

Selected upregulated pathways		
Pathway name	Number of proteins	Submitted entities found
Cellular response to stress	49	<p>           Cytoplasmic dynein 1 heavy chain 1            Flavin reductase            Thioredoxin            26S proteasome non-ATPase regulatory subunit 7            26S proteasome regulatory subunit 8            Apolipoprotein A-I            Catalase            40S ribosomal protein S10            MAP kinase-activated protein kinase 2            Hemoglobin subunit alpha            40S ribosomal protein S6            Protein disulfide-isomerase            Signal transducer and activator of transcription 3            60S ribosomal protein L18            26S proteasome non-ATPase regulatory subunit 11            60S ribosomal protein L4            Cytoplasmic dynein 1 intermediate chain 2            Glucose-6-phosphate 1-dehydrogenase            Glutamine--fructose-6-phosphate aminotransferase [isomerizing] 1            Tubulin beta-6 chain            Endoplasmic reticulum chaperone BiP            Elongation factor 1-alpha 1            40S ribosomal protein S8            Eukaryotic translation initiation factor 2 subunit 2            40S ribosomal protein S24            Proteasome subunit alpha type-6            Alpha-crystallin B chain            Glutathione peroxidase 1            40S ribosomal protein S12            Proteasome subunit alpha type-5            Proteasome activator complex subunit 1            60S ribosomal protein L35            26S proteasome regulatory subunit 10B            60S ribosomal protein L14            Protein disulfide-isomerase A6            Hemoglobin subunit beta            Proteasome subunit alpha type-4            Eukaryotic translation initiation factor 2 subunit 1            Glutamate--cysteine ligase catalytic subunit            Talin-1            Proteasome activator complex subunit 2            60S ribosomal protein L23            60S ribosomal protein L10a            Endoplasmic            Peroxiredoxin-1            Histone-binding protein RBBP4            F-actin-capping protein subunit alpha-1            Transcription factor p65            40S ribosomal protein S14         </p>

Cellular response to hypoxia + Oxygen-dependent proline hydroxylation of Hypoxia-inducible Factor Alpha	9	<p>           Proteasome activator complex subunit 2            26S proteasome regulatory subunit 10B            Proteasome subunit alpha type-5            26S proteasome regulatory subunit 8            Proteasome subunit alpha type-4            26S proteasome non-ATPase regulatory subunit 11            Proteasome activator complex subunit 1            Proteasome subunit alpha type-6            26S proteasome non-ATPase regulatory subunit 7         </p>
Cellular response to chemical stress	20	<p>           Proteasome activator complex subunit 2            Proteasome subunit alpha type-5            Peroxiredoxin-1            26S proteasome non-ATPase regulatory subunit 11            Thioredoxin            Flavin reductase            Proteasome activator complex subunit 1            Glucose-6-phosphate 1-dehydrogenase            26S proteasome non-ATPase regulatory subunit 7            26S proteasome regulatory subunit 10B            26S proteasome regulatory subunit 8            Hemoglobin subunit beta            Proteasome subunit alpha type-4            Catalase            Proteasome subunit alpha type-6            Hemoglobin subunit alpha            Glutamate--cysteine ligase catalytic subunit            Protein disulfide-isomerase            Glutathione peroxidase 1            Signal transducer and activator of transcription 3         </p>
KEAP1-NFE2L2 pathway	12	<p>           Proteasome activator complex subunit 2            26S proteasome regulatory subunit 10B            Proteasome subunit alpha type-5            26S proteasome regulatory subunit 8            Proteasome subunit alpha type-4            Peroxiredoxin-1            26S proteasome non-ATPase regulatory subunit 11            Proteasome activator complex subunit 1            Glucose-6-phosphate 1-dehydrogenase            Proteasome subunit alpha type-6            26S proteasome non-ATPase regulatory subunit 7            Glutamate--cysteine ligase catalytic subunit         </p>
Detoxification of Reactive Oxygen Species	5	<p>           Peroxiredoxin-1            Catalase            Thioredoxin            Protein disulfide-isomerase            Glutathione peroxidase 1         </p>
Cellular response to starvation + Response of EIF2AK4 (GCN2) to amino acid deficiency	14	<p>           60S ribosomal protein L18            40S ribosomal protein S12            60S ribosomal protein L10a            60S ribosomal protein L23            60S ribosomal protein L4            60S ribosomal protein L35            60S ribosomal protein L14            40S ribosomal protein S8            40S ribosomal protein S14         </p>

		40S ribosomal protein S10 Eukaryotic translation initiation factor 2 subunit 2 40S ribosomal protein S24 Eukaryotic translation initiation factor 2 subunit 1 40S ribosomal protein S6
Unfolded Protein Response (UPR)	7	Endoplasmic reticulum chaperone BiP Protein disulfide-isomerase A6 Endoplasmic reticulum chaperone BiP Eukaryotic translation initiation factor 2 subunit 2 Eukaryotic translation initiation factor 2 subunit 1 Glutamine--fructose-6-phosphate aminotransferase [isomerizing] 1 Talin-1
Immune System	82*	Signal transducer and activator of transcription 2 Ubiquitin carboxyl-terminal hydrolase 14 Cytoplasmic dynein 1 heavy chain 1 Major vault protein Probable E3 ubiquitin-protein ligase HERC4 Glycogen phosphorylase, liver form HLA class I histocompatibility antigen, A alpha chain Double-stranded RNA-specific adenosine deaminase Solute carrier family 2, facilitated glucose transporter member 3 Thioredoxin 26S proteasome non-ATPase regulatory subunit 7 Myosin-9 Signal transducer and activator of transcription 1-alpha/beta 26S proteasome regulatory subunit 8 Annexin A1 Catalase Actin-related protein 2/3 complex subunit 5 Interferon-induced GTP-binding protein Mx2 Ras GTPase-activating-like protein IQGAP1 Alpha-2-HS-glycoprotein MAP kinase-activated protein kinase 2 Cyclin-dependent kinase 11B Annexin A2 Protein disulfide-isomerase Signal transducer and activator of transcription 3 Stomatin Vitronectin Elongation factor 2 26S proteasome non-ATPase regulatory subunit 11 Cytoplasmic dynein 1 intermediate chain 2 Plastin-2 Vinculin Rho-related GTP-binding protein RhoG Tubulin beta-6 chain Endoplasmic reticulum chaperone BiP Synaptosomal-associated protein 23 Elongation factor 1-alpha 1 Fibrinogen gamma chain U2 small nuclear ribonucleoprotein A' Early endosome antigen 1 Actin-related protein 3 Gelsolin Proteasome subunit alpha type-6 Serine/threonine-protein kinase PAK 2

		Fibrinogen beta chain [Cleaved into: Fibrinopeptide B Fibronectin Glycogenin-1 Filamin-A Ferritin heavy chain Rab GDP dissociation inhibitor beta Ferritin light chain Ras GTPase-activating-like protein IQGAP2 Proteasome subunit alpha type-5 Actin-related protein 2/3 complex subunit 1B Filamin-B Proteasome activator complex subunit 1 Protein disulfide-isomerase A3 Leukocyte elastase inhibitor 26S proteasome regulatory subunit 10B 3-ketoacyl-CoA thiolase, peroxisomal Cofilin-1 Hemoglobin subunit beta Copine-1 Proteasome subunit alpha type-4 Moesin Poly Proteasome activator complex subunit 2 Cathepsin D Interferon-induced GTP-binding protein Mx1 Endoplasmic reticulum chaperone BiP Catenin beta-1 Cytoplasmic FMR1-interacting protein 1 Galectin-3 Carbonic anhydrase 1 F-actin-capping protein subunit alpha-1 Vimentin Transcription factor p65 Alpha-1-antitrypsin Calpain-1 catalytic subunit Beta-glucuronidase Eukaryotic initiation factor 4A-I Clusterin
Innate Immune System	58	Ubiquitin carboxyl-terminal hydrolase 14 Cytoplasmic dynein 1 heavy chain 1 Major vault protein Glycogen phosphorylase, liver form Solute carrier family 2, facilitated glucose transporter member 3 Thioredoxin 26S proteasome non-ATPase regulatory subunit 7 Myosin-9 26S proteasome regulatory subunit 8 Catalase Actin-related protein 2/3 complex subunit 5 Ras GTPase-activating-like protein IQGAP1 Alpha-2-HS-glycoprotein MAP kinase-activated protein kinase 2 Annexin A2 Stomatin Vitronectin Elongation factor 2 26S proteasome non-ATPase regulatory subunit 11

		<p>Vinculin  Rho-related GTP-binding protein RhoG  Synaptosomal-associated protein 23  Elongation factor 1-alpha 1  Fibrinogen gamma chain  Early endosome antigen 1  Actin-related protein 3  Gelsolin  Proteasome subunit alpha type-6  Serine/threonine-protein kinase PAK 2  Fibrinogen beta chain [Cleaved into: Fibrinopeptide B  Glycogenin-1  Ferritin heavy chain  Rab GDP dissociation inhibitor beta  Ferritin light chain  Ras GTPase-activating-like protein IQGAP2  Proteasome subunit alpha type-5  Actin-related protein 2/3 complex subunit 1B  Proteasome activator complex subunit 1  Leukocyte elastase inhibitor  26S proteasome regulatory subunit 10B  3-ketoacyl-CoA thiolase, peroxisomal  Cofilin-1  Hemoglobin subunit beta  Copine-1  Proteasome subunit alpha type-4  Poly  Proteasome activator complex subunit 2  Cathepsin D  Endoplamin  Catenin beta-1  Cytoplasmic FMR1-interacting protein 1  Galectin-3  F-actin-capping protein subunit alpha-1  Transcription factor p65  Alpha-1-antitrypsin  Calpain-1 catalytic subunit  Beta-glucuronidase  Clusterin</p>
Neutrophil degranulation	34	<p>Cytoplasmic dynein 1 heavy chain 1  Rab GDP dissociation inhibitor beta  Ferritin light chain  Major vault protein  Ras GTPase-activating-like protein IQGAP2  Glycogen phosphorylase, liver form  Proteasome subunit alpha type-5  Solute carrier family 2, facilitated glucose transporter member 3  26S proteasome non-ATPase regulatory subunit 7  Leukocyte elastase inhibitor (LEI)  3-ketoacyl-CoA thiolase, peroxisomal  Hemoglobin subunit beta  Actin-related protein 2/3 complex subunit 5  Catalase  Copine-1  Ras GTPase-activating-like protein IQGAP1  Alpha-2-HS-glycoprotein  Annexin A2</p>

		<p>Stomatin  Cathepsin D  Elongation factor 2  26S proteasome non-ATPase regulatory subunit 11  Cytoplasmic FMR1-interacting protein 1  Rho-related GTP-binding protein RhoG  Galectin-3  Vinculin  Synaptosomal-associated protein 23  Elongation factor 1-alpha 1  Alpha-1-antitrypsin  Calpain-1 catalytic subunit  Gelsolin  Beta-glucuronidase  Ferritin heavy chain  Glycogenin-1</p>
Cytokine Signaling in Immune system	35*	<p>Ubiquitin carboxyl-terminal hydrolase 14  Signal transducer and activator of transcription 2  Proteasome subunit alpha type-5  Double-stranded RNA-specific adenosine deaminase  HLA class I histocompatibility antigen, A alpha chain  Filamin-B  Proteasome activator complex subunit 1  26S proteasome non-ATPase regulatory subunit 7  Signal transducer and activator of transcription 1-alpha/beta  26S proteasome regulatory subunit 10B  26S proteasome regulatory subunit 8  Cofilin-1  Annexin A1  Proteasome subunit alpha type-4  Interferon-induced GTP-binding protein Mx2  MAP kinase-activated protein kinase 2  Moesin  Annexin A2  Protein disulfide-isomerase  Signal transducer and activator of transcription 3  Proteasome activator complex subunit 2  Interferon-induced GTP-binding protein Mx1  Endoplamin  26S proteasome non-ATPase regulatory subunit 11  Plastin-2  Carbonic anhydrase 1  F-actin-capping protein subunit alpha-1  Vimentin  Transcription factor p65  U2 small nuclear ribonucleoprotein A'  Serine/threonine-protein kinase PAK 2  Proteasome subunit alpha type-6  Fibronectin  Eukaryotic initiation factor 4A-I  Filamin-A</p>
Signaling by Interleukins	29**	<p>Ubiquitin carboxyl-terminal hydrolase 14  Signal transducer and activator of transcription 2  Proteasome subunit alpha type-5  Proteasome activator complex subunit 1  26S proteasome non-ATPase regulatory subunit 7  Signal transducer and activator of transcription 1-alpha/beta</p>

		26S proteasome regulatory subunit 10B 26S proteasome regulatory subunit 8 Cofilin-1 Annexin A1 Proteasome subunit alpha type-4 MAP kinase-activated protein kinase 2 Moesin Annexin A2 Protein disulfide-isomerase Signal transducer and activator of transcription 3 Proteasome activator complex subunit 2 Endoplasmic reticulum chaperone BiP 26S proteasome non-ATPase regulatory subunit 11 Plastin-2 Carbonic anhydrase 1 F-actin-capping protein subunit alpha-1 Vimentin Transcription factor p65 U2 small nuclear ribonucleoprotein A' Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 Fibronectin
Interleukin-1 family signaling	12	Ubiquitin carboxyl-terminal hydrolase 14 Proteasome activator complex subunit 2 26S proteasome regulatory subunit 10B Proteasome subunit alpha type-5 26S proteasome regulatory subunit 8 Transcription factor p65 Proteasome subunit alpha type-4 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 Proteasome subunit alpha type-6 26S proteasome non-ATPase regulatory subunit 7 Signal transducer and activator of transcription 3
Interleukin-1 signaling	11	Ubiquitin carboxyl-terminal hydrolase 14 Proteasome activator complex subunit 2 26S proteasome regulatory subunit 10B Proteasome subunit alpha type-5 26S proteasome regulatory subunit 8 Transcription factor p65 Proteasome subunit alpha type-4 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 Proteasome subunit alpha type-6 26S proteasome non-ATPase regulatory subunit 7
Interleukin-12 family signaling	12*	Signal transducer and activator of transcription 1-alpha/beta Proteasome activator complex subunit 2 Carbonic anhydrase 1 F-actin-capping protein subunit alpha-1 Cofilin-1 U2 small nuclear ribonucleoprotein A' Serine/threonine-protein kinase PAK 2 Moesin Plastin-2 Annexin A2 Protein disulfide-isomerase Signal transducer and activator of transcription 3

Interleukin-12 signaling	10	Proteasome activator complex subunit 2 Carbonic anhydrase 1 F-actin-capping protein subunit alpha-1 Cofilin-1 U2 small nuclear ribonucleoprotein A' Serine/threonine-protein kinase PAK 2 Plastin-2 Moesin Annexin A2 Protein disulfide-isomerase
Hemostasis	29	Annexin A5 Calumenin Guanine nucleotide-binding protein G Melanoma-associated antigen D2 Plasminogen Hemoglobin subunit beta Cofilin-1 CYFIP-related Rac1 interactor B Apolipoprotein A-I Alpha-2-HS-glycoprotein Serotransferrin Annexin A2 Talin-1 Transgelin-2 Rho-related GTP-binding protein RhoG Vinculin Tubulin beta-6 chain Endoplasmic reticulum chaperone BiP Alpha-actinin-4 Kinesin-like protein KIF1B F-actin-capping protein subunit alpha-1 Alpha-1-antitrypsin Fibrinogen gamma chain SPARC Guanine nucleotide-binding protein subunit alpha-13 Fibrinogen beta chain [Cleaved into: Fibrinopeptide B] Fibronectin Clusterin Filamin-A
Platelet activation, signaling and aggregation	24	Annexin A5 Calumenin Guanine nucleotide-binding protein G Transgelin-2 Melanoma-associated antigen D2 Rho-related GTP-binding protein RhoG Vinculin Endoplasmic reticulum chaperone BiP Alpha-actinin-4 Plasminogen Cofilin-1 CYFIP-related Rac1 interactor B Alpha-1-antitrypsin Apolipoprotein A-I Fibrinogen gamma chain Alpha-2-HS-glycoprotein Serotransferrin SPARC

		Guanine nucleotide-binding protein subunit alpha-13 Fibrinogen beta chain [Cleaved into: Fibrinopeptide B Fibronectin Clusterin Talin-1 Filamin-A
Platelet Aggregation (Plug Formation)	4	Fibrinogen gamma chain Fibrinogen beta chain Fibronectin Talin-1
Response to elevated platelet cytosolic Ca2+ + Platelet degranulation	21	Annexin A5 Calumenin Transgelin-2 Melanoma-associated antigen D2 Vinculin Endoplasmic reticulum chaperone BiP Alpha-actinin-4 Plasminogen Cofilin-1 CYFIP-related Rac1 interactor B Alpha-1-antitrypsin Apolipoprotein A-I Fibrinogen gamma chain Serotransferrin Alpha-2-HS-glycoprotein SPARC Fibrinogen beta chain [Cleaved into: Fibrinopeptide B Fibronectin Clusterin Talin-1 Filamin-A
Nervous system development + Axon guidance	37	40S ribosomal protein S12 Proteasome subunit alpha type-5 Actin-related protein 2/3 complex subunit 1B Polyadenylate-binding protein 1 Proteasome activator complex subunit 1 26S proteasome non-ATPase regulatory subunit 7 Myosin-9 Ezrin Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 26S proteasome regulatory subunit 10B 60S ribosomal protein L14 26S proteasome regulatory subunit 8 Radixin Cofilin-1 Actin-related protein 2/3 complex subunit 5 Proteasome subunit alpha type-4 40S ribosomal protein S10 Moesin 40S ribosomal protein S6 Talin-1 60S ribosomal protein L18 Proteasome activator complex subunit 2 60S ribosomal protein L10a 60S ribosomal protein L23 60S ribosomal protein L4

		26S proteasome non-ATPase regulatory subunit 11 Myosin regulatory light chain 12A Tubulin beta-6 chain 40S ribosomal protein S14 40S ribosomal protein S8 Actin-related protein 3 40S ribosomal protein S24 Ran-binding protein 9 Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 Regulator of nonsense transcripts 2
Signaling by ROBO receptors	25	40S ribosomal protein S12 Proteasome subunit alpha type-5 Polyadenylate-binding protein 1 Proteasome activator complex subunit 1 26S proteasome non-ATPase regulatory subunit 7 Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 26S proteasome regulatory subunit 10B 60S ribosomal protein L14 26S proteasome regulatory subunit 8 Proteasome subunit alpha type-4 40S ribosomal protein S10 40S ribosomal protein S6 60S ribosomal protein L18 Proteasome activator complex subunit 2 60S ribosomal protein L10a 60S ribosomal protein L23 60S ribosomal protein L4 26S proteasome non-ATPase regulatory subunit 11 40S ribosomal protein S14 40S ribosomal protein S8 40S ribosomal protein S24 Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 Regulator of nonsense transcripts 2
Regulation of expression of SLITs and ROBOs	24	60S ribosomal protein L18 Proteasome activator complex subunit 2 40S ribosomal protein S12 Proteasome subunit alpha type-5 60S ribosomal protein L10a 60S ribosomal protein L23 60S ribosomal protein L4 Polyadenylate-binding protein 1 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 26S proteasome non-ATPase regulatory subunit 7 Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 26S proteasome regulatory subunit 10B 60S ribosomal protein L14 26S proteasome regulatory subunit 8 40S ribosomal protein S14 40S ribosomal protein S8 Proteasome subunit alpha type-4 40S ribosomal protein S10 40S ribosomal protein S24

		Proteasome subunit alpha type-6 Regulator of nonsense transcripts 2 40S ribosomal protein S6
Metabolism of proteins	80	Mothers against decapentaplegic homolog 4 Ubiquitin carboxyl-terminal hydrolase 14 Cytoplasmic dynein 1 heavy chain 1 Golgi-specific brefeldin A-resistance guanine nucleotide exchange factor 1 HLA class I histocompatibility antigen, A alpha chain ADP-ribosylation factor 4 Thioredoxin Spondin-1 26S proteasome non-ATPase regulatory subunit 7 E3 ubiquitin-protein ligase BRE1B Plasminogen 26S proteasome regulatory subunit 8 Apolipoprotein E Apolipoprotein A-I 40S ribosomal protein S10 Alpha-2-HS-glycoprotein 40S ribosomal protein S6 Protein disulfide-isomerase Signal transducer and activator of transcription 3 60S ribosomal protein L18 Coatmer subunit beta' Elongation factor 2 26S proteasome non-ATPase regulatory subunit 11 Cadherin-2 60S ribosomal protein L4 Cytoplasmic dynein 1 intermediate chain 2 Glutamine--fructose-6-phosphate aminotransferase [isomerizing] 1 Tubulin beta-6 chain Elongation factor 1-alpha 1 40S ribosomal protein S8 Fibrinogen gamma chain Eukaryotic translation initiation factor 2 subunit 2 40S ribosomal protein S24 Gelsolin Proteasome subunit alpha type-6 Eukaryotic translation initiation factor 3 subunit E Fibronectin Coatmer subunit alpha Ceruloplasmin 40S ribosomal protein S12 Proteasome subunit alpha type-5 Calumenin Sec1 family domain-containing protein 1 Polyadenylate-binding protein 1 Proteasome activator complex subunit 1 Asparagine--tRNA ligase, cytoplasmic Osteopontin Protein disulfide-isomerase A3 Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 Probable ATP-dependent RNA helicase DDX5 Ubiquitin carboxyl-terminal hydrolase 15

		26S proteasome regulatory subunit 10B 60S ribosomal protein L14 LIM and cysteine-rich domains protein 1 Protein disulfide-isomerase A6 Proteasome subunit alpha type-4 Eukaryotic translation initiation factor 5 DNA damage-binding protein 1 Eukaryotic translation initiation factor 3 subunit A Eukaryotic translation initiation factor 2 subunit 1 Serotransferrin Moesin Proteasome activator complex subunit 2 Cathepsin D Translocon-associated protein subunit delta 60S ribosomal protein L23 60S ribosomal protein L10a Tryptophan--tRNA ligase, cytoplasmic Endoplasmic Catenin beta-1 Proliferating cell nuclear antigen Mannose-1-phosphate guanylttransferase beta F-actin-capping protein subunit alpha-1 Transcription factor p65 40S ribosomal protein S14 Alpha-1-antitrypsin Tenascin Eukaryotic translation initiation factor 3 subunit L Eukaryotic initiation factor 4A-I
Translation	26	40S ribosomal protein S12 Polyadenylate-binding protein 1 Asparagine--tRNA ligase, cytoplasmic Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 60S ribosomal protein L14 Eukaryotic translation initiation factor 5 40S ribosomal protein S10 Eukaryotic translation initiation factor 3 subunit A Eukaryotic translation initiation factor 2 subunit 1 40S ribosomal protein S6 60S ribosomal protein L18 Elongation factor 2 Translocon-associated protein subunit delta 60S ribosomal protein L10a Tryptophan--tRNA ligase, cytoplasmic 60S ribosomal protein L23 60S ribosomal protein L4 Elongation factor 1-alpha 1 40S ribosomal protein S14 40S ribosomal protein S8 Eukaryotic translation initiation factor 3 subunit L Eukaryotic translation initiation factor 2 subunit 2 40S ribosomal protein S24 Eukaryotic translation initiation factor 3 subunit E Eukaryotic initiation factor 4A-I
Post-translational	15	Ceruloplasmin Calumenin Endoplasmic

protein phosphorylation		Cadherin-2 Osteopontin Protein disulfide-isomerase A6 Apolipoprotein E Alpha-1-antitrypsin Apolipoprotein A-I Fibrinogen gamma chain Tenascin Serotransferrin Alpha-2-HS-glycoprotein Protein disulfide-isomerase Fibronectin
Regulation of Insulin-like Growth Factor (IGF) transport and uptake by Insulin-like Growth Factor Binding Proteins (IGFBPs)	16	Ceruloplasmin Calumenin Endoplasmic Cadherin-2 Osteopontin Plasminogen Protein disulfide-isomerase A6 Apolipoprotein E Alpha-1-antitrypsin Apolipoprotein A-I Fibrinogen gamma chain Tenascin Serotransferrin Alpha-2-HS-glycoprotein Protein disulfide-isomerase Fibronectin
Metabolism of RNA	34	40S ribosomal protein S12 Proteasome subunit alpha type-5 Double-stranded RNA-specific adenosine deaminase THO complex subunit 4 Polyadenylate-binding protein 1 Proteasome activator complex subunit 1 26S proteasome non-ATPase regulatory subunit 7 Insulin-like growth factor 2 mRNA-binding protein 2 Eukaryotic peptide chain release factor subunit 1 60S ribosomal protein L35 Probable ATP-dependent RNA helicase DDX5 26S proteasome regulatory subunit 10B 60S ribosomal protein L14 26S proteasome regulatory subunit 8 Proteasome subunit alpha type-4 40S ribosomal protein S10 MAP kinase-activated protein kinase 2 Pre-mRNA 3'-end-processing factor FIP1 Polypyrimidine tract-binding protein 1 Poly 40S ribosomal protein S6 60S ribosomal protein L18 Proteasome activator complex subunit 2 60S ribosomal protein L10a 60S ribosomal protein L23 60S ribosomal protein L4 26S proteasome non-ATPase regulatory subunit 11 40S ribosomal protein S14 40S ribosomal protein S8

		U2 small nuclear ribonucleoprotein A' 40S ribosomal protein S24 Proteasome subunit alpha type-6 Regulator of nonsense transcripts 2 Eukaryotic initiation factor 4A-I
Programmed Cell Death	17	Plectin Proteasome activator complex subunit 2 Flotillin-1 Proteasome subunit alpha type-5 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 Catenin beta-1 26S proteasome non-ATPase regulatory subunit 7 26S proteasome regulatory subunit 10B 26S proteasome regulatory subunit 8 Vimentin Proteasome subunit alpha type-4 Gelsolin Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 Flotillin-2 Signal transducer and activator of transcription 3
Apoptosis	15	Plectin Proteasome activator complex subunit 2 Proteasome subunit alpha type-5 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 Catenin beta-1 26S proteasome non-ATPase regulatory subunit 7 26S proteasome regulatory subunit 10B 26S proteasome regulatory subunit 8 Vimentin Proteasome subunit alpha type-4 Gelsolin Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 Signal transducer and activator of transcription 3
Regulation of Apoptosis	10	Proteasome activator complex subunit 2 26S proteasome regulatory subunit 10B Proteasome subunit alpha type-5 26S proteasome regulatory subunit 8 Proteasome subunit alpha type-4 26S proteasome non-ATPase regulatory subunit 11 Proteasome activator complex subunit 1 Serine/threonine-protein kinase PAK 2 Proteasome subunit alpha type-6 26S proteasome non-ATPase regulatory subunit 7

\*: Signal transducer and activator of transcription 1-alpha/beta was counted as 3 entities in Reactome

\*\*: Signal transducer and activator of transcription 1-alpha/beta was counted as 2 entities in Reactome

Selected downregulated pathways		
Pathway name	Number of proteins	Protein names
Nervous system development + Axon guidance	29	Dynamin-1 Spectrin beta chain, non-erythrocytic 2 Contactin-1 Spectrin alpha chain, non-erythrocytic 1 CLIP-associating protein 2 Dynamin-3 Neural cell adhesion molecule L1 Endophilin-A1 Neural cell adhesion molecule 1 Protein kinase C alpha type Clathrin heavy chain 1 cAMP-dependent protein kinase catalytic subunit beta Dihydropyrimidinase-related protein 1 Clathrin light chain B Dihydropyrimidinase-related protein 2 Rap1 GTPase-activating protein 1 Contactin-associated protein 1 Neurofascin Ankyrin-3 Tubulin beta-3 chain Ankyrin-2 Spectrin beta chain, non-erythrocytic 1 Dihydropyrimidinase-related protein 5 AP-2 complex subunit alpha-1 cAMP-dependent protein kinase catalytic subunit alpha Tubulin alpha-4A chain Dihydropyrimidinase-related protein 4 Tubulin beta-4A chain Neuronal cell adhesion molecule
L1CAM interactions	20	Contactin-associated protein 1 Dynamin-1 Spectrin beta chain, non-erythrocytic 2 Contactin-1 Spectrin alpha chain, non-erythrocytic 1 Neurofascin Ankyrin-3 Tubulin beta-3 chain Dynamin-3 Ankyrin-2 Spectrin beta chain, non-erythrocytic 1 Neural cell adhesion molecule L1 AP-2 complex subunit alpha-1 Endophilin-A1 Neural cell adhesion molecule 1 Clathrin heavy chain 1 Tubulin alpha-4A chain Tubulin beta-4A chain Dihydropyrimidinase-related protein 2 Neuronal cell adhesion molecule
Metabolism	82	Potassium voltage-gated channel subfamily B member 1

		<p>Electrogenic aspartate/glutamate antiporter SLC25A12, mitochondrial</p> <p>Glutathione hydrolase 7</p> <p>Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial</p> <p>Malate dehydrogenase, mitochondrial</p> <p>Dihydrolipoyllysine-residue acetyltransferase component of pyruvate dehydrogenase complex, mitochondrial</p> <p>Malate dehydrogenase, cytoplasmic</p> <p>NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2</p> <p>ATP synthase subunit gamma, mitochondrial</p> <p>Iron-sulfur cluster assembly 2 homolog, mitochondrial</p> <p>Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial</p> <p>5'-3' exonuclease PLD3</p> <p>Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial</p> <p>Creatine kinase U-type, mitochondrial</p> <p>Succinate--CoA ligase [ADP-forming] subunit beta, mitochondrial</p> <p>NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial</p> <p>Citrate synthase, mitochondrial</p> <p>Mitochondrial 2-oxoglutarate/malate carrier protein</p> <p>Aspartate aminotransferase, mitochondrial</p> <p>Leucine-rich PPR motif-containing protein, mitochondrial</p> <p>L-lactate dehydrogenase B chain</p> <p>Triosephosphate isomerase</p> <p>Adenylosuccinate synthetase isozyme 1</p> <p>Fructose-bisphosphate aldolase C</p> <p>NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial</p> <p>Electrogenic aspartate/glutamate antiporter SLC25A13, mitochondrial</p> <p>cAMP-dependent protein kinase catalytic subunit beta</p> <p>Guanine nucleotide-binding protein G</p> <p>Cytochrome c oxidase subunit 5A, mitochondrial</p> <p>Fumarate hydratase, mitochondrial</p> <p>Cytochrome c oxidase subunit 5B, mitochondrial</p> <p>Isocitrate dehydrogenase [NAD] subunit gamma, mitochondrial</p> <p>Retinol dehydrogenase 11</p> <p>NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial</p> <p>ATP synthase subunit O, mitochondrial</p> <p>Cytosolic acyl coenzyme A thioester hydrolase</p> <p>Prostaglandin E synthase 2</p> <p>Pyruvate dehydrogenase E1 component subunit beta, mitochondrial</p> <p>Mitochondrial pyruvate carrier 2</p> <p>NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial</p> <p>Guanine nucleotide-binding protein G</p> <p>Aconitate hydratase, mitochondrial</p> <p>Guanine nucleotide-binding protein G</p> <p>AMP deaminase 2</p> <p>Cytochrome c1, heme protein, mitochondrial</p> <p>Gamma-enolase</p> <p>Dihydrolipoyl dehydrogenase, mitochondrial</p> <p>Guanine nucleotide-binding protein subunit alpha-11</p> <p>ATP synthase subunit f, mitochondrial</p> <p>Vesicle-associated membrane protein-associated protein B/C</p>
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		<p>Membrane-associated phosphatidylinositol transfer protein 1</p> <p>Guanine nucleotide-binding protein G</p> <p>ATP synthase protein 8</p> <p>Glutamine synthetase</p> <p>Guanine nucleotide-binding protein G</p> <p>ATP synthase subunit alpha, mitochondrial</p> <p>Adenosylhomocysteinase</p> <p>ATP synthase-coupling factor 6, mitochondrial</p> <p>ATP synthase F</p> <p>Protein kinase C alpha type</p> <p>Aspartate aminotransferase, cytoplasmic</p> <p>Succinate dehydrogenase [ubiquinone] flavoprotein subunit, mitochondrial</p> <p>ATP synthase subunit e, mitochondrial</p> <p>Glutaminase kidney isoform, mitochondrial</p> <p>Adenylate kinase isoenzyme 1</p> <p>Cytochrome c oxidase subunit 2</p> <p>L-2-hydroxyglutarate dehydrogenase, mitochondrial</p> <p>Vesicle-associated membrane protein 2</p> <p>Dihydrolipoyllysine-residue succinyltransferase component of 2-oxoglutarate dehydrogenase complex, mitochondrial</p> <p>Succinate--CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial</p> <p>Gephyrin [Includes: Molybdopterin adenyltransferase</p> <p>Oxysterol-binding protein-related protein 1</p> <p>Phosphatidylinositol 5-phosphate 4-kinase type-2 beta</p> <p>Synaptojanin-1</p> <p>Methylglutaconyl-CoA hydratase, mitochondrial</p> <p>Hexokinase-1</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>Synaptosomal-associated protein 25</p> <p>NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial</p> <p>Guanine nucleotide-binding protein subunit beta-5</p> <p>Voltage-dependent anion-selective channel protein 1</p> <p>ATP synthase subunit beta, mitochondrial</p>
Integration of energy metabolism	13	<p>Potassium voltage-gated channel subfamily B member 1</p> <p>Guanine nucleotide-binding protein subunit alpha-11</p> <p>Guanine nucleotide-binding protein G</p> <p>Guanine nucleotide-binding protein G</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>Guanine nucleotide-binding protein G</p> <p>Guanine nucleotide-binding protein G</p> <p>Synaptosomal-associated protein 25</p> <p>Protein kinase C alpha type</p> <p>cAMP-dependent protein kinase catalytic subunit beta</p> <p>Guanine nucleotide-binding protein subunit beta-5</p> <p>Guanine nucleotide-binding protein G</p> <p>Vesicle-associated membrane protein 2</p>
The citric acid (TCA) cycle and respiratory electron transport	39	<p>Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial</p> <p>Malate dehydrogenase, mitochondrial</p> <p>Dihydrolipoyllysine-residue acetyltransferase component of pyruvate dehydrogenase complex, mitochondrial</p> <p>ATP synthase subunit f, mitochondrial</p> <p>NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2</p> <p>ATP synthase subunit gamma, mitochondrial</p>

		<p>Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial</p> <p>ATP synthase protein 8</p> <p>Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial</p> <p>Succinate--CoA ligase [ADP-forming] subunit beta, mitochondrial</p> <p>NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial</p> <p>Citrate synthase, mitochondrial</p> <p>ATP synthase subunit alpha, mitochondrial</p> <p>Leucine-rich PPR motif-containing protein, mitochondrial</p> <p>ATP synthase-coupling factor 6, mitochondrial</p> <p>ATP synthase F</p> <p>Succinate dehydrogenase [ubiquinone] flavoprotein subunit, mitochondrial</p> <p>L-lactate dehydrogenase B chain</p> <p>ATP synthase subunit e, mitochondrial</p> <p>Cytochrome c oxidase subunit 2</p> <p>NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial</p> <p>L-2-hydroxyglutarate dehydrogenase, mitochondrial</p> <p>Cytochrome c oxidase subunit 5A, mitochondrial</p> <p>Fumarate hydratase, mitochondrial</p> <p>Cytochrome c oxidase subunit 5B, mitochondrial</p> <p>Isocitrate dehydrogenase [NAD] subunit gamma, mitochondrial</p> <p>Succinate--CoA ligase [ADP/GDP-forming] subunit alpha, mitochondrial</p> <p>Dihydrolipoyllysine-residue succinyltransferase component of 2-oxoglutarate dehydrogenase complex, mitochondrial</p> <p>ATP synthase subunit O, mitochondrial</p> <p>NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial</p> <p>Pyruvate dehydrogenase E1 component subunit beta, mitochondrial</p> <p>Mitochondrial pyruvate carrier 2</p> <p>NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial</p> <p>Aconitate hydratase, mitochondrial</p> <p>Cytochrome c1, heme protein, mitochondrial</p> <p>NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial</p> <p>Voltage-dependent anion-selective channel protein 1</p> <p>ATP synthase subunit beta, mitochondrial</p> <p>Dihydrolipoyl dehydrogenase, mitochondrial</p>
Neuronal System	42	<p>Band 4.1-like protein 1</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit gamma</p> <p>Potassium voltage-gated channel subfamily B member 1</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit beta</p> <p>Guanine nucleotide-binding protein G</p> <p>Reticulon-3</p> <p>Glutamine synthetase</p> <p>Synapsin-1</p> <p>Guanine nucleotide-binding protein G</p> <p>Glutamate decarboxylase 2</p> <p>Ras-related protein Rab-3A</p> <p>Neurexin-3</p> <p>Neurofilament light polypeptide</p> <p>Protein kinase C alpha type</p> <p>Glutaminase kidney isoform, mitochondrial</p> <p>cAMP-dependent protein kinase catalytic subunit beta</p>

		<p>Vesicle-associated membrane protein 2</p> <p>Guanine nucleotide-binding protein G</p> <p>Synapsin-2</p> <p>4-aminobutyrate aminotransferase, mitochondrial</p> <p>Disks large homolog 2</p> <p>Gamma-aminobutyric acid receptor subunit beta-2</p> <p>Gamma-aminobutyric acid receptor subunit beta-3</p> <p>Tubulin beta-3 chain</p> <p>Vesicular inhibitory amino acid transporter</p> <p>Neurologin-2</p> <p>Vesicular glutamate transporter 1</p> <p>Band 4.1-like protein 3</p> <p>AP-2 complex subunit alpha-1</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>Guanine nucleotide-binding protein G</p> <p>Glutamate decarboxylase 1</p> <p>Synaptotagmin-1</p> <p>Peripheral plasma membrane protein CASK</p> <p>Guanine nucleotide-binding protein G</p> <p>Synaptosomal-associated protein 25</p> <p>Tubulin alpha-4A chain</p> <p>Tubulin beta-4A chain</p> <p>Guanine nucleotide-binding protein subunit beta-5</p> <p>Complexin-1</p> <p>Protein phosphatase 1E</p> <p>Vesicle-fusing ATPase</p>
Transmission across Chemical Synapses	37	<p>Band 4.1-like protein 1</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit gamma</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit beta</p> <p>Guanine nucleotide-binding protein G</p> <p>Glutamine synthetase</p> <p>Synapsin-1</p> <p>Glutamate decarboxylase 2</p> <p>Guanine nucleotide-binding protein G</p> <p>Ras-related protein Rab-3A</p> <p>Neurofilament light polypeptide</p> <p>Protein kinase C alpha type</p> <p>Glutaminase kidney isoform, mitochondrial</p> <p>cAMP-dependent protein kinase catalytic subunit beta</p> <p>Guanine nucleotide-binding protein G</p> <p>Vesicle-associated membrane protein 2</p> <p>Synapsin-2</p> <p>4-aminobutyrate aminotransferase, mitochondrial</p> <p>Disks large homolog 2</p> <p>Gamma-aminobutyric acid receptor subunit beta-2</p> <p>Gamma-aminobutyric acid receptor subunit beta-3</p> <p>Tubulin beta-3 chain</p> <p>Vesicular inhibitory amino acid transporter</p> <p>Vesicular glutamate transporter 1</p> <p>AP-2 complex subunit alpha-1</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>Guanine nucleotide-binding protein G</p> <p>Peripheral plasma membrane protein CASK</p> <p>Glutamate decarboxylase 1</p> <p>Synaptotagmin-1</p>

		<p>Guanine nucleotide-binding protein G</p> <p>Synaptosomal-associated protein 25</p> <p>Tubulin alpha-4A chain</p> <p>Tubulin beta-4A chain</p> <p>Guanine nucleotide-binding protein subunit beta-5</p> <p>Complexin-1</p> <p>Protein phosphatase 1E</p> <p>Vesicle-fusing ATPase</p>
Neurotransmitter release cycle	14	<p>Vesicular inhibitory amino acid transporter</p> <p>Vesicular glutamate transporter 1</p> <p>Synapsin-1</p> <p>Glutamate decarboxylase 2</p> <p>Ras-related protein Rab-3A</p> <p>Glutamate decarboxylase 1</p> <p>Peripheral plasma membrane protein CASK</p> <p>Synaptotagmin-1</p> <p>Synaptosomal-associated protein 25</p> <p>Glutaminase kidney isoform, mitochondrial</p> <p>Vesicle-associated membrane protein 2</p> <p>Complexin-1</p> <p>Synapsin-2</p> <p>4-aminobutyrate aminotransferase, mitochondrial</p>
Neurotransmitter receptors and postsynaptic signal transmission	23	<p>Band 4.1-like protein 1</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit gamma</p> <p>Disks large homolog 2</p> <p>Calcium/calmodulin-dependent protein kinase type II subunit beta</p> <p>Gamma-aminobutyric acid receptor subunit beta-2</p> <p>Gamma-aminobutyric acid receptor subunit beta-3</p> <p>Tubulin beta-3 chain</p> <p>Guanine nucleotide-binding protein G</p> <p>AP-2 complex subunit alpha-1</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>Guanine nucleotide-binding protein G</p> <p>Guanine nucleotide-binding protein G</p> <p>Peripheral plasma membrane protein CASK</p> <p>Guanine nucleotide-binding protein G</p> <p>Neurofilament light polypeptide</p> <p>Protein kinase C alpha type</p> <p>Tubulin alpha-4A chain</p> <p>Tubulin beta-4A chain</p> <p>cAMP-dependent protein kinase catalytic subunit beta</p> <p>Guanine nucleotide-binding protein subunit beta-5</p> <p>Guanine nucleotide-binding protein G</p> <p>Protein phosphatase 1E</p> <p>Vesicle-fusing ATPase</p>
Organelle biogenesis and maintenance	20	<p>ATP synthase subunit O, mitochondrial</p> <p>ATP synthase subunit f, mitochondrial</p> <p>Tubulin beta-3 chain</p> <p>ATP synthase subunit gamma, mitochondrial</p> <p>ATP synthase protein 8</p> <p>Stress-70 protein, mitochondrial</p> <p>cAMP-dependent protein kinase catalytic subunit alpha</p> <p>14-3-3 protein gamma</p> <p>ATP synthase subunit alpha, mitochondrial</p> <p>ATP synthase-coupling factor 6, mitochondrial</p>

		ATP synthase F Dynein light chain 2, cytoplasmic Tubulin alpha-4A chain Rab-3A-interacting protein ATP synthase subunit e, mitochondrial Tubulin beta-4A chain Platelet-activating factor acetylhydrolase IB subunit beta MICOS complex subunit MIC60 ATP synthase subunit beta, mitochondrial Superoxide dismutase [Mn], mitochondrial
Mitochondrial biogenesis	12	ATP synthase subunit alpha, mitochondrial ATP synthase-coupling factor 6, mitochondrial ATP synthase subunit O, mitochondrial ATP synthase F ATP synthase subunit f, mitochondrial ATP synthase subunit e, mitochondrial ATP synthase subunit gamma, mitochondrial ATP synthase protein 8 MICOS complex subunit MIC60 ATP synthase subunit beta, mitochondrial Stress-70 protein, mitochondrial Superoxide dismutase [Mn], mitochondrial
Cristae formation	11	ATP synthase subunit alpha, mitochondrial ATP synthase-coupling factor 6, mitochondrial ATP synthase subunit O, mitochondrial ATP synthase F ATP synthase subunit f, mitochondrial ATP synthase subunit e, mitochondrial ATP synthase subunit gamma, mitochondrial ATP synthase protein 8 MICOS complex subunit MIC60 ATP synthase subunit beta, mitochondrial Stress-70 protein, mitochondrial
Protein localization	14	Electrogenic aspartate/glutamate antiporter SLC25A12, mitochondrial Isocitrate dehydrogenase [NAD] subunit gamma, mitochondrial ADP/ATP translocase 1 Stress-70 protein, mitochondrial Mitochondrial import receptor subunit TOM22 homolog Citrate synthase, mitochondrial Aconitate hydratase, mitochondrial ATP synthase subunit alpha, mitochondrial Mitochondrial import receptor subunit TOM70 Cytochrome c1, heme protein, mitochondrial Electrogenic aspartate/glutamate antiporter SLC25A13, mitochondrial Vesicle-associated membrane protein 2 Voltage-dependent anion-selective channel protein 1 ATP synthase subunit beta, mitochondrial
Mitochondrial protein import	13	Electrogenic aspartate/glutamate antiporter SLC25A12, mitochondrial Isocitrate dehydrogenase [NAD] subunit gamma, mitochondrial ADP/ATP translocase 1 Stress-70 protein, mitochondrial Mitochondrial import receptor subunit TOM22 homolog Citrate synthase, mitochondrial Aconitate hydratase, mitochondrial

		ATP synthase subunit alpha, mitochondrial Mitochondrial import receptor subunit TOM70 Cytochrome c1, heme protein, mitochondrial Electrogenic aspartate/glutamate antiporter SLC25A13, mitochondrial Voltage-dependent anion-selective channel protein 1 ATP synthase subunit beta, mitochondrial
Visual phototransduction	9	Guanylyl cyclase-activating protein 1 cGMP-gated cation channel alpha-1 Guanine nucleotide-binding protein G Retinol dehydrogenase 11 Protein kinase C alpha type Short-wave-sensitive opsin 1 Guanine nucleotide-binding protein G Guanine nucleotide-binding protein subunit beta-5 Guanine nucleotide-binding protein G
The phototransduction cascade	7	Guanylyl cyclase-activating protein 1 cGMP-gated cation channel alpha-1 Guanine nucleotide-binding protein G Protein kinase C alpha type Guanine nucleotide-binding protein G Guanine nucleotide-binding protein subunit beta-5 Guanine nucleotide-binding protein G