38 PE=2 SV=1
K1C10_RAT	Keratin, type I cytoskeletal 10 Krt10 PE=3 SV=1
K2C1_RAT	Keratin, type II cytoskeletal 1 Krt1 PE=2 SV=1
K22E_RAT	Keratin, type II cytoskeletal 2 epidermal Krt2 PE=3 SV=1
LDHA_RAT	L-lactate dehydrogenase A chain Ldha PE=1 SV=1
LDHB_RAT	L-lactate dehydrogenase B chain Ldhb PE=1 SV=2
MACOI_RAT	Macoilin Tmem57 PE=2 SV=1
MIF_RAT	Macrophage migration inhibitory factor Mif PE=1 SV=4
MDHC_RAT	Malate dehydrogenase, cytoplasmic Mdh1 PE=1 SV=3
MDHM_RAT	Malate dehydrogenase, mitochondrial Mdh2 PE=1 SV=2
MAGI2_RAT	Membrane-associated guanylate kinase, WW and PDZ domain-containing protein 2 Magi2 PE=1 SV=1
MCATL_RAT	Mitochondrial carnitine/acylcarnitine carrier protein CACL Slc25a29 PE=2 SV=1
MBP_RAT	Myelin basic protein Mbp PE=1 SV=3
MYPR_RAT	Myelin proteolipid protein Plp1 PE=1 SV=2
SIR2_RAT	NAD-dependent protein deacetylase sirtuin-2 Sirt2 PE=1 SV=1
NCDN_RAT	Neurochondrin Ncdn PE=1 SV=2
GPM6A_RAT	Neuronal membrane glycoprotein M6-a Gpm6a PE=1 SV=1
NUAK2_RAT	NUAK family SNF1-like kinase 2 Nuak2 PE=1 SV=1
NASP_RAT	Nuclear autoantigenic sperm protein Nasp PE=2 SV=1
NUPL1_RAT	Nucleoporin p58/p45 Nupl1 PE=1 SV=1
NDKB_RAT	Nucleoside diphosphate kinase B Nme2 PE=1 SV=1
PPIA_RAT	Peptidyl-prolyl cis-trans isomerase A Ppia PE=1 SV=2
FKB1A_RAT	Peptidyl-prolyl cis-trans isomerase FKBP1A Fkbp1a PE=1 SV=3
PRDX1_RAT	Peroxiredoxin-1 Prdx1 PE=1 SV=1
PRDX2_RAT	Peroxiredoxin-2 Prdx2 PE=1 SV=3
PRDX4_RAT	Peroxiredoxin-4 Prdx4 PE=2 SV=1
PEBP1_RAT	Phosphatidylethanolamine-binding protein 1 Pebp1 PE=1 SV=3

PGK1_RAT	Phosphoglycerate kinase 1 Pgk1 PE=1 SV=2
KCNQ3_RAT	Potassium voltage-gated channel subfamily KQT member 3 Kcnq3 PE=2 SV=2
ATP4A_RAT	Potassium-transporting ATPase alpha chain 1 Atp4a PE=2 SV=3
EGF_RAT	Pro-epidermal growth factor Egf PE=1 SV=2
PROF1_RAT	Profilin-1 Pfn1 PE=1 SV=2
P3H2_RAT	Prolyl 3-hydroxylase 2 Leprel1 PE=1 SV=1
PARK7_RAT	Protein DJ-1 Park7 PE=1 SV=1
FA46B_RAT	Protein FAM46B Fam46b PE=2 SV=1
KPYM_RAT	Pyruvate kinase PKM Pkm PE=1 SV=3
GDIA_RAT	Rab GDP dissociation inhibitor alpha Gdi1 PE=1 SV=1
RAB12_RAT	Ras-related protein Rab-12 Rab12 PE=1 SV=2
RAB14_RAT	Ras-related protein Rab-14 Rab14 PE=1 SV=3
RAB15_RAT	Ras-related protein Rab-15 Rab15 PE=2 SV=1
RAB1B_RAT	Ras-related protein Rab-1B Rab1b PE=1 SV=1
RAB35_RAT	Ras-related protein Rab-35 Rab35 PE=1 SV=1
RAB3A_RAT	Ras-related protein Rab-3A Rab3a PE=1 SV=1
RAB3B_RAT	Ras-related protein Rab-3B Rab3b PE=1 SV=2
RAB3C_RAT	Ras-related protein Rab-3C Rab3c PE=1 SV=1
RAB6A_RAT	Ras-related protein Rab-6A Rab6a PE=2 SV=2
RAB8A_RAT	Ras-related protein Rab-8A Rab8a PE=1 SV=2
RTN3_RAT	Reticulon-3 Rtn3 PE=1 SV=1
GDIR1_RAT	Rho GDP-dissociation inhibitor 1 Arhgdia PE=1 SV=1
MTOR_RAT	Serine/threonine-protein kinase mTOR Mtor PE=1 SV=1
PP2BA_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform Ppp3ca PE=1 SV=1
PP2BB_RAT	Serine/threonine-protein phosphatase 2B catalytic subunit beta isoform Ppp3cb PE=1 SV=1
SERPH_RAT	Serpin H1 Serpinh1 PE=1 SV=1
ALBU_RAT	Serum albumin Alb PE=1 SV=2
AT1A1_RAT	Sodium/potassium-transporting ATPase subunit alpha-1 Atp1a1 PE=1 SV=1
AT1A2_RAT	Sodium/potassium-transporting ATPase subunit alpha-2 Atp1a2 PE=1 SV=1
AT1A3_RAT	Sodium/potassium-transporting ATPase subunit alpha-3 Atp1a3 PE=1 SV=2
AT1A4_RAT	Sodium/potassium-transporting ATPase subunit alpha-4 Atp1a4 PE=2 SV=1
AT1B1_RAT	Sodium/potassium-transporting ATPase subunit beta-1 Atp1b1 PE=1 SV=1
SMC3_RAT	Structural maintenance of chromosomes protein 3 Smc3 PE=1 SV=1
SODM_RAT	Superoxide dismutase [Mn], mitochondrial Sod2 PE=1 SV=2
SMRD2_RAT	SWI/SNF-related matrix-associated actin-dependent regulator of chromatin subfamily D member 2
SYN1_RAT	Synapsin-1 Syn1 PE=1 SV=3
SYN2_RAT	Synapsin-2 Syn2 PE=1 SV=1
SNP25_RAT	Synaptosomal-associated protein 25 Snap25 PE=1 SV=1
SYT1_RAT	Synaptotagmin-1 Syt1 PE=1 SV=3
STX1B_RAT	Syntaxin-1B Stx1b PE=1 SV=1
STXB1_RAT	Syntaxin-binding protein 1 Stxbp1 PE=1 SV=1
TCPA_RAT	T-complex protein 1 subunit alpha Tcp1 PE=1 SV=1

TAGL3_RAT	Transgelin-3 Tagln3 PE=1 SV=2
TBA1A_RAT	Tubulin alpha-1A chain Tuba1a PE=1 SV=1
TBA4A_RAT	Tubulin alpha-4A chain Tuba4a PE=2 SV=1
TBA8_RAT	Tubulin alpha-8 chain Tuba8 PE=2 SV=1
TBB2A_RAT	Tubulin beta-2A chain Tubb2a PE=1 SV=1
TBB3_RAT	Tubulin beta-3 chain Tubb3 PE=1 SV=1
TBB4B_RAT	Tubulin beta-4B chain Tubb4b PE=1 SV=1
TBB5_RAT	Tubulin beta-5 chain Tubb5 PE=1 SV=1
UCHL1_RAT	Ubiquitin carboxyl-terminal hydrolase isozyme L1 Uchl1 PE=1 SV=2
CG025_RAT	UPF0415 protein C7orf25 homolog OS=Rattus norvegicus PE=2 SV=1
CA174_RAT	UPF0688 protein C1orf174 homolog OS=Rattus norvegicus PE=2 SV=1
VATB2_RAT	V-type proton ATPase subunit B, brain isoform Atp6v1b2 PE=1 SV=1
VATE1_RAT	V-type proton ATPase subunit E 1 Atp6v1e1 PE=1 SV=1
VATF_RAT	V-type proton ATPase subunit F Atp6v1f PE=1 SV=1
VAMP2_RAT	Vesicle-associated membrane protein 2 Vamp2 PE=1 SV=2
NSF_RAT	Vesicle-fusing ATPase Nsf PE=1 SV=1

APPENDIX 5: MICROARRAY HIT LISTS FROM SUCROSE PAD METHOD

mRNA hit list CA1 from sucrose PAD						
	p-value	FDR	x-fold	ProbeSet	Symbol	Name
1	1E-07	0.000369	56.14	17752874	Hspa1b	heat shock 70kD protein 1B (mapped)
2	1E-07	0.000369	46.43	17756503	Hspa1a	heat shock 70kD protein 1A
3	3E-07	0.000737	8.55	17728071	Hmox1	heme oxygenase (decycling) 1
4	9E-07	0.00166	0.2	17850830		
5	3.4E-06	0.00501	30.93	17676952	Hspb1	heat shock protein 1
6	5.7E-06	0.007	5	17615739		
7	7.9E-06	0.00832	11.42	17869465		
8	1.63E-05	0.015	3.51	17723019		
9	2.15E-05	0.0164	5.12	17878998	Morc4	MORC family CW-type zinc finger 4
10	2.23E-05	0.0164	5.66	17718415	Gadd45g	growth arrest and DNA-damage-inducible, gamma
11	3.31E-05	0.0222	2.71	17832266	Gpd1	glycerol-3-phosphate dehydrogenase 1 (soluble)
12	5.14E-05	0.0284	2.51	17875520		
13	5.21E-05	0.0284	10.19	17664420		
14	0.000059	0.0284	3.38	17765931	Dusp2	dual specificity phosphatase 2
15	5.95E-05	0.0284	5.36	17844027	Cryab	crystallin, alpha B
16	6.17E-05	0.0284	2.72	17684906	Rgs2	regulator of G-protein signaling 2
17	6.72E-05	0.0291	5.48	17672229	Zfand2a	zinc finger, AN1-type domain 2A
18	7.39E-05	0.0303	0.39	17880821		
19	8.04E-05	0.0312	2.53	17868099		
20	9.83E-05	0.0338	3.4	17773115		
21	0.000105	0.0338	2.46	17811536	Pnrc2	proline-rich nuclear receptor coactivator 2
22	0.000105	0.0338	4.29	17673512	Ubc	ubiquitin C
23	0.000113	0.0338	2.86	17671497	Hsph1	heat shock 105/110 protein 1
24	0.000117	0.0338	2.64	17867377		
25	0.000117	0.0338	2.64	17869668		
26	0.000124	0.0338	4.55	17731750	Mt2A	metallothionein 2A
27	0.000125	0.0338	0.31	17791957		
28	0.000133	0.0338	3.18	17702048	LOC100362916	rCG61219-like
29	0.000142	0.0338	4.18	17632926	Ppp1r15a	protein phosphatase 1, regulatory subunit 15A
30	0.000151	0.0338	4.34	17828625	Ddit3	DNA-damage inducible transcript 3
31	0.000154	0.0338	3.23	17753672		
32	0.000156	0.0338	8.46	17731745	Mt1a	metallothionein 1a
33	0.000158	0.0338	0.44	17619179	Olr162	olfactory receptor 162
34	0.000163	0.0338	2.87	17717148	Vim	vimentin
35	0.000164	0.0338	3.4	17833546	Gadd45b	growth arrest and DNA-damage-inducible, beta
36	0.000165	0.0338	3.28	17752700		
37	0.000175	0.0339	2.46	17868246		
38	0.000177	0.0339	6.64	17687609	Atf3	activating transcription factor 3
39	0.000182	0.0339	8.89	17730862	Rpl13	ribosomal protein L13

40	0.000184	0.0339	5.9	17680795	Ptgs2	prostaglandin-endoperoxide synthase 2
41	0.000213	0.0382	5.83	17621224	Bag3	Bcl2-associated athanogene 3
42	0.000235	0.0407	2.13	17674382	Hspb8	heat shock protein B8
43	0.000237	0.0407	2.41	17867524		
44	0.000244	0.0408	2.11	17847005	Ryk	receptor-like tyrosine kinase
45	0.000267	0.0437	2.06	17824977		
46	0.000308	0.0481	2.26	17636799	Cdr2	cerebellar degeneration-related 2
47	0.000311	0.0481	0.47	17715365		
48	0.000313	0.0481	2.09	17845560		
49	0.000321	0.0483	2.73	17853273	Glce	glucuronic acid epimerase
50	0.000336	0.0484	2	17843725	Mpzl3	myelin protein zero-like 3
51	0.00034	0.0484	0.49	17772385	Nr4a2	nuclear receptor subfamily 4, group A, member 2
52	0.000343	0.0484	0.43	17707441		
53	0.00036	0.0484	0.37	17692312		
54	0.000365	0.0484	2.25	17715072	Nedd9	neural precursor cell expressed, developmentally down-regulated 9
55	0.000367	0.0484	6.56	17639411	Npas4	neuronal PAS domain protein 4
56	0.000371	0.0484	4.93	17703273		
57	0.000381	0.0484	2.02	17880303		
58	0.000387	0.0484	2.34	17684954	Pla2g4a	phospholipase A2, group IVA (cytosolic, calcium-dependent)
59	0.000392	0.0484	2.4	17761562		
60	0.000394	0.0484	2.77	17868131		
61	0.000411	0.0496	2.35	17611516		
62	0.000417	0.0496	2.26	17728152		
63	0.000443	0.0505	5.99	17875665	Timp1	TIMP metallopeptidase inhibitor 1
64	0.000443	0.0505	2.65	17669324		
65	0.00046	0.0505	2.74	17767319		
66	0.000479	0.0505	3.35	17756041	Rnf39	ring finger protein 39
67	0.000513	0.0529	2.33	17735630	RGD1564606	similar to 60S ribosomal protein L23a
68	0.000517	0.0529	2.67	17664730	Slc5a3	solute carrier family 5 (sodium/myo-inositol cotransporter), member 3
69	0.000542	0.0546	2.47	17868037		
70	0.000548	0.0546	0.23	17621993	Olr305	olfactory receptor 305
71	0.000563	0.0554	2.37	17696845		
72	0.000587	0.0569	2.31	17872261		
73	0.000608	0.057	3.41	17808756		
74	0.000611	0.057	4.52	17802844	Sesn2	sestrin 2
75	0.000611	0.057	3.85	17791883		
76	0.000624	0.0575	2.13	17711471	Aadat	aminoadipate aminotransferase
77	0.000653	0.0578	2.42	17867369		
78	0.000673	0.0578	2.67	17833162	Olr896	olfactory receptor 896
79	0.000677	0.0578	2.16	17869664		
80	0.000681	0.0578	2.25	17697923	Samd4a	sterile alpha motif domain containing 4A
81	0.000682	0.0578	0.49	17772363		
82	0.000688	0.0578	2.89	17675915	Nptx2	neuronal pentraxin II

83	0.000702	0.0582	2.88	17866859		
84	0.000719	0.0588	2.54	17648894	Rpl23a	ribosomal protein L23a
85	0.000733	0.0588	3.24	17719769	Inhba	inhibin beta-A
86	0.000738	0.0588	0.28	17761763	Olr400	olfactory receptor 400
87	0.000742	0.0588	3.19	17765084	Chac1	ChaC, cation transport regulator homolog 1 (E. coli)
88	0.000754	0.0591	2.06	17869622		
89	0.000767	0.0595	2.88	17870204		
90	0.000774	0.0595	2.43	17880740	Mthfd2	methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methenyltetrahydrofolate cyclohydrolase
91	0.000802	0.0603	0.4	17721097		
92	0.000807	0.0603	2.37	17661537	Stat3	signal transducer and activator of transcription 3 (acute-phase response factor)
93	0.00081	0.0603	3.94	17821305	Sox11	SRY (sex determining region Y)-box 11
94	0.000856	0.0631	2.06	17778298	Trib3	tribbles homolog 3 (Drosophila)
95	0.000891	0.0636	2.73	17634637		
96	0.000896	0.0636	2.23	17859277	Hspe1	heat shock protein 1 (chaperonin 10)
97	0.000903	0.0636	2.99	17703301		
98	0.000906	0.0636	0.33	17688235		
99	0.000929	0.0646	2.4	17783943		
100	0.000943	0.0649	2.54	17856053		
101	0.000968	0.0661	2.44	17668398	Olr1537	olfactory receptor 1537
102	0.000993	0.0666	9.26	17717103	Mt1a	metallothionein 1a
103	0.001061	0.0705	2.55	17638715		
104	0.001078	0.0709	2.78	17826912	Vom1r108	vomeronasal 1 receptor 108
105	0.001109	0.0724	2.74	17868148		
106	0.001142	0.0732	3.93	17877200	LOC100362769	hypothetical protein LOC100362769
107	0.001163	0.0732	2.8	17682964		
108	0.001205	0.0748	2.33	17869596		
109	0.00122	0.0749	4.72	17685339		
110	0.001282	0.0776	2.69	17727551	Rrad	Ras-related associated with diabetes
111	0.001284	0.0776	2.1	17868207		
112	0.001375	0.0815	2.22	17820411		
113	0.001378	0.0815	3.88	17626509		
114	0.001387	0.0815	3.41	17665017		
115	0.001392	0.0815	2.23	17816328		
116	0.001421	0.0824	0.34	17803983		
117	0.001446	0.0824	2.89	17872868	Msn	moesin
118	0.001464	0.0824	2.11	17748101	Fnip2	folliculin interacting protein 2
119	0.001465	0.0824	2.1	17651421	Arl4d	ADP-ribosylation factor-like 4D
120	0.001475	0.0824	3.65	17781033		
121	0.00151	0.0837	2.76	17818250		
122	0.001563	0.0843	0.31	17815318		
123	0.001576	0.0843	2.54	17809625	Plk3	polo-like kinase 3
124	0.001576	0.0843	0.32	17792025		

125	0.001577	0.0843	2.03	17692307		
126	0.001579	0.0843	2.37	17703668		
127	0.001603	0.0844	2.24	17870257		
128	0.001747	0.0894	2.43	17843026	Cdon	cell adhesion associated, oncogene regulated
129	0.001899	0.0953	2.35	17827861	Kitlg	KIT ligand
130	0.001901	0.0953	2.15	17731681	Herpud1	homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-like domain member 1
131	0.002126	0.104	2.46	17869467		
132	0.002126	0.104	2.46	17870157		
133	0.002313	0.11	0.41	17763629	Olr530	olfactory receptor 530
134	0.002321	0.11	2.22	17752318	OLR1740-PS // LOC100362200	// ---
135	0.002393	0.112	2.97	17769238	Dok5	docking protein 5
136	0.002403	0.112	2.05	17833977	Ptbp1	polypyrimidine tract binding protein 1
137	0.002408	0.112	2.4	17821927		
138	0.002511	0.115	0.4	17700161	Kctd4	potassium channel tetramerisation domain containing 4
139	0.002537	0.115	2.1	17880291		
140	0.00265	0.117	2.85	17637216	Sult1a1	sulfotransferase family, cytosolic, 1A, phenol-preferring, member 1
141	0.002691	0.117	2.6	17838120	Arc	activity-regulated cytoskeleton-associated protein
142	0.00279	0.12	2.89	17853950	Pigb	phosphatidylinositol glycan anchor biosynthesis, class B
143	0.002822	0.12	2.43	17779781		
144	0.002827	0.12	2.25	17768956	Mmp9	matrix metallopeptidase 9
145	0.002846	0.12	2.79	17633661	Mir344a-2	microRNA mir-344a-2
146	0.002869	0.12	2.12	17797676	RGD1562265	similar to ribosomal protein S12
147	0.002873	0.12	2.87	17654073	Olr1376	olfactory receptor 1376
148	0.002942	0.122	3.51	17795795	Tas2r110	taste receptor, type 2, member 110
149	0.003068	0.122	3.23	17851234	Olr1257	olfactory receptor 1257
150	0.003078	0.122	2.03	17867711		
151	0.003078	0.122	2.03	17870281		
152	0.003093	0.122	2.22	17699330		
153	0.003101	0.122	5.13	17764480		
154	0.003101	0.122	5.13	17860243		
155	0.003103	0.122	0.49	17703132		
156	0.003129	0.122	2.46	17815894		
157	0.003156	0.122	0.49	17746295	LOC361914	similar to solute carrier family 7 (cationic amino acid transporter, y+ system), member 12
158	0.003166	0.122	2.44	17664369	Cxadr	coxsackie virus and adenovirus receptor
159	0.003241	0.122	2.17	17658404	Spns2	spinster homolog 2
160	0.00329	0.123	2.84	17693294	RGD1561226	similar to DNA segment, Chr 5, ERATO Doi 577, expressed
161	0.003418	0.126	2.09	17783185		
162	0.00351	0.128	0.47	17774126	Olr485	olfactory receptor 485
163	0.003539	0.128	2.32	17829032		

164	0.003751	0.134	0.49	17755248		
165	0.003878	0.137	0.43	17835175		
166	0.003915	0.137	0.36	17744380		
167	0.003946	0.138	2.06	17794096		
168	0.004039	0.139	2.19	17731173		
169	0.004098	0.14	2.55	17869518		
170	0.004106	0.14	2.77	17673385		
171	0.004299	0.143	3.38	17711336		
172	0.004339	0.143	2.31	17792677	Cd207	CD207 molecule, langerin
173	0.004453	0.144	3.43	17812434	LOC691257	similar to Zinc finger protein 267 (Zinc finger protein HZF2)
174	0.004463	0.144	2.04	17815281	Lamb1	laminin, beta 1
175	0.004487	0.144	2.16	17751213		
176	0.004502	0.144	2.15	17613853		
177	0.004631	0.147	2.38	17818497		
178	0.004663	0.147	2.18	17843248	Olr1213	olfactory receptor 1213
179	0.00492	0.151	2.07	17762021	LOC690840	similar to ribosomal protein L37
180	0.004923	0.151	2.11	17808683	Jun	jun proto-oncogene
181	0.004928	0.151	2.32	17724318	Smad7	SMAD family member 7
182	0.005032	0.154	2.69	17737218		
183	0.005126	0.155	2.62	17640939		
184	0.00518	0.156	0.3	17692790		
185	0.005185	0.156	0.35	17714226		
186	0.005204	0.156	3.77	17701208		
187	0.005218	0.156	2.06	17626435	Dusp5	dual specificity phosphatase 5
188	0.005308	0.157	2.02	17797978		
189	0.005635	0.162	0.41	17683699	Htr5b	5-hydroxytryptamine (serotonin) receptor 5B
190	0.005822	0.165	2.08	17648358		
191	0.005862	0.165	2.27	17671549	Slc7a1	solute carrier family 7 (cationic amino acid transporter, y+ system), member 1
192	0.005879	0.165	2.57	17849817		
193	0.005946	0.166	0.37	17779805		
194	0.006168	0.171	2.23	17794683	RGD1307916	LOC362433
195	0.006273	0.173	0.26	17784277		
196	0.006305	0.173	2.13	17868250		
197	0.006339	0.173	2.45	17825853	Olr907	olfactory receptor 907
198	0.006368	0.173	3.64	17816457		
199	0.006421	0.173	0.49	17763974		
200	0.006443	0.173	0.38	17766487		
201	0.006517	0.174	2.13	17687846	Tmed11	transmembrane emp24 protein transport domain containing 11
202	0.006712	0.177	4.95	17661197	Krt31	keratin 31
203	0.00678	0.178	2.81	17832121	Tuba1c	tubulin, alpha 1C
204	0.006801	0.178	0.29	17752277	Olr1670	olfactory receptor 1670
205	0.006878	0.179	0.39	17784001		
206	0.006967	0.181	2.19	17866112		

207	0.007115	0.182	0.49	17737823		
208	0.007136	0.182	4.32	17797986		
209	0.007155	0.182	2.01	17731112		
210	0.007284	0.184	2.37	17729887		
211	0.007297	0.184	2.32	17771736	Olr416	olfactory receptor 416
212	0.007314	0.184	3.08	17875518		
213	0.007325	0.184	2.06	17741409		
214	0.007405	0.184	2.62	17702543		
215	0.007476	0.185	2.92	17724639		
216	0.007606	0.188	2.78	17876868		
217	0.007802	0.191	2.36	17854132		
218	0.007901	0.192	0.5	17682222	Olr1595	olfactory receptor 1595
219	0.007911	0.192	0.48	17792019		
220	0.00795	0.193	2.06	17645342	Olr1389	olfactory receptor 1389
221	0.007969	0.193	0.4	17726231		
222	0.00812	0.194	0.47	17703173		
223	0.008169	0.195	2.02	17868103		
224	0.008215	0.195	2.17	17679473	Serpinb2	serpin peptidase inhibitor, clade B (ovalbumin), member 2
225	0.008225	0.195	2.54	17708174		
226	0.008273	0.195	2.33	17692732	Lrrc8c	leucine rich repeat containing 8 family, member C
227	0.008397	0.197	3.18	17805948		
228	0.008596	0.2	2.3	17786978	Clec4b2	C-type lectin domain family 4, member B2
229	0.008699	0.2	2.17	17675680		
230	0.008881	0.202	2.61	17749614	Hist2h2ac	histone cluster 2, H2ac
231	0.008981	0.203	0.34	17878683		
232	0.009074	0.204	2.37	17666518		
233	0.009074	0.204	2.37	17747511		
234	0.00917	0.204	2.04	17657603		
235	0.009208	0.204	0.49	17876494	Il13ra2	interleukin 13 receptor, alpha 2
236	0.009349	0.205	2.4	17865389		
237	0.009434	0.205	2.21	17681325		
238	0.009456	0.205	2.01	17733326		
239	0.009473	0.205	2.18	17665771		
240	0.009706	0.208	2.6	17851521		
241	0.009721	0.208	3.05	17868678	Vom2r79	vomeronasal 2 receptor, 79
242	0.009833	0.21	0.47	17880467		
243	0.009992	0.212	5.29	17869670		

mRNA hit list CA3 from sucrose PAD						
	p-value	FDR	x-fold	ProbeSet	Symbol	Name
1	1E-07	0.00073	8.72	17665491		
2	1.8E-06	0.00663	10.28	17784575		
3	4.2E-06	0.00958	34.89	17752874	Hspa1b	heat shock 70kD protein 1B
4	5.2E-06	0.00958	2.07	17689126		

5	8.6E-06	0.0127	3.78	17853671		
6	1.26E-05	0.0142	2.35	17832266	Gpd1	glycerol-3-phosphate dehydrogenase 1 (soluble)
7	1.35E-05	0.0142	7.42	17735609		
8	3.18E-05	0.026	2.69	17626769	Pnliprp1	pancreatic lipase-related protein 1
9	6.06E-05	0.0447	7.47	17613332	Vom1r53	vomeronasal 1 receptor 53
10	6.97E-05	0.0467	2.28	17780786	Slc26a5	solute carrier family 26, member 5 (prestin)
11	0.000095	0.0539	2.78	17810979		
12	0.000095	0.0539	2.78	17810981		
13	0.000103	0.0541	2.16	17645248	LOC100359777	mCG12681-like
14	0.000113	0.0549	7.84	17724830		
15	0.000119	0.0549	27.99	17756503	Hspa1a	heat shock 70kD protein 1A
16	0.000151	0.0574	5.79	17850030	Olr1177	olfactory receptor 1177
17	0.000151	0.0574	9.46	17642957		
18	0.000155	0.0574	7.68	17728071	Hmox1	heme oxygenase (decycling) 1
19	0.000156	0.0574	3.64	17742515		
20	0.00018	0.0582	2.57	17818613		
21	0.000187	0.0582	2.03	17870257		
22	0.000192	0.0582	2.32	17646559	Map2k3	mitogen activated protein kinase kinase 3
23	0.000195	0.0582	28.04	17676952	Hspb1	heat shock protein 1
24	0.000205	0.0582	3.85	17824767		
25	0.000221	0.0598	3.36	17711299		
26	0.000236	0.0598	9.95	17687609	Atf3	activating transcription factor 3
27	0.00024	0.0598	3.36	17774230	Olr587	olfactory receptor 587
28	0.00025	0.0598	8.9	17849293	LOC684822	similar to transcription elongation factor B (SIII), polypeptide 2
29	0.000293	0.0639	2.9	17623115	Fosl1	fos-like antigen 1
30	0.000294	0.0639	2.23	17867524		
31	0.000295	0.0639	2.16	17868246		
32	0.000323	0.0667	5.96	17628747		
33	0.000336	0.0667	2.54	17724601		
34	0.000352	0.0667	2.65	17862549		
35	0.000353	0.0667	2.03	17759437		
36	0.000427	0.0782	4.9	17844027	Cryab	crystallin, alpha B
37	0.000435	0.0782	4.48	17871507		
38	0.000452	0.079	2.08	17878067	Slc7a3	solute carrier family 7 (cationic amino acid transporter, y+ system), member 3
39	0.000461	0.079	4.15	17618305		
40	0.000488	0.0817	2.5	17735630	RGD1564606	similar to 60S ribosomal protein L23a
41	0.000519	0.0827	2.21	17763566	Olr444	olfactory receptor 444
42	0.000535	0.0827	2.41	17635975	Olr239	olfactory receptor 239

43	0.000538	0.0827	3.32	17665373		
44	0.000551	0.0828	7.38	17833185	Olr901	olfactory receptor 901
45	0.000574	0.0836	0.37	17624808		
46	0.000578	0.0836	2.29	17844935	LOC691098	similar to ribosomal protein L37
47	0.000608	0.0862	2.83	17635579	Olr115	olfactory receptor 115
48	0.000648	0.0901	2.42	17728152		
49	0.000701	0.0922	2.08	17635422	Lrrc51	leucine rich repeat containing 51
50	0.000735	0.0922	2.18	17704121	Adamdec1	ADAM-like, decysin 1
51	0.000751	0.0922	5.06	17772374		
52	0.000777	0.0922	2.65	17875518		
53	0.00078	0.0922	2.04	17845678		
54	0.00082	0.0922	7.85	17664420		
55	0.000836	0.0922	3.31	17869418		
56	0.000843	0.0922	7.51	17687455		
57	0.000846	0.0922	0.46	17708441		
58	0.000861	0.0922	3.6	17869467		
59	0.000861	0.0922	3.6	17870157		
60	0.000877	0.0922	2.65	17870204		
61	0.00089	0.0922	2.8	17742509		
62	0.000911	0.0922	6.21	17779805		
63	0.000913	0.0922	2.16	17635598	Olr128	olfactory receptor 128
64	0.000929	0.0922	2.27	17647364		
65	0.000953	0.0922	2.05	17711471	Aadat	aminoadipate aminotransferase
66	0.000956	0.0922	2.48	17643242		
67	0.00096	0.0922	4.2	17766256	RGD1561317	similar to ribosomal protein L31
68	0.00098	0.0922	2.28	17740584	S100a10	S100 calcium binding protein A10
69	0.001014	0.0922	3.11	17765931	Dusp2	dual specificity phosphatase 2
70	0.00102	0.0922	2.9	17789520		
71	0.00102	0.0922	4.97	17835454		
72	0.001035	0.0922	2.5	17718415	Gadd45g	growth arrest and DNA-damage-inducible, gamma
73	0.001042	0.0922	2.98	17752700		
74	0.001062	0.0922	0.27	17624349		
75	0.001064	0.0922	2.45	17619405	Olr242	olfactory receptor 242
76	0.001087	0.0927	2.43	17793713		
77	0.001109	0.0927	0.23	17784180		
78	0.001121	0.0927	2.17	17799775	Mir3554	microRNA mir-3554
79	0.001126	0.0927	2.76	17621987	Olr300	olfactory receptor 300
80	0.001132	0.0927	2.02	17868037		
81	0.00116	0.0933	0.44	17668766	Retnla	resistin like alpha
82	0.0012	0.0933	3.13	17717148	Vim	vimentin
83	0.001203	0.0933	2.39	17795006	Tuba3a	tubulin, alpha 3A
84	0.001206	0.0933	5.76	17619045		
85	0.001245	0.0933	2.22	17712302	Kcnu1	potassium channel, subfamily U,

						member 1
86	0.001259	0.0933	2.13	17809625	Plk3	polo-like kinase 3
87	0.001263	0.0933	5.24	17835750		
88	0.001297	0.0947	2.24	17618283		
89	0.001352	0.0977	0.24	17832683		
90	0.00139	0.099	0.19	17650171	RGD1304870	similar to Tceb2 protein
91	0.001397	0.099	0.42	17879633	Mir463	microRNA mir-463
92	0.001461	0.103	3.56	17664532		
93	0.001484	0.103	3.39	17826910	Vom1r107	vomeronasal 1 receptor 107
94	0.00153	0.104	0.37	17818677		
95	0.001557	0.105	2.45	17647137		
96	0.001561	0.105	2.33	17870740	RGD1559566 // LOC100911472	similar to 60S ribosomal protein L9 // 60S ribosomal protein L9-like
97	0.001608	0.107	2.39	17849826		
98	0.001633	0.107	3.14	17693264	LOC685667 // LOC100363333 // LOC100912929	similar to PRAME family member DJ1198H6.2 // PRAME family member 12 // PRAME family member 12-like
99	0.001655	0.107	5.05	17672229	Zfand2a	zinc finger, AN1-type domain 2A
100	0.001662	0.107	0.25	17624493		
101	0.001685	0.107	2.12	17655501		
102	0.001691	0.107	2.24	17795302	Klrb1a	killer cell lectin-like receptor subfamily B, member 1A
103	0.001694	0.107	0.3	17696207		
104	0.001723	0.108	0.49	17742244		
105	0.001757	0.109	2.14	17756838		
106	0.001789	0.109	3.72	17799940		
107	0.001795	0.109	2.51	17809339		
108	0.001809	0.109	3.05	17777631		
109	0.00182	0.109	2.5	17624245		
110	0.00187	0.111	3.02	17797643		
111	0.00193	0.114	2.36	17815867		
112	0.001951	0.114	3.67	17753672		
113	0.002069	0.117	3.03	17868057		
114	0.002069	0.117	3.03	17868324		
115	0.002079	0.117	2.03	17781129	Abcb1b	ATP-binding cassette, subfamily B (MDR/TAP), member 1B
116	0.002081	0.117	2.51	17636799	Cdr2	cerebellar degeneration-related 2
117	0.002105	0.118	2.17	17869596		
118	0.002155	0.119	3.99	17843361	Olr1265	olfactory receptor 1265
119	0.002242	0.121	2.37	17821305	Sox11	SRY (sex determining region Y)-box 11
120	0.002268	0.121	5.2	17783091	Olr819	olfactory receptor 819
121	0.002281	0.121	3.88	17637890		
122	0.00232	0.121	0.16	17791978		
123	0.002344	0.121	5.16	17629882	Vom2r35	vomeronasal 2 receptor, 35

124	0.002344	0.121	3.96	17859862		
125	0.002378	0.121	2.03	17867369		
126	0.00238	0.121	2.06	17622041	Scgb1c1	secretoglobin, family 1C, member 1
127	0.002387	0.121	3.58	17818250		
128	0.002454	0.121	2.19	17765620		
129	0.00253	0.124	2.24	17873013		
130	0.002625	0.126	3.38	17644053		
131	0.002641	0.126	5.16	17741625		
132	0.002642	0.126	2.35	17880683		
133	0.002727	0.128	2.46	17621948		
134	0.002731	0.128	0.32	17850533		
135	0.002798	0.128	2.5	17779186	Slpi	secretory leukocyte peptidase inhibitor
136	0.002816	0.128	2	17869943		
137	0.002824	0.128	4.64	17749842	RGD1560000	similar to alpha tubulin
138	0.002845	0.128	2.08	17754240		
139	0.002851	0.128	0.3	17879499		
140	0.002942	0.129	3.19	17716847		
141	0.003001	0.129	3	17621224	Bag3	Bcl2-associated athanogene 3
142	0.003013	0.129	0.23	17784641		
143	0.003054	0.13	7.56	17873683		
144	0.00308	0.13	0.35	17683259		
145	0.003154	0.133	5.93	17798721		
146	0.003177	0.133	2.08	17700646		
147	0.003209	0.133	2.18	17799795		
148	0.003227	0.133	2.1	17838143	RGD1308195	similar to secreted Ly6/uPAR related protein 2
149	0.003234	0.133	0.29	17664326		
150	0.003324	0.135	0.24	17698284		
151	0.003331	0.135	0.49	17771783		
152	0.003358	0.135	0.37	17767173		
153	0.003358	0.135	0.37	17767180		
154	0.003408	0.136	0.25	17635565	Olr104	olfactory receptor 104
155	0.003547	0.14	4.18	17731745	Mt1a	metallothionein 1a
156	0.003584	0.141	2.55	17878998	Morc4	MORC family CW-type zinc finger 4
157	0.003635	0.142	4.37	17634970		
158	0.003696	0.143	2.53	17629294	LOC365171	similar to nitric oxide synthase interacting protein
159	0.003768	0.145	4.29	17841786		
160	0.003813	0.146	2.12	17745208	Il31ra	interleukin 31 receptor A
161	0.003854	0.146	3.77	17631491		
162	0.003944	0.149	2.15	17697116	Mss51	MSS51 mitochondrial translational activator
163	0.003969	0.149	2.17	17650036	Mir142	microRNA mir-142

164	0.003985	0.149	0.45	17704845		
165	0.004064	0.151	3.01	17719265	Prl3d4	prolactin family 3, subfamily d, member 4
166	0.004118	0.152	0.48	17675139		
167	0.004199	0.154	0.42	17835409		
168	0.00423	0.154	0.5	17679011		
169	0.00435	0.155	2.47	17732255		
170	0.004354	0.155	2.27	17853630		
171	0.004366	0.155	2.68	17719272	Prl8a2	prolactin family 8, subfamily a, member 2
172	0.004383	0.155	2.55	17822169		
173	0.004402	0.155	0.41	17772840		
174	0.004412	0.155	2.53	17788927		
175	0.004438	0.155	2.23	17666056		
176	0.004481	0.155	3.34	17807271	Olr845	olfactory receptor 845
177	0.004503	0.155	2.11	17747224		
178	0.004505	0.155	13.2	17804126		
179	0.004505	0.155	2.54	17868154		
180	0.004544	0.156	2.3	17833135	Olr878	olfactory receptor 878
181	0.004698	0.16	3.21	17828625	Ddit3	DNA-damage inducible transcript 3
182	0.004753	0.16	4.25	17875052	RGD1565183	similar to ribosomal protein L28
183	0.004753	0.16	2.3	17845560		
184	0.004771	0.16	0.43	17799873		
185	0.004796	0.16	11.91	17730862	Rpl13	ribosomal protein L13
186	0.004877	0.161	0.33	17763762	Olr726	olfactory receptor 726
187	0.004999	0.164	0.22	17695156		
188	0.005141	0.165	7.32	17808103		
189	0.005207	0.165	4.13	17797504		
190	0.005222	0.165	2.46	17773349		
191	0.005236	0.165	3.2	17875665	Timp1	TIMP metallopeptidase inhibitor 1
192	0.005241	0.165	4.01	17833260	Olr1057	olfactory receptor 1057
193	0.005247	0.165	3.11	17809417	Cyp4a2	cytochrome P450, family 4, subfamily a, polypeptide 2
194	0.005268	0.165	4.27	17766761		
195	0.005347	0.167	2.11	17866200	Alpp	alkaline phosphatase, placental
196	0.005377	0.167	2.17	17842186	LOC690305	similar to Nucleolar transcription factor 1 (Upstream-binding factor 1) (UBF-1)
197	0.005455	0.167	0.27	17692312		
198	0.005462	0.167	2.11	17869614		
199	0.005462	0.167	2.75	17637632		
200	0.005493	0.167	3.31	17731750	Mt2A	metallothionein 2A
201	0.005495	0.167	2.14	17746004	RGD1564125	similar to Cln5 protein
202	0.005521	0.167	2.23	17702085		
203	0.005631	0.169	3.1	17727551	Rrad	Ras-related associated with

						diabetes
204	0.005677	0.169	10.55	17768155		
205	0.005715	0.169	2.42	17870212		
206	0.005864	0.17	0.41	17664274		
207	0.005884	0.17	0.32	17797651		
208	0.005896	0.17	0.16	17807875	Mup5	major urinary protein 5
209	0.00605	0.173	0.46	17791785		
210	0.006081	0.173	2.17	17783085	Olr813	olfactory receptor 813
211	0.00618	0.173	2.6	17750295		
212	0.006222	0.173	2.13	17864163		
213	0.006246	0.173	4.04	17837230		
214	0.006279	0.173	3.12	17878714		
215	0.00628	0.173	4.45	17792089		
216	0.00634	0.174	2.48	17787596	Klre1	killer cell lectin-like receptor, family E, member 1
217	0.006423	0.174	0.4	17818655		
218	0.006491	0.174	2.05	17782616		
219	0.006552	0.174	0.43	17842225		
220	0.00657	0.174	2.13	17717140	Pter	phosphotriesterase related
221	0.006587	0.174	2.06	17797599	Mms22l	MMS22-like, DNA repair protein
222	0.006609	0.174	2.31	17811631	C1qb	complement component 1, q subcomponent, B chain
223	0.006614	0.174	2.81	17720630		
224	0.006638	0.174	0.39	17844988		
225	0.006692	0.174	2.25	17644056	Zscan10	zinc finger and SCAN domain containing 10
226	0.006802	0.175	2.76	17720965	LOC100364106	Sec61 gamma subunit-like
227	0.006812	0.175	2.89	17838642	LOC100910811	putative transmembrane protein C8orfK29-like
228	0.006876	0.175	4.28	17618009		
229	0.007	0.176	2.56	17682865	Tlr5	toll-like receptor 5
230	0.007004	0.176	3	17767175		
231	0.007012	0.176	2.37	17667228		
232	0.007064	0.176	4.01	17628506		
233	0.007079	0.176	2	17681861	Apoa2	apolipoprotein A-II
234	0.007158	0.177	0.36	17665038		
235	0.007189	0.177	2.37	17630418	PVR	poliovirus receptor
236	0.007216	0.177	0.43	17773187		
237	0.007249	0.177	4.87	17806280		
238	0.007332	0.177	0.24	17732640		
239	0.007367	0.177	2.35	17624351	Olr367	olfactory receptor 367
240	0.007453	0.178	2.62	17721795		
241	0.007537	0.179	3.58	17782681	Tas2r108	taste receptor, type 2, member 108
242	0.007642	0.179	2.26	17813867	Rhoq	ras homolog family member Q
243	0.007651	0.179	2.52	17679536	Cntnap5c	contactin associated protein-like

						5C
244	0.007713	0.179	2.63	17653002		
245	0.007932	0.183	3.59	17805604		
246	0.008004	0.184	2.04	17834341	RGD1310212	similar to KIAA1111-like protein
247	0.008042	0.185	2.91	17877200	LOC100362769	hypothetical protein LOC100362769
248	0.008154	0.187	2.92	17880857	LOC680635	similar to 40S ribosomal protein S10
249	0.00822	0.188	2.09	17822627		
250	0.008268	0.188	2.1	17750982		
251	0.008272	0.188	0.37	17879614		
252	0.008337	0.188	2.47	17853950	Pigb	phosphatidylinositol glycan anchor biosynthesis, class B
253	0.008353	0.188	3.37	17835733		
254	0.008357	0.188	2.82	17684927	LOC100364404	regulator of G-protein signaling 2-like
255	0.00847	0.188	2.59	17816034	Ctage5	CTAGE family, member 5
256	0.008494	0.188	0.37	17689964		
257	0.008512	0.188	2.39	17825894		
258	0.008516	0.188	0.21	17790393		
259	0.00853	0.188	2.17	17872259		
260	0.008596	0.189	3.75	17856790	Ccr1l1	chemokine (C-C motif) receptor 1-like 1
261	0.008715	0.191	0.29	17767283		
262	0.008854	0.193	2.11	17833546	Gadd45b	growth arrest and DNA-damage-inducible, beta
263	0.00892	0.194	0.23	17834079	Olr1075	olfactory receptor 1075
264	0.00896	0.194	0.46	17697179		
265	0.009008	0.194	0.46	17766487		
266	0.009017	0.194	2.78	17629876	Vom2r34	vomeronasal 2 receptor, 34
267	0.009026	0.194	3.31	17716541		
268	0.009146	0.195	2.03	17686666	Ly9	lymphocyte antigen 9
269	0.009159	0.195	4.04	17613328	Vom1r51	vomeronasal 1 receptor 51
270	0.009223	0.195	3.47	17870224		
271	0.009242	0.195	2.31	17842144		
272	0.009268	0.195	2.47	17673512	Ubc	ubiquitin C
273	0.009288	0.195	2.39	17654068	Olr1374	olfactory receptor 1374
274	0.009324	0.195	3.64	17648329	Olr1466	olfactory receptor 1466
275	0.009351	0.195	6.41	17781033		
276	0.009494	0.197	0.33	17629100	Vom2r15	vomeronasal 2 receptor, 15
277	0.009521	0.197	2.2	17868099		
278	0.009616	0.197	2.25	17629433	Galp	galanin-like peptide
279	0.009622	0.197	3.14	17682452		
280	0.009656	0.197	2.61	17795373	RGD1564770	similar to CD69 antigen (p60, early T-cell activation antigen)
281	0.009687	0.197	2.48	17680779	LOC689412	similar to CG4025-PA
282	0.009818	0.197	0.45	17743570		

283	0.00982	0.197	0.32	17615462		
284	0.009926	0.199	0.3	17646207	Olr1449	olfactory receptor 1449
285	0.009967	0.199	2.03	17781276		

APPENDIX 6: REANALYSIS OF MICROARRAY HIT LISTS FROM SUCROSE GRADIENT METHOD

Reanalysis of CA1 mRNA from sucrose GRADIENT						
	p-value	FDR	x-fold	ProbeSet	Symbol	Name
1	1.4E-06	0.00957	8.04	10823075	Elf2	E74-like factor 2
2	0.000003	0.00957	17.23	10729213		
3	4.2E-06	0.00957	9.42	10722427		
4	1.93E-05	0.033	9.03	10817894		
5	5.78E-05	0.06	9.6	10877206		
6	6.04E-05	0.06	5.4	10763477	Mki67ip	Mki67 (FHA domain) interacting nucleolar phosphoprotein
7	7.08E-05	0.06	12.02	10749983	Cxadr	coxsackie virus and adenovirus receptor
8	7.81E-05	0.06	6.97	10873903		
9	0.000079	0.06	9.5	10796507	Slc39a12	solute carrier family 39 (zinc transporter), member 12
10	0.000107	0.067	5.17	10907913	Mmp8	matrix metallopeptidase 8
11	0.000108	0.067	7.77	10937020	Gripap1	GRIP1 associated protein 1
12	0.000134	0.0765	9.12	10784416	Ints6	integrator complex subunit 6
13	0.000208	0.109	10.91	10931717	C3	complement component 3
14	0.000258	0.126	6.13	10762704	Srsf9	serine/arginine-rich splicing factor 9
15	0.000289	0.132	7.08	10824322	Lmna	lamin A/C
16	0.000361	0.153	8.62	10838497	Katnbl1	katanin p80 subunit B-like 1
17	0.000405	0.153	145.99	10770710	Atf3	activating transcription factor 3
18	0.000409	0.153	9.36	10895152	Kitlg	KIT ligand
19	0.000434	0.153	6.84	10846966	Olr490	olfactory receptor 490
20	0.000503	0.153	13.17	10880107		
21	0.000538	0.153	13.16	10862473		
22	0.00054	0.153	11.7	10855701	Aqp1	aquaporin 1
23	0.000567	0.153	3.6	10853916		
24	0.000574	0.153	10.71	10894333	Myo1f	myosin IF
25	0.000581	0.153	4.25	10818687		
26	0.000592	0.153	6.79	10764567	Pdc	phosducin
27	0.000615	0.153	7.32	10717069	Pde7b	phosphodiesterase 7B
28	0.000626	0.153	0.092	10707639		
29	0.000698	0.156	8.96	10856282	Rnf103	ring finger protein 103
30	0.00073	0.156	43.93	10862867	Gadd45a	growth arrest and DNA-damage-inducible, alpha
31	0.000748	0.156	9.76	10814146		
32	0.000762	0.156	12.83	10797929	Gcnt2	glucosaminyl (N-acetyl) transferase 2, I-branching enzyme
33	0.000785	0.156	5.21	10927838		
34	0.000809	0.156	7.76	10812922		
35	0.00082	0.156	12.84	10877538		
36	0.000909	0.156	4.05	10839579	Dusp2	dual specificity phosphatase 2
37	0.00091	0.156	13.22	10821117	Nln	neurolysin (metallopeptidase M3 family)

38	0.000983	0.156	14.29	10926405		
39	0.001008	0.156	7.23	10906364	Syt10	synaptotagmin X
40	0.001012	0.156	15.91	10828861		
41	0.001012	0.156	15.91	10850255		
42	0.001012	0.156	15.91	10874216		
43	0.001012	0.156	15.91	10875949		
44	0.001012	0.156	15.91	10910193		
45	0.001027	0.156	6.57	10830906	Znrd1as	ZNRD1 antisense RNA
46	0.001115	0.161	3.09	10885382	Mthfd1	methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 1, methenyltetrahydrofolate cyclohydrolase, formyltetrahydrofolate synthetase
47	0.001134	0.161	9.23	10768339		
48	0.001196	0.161	9.97	10768332	Rgs2	regulator of G-protein signaling 2
49	0.001223	0.161	6.08	10934560		
50	0.001228	0.161	11.36	10864481	Cntn3	contactin 3 (plasmacytoma associated)
51	0.001235	0.161	63.27	10798702	Inhba	inhibin beta-A
52	0.001261	0.161	7.04	10830932	Trim26	tripartite motif-containing 26
53	0.001261	0.161	58.4	10761128	Hspb1	heat shock protein 1
54	0.001292	0.161	9.29	10730116		
55	0.001298	0.161	7.47	10866374	Lrp6	low density lipoprotein receptor-related protein 6
56	0.001341	0.164	9.29	10734828		
57	0.001411	0.166	8.6	10767763	Prelp	proline/arginine-rich end leucine-rich repeat protein
58	0.001448	0.166	7.04	10858967	Tnfrsf1a	tumor necrosis factor receptor superfamily, member 1a
59	0.001461	0.166	7.97	10765040		
60	0.001484	0.166	4.01	10877855		
61	0.001489	0.166	19.95	10901367		
62	0.00151	0.166	183.77	10828154	Hspa1b	heat shock 70kD protein 1B (mapped)
63	0.001554	0.167	4.46	10724993	Rras2	related RAS viral (r-ras) oncogene homolog 2
64	0.001585	0.167	8.57	10788483		
65	0.00159	0.167	7.06	10910252	Snupn	snurportin 1
66	0.001649	0.171	6.6	10823338	Siah2	seven in absentia 2
67	0.00176	0.175	31.05	10797566		
68	0.001784	0.175	8.01	10793175	Usp19	ubiquitin specific peptidase 19
69	0.001788	0.175	18.87	10933345	Tlr7	toll-like receptor 7
70	0.001795	0.175	13.85	10933903		
71	0.001832	0.176	8.58	10934666		
72	0.001923	0.18	9.6	10800442	Rnf138	ring finger protein 138, E3 ubiquitin protein ligase
73	0.001948	0.18	5.35	10729996		
74	0.001987	0.18	6.41	10773004		
75	0.002043	0.18	22.66	10711401	Bag3	Bcl2-associated athanogene 3
76	0.002062	0.18	16.01	10924076	Rpe	ribulose-5-phosphate-3-epimerase
77	0.002079	0.18	6.96	10804783	Fbxo38	F-box protein 38
78	0.00211	0.18	8.67	10788497	Eri1	exoribonuclease 1

79	0.00212	0.18	8.5	10885029	Frmd6	FERM domain containing 6
80	0.002138	0.18	7.21	10872747	Ubxn11	UBX domain protein 11
81	0.00216	0.18	6.13	10881820	Spsb1	splA/ryanodine receptor domain and SOCS box containing 1
82	0.00221	0.18	6.06	10790725		
83	0.002261	0.18	9.68	10774383	Vps54	vacuolar protein sorting 54 homolog (S. cerevisiae)
84	0.002278	0.18	6.22	10862453		
85	0.002294	0.18	11.97	10890354	Cdkl1	cyclin-dependent kinase-like 1 (CDC2-related kinase)
86	0.002309	0.18	14.67	10934631	Lpar4	lysophosphatidic acid receptor 4
87	0.002325	0.18	6.85	10768726	Npl	N-acetylneuraminate pyruvate lyase
88	0.002326	0.18	22.61	10896793	Trib1	tribbles homolog 1 (Drosophila)
89	0.00235	0.18	18.83	10853202	Phtf2	putative homeodomain transcription factor 2
90	0.002478	0.181	3.49	10794477	Kif13a	kinesin family member 13A
91	0.00249	0.181	6.75	10714348	Fam108b1	family with sequence similarity 108, member B1
92	0.002504	0.181	6.6	10810811	Slc7a6os	solute carrier family 7, member 6 opposite strand
93	0.002556	0.181	7.12	10719616	PVR	poliovirus receptor
94	0.002559	0.181	6.72	10840396	Sec23b	Sec23 homolog B (S. cerevisiae)
95	0.00256	0.181	7.04	10895988	Zbtb39	zinc finger and BTB domain containing 39
96	0.002575	0.181	22.18	10781962		
97	0.002575	0.181	22.18	10864711		
98	0.002601	0.181	6.9	10803991	Cd14	CD14 molecule
99	0.00262	0.181	15.36	10922962		
100	0.002709	0.182	13.62	10891548		
101	0.002709	0.182	34.07	10745323	Wsb1	WD repeat and SOCS box-containing 1
102	0.002712	0.182	6.6	10775519	Agpat9	1-acylglycerol-3-phosphate O-acyltransferase 9
103	0.002824	0.187	14.9	10721050	Cebpg	CCAAT/enhancer binding protein (C/EBP), gamma
104	0.00285	0.187	22.59	10892171		
105	0.002959	0.193	16.25	10844223	Ptges	prostaglandin E synthase
106	0.003014	0.194	6.01	10785405		
107	0.003043	0.194	13.41	10915716	Zfp653	zinc finger protein 653
108	0.003219	0.202	7.07	10812580		
109	0.003225	0.202	6.14	10868226	Ifnk	interferon kappa
110	0.003272	0.202	6.72	10928254	Orc2	origin recognition complex, subunit 2
111	0.003345	0.202	4.64	10932652		
112	0.00342	0.202	8.6	10898408		
113	0.00345	0.202	8.55	10730472		
114	0.00352	0.202	22.23	10903210		
115	0.00359	0.202	44.04	10758344	Vps37b	vacuolar protein sorting 37 homolog B (S. cerevisiae)
116	0.003595	0.202	6.47	10772795		
117	0.003598	0.202	5.17	10745871	Ints2	integrator complex subunit 2
118	0.003621	0.202	5.57	10703104	Pacrg	Park2 co-regulated
119	0.003624	0.202	6.89	10745340		

120	0.00367	0.202	3.26	10912088	Nt5e	5' nucleotidase, ecto
121	0.003673	0.202	7.45	10903466	Azin1	antizyme inhibitor 1
122	0.003706	0.202	77.72	10831298	Hspa1b	heat shock 70kD protein 1B (mapped)
123	0.003713	0.202	22.84	10767001	Mat2a	methionine adenosyltransferase II, alpha
124	0.003716	0.202	7.97	10901752		
125	0.003751	0.202	9.25	10885906	Zfp410	zinc finger protein 410
126	0.003753	0.202	7.24	10801260		
127	0.003762	0.202	9.04	10721925	Grwd1	glutamate-rich WD repeat containing 1
128	0.003801	0.203	8.58	10716984	Heca	headcase homolog (Drosophila)
129	0.003892	0.204	10.85	10808103	Terf2ip	telomeric repeat binding factor 2, interacting protein
130	0.003895	0.204	8.41	10780813	Fgf9	fibroblast growth factor 9
131	0.003956	0.204	4.03	10774652	Pnpt1	polyribonucleotide nucleotidyltransferase 1
132	0.00397	0.204	21.24	10727717	Npas4	neuronal PAS domain protein 4
133	0.003999	0.204	14.87	10880404	Ptafr	platelet-activating factor receptor
134	0.004005	0.204	14.47	10712340	Cd151	CD151 molecule (Raph blood group)
135	0.004045	0.205	8.37	10812589	F2rl2	coagulation factor II (thrombin) receptor-like 2
136	0.004076	0.205	9.9	10903482	Slc25a32	solute carrier family 25 (mitochondrial folate carrier) , member 32
137	0.004116	0.205	6.6	10776646	Guf1	GUF1 GTPase homolog (S. cerevisiae)
138	0.004133	0.205	20.87	10889415	Sox11	SRY (sex determining region Y)-box 11
139	0.004201	0.206	31.8	10785461	Pcdh8	protocadherin 8
140	0.004215	0.206	7.87	10714576	Vldlr	very low density lipoprotein receptor
141	0.004264	0.207	11.09	10733045		
142	0.004358	0.207	9.64	10920860	Myd88	myeloid differentiation primary response 88
143	0.004364	0.207	10.93	10701663	LOC292449	similar to hypothetical protein
144	0.004411	0.207	21.87	10842500	Dok5	docking protein 5
145	0.004434	0.207	6.77	10818218	Dram2	DNA-damage regulated autophagy modulator 2
146	0.00445	0.207	5.87	10890210	Mdga2	MAM domain containing glycosylphosphatidylinositol anchor 2
147	0.004475	0.207	7.4	10727493		
148	0.004529	0.207	7.69	10789042		
149	0.004563	0.207	17.95	10733047		
150	0.00459	0.207	7.56	10815393	Supt20	suppressor of Ty 20
151	0.004592	0.207	15.28	10845095	Orc4	origin recognition complex, subunit 4
152	0.004599	0.207	17.45	10847932	Depdc7	DEP domain containing 7
153	0.004686	0.208	6.87	10740959	Kctd5	potassium channel tetramerisation domain containing 5
154	0.004695	0.208	16.96	10787212	Myo9b	myosin IXb
155	0.00476	0.21	7.66	10763284	Zcchc2	zinc finger, CCHC domain containing 2
156	0.004783	0.21	7.1	10776807	Mcart1	mitochondrial carrier triple repeat 1
157	0.00482	0.21	11.3	10866926	Asun	asunder, spermatogenesis regulator
158	0.004967	0.211	5.57	10890626	Gphb5	glycoprotein hormone beta 5
159	0.00499	0.211	28.4	10708672	Prcp	prolylcarboxypeptidase (angiotensinase C)
160	0.005047	0.211	14.79	10714973	Hectd2	HECT domain containing 2
161	0.005061	0.211	8.63	10719956	Nemf	nuclear export mediator factor
162	0.005062	0.211	12.61	10813984	LOC64038	sertolin

163	0.005096	0.211	7.05	10887826	Tmem196	transmembrane protein 196
164	0.005116	0.211	8.64	10789709		
165	0.005156	0.211	8.11	10903195	Mterfd1	MTERF domain containing 1
166	0.005168	0.211	13.07	10713602		
167	0.005192	0.211	7.32	10703508		
168	0.005228	0.211	21.64	10868302		
169	0.005271	0.212	24.27	10796673		
170	0.005298	0.212	7.33	10867761	Mmp16	matrix metallopeptidase 16
171	0.005363	0.212	4.7	10792863	Atp11a	ATPase, class VI, type 11A
172	0.005371	0.212	22.01	10827686	RT1-M6-1	RT1 class I, locus M6, gene 1
173	0.005422	0.212	6.82	10872291	Yars	tyrosyl-tRNA synthetase
174	0.005427	0.212	8.3	10908205	Olr1165	olfactory receptor 1165
175	0.005464	0.212	11.68	10855187	Zfp398	zinc finger protein 398
176	0.005496	0.212	44.21	10806122	Hmox1	heme oxygenase (decycling) 1
177	0.00551	0.212	16.32	10894115		
178	0.005695	0.215	4.41	10910768		
179	0.005764	0.215	6.14	10727464	Rps6kb2	ribosomal protein S6 kinase, polypeptide 2
180	0.00577	0.215	11.44	10808764	Urb2	URB2 ribosome biogenesis 2 homolog (S. cerevisiae)
181	0.005794	0.215	13.71	10781100	Zfp395	zinc finger protein 395
182	0.005808	0.215	14.13	10875939	Zfp292	zinc finger protein 292
183	0.005808	0.215	9.11	10794599	Nedd9	neural precursor cell expressed, developmentally down-regulated 9
184	0.005856	0.215	7.64	10817989		
185	0.005866	0.215	12.72	10832460	Zfp280b	zinc finger protein 280B
186	0.005889	0.215	6.8	10792278	Whsc1l1	Wolf-Hirschhorn syndrome candidate 1-like 1 (human)
187	0.005969	0.216	20.08	10865349	Slc2a3	solute carrier family 2 (facilitated glucose transporter), member 3
188	0.006002	0.216	8.21	10766521	Eprs	glutamyl-prolyl-tRNA synthetase
189	0.006032	0.216	55.02	10781715	Pcdh8	protocadherin 8
190	0.006037	0.216	13.86	10937834	Rai2	retinoic acid induced 2
191	0.00607	0.216	13.89	10846286	Nfe2l2	nuclear factor, erythroid derived 2, like 2
192	0.006133	0.217	10.31	10729970	Rbp4	retinol binding protein 4, plasma
193	0.0062	0.217	13.07	10846762	Calcrl	calcitonin receptor-like
194	0.006214	0.217	5.24	10702792	Cldn20	claudin 20
195	0.00625	0.217	13.77	10805100	LOC361346	similar to chromosome 18 open reading frame 54
196	0.006305	0.217	6.98	10705485	Fbl	fibrillarin
197	0.006337	0.217	21.48	10908089	Taf1d	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, D
198	0.006376	0.217	7.06	10913866		
199	0.006381	0.217	13.63	10875936	Zfp292	zinc finger protein 292
200	0.006432	0.218	11.74	10877943	Ptplad2	protein tyrosine phosphatase-like A domain containing 2
201	0.006527	0.22	9.24	10877431	Hdhd3	haloacid dehalogenase-like hydrolase domain containing 3
202	0.006738	0.224	7.1	10767067		
203	0.00675	0.224	6.63	10743318	Shmt1	serine hydroxymethyltransferase 1 (soluble)

204	0.006816	0.224	11.89	10928229	Clk1	CDC-like kinase 1
205	0.006826	0.224	7.56	10822043	Cdh6	cadherin 6
206	0.006905	0.224	7.9	10720215	Zfp36	zinc finger protein 36
207	0.006928	0.224	7.41	10859264	Ddx47	DEAD (Asp-Glu-Ala-Asp) box polypeptide 47
208	0.00697	0.224	14.4	10935021		
209	0.006987	0.224	6.85	10732113		
210	0.007019	0.224	7.18	10883716	E2f6	E2F transcription factor 6
211	0.007023	0.224	17.41	10867093		
212	0.007046	0.224	7.08	10871133	Mknk1	MAP kinase-interacting serine/threonine kinase 1
213	0.007104	0.224	32.87	10757082	Zfand2a	zinc finger, AN1-type domain 2A
214	0.007149	0.224	6.39	10730428	Fbxw4	F-box and WD repeat domain containing 4
215	0.00718	0.224	6.69	10935949	Abcd1	ATP-binding cassette, subfamily D (ALD), member 1
216	0.007295	0.224	8.32	10801606	Dmxl1	Dmx-like 1
217	0.007301	0.224	8.95	10861890	Creb3l2	cAMP responsive element binding protein 3-like 2
218	0.007365	0.224	8.62	10737344	Srsf1	serine/arginine-rich splicing factor 1
219	0.007428	0.224	4.27	10848908		
220	0.007466	0.224	8.68	10887016		
221	0.007466	0.224	8.68	10887020		
222	0.007466	0.224	8.68	10887024		
223	0.007466	0.224	8.68	10887028		
224	0.007466	0.224	8.68	10887032		
225	0.007466	0.224	8.68	10887036		
226	0.007466	0.224	8.68	10887040		
227	0.007546	0.225	6.21	10729350	Smc5	structural maintenance of chromosomes 5
228	0.007565	0.225	11.59	10797992	Riok1	RIO kinase 1
229	0.007592	0.225	5.73	10833366		
230	0.007689	0.226	8.46	10856673	Slc4a5	solute carrier family 4, sodium bicarbonate cotransporter, member 5
231	0.007705	0.226	9.35	10759342	Noc4l	nucleolar complex associated 4 homolog (S. cerevisiae)
232	0.007859	0.23	5.94	10775113	Mtf2	metal response element binding transcription factor 2
233	0.007896	0.23	18.52	10797527	Gadd45g	growth arrest and DNA-damage-inducible, gamma
234	0.007973	0.23	5.15	10886714	Ccnk	cyclin K
235	0.00803	0.23	12.4	10823462	Slc33a1	solute carrier family 33 (acetyl-CoA transporter), member 1
236	0.008041	0.23	9.39	10891364	Alkbh1	alkB, alkylation repair homolog 1 (E. coli)
237	0.008053	0.23	0.17	10846974	Olr495	olfactory receptor 495
238	0.008176	0.232	12.04	10772330		
239	0.008206	0.232	7.1	10936365	Il13ra1	interleukin 13 receptor, alpha 1
240	0.008217	0.232	16.84	10742464	Zfp2	zinc finger protein 2
241	0.008287	0.232	12.92	10805202		
242	0.008312	0.232	10.18	10811531	Slc7a5	solute carrier family 7 (amino acid transporter light chain, L system), member 5
243	0.008337	0.232	6.78	10854086	Lep	leptin

244	0.008388	0.232	7.62	10908764	Snx19	sorting nexin 19
245	0.0084	0.232	5.64	10886036	Jdp2	Jun dimerization protein 2
246	0.008406	0.232	29.46	10778568	Pno1	partner of NOB1 homolog (S. cerevisiae)
247	0.008568	0.235	4.68	10868718	Dcaf10	DDB1 and CUL4 associated factor 10
248	0.008579	0.235	3.17	10927840		
249	0.008621	0.235	6.4	10707824	Vimp	VCP-interacting membrane protein
250	0.00866	0.235	12.28	10753533	Mina	myc induced nuclear antigen
251	0.008791	0.237	9.6	10881167	Ddi2	DNA-damage inducible protein 2
252	0.00883	0.237	8.82	10891324	Zdhhc22	zinc finger, DHHC-type containing 22
253	0.008889	0.237	6.63	10752592	Yars2	tyrosyl-tRNA synthetase 2 (mitochondrial)
254	0.008895	0.237	0.18	10847215	Olr712	olfactory receptor 712
255	0.009045	0.241	6.77	10701697		
256	0.009129	0.242	28.47	10857314	Slc6a6	solute carrier family 6 (neurotransmitter transporter, taurine), member 6
257	0.009266	0.245	7.64	10868627		
258	0.009434	0.248	12.36	10750296	Clic6	chloride intracellular channel 6
259	0.009531	0.25	9.6	10911352	RGD1307526	similar to modulator of estrogen induced transcription
260	0.009737	0.254	17.67	10832905	Sirt1	sirtuin 1
261	0.009804	0.255	14.4	10936993	Pim2	pim-2 oncogene
262	0.009911	0.256	6.6	10908521	Ldlr	low density lipoprotein receptor
263	0.009964	0.256	18.58	10772580		

Reanalysis of CA3 mRNA from sucrose GRADIENT

	p-value	FDR	x-fold	ProbeSet	Symbol	Name
1	2E-07	0.00137	58.64	10828154	Hspa1b	heat shock 70kD protein 1B
2	6E-07	0.00205	74.54	10761128	Hspb1	heat shock protein 1
3	1.8E-06	0.00359	13.66	10803991	Cd14	CD14 molecule
4	2.1E-06	0.00359	93.48	10770710	Atf3	activating transcription factor 3
5	3.3E-06	0.00427	17.37	10831298	Hspa1a	heat shock 70kD protein 1A
6	3.8E-06	0.00427	8.76	10809392	Mt1a	metallothionein 1a
7	4.9E-06	0.00427	8.42	10796411	Mt1a	metallothionein 1a
8	0.000005	0.00427	9.36	10937867		
9	1.08E-05	0.00752	7.24	10853916		
10	1.18E-05	0.00752	10.52	10808167		
11	1.21E-05	0.00752	0.073	10862359		
12	1.36E-05	0.00775	0.074	10855946		
13	1.66E-05	0.00873	16.21	10900358	Gadd45b	growth arrest and DNA-damage-inducible, beta
14	0.000018	0.00879	27.52	10937762	Tmem27	transmembrane protein 27
15	0.000021	0.00957	6.48	10740869	Tnfrsf12a	tumor necrosis factor receptor superfamily, member 12a
16	2.82E-05	0.012	8.91	10711401	Bag3	Bcl2-associated athanogene 3
17	3.34E-05	0.0129	9.11	10936482	Timp1	TIMP metallopeptidase inhibitor 1
18	3.41E-05	0.0129	0.12	10932269		
19	3.98E-05	0.013	7.48	10907749	Glycam1	glycosylation dependent cell adhesion molecule 1

20	4.08E-05	0.013	12.05	10727717	Npas4	neuronal PAS domain protein 4
21	4.12E-05	0.013	7	10939174		
22	0.000042	0.013	5.04	10838813	Dll4	delta-like 4 (Drosophila)
23	5.92E-05	0.0176	5.98	10909892	Cryab	crystallin, alpha B
24	7.49E-05	0.0191	9.54	10797527	Gadd45g	growth arrest and DNA-damage-inducible, gamma
25	7.63E-05	0.0191	15.58	10892173		
26	7.84E-05	0.0191	6.55	10868718	Dcaf10	DDB1 and CUL4 associated factor 10
27	7.96E-05	0.0191	12.77	10840791	Srxn1	sulfiredoxin 1
28	0.000081	0.0191	10.47	10757082	Zfand2a	zinc finger, AN1-type domain 2A
29	8.79E-05	0.0191	4.31	10794599	Nedd9	neural precursor cell expressed, developmentally down-regulated 9
30	9.09E-05	0.0191	7.28	10750296	Clic6	chloride intracellular channel 6
31	9.19E-05	0.0191	4.69	10907324		
32	9.35E-05	0.0191	20.47	10909428	Mfrp	membrane frizzled-related protein
33	9.55E-05	0.0191	9.68	10896793	Trib1	tribbles homolog 1 (Drosophila)
34	9.68E-05	0.0191	6.67	10736697	Ccl2	chemokine (C-C motif) ligand 2
35	9.84E-05	0.0191	5.35	10812580		
36	0.000101	0.0191	36.23	10798702	Inhba	inhibin beta-A
37	0.000103	0.0191	4.27	10717331	Sgk1	serum/glucocorticoid regulated kinase 1
38	0.000107	0.0193	6.65	10817552	Txnip	thioredoxin interacting protein
39	0.000113	0.0198	6.87	10891679	Gpr68	G protein-coupled receptor 68
40	0.000121	0.0207	7.08	10920977		
41	0.000131	0.0216	37.66	10800426	Ttr	transthyretin
42	0.000133	0.0216	6.45	10732652	Dusp1	dual specificity phosphatase 1
43	0.000139	0.0219	5.13	10885400	Hspa2	heat shock protein 2
44	0.000141	0.0219	6	10768332	Rgs2	regulator of G-protein signaling 2
45	0.000164	0.0249	9.36	10899187	Gpd1	glycerol-3-phosphate dehydrogenase 1 (soluble)
46	0.000195	0.0281	6.58	10760290	Nptx2	neuronal pentraxin II
47	0.000196	0.0281	6.21	10756343	Hsph1	heat shock 105/110 protein 1
48	0.000209	0.0281	3.47	10806527		
49	0.000211	0.0281	7.79	10775519	Agpat9	1-acylglycerol-3-phosphate O-acyltransferase 9
50	0.000216	0.0281	4.78	10865081	Adipor2	adiponectin receptor 2
51	0.000222	0.0281	6.56	10713583	Wdr74	WD repeat domain 74
52	0.000224	0.0281	3.99	10868289	Dnaja1	DnaJ (Hsp40) homolog, subfamily A, member 1
53	0.000226	0.0281	5.59	10819347		
54	0.000227	0.0281	12.38	10759762	Kl	Klotho
55	0.000228	0.0281	3.65	10774274	Egfr	epidermal growth factor receptor
56	0.00023	0.0281	3.6	10794225	Nfil3	nuclear factor, interleukin 3 regulated
57	0.000237	0.0284	7.47	10884274	Sostdc1	sclerostin domain containing 1
58	0.000267	0.0304	3.79	10752758	Btg3	BTG family, member 3
59	0.000275	0.0304	4.45	10875532	Pdp1	pyruvate dehyrogenase phosphatase catalytic subunit 1
60	0.000276	0.0304	4.95	10865738	Kcna6	potassium voltage gated channel, shaker related subfamily, member 6

61	0.000283	0.0304	6.2	10867731	Calb1	calbindin 1
62	0.000287	0.0304	8.83	10745323	Wsb1	WD repeat and SOCS box-containing 1
63	0.000295	0.0304	4.65	10807473	Slc7a6	solute carrier family 7 (amino acid transporter light chain, y+L system), member 6
64	0.000296	0.0304	3.65	10844587	Psmd5	proteasome (prosome, macropain) 26S subunit, non-ATPase, 5
65	0.000299	0.0304	3.11	10751255	Arhgap31	Rho GTPase activating protein 31
66	0.000306	0.0304	17.56	10817071	S100a8	S100 calcium binding protein A8
67	0.000306	0.0304	4.92	10720813	Mag	myelin-associated glycoprotein
68	0.00031	0.0304	3.92	10863221	Mat2a	methionine adenosyltransferase II, alpha
69	0.00031	0.0304	3.31	10892184	Hsp90aa1	heat shock protein 90, alpha (cytosolic), class A member 1
70	0.000311	0.0304	5.56	10734853	Aurkb	aurora kinase B
71	0.000337	0.0317	7.29	10810295	Dnajb1	DnaJ (Hsp40) homolog, subfamily B, member 1
72	0.000339	0.0317	4	10884205	Twistnb	TWIST neighbor
73	0.000341	0.0317	5.9	10928522		
74	0.000343	0.0317	5.77	10871417		
75	0.000349	0.0317	4.56	10813643		
76	0.000352	0.0317	6.18	10820613	Sv2c	synaptic vesicle glycoprotein 2c
77	0.000365	0.032	5.85	10721865	Ppp1r15a	protein phosphatase 1, regulatory subunit 15A
78	0.000365	0.032	4.41	10767605	Cntn2	contactin 2 (axonal)
79	0.000417	0.0355	0.21	10850440		
80	0.000419	0.0355	3.98	10906608	Slc38a2	solute carrier family 38, member 2
81	0.000424	0.0355	4.2	10879516	Mfsd2a	major facilitator superfamily domain containing 2A
82	0.000426	0.0355	3.28	10902547	Lyz2	lysozyme 2
83	0.000434	0.0356	3.17	10774470		
84	0.000452	0.0356	4.42	10755013	Il1rap	interleukin 1 receptor accessory protein
85	0.000454	0.0356	5.74	10725387	Cdr2	cerebellar degeneration-related 2
86	0.000461	0.0356	4.04	10820282	Vcan	versican
87	0.000467	0.0356	6.61	10726682	Ifitm3	interferon induced transmembrane protein 3
88	0.00047	0.0356	6.24	10744766	Aspa	aspartoacylase
89	0.000473	0.0356	5.27	10812922		
90	0.000474	0.0356	4.01	10860900	Pdk4	pyruvate dehydrogenase kinase, isozyme 4
91	0.000479	0.0356	4.66	10809328	Herpud1	homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-like domain member 1
92	0.000482	0.0356	3.49	10896992	Ptp4a3	protein tyrosine phosphatase type IVA, member 3
93	0.000484	0.0356	3.3	10796673		
94	0.000491	0.0357	5.18	10897428	Csf2rb	colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)
95	0.000507	0.0363	0.19	10856024		
96	0.000509	0.0363	6.56	10817183	S100a11	S100 calcium binding protein A11

97	0.000515	0.0363	5.18	10764540		
98	0.000523	0.0363	4.01	10765744	Pigm	phosphatidylinositol glycan anchor biosynthesis, class M
99	0.000531	0.0363	3.54	10901231	Timp3	TIMP metallopeptidase inhibitor 3
100	0.000531	0.0363	22.61	10764551	Ptgs2	prostaglandin-endoperoxide synthase 2
101	0.000543	0.0367	5.28	10881820	Spsb1	splA/ryanodine receptor domain and SOCS box containing 1
102	0.000563	0.0372	5.08	10921120	Slc6a20	solute carrier family 6 (proline IMINO transporter), member 20
103	0.000571	0.0372	3.64	10885417		
104	0.000574	0.0372	4.5	10767001	Mat2a	methionine adenosyltransferase II, alpha
105	0.000574	0.0372	5.08	10827450		
106	0.000576	0.0372	3.62	10796991	Npepo	aminopeptidase O
107	0.000594	0.0379	6.84	10927840		
108	0.000599	0.0379	5.47	10788374	Mtus1	microtubule associated tumor suppressor 1
109	0.000609	0.0381	3.1	10719432		
110	0.000614	0.0381	2.96	10899248	Atf1	activating transcription factor 1
111	0.000626	0.0385	3.38	10817894		
112	0.000648	0.0392	6.74	10903736	Enpp2	ectonucleotide pyrophosphatase/phosphodiesterase 2
113	0.000649	0.0392	4.13	10887939	Cdc42ep3	CDC42 effector protein (Rho GTPase binding) 3
114	0.000654	0.0392	3.67	10831940	Fkbp5	FK506 binding protein 5
115	0.000673	0.0394	6.05	10761394	Psph	phosphoserine phosphatase
116	0.000677	0.0394	3.97	10861565	Zc3hc1	zinc finger, C3HC-type containing 1
117	0.000679	0.0394	4.46	10855449	Gpnmb	glycoprotein (transmembrane) nmb
118	0.00068	0.0394	4.2	10911287	Anxa2	annexin A2
119	0.000688	0.0395	3.69	10871511	Lao1	L-amino acid oxidase 1
120	0.000732	0.0415	3.06	10877907	Plin2	perilipin 2
121	0.000734	0.0415	6.88	10880107		
122	0.00075	0.0417	5.69	10772472	Nfxl1	nuclear transcription factor, X-box binding-like 1
123	0.000751	0.0417	3.46	10808362	Usp10	ubiquitin specific peptidase 10
124	0.000768	0.0421	2.94	10763685		
125	0.00077	0.0421	3.05	10767067		
126	0.000798	0.0423	12.73	10827686	RT1-M6-1	RT1 class I, locus M6, gene 1
127	0.000799	0.0423	4.66	10712317	Pnpla2	patatin-like phospholipase domain containing 2
128	0.000814	0.0423	3.07	10871521	Slc2a1	solute carrier family 2 (facilitated glucose transporter), member 1
129	0.000817	0.0423	3.78	10721232	Isg20l2	interferon stimulated exonuclease gene 20-like 2
130	0.00082	0.0423	16.98	10797566		
131	0.000821	0.0423	3.94	10723884	Serpinh1	serpin peptidase inhibitor, clade H (heat shock protein 47), member 1, (collagen binding protein 1)
132	0.000826	0.0423	4.93	10862453		
133	0.000829	0.0423	3.51	10890650		
134	0.000832	0.0423	4.9	10817696	Prkab2	protein kinase, AMP-activated, beta 2

						non-catalytic subunit
135	0.000838	0.0423	3.39	10836394	41705	membrane-associated ring finger (C3HC4) 7, E3 ubiquitin protein ligase
136	0.000842	0.0423	3.8	10862473		
137	0.000866	0.0432	5.9	10785461	Pcdh8	protocadherin 8
138	0.000886	0.0439	4.69	10928154	Hspd1	heat shock protein 1 (chaperonin)
139	0.000892	0.0439	3.55	10822627	Tmem212	transmembrane protein 212
140	0.000907	0.0439	3.26	10811531	Slc7a5	solute carrier family 7 (amino acid transporter light chain, L system), member 5
141	0.000913	0.0439	0.22	10818571		
142	0.000913	0.0439	0.22	10908096		
143	0.000919	0.0439	4.35	10909382	Vof16	ischemia related factor vof-16
144	0.000927	0.0439	4.46	10796149	Pfkfb3	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 3
145	0.000931	0.0439	3.67	10781361	Lgi3	leucine-rich repeat LGI family, member 3
146	0.000978	0.0452	4.11	10895589	Cpm	carboxypeptidase M
147	0.000988	0.0452	4.13	10801884	Slc12a2	solute carrier family 12 (sodium/potassium/chloride transporters), member 2
148	0.000988	0.0452	2.74	10805335	Slc14a1	solute carrier family 14 (urea transporter), member 1
149	0.000991	0.0452	15.56	10929656	Kcnj13	potassium inwardly-rectifying channel, subfamily J, member 13
150	0.000992	0.0452	4.55	10765042		
151	0.001	0.0453	3.73	10822631	Cldn11	claudin 11
152	0.001043	0.0464	2.54	10901752		
153	0.001048	0.0464	5.42	10908102		
154	0.001052	0.0464	6.06	10914019		
155	0.001053	0.0464	6.05	10912614	Slco2a1	solute carrier organic anion transporter family, member 2a1
156	0.001075	0.0471	4.44	10834022	Arrdc3	arrestin domain containing 3
157	0.00109	0.0473	3.63	10765534	Adamts4	ADAM metallopeptidase with thrombospondin type 1 motif, 4
158	0.001093	0.0473	3.92	10812470	Serinc5	serine incorporator 5
159	0.00111	0.0477	2.55	10823049		
160	0.001137	0.0485	6.48	10753423		
161	0.001147	0.0485	3.42	10872291	Yars	tyrosyl-tRNA synthetase
162	0.001165	0.0485	4.19	10880524		
163	0.00117	0.0485	2.68	10871909	Gnl2	guanine nucleotide binding protein-like 2 (nucleolar)
164	0.001172	0.0485	3.5	10792863	Atp11a	ATPase, class VI, type 11A
165	0.001172	0.0485	2.8	10863866	Cnbp	CCHC-type zinc finger, nucleic acid binding protein
166	0.001179	0.0486	3.69	10712706	Chka	choline kinase alpha
167	0.001208	0.0489	0.16	10703224		
168	0.00121	0.0489	3.99	10868428	Dnajb5	DnaJ (Hsp40) homolog, subfamily B, member 5
169	0.001215	0.0489	6.03	10847761	Cd44	Cd44 molecule
170	0.001217	0.0489	4.25	10899263	Mettl7a	methyltransferase like 7A

171	0.001251	0.0497	5.55	10853852	ST7	suppression of tumorigenicity 7
172	0.001252	0.0497	4.58	10886846		
173	0.001288	0.0503	2.98	10859371	Strap	serine/threonine kinase receptor associated protein
174	0.001288	0.0503	23.13	10828827	Cdkn1a	cyclin-dependent kinase inhibitor 1A
175	0.001295	0.0503	7.74	10856673	Slc4a5	solute carrier family 4, sodium bicarbonate cotransporter, member 5
176	0.001303	0.0503	2.9	10725253		
177	0.001306	0.0503	4.84	10858967	Tnfrsf1a	tumor necrosis factor receptor superfamily, member 1a
178	0.001315	0.0503	3.42	10716080	Dusp5	dual specificity phosphatase 5
179	0.001319	0.0503	8.06	10838823	Chac1	ChaC, cation transport regulator homolog 1 (E. coli)
180	0.00133	0.0503	3.36	10768726	Npl	N-acetylneuraminate pyruvate lyase
181	0.001331	0.0503	3.57	10897683	Ddx17	DEAD (Asp-Glu-Ala-Asp) box polypeptide 17
182	0.001347	0.0504	4.71	10885959	RGD1563216	similar to HESB like domain containing 1
183	0.001349	0.0504	5.65	10938209		
184	0.001378	0.0511	2.98	10707824	Vimp	VCP-interacting membrane protein
185	0.001382	0.0511	3.29	10749704	Sirt7	sirtuin 7
186	0.001412	0.0519	8.08	10811126	Fa2h	fatty acid 2-hydroxylase
187	0.001433	0.0524	4.35	10818059		
188	0.001454	0.0529	7.48	10772580		
189	0.001464	0.0529	3.72	10724228	Bcl2l1	Bcl2-like 1
190	0.001473	0.053	2.71	10782764		
191	0.001481	0.053	4.73	10728647	Myrf	myelin regulatory factor
192	0.001496	0.0531	5.48	10899756	Coq10a	coenzyme Q10 homolog A (S. cerevisiae)
193	0.001508	0.0531	2.68	10746014		
194	0.00151	0.0531	2.71	10713045	Fosl1	fos-like antigen 1
195	0.001514	0.0531	4.08	10789653	Irs2	insulin receptor substrate 2
196	0.001542	0.0538	11.71	10935177	Cldn2	claudin 2
197	0.001559	0.0539	3.01	10862505	LOC500124	similar to RIKEN cDNA 4921507P07
198	0.001563	0.0539	3.2	10909733	Zfp259	zinc finger protein 259
199	0.001572	0.054	3.14	10816400	Isg20l2	interferon stimulated exonuclease gene 20-like 2
200	0.001629	0.0554	2.86	10811493	Cox4nb	COX4 neighbor
201	0.00163	0.0554	2.89	10851952	B4galt5	UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 5
202	0.001688	0.0571	2.74	10889728	Arl4a	ADP-ribosylation factor-like 4A
203	0.001697	0.0571	4.38	10791677	Acsl1	acyl-CoA synthetase long-chain family member 1
204	0.001724	0.0575	3.15	10790002	Gnl3	guanine nucleotide binding protein-like 3 (nucleolar)
205	0.001743	0.0575	3.66	10730884	Smndc1	survival motor neuron domain containing 1
206	0.001755	0.0575	3.25	10924223	Igfbp2	insulin-like growth factor binding protein 2
207	0.001762	0.0575	2.33	10914580	Sacm1l	SAC1 suppressor of actin mutations 1-like (yeast)
208	0.001769	0.0575	2.7	10707656		

209	0.00177	0.0575	3.27	10822043	Cdh6	cadherin 6
210	0.001803	0.0575	4.64	10826837	Cyp2u1	cytochrome P450, family 2, subfamily u, polypeptide 1
211	0.001807	0.0575	3.67	10750080	Bach1	BTB and CNC homology 1, basic leucine zipper transcription factor 1
212	0.001813	0.0575	3.67	10739204	Smndc1	survival motor neuron domain containing 1
213	0.001819	0.0575	3.16	10894999	Tmcc3	transmembrane and coiled-coil domain family 3
214	0.00182	0.0575	16.28	10830908	Rnf39	ring finger protein 39
215	0.00184	0.0575	0.28	10750426	Ttc3	tetratricopeptide repeat domain 3
216	0.001851	0.0575	7.19	10807464	Pla2g15	phospholipase A2, group XV
217	0.001853	0.0575	3.36	10824059		
218	0.001856	0.0575	3.22	10890156	Fbxo33	F-box protein 33
219	0.001858	0.0575	3.15	10902564	Mdm2	p53 E3 ubiquitin protein ligase
220	0.001871	0.0575	3.29	10803238		
221	0.001871	0.0575	3.74	10908133	Chordc1	cysteine and histidine-rich domain (CHORD)-containing 1
222	0.001879	0.0575	2.95	10847562	Tspan18	tetraspanin 18
223	0.001882	0.0575	2.55	10881167	Ddi2	DNA-damage inducible protein 2
224	0.001886	0.0575	2.35	10726679	Ifitm2	interferon induced transmembrane protein 2
225	0.001893	0.0575	3.2	10906323	Chkb	choline kinase beta
226	0.001908	0.0575	2.73	10916768	Vps11	vacuolar protein sorting 11 homolog (S. cerevisiae)
227	0.001911	0.0575	2.59	10823119		
228	0.001948	0.0577	3.57	10865855		
229	0.001948	0.0577	3.17	10878034		
230	0.001957	0.0577	2.9	10900753	Ptbp1	polypyrimidine tract binding protein 1
231	0.001964	0.0577	2.68	10831135	Ddx39b	DEAD (Asp-Glu-Ala-Asp) box polypeptide 39B
232	0.00197	0.0577	2.98	10874866	Noc2l	nucleolar complex associated 2 homolog (S. cerevisiae)
233	0.001971	0.0577	2.72	10743318	Shmt1	serine hydroxymethyltransferase 1 (soluble)
234	0.001983	0.0577	3.26	10792441	Slc20a2	solute carrier family 20 (phosphate transporter), member 2
235	0.001986	0.0577	10.66	10765212	F5	coagulation factor V (proaccelerin, labile factor)
236	0.002001	0.0577	3.88	10934794	Isg20l2	interferon stimulated exonuclease gene 20-like 2
237	0.002001	0.0577	3.06	10885396	Zbtb1	zinc finger and BTB domain containing 1
238	0.002016	0.0577	5.51	10789059	Agpat6	1-acylglycerol-3-phosphate O-acyltransferase 6
239	0.002033	0.0577	2.72	10706635	Nup62	nucleoporin 62
240	0.002039	0.0577	2.76	10889263	Trib2	tribbles homolog 2 (Drosophila)
241	0.002045	0.0577	2.55	10901367		
242	0.002056	0.0577	3.45	10908968	Cdon	cell adhesion associated, oncogene regulated
243	0.002057	0.0577	3.44	10874193	Errfi1	ERBB receptor feedback inhibitor 1
244	0.002059	0.0577	4.52	10885015		
245	0.002093	0.0582	2.53	10928220	Kctd18	potassium channel tetramerisation domain containing 18

246	0.002105	0.0582	2.78	10859108	Clec2g	C-type lectin domain family 2, member G
247	0.002111	0.0582	3.51	10871711	Trit1	tRNA isopentenyltransferase 1
248	0.002112	0.0582	6.12	10772330		
249	0.002164	0.0593	5.6	10914823	LOC654482	hypothetical protein LOC654482
250	0.002171	0.0593	16.09	10855701	Aqp1	aquaporin 1
251	0.002179	0.0593	3.72	10787517	Gdf15	growth differentiation factor 15
252	0.002198	0.0596	2.44	10713760	Mta2	metastasis associated 1 family, member 2
253	0.002209	0.0596	3.12	10918364		
254	0.002214	0.0596	4.56	10803851	Hspa9	heat shock protein 9
255	0.002239	0.0597	4.35	10903061	Shmt2	serine hydroxymethyltransferase 2 (mitochondrial)
256	0.002242	0.0597	8.74	10903459	Klf10	Kruppel-like factor 10
257	0.002243	0.0597	4.25	10834162	Tprn	taperin
258	0.002279	0.0604	4.4	10861793	Slc13a4	solute carrier family 13 (sodium/sulfate symporters), member 4
259	0.002303	0.0608	3.53	10912495	Dbr1	debranching enzyme homolog 1 (S. cerevisiae)
260	0.00233	0.0613	3.15	10906574		
261	0.00235	0.0613	0.16	10919074		
262	0.002364	0.0613	3.56	10920632	Pdcd6ip	programmed cell death 6 interacting protein
263	0.002364	0.0613	5.78	10762709	Coq5	coenzyme Q5 homolog, methyltransferase (S. cerevisiae)
264	0.002367	0.0613	5.92	10891364	Alkbh1	alkB, alkylation repair homolog 1 (E. coli)
265	0.002377	0.0613	3.15	10833005	Slc29a3	solute carrier family 29 (nucleoside transporters), member 3
266	0.002397	0.0615	5.39	10726669	Cox8b	cytochrome c oxidase, subunit VIIIb
267	0.002404	0.0615	3.63	10754939	Fam43a	family with sequence similarity 43, member A
268	0.00241	0.0615	2.73	10927230	Bag2	Bcl2-associated athanogene 2
269	0.002432	0.0615	3.32	10718001	Agpat4	1-acylglycerol-3-phosphate O-acyltransferase 4 (lysophosphatidic acid acyltransferase, delta)
270	0.00244	0.0615	3.88	10703465	Taf5l	TAF5-like RNA polymerase II, p300/CBP-associated factor (PCAF)-associated factor
271	0.002441	0.0615	3.61	10864662	Emc3	ER membrane protein complex subunit 3
272	0.002461	0.0615	2.67	10763740	Yod1	YOD1 OTU deubiquinating enzyme 1 homolog (S. cerevisiae)
273	0.002464	0.0615	3.24	10852671		
274	0.002468	0.0615	2.49	10926658	Rcan2	regulator of calcineurin 2
275	0.002483	0.0615	3.44	10825472	Atp1a1	ATPase, Na+/K+ transporting, alpha 1 polypeptide
276	0.002493	0.0615	3.61	10803947	Hbegf	heparin-binding EGF-like growth factor
277	0.002507	0.0615	3.29	10936537	Gtpbp4	GTP binding protein 4
278	0.002507	0.0615	2.89	10824655	Npr1	natriuretic peptide receptor A/guanylate cyclase A (atrionatriuretic peptide receptor A)
279	0.002511	0.0615	2.49	10899278	Slc4a8	solute carrier family 4, sodium bicarbonate cotransporter, member 8

280	0.002524	0.0616	3.53	10864874	Rassf4	Ras association (RalGDS/AF-6) domain family member 4
281	0.002533	0.0616	3.35	10798856	Cul2	cullin 2
282	0.002573	0.0623	4.02	10881630	Tardbp	TAR DNA binding protein
283	0.002583	0.0623	6.5	10931308	P4ha1	prolyl 4-hydroxylase, alpha polypeptide I
284	0.002617	0.0623	2.6	10889772		
285	0.002618	0.0623	11.49	10844223	Ptges	prostaglandin E synthase
286	0.002624	0.0623	4.29	10865347		
287	0.002625	0.0623	3.77	10769672	Rgs4	regulator of G-protein signaling 4
288	0.002637	0.0623	2.7	10807430	Pskh1	protein serine kinase H1
289	0.002644	0.0623	3.11	10938091		
290	0.002644	0.0623	4.07	10859342	Ptpro	protein tyrosine phosphatase, receptor type, O
291	0.00266	0.0625	2.45	10925810	Ppp4r1	protein phosphatase 4, regulatory subunit 1
292	0.002709	0.0632	2.67	10749789	LOC619574	hypothetical protein LOC619574
293	0.002715	0.0632	2.26	10905909		
294	0.002726	0.0632	2.8	10904169	Ndrg1	N-myc downstream regulated 1
295	0.00273	0.0632	4.31	10750282	Slc5a3	solute carrier family 5 (sodium/myo-inositol cotransporter), member 3
296	0.002743	0.0633	3.53	10881648	Pex14	peroxisomal biogenesis factor 14
297	0.002758	0.0633	5.82	10840396	Sec23b	Sec23 homolog B (S. cerevisiae)
298	0.00276	0.0633	2.52	10846821	Tmx2	thioredoxin-related transmembrane protein 2
299	0.002776	0.0635	5.3	10825100	Car14	carbonic anhydrase 14
300	0.002805	0.0635	0.23	10767380		
301	0.002832	0.0635	4.42	10801260		
302	0.002836	0.0635	2.28	10932162		
303	0.002837	0.0635	0.44	10857435		
304	0.00285	0.0635	2.38	10887821		
305	0.002862	0.0635	3.5	10727373		
306	0.002865	0.0635	7.06	10730472		
307	0.002866	0.0635	3.99	10719977	Mia	melanoma inhibitory activity
308	0.002872	0.0635	3.03	10889064	Seli	selenoprotein I
309	0.002878	0.0635	2.62	10890365		
310	0.002882	0.0635	3.06	10763547		
311	0.002892	0.0636	3.57	10727643		
312	0.002935	0.0636	0.4	10797584		
313	0.002936	0.0636	3.93	10884853	Prpf39	PRP39 pre-mRNA processing factor 39 homolog (S. cerevisiae)
314	0.002938	0.0636	2.77	10863698	Dusp11	dual specificity phosphatase 11 (RNA/RNP complex 1-interacting)
315	0.002942	0.0636	6.1	10713602		
316	0.002944	0.0636	2.65	10818173	Wdr77	WD repeat domain 77
317	0.00295	0.0636	5.95	10799187	Dip2c	DIP2 disco-interacting protein 2 homolog C (Drosophila)
318	0.003003	0.0644	3.86	10711357	Armc5	armadillo repeat containing 5
319	0.003004	0.0644	2.66	10921527		

320	0.003048	0.065	4.49	10754218	Fstl1	follistatin-like 1
321	0.003067	0.065	3.76	10739399		
322	0.00307	0.065	3.28	10785773	Spry2	sprouty homolog 2 (Drosophila)
323	0.003071	0.065	2.37	10711433	Sec23ip	SEC23 interacting protein
324	0.003084	0.065	3.02	10767631	Nfasc	neurofascin
325	0.00309	0.065	0.41	10871127	Mob3c	MOB kinase activator 3C
326	0.003099	0.065	7.01	10827691	RT1-M6-2	RT1 class I, locus M6, gene 2
327	0.003111	0.065	4.86	10924076	Rpe	ribulose-5-phosphate-3-epimerase
328	0.00316	0.0658	3.99	10935131	Rnf128	ring finger protein 128, E3 ubiquitin protein ligase
329	0.003184	0.0661	2.31	10884738		
330	0.0032	0.0663	9.84	10749983	Cxadr	coxsackie virus and adenovirus receptor
331	0.00322	0.0663	2.58	10791902	Slc7a2	solute carrier family 7 (cationic amino acid transporter, y+ system), member 2
332	0.003228	0.0663	4.34	10915885		
333	0.003229	0.0663	3.08	10909691	Bace1	beta-site APP cleaving enzyme 1
334	0.003259	0.0666	3.61	10859774		
335	0.003265	0.0666	2.84	10812390		
336	0.003305	0.0672	2.54	10875420	LOC502940	pro-histogranin
337	0.003311	0.0672	2.53	10795200	LOC502940	pro-histogranin
338	0.003332	0.0674	2.43	10850199	Tmx4	thioredoxin-related transmembrane protein 4
339	0.003386	0.0682	2.87	10720430	Psmd8	proteasome (prosome, macropain) 26S subunit, non-ATPase, 8
340	0.003391	0.0682	3.88	10728028		
341	0.003435	0.0686	0.36	10807881		
342	0.003435	0.0686	3.05	10805895	Gtl3	gene trap locus 3
343	0.003519	0.0699	16.42	10806122	Hmox1	heme oxygenase (decycling) 1
344	0.00352	0.0699	2.37	10869355	Rgs3	regulator of G-protein signaling 3
345	0.003531	0.0699	3.46	10742236	Thg1l	tRNA-histidine guanylyltransferase 1-like (S. cerevisiae)
346	0.003548	0.0701	2.17	10827916	Ddr1	discoidin domain receptor tyrosine kinase 1
347	0.003588	0.0707	3.66	10835757	Gsn	gelsolin
348	0.003636	0.0714	2.53	10747692	Dusp3	dual specificity phosphatase 3
349	0.003655	0.0716	3.59	10871479	Elovl1	ELOVL fatty acid elongase 1
350	0.003673	0.0717	2.16	10766161	Itpkb	inositol-trisphosphate 3-kinase B
351	0.003702	0.072	3.73	10714973	Hectd2	HECT domain containing 2
352	0.003717	0.072	6.39	10776667		
353	0.003718	0.072	4.86	10736873		
354	0.003732	0.0721	2.37	10829976	Psap	prosaposin
355	0.003774	0.0727	3.73	10797657	Omd	osteomodulin
356	0.003787	0.0727	2.55	10873303	Ddost	dolichyl-diphosphooligosaccharide-protein glycosyltransferase
357	0.003813	0.073	3.93	10889462		
358	0.003846	0.0734	4.18	10835692	Hspa5	heat shock protein 5
359	0.003856	0.0734	5.79	10757489	Vgf	VGF nerve growth factor inducible
360	0.003875	0.0735	5.19	10917831	Arid3b	AT rich interactive domain 3B (Bright like)

361	0.003884	0.0735	2.21	10871117	Atpaf1	ATP synthase mitochondrial F1 complex assembly factor 1
362	0.003901	0.0737	6.67	10925291	Cxcr7	chemokine (C-X-C motif) receptor 7
363	0.003936	0.0739	2.24	10798434		
364	0.003937	0.0739	2.39	10820795		
365	0.003955	0.0741	0.16	10729065		
366	0.004009	0.0743	2.43	10765503	RGD1562658	similar to RIKEN cDNA 1700009P17
367	0.004031	0.0743	3.25	10795927	Gtpbp4	GTP binding protein 4
368	0.00405	0.0743	3.18	10820666	Hmgcr	3-hydroxy-3-methylglutaryl-CoA reductase
369	0.004053	0.0743	3.35	10798831	Mtpap	mitochondrial poly(A) polymerase
370	0.004062	0.0743	2.5	10778620	Slc1a4	solute carrier family 1 (glutamate/neutral amino acid transporter), member 4
371	0.004063	0.0743	2.23	10793397	Hiatl1	hippocampus abundant transcript-like 1
372	0.004065	0.0743	2.66	10811185	Bcar1	breast cancer anti-estrogen resistance 1
373	0.004069	0.0743	3.41	10799133	Smarca5	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5
374	0.004076	0.0743	3.54	10786624	Nt5dc2	5'-nucleotidase domain containing 2
375	0.004076	0.0743	6.6	10740519	Pmm2	phosphomannomutase 2
376	0.004108	0.0745	4.99	10719616	PVR	poliovirus receptor
377	0.004112	0.0745	3.4	10914937		
378	0.004121	0.0745	2.67	10885524	Plekhh1	pleckstrin homology domain containing, family H (with MyTH4 domain) member 1
379	0.004152	0.0749	4.03	10869106	Slc44a1	solute carrier family 44, member 1
380	0.004184	0.0751	2.61	10863777	Antxr1	anthrax toxin receptor 1
381	0.004188	0.0751	3.39	10763587	Slc35f5	solute carrier family 35, member F5
382	0.004201	0.0752	0.29	10714632		
383	0.004241	0.0754	2.35	10821115		
384	0.004246	0.0754	3.01	10742968	Plod1	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 1
385	0.00427	0.0754	3.94	10812589	F2rl2	coagulation factor II (thrombin) receptor-like 2
386	0.004272	0.0754	3.68	10859264	Ddx47	DEAD (Asp-Glu-Ala-Asp) box polypeptide 47
387	0.004278	0.0754	2.29	10872003	Stk40	serine/threonine kinase 40
388	0.004295	0.0754	2.63	10724042	P2ry2	purinergic receptor P2Y, G-protein coupled, 2
389	0.004298	0.0754	5.08	10739353	Kcnj2	potassium inwardly-rectifying channel, subfamily J, member 2
390	0.004306	0.0754	2.82	10854108	Calu	calumenin
391	0.004328	0.0754	3.19	10759409	Pgam5	phosphoglycerate mutase family member 5
392	0.004335	0.0754	2.73	10798878		
393	0.004355	0.0754	2.72	10756692	Aimp2	aminoacyl tRNA synthetase complex-interacting multifunctional protein 2
394	0.004362	0.0754	2.14	10832299	Pttg1ip	pituitary tumor-transforming 1 interacting protein
395	0.004369	0.0754	2.89	10887981	Srsf7	serine/arginine-rich splicing factor 7
396	0.004371	0.0754	2.29	10726979	Ctsd	cathepsin D

397	0.004378	0.0754	2.43	10803577	Syt4	synaptotagmin IV
398	0.004396	0.0755	2.63	10767985		
399	0.004441	0.0761	3.86	10762600	Gcn1l1	GCN1 general control of amino-acid synthesis 1-like 1 (yeast)
400	0.004512	0.0768	3.98	10937302	Htr2c	5-hydroxytryptamine (serotonin) receptor 2C, G protein-coupled
401	0.004514	0.0768	2.42	10714667	Jak2	Janus kinase 2
402	0.004547	0.0768	2.96	10907793	Mettl7a	methyltransferase like 7A
403	0.00455	0.0768	3.74	10811875	Taf5l	TAF5-like RNA polymerase II, p300/CBP-associated factor (PCAF)-associated factor
404	0.004564	0.0768	2.59	10714103	Mpeg1	macrophage expressed 1
405	0.004566	0.0768	2.71	10714788	Cstf2t	cleavage stimulation factor, 3' pre-RNA, subunit 2, 64kDa, tau variant
406	0.004573	0.0768	3	10852106		
407	0.004582	0.0768	2.9	10827531	Srsf11	serine/arginine-rich splicing factor 11
408	0.004587	0.0768	4.41	10808103	Terf2ip	telomeric repeat binding factor 2, interacting protein
409	0.00461	0.077	3.28	10919433		
410	0.00465	0.0775	2.36	10764678		
411	0.004677	0.0778	3.21	10862131	Clec5a	C-type lectin domain family 5, member A
412	0.00469	0.0778	2.68	10919637	Tf	transferrin
413	0.004721	0.0781	2.81	10901536		
414	0.004735	0.0782	2.63	10822184		
415	0.004765	0.0782	2.35	10835355	Ass1	argininosuccinate synthase 1
416	0.004782	0.0782	2.9	10716667	Ust	uronyl-2-sulfotransferase
417	0.004786	0.0782	3.85	10781197	Stmn4	stathmin-like 4
418	0.004801	0.0782	4.06	10765335	Creg1	cellular repressor of E1A-stimulated genes 1
419	0.004808	0.0782	3.07	10791631	Enpp6	ectonucleotide pyrophosphatase/phosphodiesterase 6
420	0.004815	0.0782	2.19	10817898	Tspan2	tetraspanin 2
421	0.004837	0.0782	3.06	10830270		
422	0.004859	0.0782	3.08	10727321	Gal	galanin/GMAP prepropeptide
423	0.00486	0.0782	3.36	10885006	Tmx1	thioredoxin-related transmembrane protein 1
424	0.004866	0.0782	0.24	10756530		
425	0.004871	0.0782	2.6	10724529	Tpp1	tripeptidyl peptidase I
426	0.004874	0.0782	2.35	10794257		
427	0.004897	0.0784	2.07	10702768		
428	0.00491	0.0784	2.22	10829191	Pdxk	pyridoxal (pyridoxine, vitamin B6) kinase
429	0.00496	0.079	2.16	10754337	Iqcb1	IQ motif containing B1
430	0.004978	0.0791	2.68	10718486		
431	0.005016	0.0795	3.68	10719956	Nemf	nuclear export mediator factor
432	0.005033	0.0796	2.52	10867163	Rbpj	recombination signal binding protein for immunoglobulin kappa J region
433	0.005062	0.0797	9.27	10720215	Zfp36	zinc finger protein 36
434	0.005064	0.0797	2.23	10897760	Atf4	activating transcription factor 4 (tax-responsive enhancer element B67)

435	0.005094	0.0799	2.68	10761329	Tmem248	transmembrane protein 248
436	0.005094	0.0799	0.25	10742192		
437	0.005115	0.08	2.76	10787212	Myo9b	myosin IXb
438	0.005128	0.08	4.99	10749495	Lgals3bp	lectin, galactoside-binding, soluble, 3 binding protein
439	0.005184	0.0807	4.26	10831802		
440	0.005192	0.0807	2.27	10890402	Nin	ninein (GSK3B interacting protein)
441	0.005224	0.0807	3.84	10804127	Fgf1	fibroblast growth factor 1 (acidic)
442	0.005237	0.0807	2.78	10797681	Ippk	inositol 1,3,4,5,6-pentakisphosphate 2-kinase
443	0.005241	0.0807	3.34	10833013	Unc5b	unc-5 homolog B (C. elegans)
444	0.005252	0.0807	2.49	10765683	Copa	coatomer protein complex subunit alpha
445	0.005256	0.0807	2.4	10863197	Usp39	ubiquitin specific peptidase 39
446	0.005293	0.0811	2.77	10886816	RGD1566401	similar to GTL2, imprinted maternally expressed untranslated
447	0.005313	0.0812	2.53	10738576	Grn	granulin
448	0.005328	0.0813	2.69	10812656		
449	0.005347	0.0813	2.43	10844747	Rbm18	RNA binding motif protein 18
450	0.005353	0.0813	2.4	10758940	Prkab1	protein kinase, AMP-activated, beta 1 non-catalytic subunit
451	0.005385	0.0814	2.32	10832905	Sirt1	sirtuin 1
452	0.005398	0.0814	2.39	10724494	Trim3	tripartite motif-containing 3
453	0.005403	0.0814	5.26	10929536	Slc16a14	solute carrier family 16, member 14 (monocarboxylic acid transporter 14)
454	0.005415	0.0814	0.17	10817191		
455	0.005422	0.0814	2.38	10721191	Pop4	processing of precursor 4, ribonuclease P/MRP subunit (S. cerevisiae)
456	0.005453	0.0817	0.32	10803824	Cdc25c	cell division cycle 25C
457	0.005485	0.0818	2.2	10891293	Tmed10	transmembrane emp24-like trafficking protein 10 (yeast)
458	0.005488	0.0818	2.09	10799241	Idi1	isopentenyl-diphosphate delta isomerase 1
459	0.005492	0.0818	3.55	10928275	Fam126b	family with sequence similarity 126, member B
460	0.005518	0.0819	3.28	10833152	Csrp2	cysteine and glycine-rich protein 2
461	0.005521	0.0819	0.21	10778675		
462	0.005664	0.0834	3.58	10885029	Frmd6	FERM domain containing 6
463	0.005669	0.0834	2.6	10813048	Ppap2a	phosphatidic acid phosphatase type 2A
464	0.005677	0.0834	4.01	10877538		
465	0.005678	0.0834	2.62	10749663	P4hb	prolyl 4-hydroxylase, beta polypeptide
466	0.00571	0.0834	2.42	10796701	Gpr158	G protein-coupled receptor 158
467	0.005712	0.0834	2.3	10908427	Dnm2	dynamin 2
468	0.005712	0.0834	4.04	10797949	Bmp6	bone morphogenetic protein 6
469	0.005733	0.0835	7.74	10839579	Dusp2	dual specificity phosphatase 2
470	0.005768	0.0839	5.12	10705364	Sertad1	SERTA domain containing 1
471	0.00581	0.0842	2.57	10887695		
472	0.005815	0.0842	3.51	10923338	Coq10b	coenzyme Q10 homolog B (S. cerevisiae)
473	0.005839	0.0844	2.67	10745062	Eral1	Era (G-protein)-like 1 (E. coli)

474	0.005874	0.0847	3.76	10742575	Hspa4	heat shock protein 4
475	0.005911	0.0849	2.43	10752650	MGC95208	similar to 4930453N24Rik protein
476	0.005913	0.0849	3.84	10784181	Zdhhc20	zinc finger, DHHC-type containing 20
477	0.005978	0.0857	3	10938048	Taf5l	TAF5-like RNA polymerase II, p300/CBP-associated factor (PCAF)-associated factor
478	0.006015	0.0857	3.41	10707121	Gtf2h1	general transcription factor IIH, polypeptide 1
479	0.006042	0.0857	2.83	10839511	Snrnp200	small nuclear ribonucleoprotein 200 (U5)
480	0.006045	0.0857	2.11	10894525	Cry1	cryptochrome 1 (photolyase-like)
481	0.006048	0.0857	2.68	10858487	M6pr	mannose-6-phosphate receptor, cation dependent
482	0.006067	0.0857	2.91	10705485	Fbl	fibrillarin
483	0.006092	0.0857	3.13	10914923	Cep57	centrosomal protein 57
484	0.006105	0.0857	0.45	10830267		
485	0.006146	0.0857	3.04	10939498	Rbm41	RNA binding motif protein 41
486	0.006166	0.0857	3.51	10884200	Efcab10	EF-hand calcium binding domain 10
487	0.006167	0.0857	5.59	10708521	Ctsc	cathepsin C
488	0.006176	0.0857	0.39	10711219	Stx4	syntaxin 4
489	0.006181	0.0857	2.09	10922415	Imp4	IMP4, U3 small nucleolar ribonucleoprotein, homolog (yeast)
490	0.006187	0.0857	2.76	10846340	Fkbp7	FK506 binding protein 7
491	0.00619	0.0857	3.33	10932584	Clcn5	chloride channel, voltage-sensitive 5
492	0.0062	0.0857	4.92	10799291	Klf6	Kruppel-like factor 6
493	0.006202	0.0857	2.17	10884211	Tomm70a	translocase of outer mitochondrial membrane 70 homolog A (S. cerevisiae)
494	0.006212	0.0857	2.91	10843909	Rexo4	REX4, RNA exonuclease 4 homolog (S. cerevisiae)
495	0.006215	0.0857	2.26	10826300	Trmt13	tRNA methyltransferase 13 homolog (S. cerevisiae)
496	0.00623	0.0857	3.4	10871444	Slc6a9	solute carrier family 6 (neurotransmitter transporter, glycine), member 9
497	0.006234	0.0857	2.81	10896836	Efr3a	EFR3 homolog A (S. cerevisiae)
498	0.00627	0.086	2.15	10793175	Usp19	ubiquitin specific peptidase 19
499	0.006276	0.086	0.42	10869614		
500	0.006347	0.0867	2.53	10773610		
501	0.006361	0.0867	2.55	10764773	Rgs16	regulator of G-protein signaling 16
502	0.006367	0.0867	3.11	10776968	Tra2b	transformer 2 beta homolog (Drosophila)
503	0.006392	0.0867	2.33	10734148		
504	0.006409	0.0867	8.42	10820748	Utp15	UTP15, U3 small nucleolar ribonucleoprotein, homolog (S. cerevisiae)
505	0.00641	0.0867	2.16	10936827	Atp6ap2	ATPase, H+ transporting, lysosomal accessory protein 2
506	0.006416	0.0867	2.34	10708541	Prss23	protease, serine, 23
507	0.006434	0.0867	2.14	10933015	MGC95208	similar to 4930453N24Rik protein
508	0.006457	0.0867	3.19	10786743	Ncoa4	nuclear receptor coactivator 4
509	0.006466	0.0867	3.62	10895144	Dusp6	dual specificity phosphatase 6

510	0.00647	0.0867	4.68	10895581	LOC362855	P55
511	0.006484	0.0867	2.05	10742388	Sqstm1	sequestosome 1
512	0.006567	0.0875	5.67	10717865		
513	0.006569	0.0875	2.27	10713915		
514	0.006577	0.0875	2.97	10714576	Vldlr	very low density lipoprotein receptor
515	0.006637	0.0881	4.86	10762115	Naa25	N(alpha)-acetyltransferase 25, NatB auxiliary subunit
516	0.006679	0.0883	4.25	10813361	Dab2	disabled 2, mitogen-responsive phosphoprotein
517	0.00669	0.0883	2.82	10936993	Pim2	pim-2 oncogene
518	0.006692	0.0883	2.85	10917301	Snf1lk2	SNF1-like kinase 2
519	0.006734	0.0885	2.64	10918326	Snx1	sorting nexin 1
520	0.006737	0.0885	2.74	10889027	Slc35f6	solute carrier family 35, member F6
521	0.006749	0.0885	2.24	10798499	Hist1h4b	histone cluster 1, H4b
522	0.006793	0.089	2.24	10813472	Nup155	nucleoporin 155
523	0.006855	0.0894	2.4	10939310	Gla	galactosidase, alpha
524	0.006865	0.0894	2.22	10888608	Lbh	limb bud and heart
525	0.006963	0.0894	2.56	10879502	Cap1	CAP, adenylate cyclase-associated protein 1 (yeast)
526	0.006982	0.0894	3.13	10800783		
527	0.006986	0.0894	3.29	10719006	Leng8	leukocyte receptor cluster (LRC) member 8
528	0.00703	0.0894	3.72	10765166	Mettl18	methyltransferase like 18
529	0.007047	0.0894	2.63	10832927		
530	0.007052	0.0894	2.89	10792035	Dusp4	dual specificity phosphatase 4
531	0.007063	0.0894	2.25	10702485	Pdcd6	programmed cell death 6
532	0.007063	0.0894	2.42	10850979	Ahcy	adenosylhomocysteinase
533	0.007069	0.0894	2.58	10781344	Bin3	bridging integrator 3
534	0.007071	0.0894	2.88	10721925	Grwd1	glutamate-rich WD repeat containing 1
535	0.007094	0.0894	2.9	10773800	Rnf215	ring finger protein 215
536	0.007128	0.0894	2.41	10805100	LOC361346	similar to chromosome 18 open reading frame 54
537	0.00713	0.0894	2.35	10877573	Dbc1	deleted in bladder cancer 1
538	0.007145	0.0894	2.53	10847693	Api5	apoptosis inhibitor 5
539	0.007152	0.0894	2.35	10894512	Prdm4	PR domain containing 4
540	0.00716	0.0894	0.49	10899053		
541	0.00716	0.0894	4.27	10792344		
542	0.007163	0.0894	2.26	10723866	Dgat2	diacylglycerol O-acyltransferase 2
543	0.007163	0.0894	2.52	10711657		
544	0.00718	0.0894	2.28	10911576	Fam214a	family with sequence similarity 214, member A
545	0.00719	0.0894	2.42	10754592		
546	0.007196	0.0894	0.19	10742927	Olr1418	olfactory receptor 1418
547	0.007199	0.0894	3.31	10896065		
548	0.007209	0.0894	3.21	10935962	Plxnb3	plexin B3
549	0.007209	0.0894	2.26	10866819	Bcat1	branched chain amino acid transaminase 1, cytosolic
550	0.007212	0.0894	2.51	10808929	Lrrc57	leucine rich repeat containing 57

551	0.00722	0.0894	2.32	10787817		
552	0.007243	0.0894	4.55	10894498	LOC362855	P55
553	0.007273	0.0894	3.35	10727806		
554	0.007282	0.0894	2.25	10744134	Eif4a1	eukaryotic translation initiation factor 4A1
555	0.00729	0.0894	2.83	10903845	Derl1	derlin 1
556	0.00731	0.0894	3.95	10852144	Pmepa1	prostate transmembrane protein, androgen induced 1
557	0.007311	0.0894	3.86	10873903		
558	0.007319	0.0894	2.55	10833215	Ddx50	DEAD (Asp-Glu-Ala-Asp) box polypeptide 50
559	0.00736	0.0894	3.36	10806687	Ccdc130	coiled-coil domain containing 130
560	0.00736	0.0894	3.35	10702996	Igf2r	insulin-like growth factor 2 receptor
561	0.007361	0.0894	3.13	10745558	Rffl	ring finger and FYVE-like domain containing E3 ubiquitin protein ligase
562	0.007368	0.0894	3	10928254	Orc2	origin recognition complex, subunit 2
563	0.007381	0.0895	2.37	10796432	Rpp38	ribonuclease P/MRP 38 subunit
564	0.007409	0.0895	2.42	10891850		
565	0.007415	0.0895	3.97	10859857		
566	0.007445	0.0897	2.02	10915567	Yipf2	Yip1 domain family, member 2
567	0.007461	0.0897	2.21	10795297	Hist1h4b	histone cluster 1, H4b
568	0.007463	0.0897	4.3	10802013	Cd74	Cd74 molecule, major histocompatibility complex, class II invariant chain
569	0.007482	0.0897	2.53	10869014	Rnf20	ring finger protein 20, E3 ubiquitin protein ligase
570	0.007511	0.0899	2.38	10854494	Nup205	nucleoporin 205
571	0.00755	0.0902	2.28	10938837		
572	0.007623	0.0909	4.05	10802734	Smad7	SMAD family member 7
573	0.007648	0.0911	2.52	10758724		
574	0.007665	0.0911	0.32	10703568		
575	0.007697	0.0913	2.09	10862666		
576	0.007715	0.0914	3.46	10812722	Mrps27	mitochondrial ribosomal protein S27
577	0.007753	0.0917	3.9	10726244	RGD1305014	similar to RIKEN cDNA 2310057M21
578	0.007771	0.0917	0.47	10783796	Nrl	neural retina leucine zipper
579	0.00779	0.0918	3.08	10730148	Opalin	oligodendrocytic myelin paranodal and inner loop protein
580	0.007839	0.0919	2.74	10733100	Olr1401	olfactory receptor 1401
581	0.007845	0.0919	2.66	10713160	Syvn1	synovial apoptosis inhibitor 1, synoviolin
582	0.007849	0.0919	2.32	10807722	Txnl4b	thioredoxin-like 4B
583	0.007864	0.0919	2.91	10864621	Jagn1	jagunal homolog 1 (Drosophila)
584	0.007877	0.0919	2.24	10798490	Hist1h4b	histone cluster 1, H4b
585	0.007882	0.0919	4.14	10831816	Bak1	BCL2-antagonist/killer 1
586	0.007939	0.0919	3.35	10830962		
587	0.007939	0.0919	3.35	10875983		
588	0.007968	0.0919	3.51	10717069	Pde7b	phosphodiesterase 7B
589	0.007976	0.0919	2.85	10702320	Clvs2	clavesin 2
590	0.007982	0.0919	3.01	10780908		

591	0.007991	0.0919	2.29	10931919	Lamp2	lysosomal-associated membrane protein 2
592	0.007996	0.0919	5.99	10824322	Lmna	lamin A/C
593	0.007996	0.0919	3.39	10714377		
594	0.008004	0.0919	2.14	10816965	Crtc2	CREB regulated transcription coactivator 2
595	0.008018	0.092	4.67	10750055	Usp16	ubiquitin specific peptidase 16
596	0.008064	0.0923	5	10835498	Ppapdc3	phosphatidic acid phosphatase type 2 domain containing 3
597	0.008116	0.0927	2.85	10776835		
598	0.008156	0.0927	2.17	10775271	Lrrc8c	leucine rich repeat containing 8 family, member C
599	0.008176	0.0927	3.71	10728800	Tmem132a	transmembrane protein 132A
600	0.008181	0.0927	2.13	10854446	Cald1	caldesmon 1
601	0.008212	0.0929	4.76	10913866		
602	0.008273	0.0931	2.7	10885045	Psma3	proteasome (prosome, macropain) subunit, alpha type 3
603	0.008276	0.0931	3	10717941	Tcp1	t-complex 1
604	0.008276	0.0931	2.95	10726477	Nkx6-2	NK6 homeobox 2
605	0.008289	0.0931	3.01	10791522	Hpgd	hydroxyprostaglandin dehydrogenase 15 (NAD)
606	0.008295	0.0931	2.11	10846762	Calcrl	calcitonin receptor-like
607	0.008332	0.0932	4.15	10834241	Abca2	ATP-binding cassette, subfamily A (ABC1), member 2
608	0.008333	0.0932	2.68	10751868	Mb21d2	Mab-21 domain containing 2
609	0.008351	0.0932	5.42	10837279	Itgav	integrin, alpha V
610	0.008362	0.0932	2.83	10751769		
611	0.008373	0.0932	2.44	10745509	Myo1d	myosin ID
612	0.008387	0.0932	3.21	10756229	Insr	insulin receptor
613	0.00848	0.0939	3.64	10750489	B3galt5	UDP-Gal:betaGlcNAc beta 1,3-galactosyltransferase, polypeptide 5
614	0.008488	0.0939	3.21	10740959	Kctd5	potassium channel tetramerisation domain containing 5
615	0.008489	0.0939	5.1	10877855		
616	0.008554	0.0941	4.08	10796507	Slc39a12	solute carrier family 39 (zinc transporter), member 12
617	0.008581	0.0941	2.59	10880731	C1qc	complement component 1, q subcomponent, C chain
618	0.008585	0.0941	2.14	10783241	Hnrnpc	heterogeneous nuclear ribonucleoprotein C (C1/C2)
619	0.008585	0.0941	2.05	10937523		
620	0.00859	0.0941	2.36	10713706	Ganab	glucosidase, alpha; neutral AB
621	0.008593	0.0941	5.82	10911476		
622	0.008624	0.0942	3.16	10758344	Vps37b	vacuolar protein sorting 37 homolog B (S. cerevisiae)
623	0.008638	0.0942	2.63	10936346		
624	0.008654	0.0942	3.56	10840226	Lamp5	lysosomal-associated membrane protein family, member 5
625	0.008677	0.0943	2.84	10912080	Mrap2	melanocortin 2 receptor accessory protein 2
626	0.008724	0.0946	2.27	10814521	Nceh1	neutral cholesterol ester hydrolase 1
627	0.00875	0.0947	0.4	10739864		

628	0.008753	0.0947	8.27	10833031	Sgpl1	sphingosine-1-phosphate lyase 1
629	0.008825	0.0949	2.75	10939570	Zdhhc9	zinc finger, DHHC-type containing 9
630	0.008842	0.0949	3.02	10923560	Bzw1	basic leucine zipper and W2 domains 1
631	0.008863	0.0949	3.33	10745456	Blmh	bleomycin hydrolase
632	0.008888	0.0949	2.63	10731009		
633	0.008907	0.0949	2.58	10840384	Polr3f	polymerase (RNA) III (DNA directed) polypeptide F
634	0.008916	0.0949	2.45	10881291		
635	0.008918	0.0949	3.86	10775113	Mtf2	metal response element binding transcription factor 2
636	0.008918	0.0949	2.35	10747482	Hcrt	hypocretin
637	0.008935	0.095	2.37	10747368	Klhl11	kelch-like family member 11
638	0.00897	0.095	2.45	10784938	RGD1309922	similar to 2610301G19Rik protein
639	0.008975	0.095	2.27	10824072		
640	0.008979	0.095	3.19	10834704	Wdr5	WD repeat domain 5
641	0.008994	0.095	2.53	10866926	Asun	asunder, spermatogenesis regulator
642	0.009027	0.0952	3.73	10935843		
643	0.00909	0.0957	2.71	10806937	Smarca5	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5
644	0.009188	0.0965	2.21	10822436	Armc1	armadillo repeat containing 1
645	0.009189	0.0965	2.61	10842469	Cebpb	CCAAT/enhancer binding protein (C/EBP), beta
646	0.009215	0.0965	4.17	10857314	Slc6a6	solute carrier family 6 (neurotransmitter transporter, taurine), member 6
647	0.009216	0.0965	0.43	10892638		
648	0.009247	0.0966	3.12	10817383	Cers2	ceramide synthase 2
649	0.009294	0.0968	2.31	10740701	Vasn	vasorin
650	0.009326	0.0968	2.45	10900537	Dazap1	DAZ associated protein 1
651	0.00933	0.0968	3.29	10725340	Dcun1d3	DCN1, defective in cullin neddylation 1, domain containing 3 (S. cerevisiae)
652	0.009338	0.0968	3.48	10712340	Cd151	CD151 molecule (Raph blood group)
653	0.009338	0.0968	2.13	10712687	RGD1311946	similar to RIKEN cDNA 1810055G02
654	0.009362	0.0968	7.48	10842500	Dok5	docking protein 5
655	0.009364	0.0968	3.34	10908072	Gpr83	G protein-coupled receptor 83
656	0.009407	0.0968	3.18	10738209	Cnp	2',3'-cyclic nucleotide 3' phosphodiesterase
657	0.009408	0.0968	2.16	10856050		
658	0.009408	0.0968	2.58	10864722	Tamm41	TAM41, mitochondrial translocator assembly and maintenance protein, homolog (S. cerevisiae)
659	0.009443	0.0971	2.49	10891548		
660	0.009466	0.0971	3.41	10868304	Spink4	serine peptidase inhibitor, Kazal type 4
661	0.009496	0.0972	0.47	10782599	RGD1306063	similar to HT021
662	0.009503	0.0972	2.29	10804856	Txnl1	thioredoxin-like 1
663	0.009541	0.0973	3.2	10728361	Stip1	stress-induced phosphoprotein 1
664	0.009541	0.0973	5.09	10729970	Rbp4	retinol binding protein 4, plasma
665	0.009573	0.0975	2.35	10832287	Ube2g2	ubiquitin-conjugating enzyme E2G 2

666	0.009585	0.0975	3.66	10823462	Slc33a1	solute carrier family 33 (acetyl-CoA transporter), member 1
667	0.009608	0.0975	2.43	10708929	Gdpd5	glycerophosphodiester phosphodiesterase domain containing 5
668	0.009622	0.0975	2.66	10857667	Thumpd3	THUMP domain containing 3
669	0.009644	0.0975	2.19	10800696	Lims2	LIM and senescent cell antigen like domains 2
670	0.009656	0.0975	2.99	10711987		
671	0.009666	0.0975	5.13	10858152		
672	0.009674	0.0975	0.41	10793052		
673	0.009697	0.0975	9.02	10785019	Slc39a14	solute carrier family 39 (zinc transporter), member 14
674	0.009713	0.0975	2.06	10883609	Smc6	structural maintenance of chromosomes 6
675	0.009713	0.0975	2.16	10875974	Lingo2	leucine rich repeat and Ig domain containing 2
676	0.009746	0.0976	2.11	10742876	Gemin5	gem (nuclear organelle) associated protein 5
677	0.009752	0.0976	4.32	10727228	Fadd	Fas (TNFRSF6)-associated via death domain
678	0.009807	0.0979	2.74	10851497	Fitm2	fat storage-inducing transmembrane protein 2
679	0.009811	0.0979	2.64	10706437	Klk6	kallikrein related-peptidase 6
680	0.009847	0.0981	0.43	10887336		
681	0.00993	0.0988	3.51	10882221	Tmem88b	transmembrane protein 88B
682	0.009956	0.0989	3.74	10874802	Ube2j2	ubiquitin-conjugating enzyme E2, J2
683	0.009967	0.0989	3.19	10803602	Lims2	LIM and senescent cell antigen like domains 2

APPENDIX 7: LISTS OF ARE-CONTAINING MRNAS FROM ARED SEARCH

Note: repetitions of genes in below tables are due to multiple ARE sequences in the gene. Repetitions were not counted for counts of ARE-mRNAs in the text, and non-redundant lists were used for counting.

ARE-mRNAs from CA1 mRNAs isolated by sucrose PAD method			
PolyA Signal	**Gene**	**ARE**	**Location**
TRUE	STAT3	AAAAATTTATATT	2313-2325
TRUE	Stat3	AAAAATTTATATT	1795-1807
TRUE	Stat3	AAAAATTTATATT	1816-1828
TRUE	PTBP1	AAATATTTATAAT	1190-1202
TRUE	KITLG	AAATTTATTTATA	3909-3921
FALSE	Aadat	AATTATTTACAAA	300-312
TRUE	Plk3	ACATTTATTTATT	265-277
TRUE	Plk3	ACATTTATTTATT	266-278
TRUE	Rgs2	ATAAATTTATTTT	659-671
TRUE	Rgs2	ATAAATTTATTTT	654-666
TRUE	MTHFD2	ATTAATTTATATA	477-489
TRUE	MRPS6	ATTCATTTATTTT	8069-8081
FALSE	PTGS2	ATTTAATTATTTA	47-59
FALSE	Ptgs2	ATTTAATTATTTA	42-54
FALSE	Hspa1a	ATTTATTTACTTA	967-979
TRUE	HSPA1A	ATTTGTTTATTTA	339-351
TRUE	Cdon	CATTATTTATTTT	99-111
TRUE	Glce	GATTATTTATATT	349-361
FALSE	Cxadr	GTATTTATTTAAA	2336-2348
TRUE	KCTD4	TAATATTTAAAAT	388-400
TRUE	PPP1R15A	TATAATTTATTAA	17-29
TRUE	GLCE	TATTATTTAGAAT	1787-1799
TRUE	SERPINB2	TGTTATTTATTAT	275-287
TRUE	Serpinb2	TGTTATTTATTAT	244-256
TRUE	DUSP2	TTATATTTATACA	595-607
TRUE	Dusp2	TTATATTTATATA	517-529
TRUE	Dusp2	TTATATTTATATA	549-561
TRUE	SOX11	TTTTATTTAAAAA	4497-4509
TRUE	CDON	TTTTATTTATAAA	2295-2307
TRUE	PLA2G4A	TTTTATTTATATA	415-427
TRUE	Mmp9	TTTTATTTATTAT	396-408
TRUE	Mmp9	TTTTATTTATTAT	376-388
ARE-mRNAs from CA3 mRNAs isolated by sucrose PAD method			
PolyA Signal	**Gene**	**ARE**	**Location**
FALSE	Aadat	AATTATTTACAAA	300-312
TRUE	Plk3	ACATTTATTTATT	265-277
TRUE	Plk3	ACATTTATTTATT	266-278

TRUE	Pvr	ATATATTTATAAA	565-577
FALSE	PVR	ATATATTTATAAA	574-586
FALSE	Hspa1a	ATTTATTTACTTA	967-979
TRUE	HSPA1A	ATTTGTTTATTTA	339-351
TRUE	PTER	TTACATTTATAAT	752-764
TRUE	DUSP2	TTATATTTATACA	595-607
TRUE	Dusp2	TTATATTTATATA	517-529
TRUE	Dusp2	TTATATTTATATA	549-561
FALSE	Il31ra	TTATATTTATTTT	540-552
TRUE	SOX11	TTTTATTTAAAAA	4497-4509
ARE-mRNAs from CA1 mRNAs isolated by sucrose GRADIENT method			
PolyA Signal	**Gene**	**ARE**	**Location**
TRUE	VLDLR	AAAAATTTATAAA	484-496
TRUE	Slc33a1	AAAGATTTATAAA	588-600
FALSE	Pnpt1	AAATATTTATTAA	184-196
FALSE	PNPT1	AAATATTTATTAT	209-221
FALSE	LOC641190	AAATATTTATTAT	176-188
TRUE	DDX47	AAATATTTATTTC	3172-3184
TRUE	KITLG	AAATTTATTTATA	3909-3921
TRUE	BC043118	AAGTATTTATATT	504-516
TRUE	HECA	AATTATTTATTTT	2815-2827
TRUE	CDH6	ACATATTTATATA	1119-1131
TRUE	Lep	ACTTATTTATTTA	439-451
TRUE	WSB1	AGATTTATTTAAT	98-110
TRUE	Rgs2	ATAAATTTATTTT	659-671
TRUE	Rgs2	ATAAATTTATTTT	654-666
FALSE	Cdkl1	ATACATTTATTTA	353-365
FALSE	ZFP36	ATATATTTAGTAA	628-640
FALSE	PVR	ATATATTTATAAA	574-586
FALSE	Ldlr	ATATATTTATTGT	188-200
FALSE	FGF9	ATATATTTATTTA	634-646
TRUE	Calcrl	ATATTTATTTAAA	1192-1204
TRUE	Gcnt2	ATATTTATTTAAT	1918-1930
TRUE	GCNT2	ATATTTATTTATT	1663-1675
TRUE	Vps54	ATCTATTTATTAA	740-752
TRUE	Ldlr	ATCTATTTATTTT	1514-1526
TRUE	ATP11A	ATTCATTTATTTA	2605-2617
FALSE	AZIN1	ATTTATTTAATTA	702-714
TRUE	Azin1	ATTTATTTAGATA	186-198
TRUE	ZBTB39	ATTTATTTATTTT	1495-1507
TRUE	RNF103	ATTTTTTTATTTA	194-206
TRUE	WHSC1L1	CTTTATTTATTTT	3551-3563
TRUE	CNTN3	GAATTTATTTAAT	752-764

FALSE	Cxadr	GTATTTATTTAAA	2336-2348
TRUE	NLN	TAATATTTAAAAT	1864-1876
FALSE	LDLR	TAATATTTATTAA	676-688
TRUE	Zfp36	TAGTATTTATATA	622-634
TRUE	Nln	TATTATTTAGATA	645-657
FALSE	INTS2	TTAAATTTATTTT	782-794
TRUE	PHTF2	TTACATTTATTTT	172-184
TRUE	F2RL2	TTATATTTAAATT	1437-1449
TRUE	Slc25a32	TTATATTTACAAA	1174-1186
TRUE	PNO1	TTATATTTATAAA	335-347
TRUE	DUSP2	TTATATTTATACA	595-607
TRUE	MMP16	TTATATTTATACT	2375-2387
FALSE	Mmp16	TTATATTTATACT	2361-2373
TRUE	Dusp2	TTATATTTATATA	517-529
TRUE	RNF138	TTGTATTTATATA	522-534
TRUE	NPL	TTTAATTTATAAA	1802-1814
TRUE	SOX11	TTTTATTTAAAAA	4497-4509
ARE-mRNAs from CA3 mRNAs isolated by sucrose GRADIENT method			
PolyA Signal	**Gene**	**ARE**	**Location**
TRUE	Slc33a1	AAAGATTTATAAA	588-600
TRUE	Hpgd	AAATATTTAGTAA	417-429
TRUE	PTBP1	AAATATTTATAAT	1190-1202
FALSE	WDR77	AAATATTTATTCT	1098-1110
TRUE	YOD1	AAATATTTATTGA	2128-2140
TRUE	DDX47	AAATATTTATTTC	3172-3184
FALSE	Trim3	AAATATTTATTTT	567-579
TRUE	SLC7A2	AAATTTATTTAAA	3876-3888
FALSE	CDC42EP3	AAATTTATTTAAC	393-405
TRUE	MTUS1	AAATTTATTTACA	346-358
TRUE	Unc5b	AATGATTTATTAT	548-560
TRUE	Cry1	AATTATTTAAAAA	66-78
TRUE	Cry1	AATTATTTAAAAA	66-78
FALSE	Yod1	AATTATTTAATTA	2465-2477
TRUE	Dcun1d3	AATTATTTATTGT	1191-1203
TRUE	Pnpla2	AATTATTTATTTT	374-386
TRUE	CDH6	ACATATTTATATA	1119-1131
FALSE	B4GALT5	ACATATTTATATA	1877-1889
TRUE	WSB1	AGATTTATTTAAT	98-110
FALSE	BTG3	AGTTATTTATATA	346-358
FALSE	PSKH1	AGTTATTTATTAT	1944-1956
TRUE	DCUN1D3	AGTTATTTATTAT	1205-1217
TRUE	Rgs2	ATAAATTTATTTT	659-671
FALSE	BMP6	ATACATTTATAAT	1061-1073

TRUE	CTSC	ATATATTTAATAT	5301-5313
TRUE	PDK4	ATATATTTAATTA	989-1001
TRUE	Spsb1	ATATATTTACATA	1458-1470
TRUE	NFXL1	ATATATTTACATT	92-104
TRUE	OMD	ATATATTTAGAAT	88-100
FALSE	ZFP36	ATATATTTAGTAA	628-640
TRUE	Hbegf	ATATATTTAGTTT	650-662
FALSE	Hbegf	ATATATTTAGTTT	631-643
TRUE	Pvr	ATATATTTATAAA	565-577
TRUE	VASN	ATATATTTATAAG	493-505
TRUE	D130054N24Rik	ATATATTTATACA	76-88
FALSE	DUSP4	ATATATTTATGTT	615-627
TRUE	Calcrl	ATATTTATTTAAA	1192-1204
TRUE	Rgs16	ATATTTATTTATT	1481-1493
TRUE	Vasn	ATGTATTTATAAA	444-456
TRUE	Igfbp2	ATGTATTTATATT	98-110
TRUE	Syt4	ATTAATTTATAAA	632-644
TRUE	ITGAV	ATTAATTTATTTT	962-974
FALSE	AGPAT4	ATTCATTTATTTA	103-115
TRUE	ATP11A	ATTCATTTATTTA	2605-2617
TRUE	MRPS6	ATTCATTTATTTT	8069-8081
FALSE	PTGS2	ATTTAATTATTTA	47-59
TRUE	ARRDC3	ATTTATTTACAAA	604-616
TRUE	Arrdc3	ATTTATTTACAAA	830-842
TRUE	NIN	ATTTATTTATGTA	170-182
TRUE	Pfkfb3	ATTTATTTATTTA	2432-2444
TRUE	SRXN1	ATTTATTTATTTATCTATTTA	1025-1045
TRUE	SNX1	ATTTATTTATTTT	2941-2953
TRUE	Ube2j2	ATTTATTTATTTT	1649-1661
FALSE	Stk40	ATTTATTTTTTTA	527-539
TRUE	HSPA1A	ATTTGTTTATTTA	339-351
TRUE	Slc14a1	ATTTGTTTATTTA	1087-1099
TRUE	NUP155	GATTATTTATTAT	219-231
TRUE	GDF15	GTATTTATTTAAA	194-206
FALSE	Cxadr	GTATTTATTTAAA	2336-2348
TRUE	PPP4R1	TAAAATTTATTAA	855-867
TRUE	Trib2	TAACATTTATAAT	1228-1240
TRUE	GEMIN5	TAATATTTAATTT	455-467
TRUE	Bach1	TAATATTTAATTT	3364-3376
TRUE	Zfp36	TAGTATTTATATA	612-624
TRUE	Zfp36	TAGTATTTATATA	622-634
TRUE	PPP1R15A	TATAATTTATTAA	17-29
TRUE	Sirt1	TATTATTTATAGA	111-123

TRUE	Pdk4	TATTATTTATGAA	1942-1954
TRUE	Ccdc130	TATTATTTATTTG	101-113
TRUE	Hectd2	TATTATTTATTTT	2178-2190
FALSE	Il1rap	TCATATTTATAAA	614-626
TRUE	Tnfrsf12a	TGATATTTATTTT	480-492
TRUE	ASPA	TGATTTATTTATT	497-509
TRUE	ATP6AP2	TTACATTTATAAA	94-106
TRUE	Psma3	TTAGATTTATTTT	730-742
TRUE	F2RL2	TTATATTTAAATT	1437-1449
TRUE	SMC6	TTATATTTAGTTT	375-387
TRUE	Sacm1l	TTATATTTATAAT	199-211
TRUE	DUSP2	TTATATTTATACA	595-607
TRUE	PIGM	TTATATTTATATA	5413-5425
TRUE	Dusp2	TTATATTTATATA	517-529
TRUE	FGF1	TTATATTTATGAT	2361-2373
TRUE	Sacm1l	TTATATTTATGAT	199-211
TRUE	Dusp1	TTATTTATTTAAC	103-115
TRUE	SYT4	TTGTATTTATTAA	464-476
TRUE	UBE2G2	TTGTATTTATTAA	2239-2251
TRUE	ADAMTS4	TTGTATTTATTTA	297-309
FALSE	Utp15	TTTAATTTATTAT	2121-2133
FALSE	DIP2C	TTTAATTTATTTT	733-745
FALSE	Pigm	TTTAATTTATTTT	1440-1452
TRUE	DBR1	TTTCATTTATTAT	766-778
FALSE	Cxcr7	TTTTATTTACAAT	617-629
TRUE	SLC16A14	TTTTATTTACATA	2358-2370
TRUE	Slc12a2	TTTTATTTACATT	1811-1823
TRUE	Mat2a	TTTTATTTAGTAA	1352-1364
TRUE	IRS2	TTTTATTTAGTTT	1792-1804
TRUE	TCP1	TTTTATTTATAAC	4-1997
TRUE	P2ry2	TTTTATTTATAAC	839-851
FALSE	Gpr158	TTTTATTTATATG	258-270
FALSE	Hmgcr	TTTTATTTATTCA	406-418
FALSE	RGD1305014	TTTTATTTATTCA	323-335
TRUE	FSTL1	TTTTATTTATTCT	998-1010
TRUE	RGS3	TTTTATTTATTTA	420-432
TRUE	Rgs3	TTTTATTTATTTA	431-443
TRUE	Rgs3	TTTTATTTATTTA	423-435

APPENDIX 8: IACUC PROTOCOL APPROVAL LETTER

WAYNE STATE UNIVERSITY

INSTITUTIONAL ANIMAL
CARE AND USE COMMITTEE
87 E. Canfield, Second Floor
Detroit, MI 48201-2011
Telephone: (313) 577-1629
Fax Number: (313) 577-1941

ANIMAL WELFARE ASSURANCE # A 3310-01

PROTOCOL # A 01-03-12

Protocol Effective Period: March 8, 2012 – January 31, 2015

TO: Dr. Donald J. DeGracia
Department of Physiology
4116 Scott Hall

FROM: Lisa Anne Polin, Ph.D.
Chairperson
Institutional Animal Care and Use Committee

SUBJECT: Approval of Protocol # A 01-03-12
"Stress Granules Cause Translation Arrest In Ischemic Vulnerable Neurons"

DATE: March 8, 2012

Your animal research protocol has been reviewed by the Wayne State University Institutional Animal Care and Use Committee, and given final approval for the period effective **March 8, 2012** through **January 31, 2015**. The listed source of funding for the protocol is **NIH**. The species and number of animals approved for the duration of this protocol are listed below.

Species	Strain	Qty.	USDA Cat.
RATS	Long Evans, male, 250-300g	126	E
RATS	Long Evans, male, 250-300g	303	D

Be advised that this protocol must be reviewed by the IACUC on an annual basis to remain active. Any change in procedures, change in lab personnel, change in species, or additional numbers of animals requires prior approval by the IACUC. Any animal work on this research protocol beyond the expiration date will require the submission of a new IACUC protocol form and full committee review.

The Guide for the Care and Use of Laboratory Animals is the primary reference used for standards of animal care at Wayne State University. The University has submitted an appropriate assurance statement to the Office for Laboratory Animal Welfare (OLAW) of the National Institutes of Health. The animal care program at Wayne State University is accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

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ABSTRACT

RIBONOMIC CONTROL DURING GLOBAL BRAIN ISCHEMIA AND REPERFUSION

by

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August 2014

Advisor: Donald J. DeGracia, Ph.D.

Major: Physiology

Degree: Doctor of Philosophy

The study presented here used "omic" technology to look at the mechanism behind the selective delayed death of hippocampus CA1 neurons after transient global brain ischemia. To summarize the results, I have worked up a consistent method of isolating polysomes from whole animal model, which is much cleaner than the sucrose density gradient methods. Both results from Hu IP and polysomes experiments strongly agree that control CA1 is in a different state compared with control CA3. My results suggest that the selective vulnerability of CA1 after ischemia reperfusion injury may be due to the fact that CA1 is "weaker" from the beginning. This finding is significant as it shifts the focus of research from studying the difference of ischemia reperfusion injury to the different initial state of CA1 and CA3 cells. This study has also reformed our general idea as revealed by the high resolution of proteomics, which is much more superior than that of WB, that contamination makes up big proportion of cell preparation, and we should be cautious of the interpretation from those results.

Results are summarized as below:

1. The polysomes isolated from whole animal models were demonstrated by traditional WB and RNA agarose gel to be concentrated and clean. However, proteomics suggests that ribosomal protein represents only about 25% of the whole protein hits. The same case

was in Hu IP proteomics results.

2. The main form of ELAV protein family detected in CA1/CA3 in Hu IP and polysomes is HuB (Hel_N1). HuB is present in control, reperfused CA3, reperfused CA1, missing only in control CA1. AUF-1, hnRNP K, hnRNP M are also missing only in control CA1. This suggests that HuB binding with AUF-1, hnRNP K, hnRNP M forming complexes in all experimental groups, only control CA1.

3. mRNA population is very different between sucrose pad preparation and sucrose gradient preparation, although both are enriched with ARE-mRNA and ribosomal proteins. This suggests two different RNA binding complexes have been isolated, which possibly includes mRNA granules.

AUTOBIOGRAPHICAL STATEMENT

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1. Szymanski, JJ, **Wang, H**, Jamison, JT, and DeGracia, DJ, (2013) HuR Function and Translational State Analysis Following Global Brain Ischemia and Reperfusion. Translational Stroke Research: 1-15.