

Table S5. Proteome-metabolome data co-analysis.

ID	Name	#Cpd	Cpd Metabolites	Proteins (accession)
ko00230	Purine metabolism	18	Adenine D-Ribose 5-phosphate Adenosine monophosphate (AMP) Xanthylic acid (XMP) Inosine Xanthosine Guanosine 5'-monophosphate (GMP) Hypoxanthine ADP-ribose Deoxyadenosine	Q99WJ1 Q6GEU7 Q6GHM6 Q6GJC6 Q6GEE4 Q6GGU2 Q99UU0 Q6GA63
ko00630	Glyoxylate and dicarboxylate metabolism	17	Succinate L-Serine L-Glutamate cis-Aconitate D-Ribulose 1,5-bisphosphate DL-2-Phosphoglycerate Citrate Glyceric acid	Q6GII3 Q6GHY9 Q6G9K9 Q99RW4 Q2Y YT1 Q8NWD0 Q8NWC9 Q6GH72 Q8NY 95
ko00260	Glycine, serine and threonine metabolism	15	L-Serine L-Threonine DL-2-Phosphoglycerate Glyceric acid Betaine Choline	Q6GII3 Q6GHY9 Q6GJB8 Q8NXY3 Q6G6 Q5 Q8NWD0 Q8NWC9 Q8NUM0 Q99SJ 1
ko05230	Central carbon metabolism in cancer	14	Succinate L-Serine L-Glutamate DL-2-Phosphoglycerate Citrate L-Methionine L-Leucine L-Valine L-Histidine L-Arginine L-Isoleucine	Q6GG08 Q820A6 Q6G6Q5
ko00020	Citrate cycle (TCA cycle)	13	Succinate cis-Aconitate Citrate	Q6GHY9 Q6G9K9 Q6GHJ0 Q8NX01 Q8N W61 Q931R8 Q5HES4 Q8NWR7 Q820A6 Q2YY06
ko00720	Carbon fixation pathways in prokaryotes	13	Succinate cis-Aconitate Citrate 5-Methyltetrahydrofolate (5-Methyl-THF)	Q6G9K9 Q8NX95 Q6GHJ0 Q8NX01 Q8N W61 Q5HES4 Q2G296 Q5HF42 Q8NY95
ko00240	Pyrimidine metabolism	13	Uridine diphosphate glucose(UDP-D-Glucose) Uracil Uridine 5'-diphosphate (UDP) Uridine Uridine 5'-monophosphate (UMP)	Q6GEU7 Q6GJC6 Q6GA10 Q8NX25 Q99S C3 Q6GGU2 Q8NYD0 Q6GHN4
ko00970	Aminoacyl-tRNA biosynthesis	13	L-Serine L-Glutamate L-Threonine L-Methionine L-Leucine L-Valine L-Histidine L-Arginine L-Isoleucine	Q6GFF6 Q5HJY7 Q99W73 P41368
ko00620	Pyruvate metabolism	12	Succinate	Q6GHY9 Q6GK73 Q8NXY2 Q5HJK3 Q6 GDS2 Q5HES4 Q820A6 Q99WZ7 Q8NU M9 Q8NY95 Q2FWX9
ko00010	Glycolysis Gluconeogenesis	/ 12	DL-2-Phosphoglycerate	Q6GG08 Q93P61 Q6GHY9 Q6GK73 Q5H JK3 Q5HCU6 Q820A6 Q6G6Q5 Q8NUM9 Q6GG19 Q2FWX9

ko02020	Two-component system	11	Succinate L-Glutamate Citrate	Q6GD89 Q7A4R9 Q931H9 Q6GIF4 Q99VW2 Q6GIF6 Q8NY95 Q99X00
ko00340	Histidine metabolism	11	L-Carnosine L-Glutamate L-Histidine	Q5HJK3 Q8NV65 Q6GEA1 Q6GDC8 Q8NUI2 P64356 Q931G1 Q2FWX9
ko00330	Arginine and proline metabolism	11	D-Proline L-Glutamate Hydroxyproline L-Arginine Creatinine S-Adenosylmethionine	Q5HF24 Q5HJK3 Q6GAW9 Q8NUR2 Q2FWX9
ko00310	Lysine degradation	10	Succinate 2-Oxoadipic acid L-Saccharopine	Q5HF24 Q5HJK3 Q931R8 Q8NWR7 Q8NY95 Q2FWX9 Q2YY06
ko00270	Cysteine and methionine metabolism	10	L-Serine L-Methionine S-Methyl-5'-thioadenosine S-Adenosylmethionine	Q6GEU1 Q6GK73 Q6GBT3 Q8NUM9 Q8NY94 Q99TQ0
ko00220	Arginine biosynthesis	10	L-Glutamate N2-Acetyl-L-ornithine L-Arginine L-Citrulline	Q6GEE4 Q99VD0 Q99UU0 Q8NUK7 Q8NUK8 Q8NXF2
ko00680	Methane metabolism	10	L-Serine DL-2-Phosphoglycerate Glyceric acid Tyramine	Q6GG08 Q99RW4 Q5HCU6 Q6G6Q5 Q2YYT1
ko00640	Propanoate metabolism	9	Succinate Propionic acid	Q6GHY9 Q6GK73 Q6GHJ0 Q8NX01 Q99WZ7 Q8NUM9 Q8NY95
ko00250	Alanine, aspartate and glutamate metabolism	9	Succinate L-Glutamate Citrate	Q6GA10 Q8NVE6 Q99VD0 Q99TF4 Q8NUR2 Q8NXF2
ko00561	Glycerolipid metabolism	9	Uridine diphosphate glucose(UDP-D-Glucose) DL-2-Phosphoglycerate Glyceric acid Glycerol 3-phosphate	Q6GH52 Q6GHD5 Q5HJK3 Q8NUI5 Q2FWX9
ko00290	Valine, leucine and isoleucine biosynthesis	9	L-Threonine L-Leucine L-Valine L-Isoleucine	Q6GF14 Q6GBT3 Q6G7Q4 Q8NVI9 Q99SJ1
ko00190	Oxidative phosphorylation	8	Succinate Nicotinamide adenine dinucleotide (NAD)	Q6GFD7 Q99V36 Q99SF4 Q6GEX3 Q99SE9 Q99V38
ko00520	Amino sugar and nucleotide sugar metabolism	8	Uridine diphosphate glucose(UDP-D-Glucose) L-Fucose-1-phosphate N-Acetylmannosamine	Q6GIQ3 Q93P61 Q8NVE6 Q6GBR8 Q99X30
ko00280	Valine, leucine and isoleucine degradation	8	L-Leucine L-Valine L-Isoleucine	Q6GHY9 Q6GBT3 Q5HJK3 Q8NY95 Q2FWX9

ko00380	Tryptophan metabolism	7	2-Oxoadipic acid Anthranilic acid (Vitamin L1)	Q5HJK3 Q931R8 Q6GH72 Q8NY95 Q2FWX9
ko00770	Pantothenate and CoA biosynthesis	7	Pantothenate Uracil L-Valine	Q6GHW1 Q6G8N8 Q6GBT3 Q6G7Q4
ko04922	Glucagon signaling pathway	7	Succinate DL-2-Phosphoglycerate Citrate	Q6GK73 Q820A6 Q6G6Q5 Q8NUM9
ko00660	C5-Branched dibasic acid metabolism	6	L-Glutamate cis-Aconitate	Q6GF14 Q6GHJ0 Q8NX01 Q8NVI9
ko00860	Porphyrin and chlorophyll metabolism	6	L-Glutamate L-Threonine	Q6GFM3 Q8NW75 Q2YU22 Q99X56
ko00030	Pentose phosphate pathway	6	D-Ribose 5-phosphate DL-2-Phosphoglycerate Glyceric acid	Q6GG08 P99174 Q5HCU6
ko00410	beta-Alanine metabolism	6	L-Carnosine Pantothenate Uracil L-Histidine	Q5HJK3 Q2FWX9
ko00061	Fatty acid biosynthesis	6	Palmitic acid Myristic acid Stearic acid cis-9-Palmitoleic acid	Q6GI75 Q6GIA4
ko00760	Nicotinate and nicotinamide metabolism	6	Succinate Propionic acid Nicotinate Nicotinamide Nicotinamide adenine dinucleotide (NAD)	Q5HEK9
ko00550	Peptidoglycan biosynthesis	5	D-Alanyl-D-alanine (D-Ala-D-Ala)	Q6GIQ3 Q2FZP6 Q6GFW8 Q9KIN5
ko04212	Longevity regulating pathway - worm	5	Nicotinamide Nicotinamide adenine dinucleotide (NAD)	Q6GIM3 Q6GKH2 Q6GH72
ko00300	Lysine biosynthesis	5	2-Oxoadipic acid L-Saccharopine	Q7A522 Q9EZ10 Q9EZ12
ko00650	Butanoate metabolism	5	Succinate L-Glutamate	Q99WZ7 Q6GKH9 Q8NY95
ko00480	Glutathione metabolism	5	L-Glutamate gamma-L-Glutamyl-L-valine L-Pyroglutamic acid	Q8NW61 Q6GHD0
ko00966	Glucosinolate biosynthesis	5	L-Methionine L-Leucine L-Valine L-Isoleucine	Q6GF14
ko00261	Monobactam biosynthesis	5	L-Serine L-Threonine L-Arginine S-Adenosylmethionine	Q9EZ12
ko00040	Pentose and glucuronate interconversions	4	Uridine diphosphate glucose(UDP-D-Glucose)	Q99WW8 Q6GK63 Q2G1B9
ko00670	One carbon pool by folate	4	5-Methyltetrahydrofolate (5-Methyl-THF)	Q8NX95 Q2G296 Q5HF42
ko00473	D-Alanine metabolism	4	D-Alanyl-D-alanine (D-Ala-D-Ala)	Q5HF24 Q6GIF4 Q6GIF6
ko00071	Fatty acid degradation	4	Palmitic acid	Q5HJK3 Q8NY95 Q2FWX9
ko00710	Carbon fixation in photosynthetic organisms	4	D-Ribose 5-phosphate D-Ribulose 1,5-bisphosphate	Q5HCU6 Q6GG19

ko04211	Longevity regulating pathway	4	Adenosine monophosphate (AMP) Nicotinamide dinucleotide (NAD)	adenine	Q6GKH2 Q6GH72
ko04068	FoxO signaling pathway	4	L-Glutamate Adenosine monophosphate (AMP)		Q6GKH2 Q6GH72
ko00564	Glycerophospholipid metabolism	4	Glycerol 3-phosphate Triethanolamine Choline		Q6GH52
ko00430	Taurine and hypotaurine metabolism	3	L-Glutamate		Q99VD0 Q99TF4
ko00053	Ascorbate and aldarate metabolism	3	Uridine diphosphate glucose(UDP-D-Glucose)		Q5HJK3 Q2FWX9
ko00910	Nitrogen metabolism	3	L-Glutamate		Q99VD0 Q99UU0
ko00051	Fructose and mannose metabolism	3	L-Fucose-1-phosphate		Q6GG08 Q5HCU6
ko05014	Amyotrophic lateral sclerosis (ALS)	3	L-Glutamate L-Arginine		Q6GH72
ko04152	AMPK signaling pathway	3	Adenosine monophosphate (AMP) Nicotinamide dinucleotide (NAD)	adenine	Q6GG08
ko00500	Starch and sucrose metabolism	2	Uridine diphosphate glucose(UDP-D-Glucose)		Q93P61
ko00052	Galactose metabolism	2	Uridine diphosphate glucose(UDP-D-Glucose)		Q6GG08
ko00400	Phenylalanine, tyrosine and tryptophan biosynthesis	2	Anthranilic acid (Vitamin L1)		Q59803
ko04918	Thyroid hormone synthesis	2	D-Ribose 5-phosphate		Q6GHD0
ko00471	D-Glutamine and D-glutamate metabolism	2	L-Glutamate		Q6GFW8
ko00983	Drug metabolism - other enzymes	2	Nicotinamide adenine dinucleotide (NAD)		Q6GGU2
ko00472	D-Arginine and D-ornithine metabolism	2	L-Arginine		Q5HF24
ko00750	Vitamin B6 metabolism	2	Pyridoxine		Q6GJF0

ko00590	Arachidonic metabolism	acid	2	Arachidonic Acid (peroxide free)	Q6GHD0
ko00900	Terpenoid biosynthesis	backbone	2	Mevalonic acid	Q8NY95
ko05016	Huntington disease		2	L-Glutamate	Q6GKH2
ko00360	Phenylalanine metabolism		2	Succinate	Q5HF24
