

Supplementary Table S7. GO annotation and KEGG pathway analysis of DE mRNAs.**Table S7-1. GO annotation of DE mRNAs.**

| GO_CFP term level_2 | GO_CFP term level_1 | Number |
|---|---------------------|--------|
| cellular process | biological_process | 1138 |
| biological regulation | biological_process | 847 |
| metabolic process | biological_process | 815 |
| regulation of biological process | biological_process | 789 |
| response to stimulus | biological_process | 594 |
| cellular component organization or biogenesis | biological_process | 499 |
| multicellular organismal process | biological_process | 486 |
| positive regulation of biological process | biological_process | 447 |
| developmental process | biological_process | 441 |
| signaling | biological_process | 434 |
| localization | biological_process | 424 |
| negative regulation of biological process | biological_process | 384 |
| locomotion | biological_process | 151 |
| immune system process | biological_process | 135 |
| cell proliferation | biological_process | 132 |
| biological adhesion | biological_process | 97 |
| multi-organism process | biological_process | 92 |
| growth | biological_process | 87 |
| reproduction | biological_process | 76 |
| reproductive process | biological_process | 76 |
| behavior | biological_process | 35 |
| rhythmic process | biological_process | 14 |
| cell killing | biological_process | 11 |
| detoxification | biological_process | 11 |
| pigmentation | biological_process | 10 |
| biological_process | biological_process | 4 |
| cell aggregation | biological_process | 1 |
| cell | cellular_component | 1190 |
| cell part | cellular_component | 1184 |

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|----------------------------------|--------------------|-----|
| organelle | cellular_component | 905 |
| organelle part | cellular_component | 624 |
| membrane | cellular_component | 570 |
| membrane part | cellular_component | 419 |
| protein-containing complex | cellular_component | 370 |
| membrane-enclosed lumen | cellular_component | 337 |
| extracellular region | cellular_component | 115 |
| cell junction | cellular_component | 92 |
| supramolecular complex | cellular_component | 90 |
| extracellular region part | cellular_component | 90 |
| synapse | cellular_component | 82 |
| synapse part | cellular_component | 59 |
| cellular_component | cellular_component | 4 |
| nucleoid | cellular_component | 4 |
| other organism | cellular_component | 1 |
| other organism part | cellular_component | 1 |
| binding | molecular_function | 973 |
| catalytic activity | molecular_function | 468 |
| molecular function regulator | molecular_function | 137 |
| transcription regulator activity | molecular_function | 109 |
| transporter activity | molecular_function | 84 |
| structural molecule activity | molecular_function | 61 |
| molecular transducer activity | molecular_function | 59 |
| translation regulator activity | molecular_function | 10 |
| antioxidant activity | molecular_function | 8 |
| cargo receptor activity | molecular_function | 5 |
| molecular carrier activity | molecular_function | 4 |
| molecular_function | molecular_function | 4 |
| hijacked molecular function | molecular_function | 3 |

Table S7-2. KEGG pathway enrichment of DE mRNAs.

| KEGG pathway term ID | KEGG pathway term description | KEGG pathway term level_1 | KEGG pathway term level_2 | Term candidate gene number | Total candidate gene number | Term gene number | Total gene number | Rich ratio | Q value |
|----------------------|--|--------------------------------------|---|----------------------------|-----------------------------|------------------|-------------------|------------|-------------|
| 590 | Arachidonic acid metabolism | Metabolism | Lipid metabolism | 17 | 582 | 211 | 27723 | 0.08056872 | 6.05E-04 |
| 10 | Glycolysis/Gluconeogenesis | Metabolism | Carbohydrate metabolism | 14 | 582 | 189 | 27723 | 0.07407407 | 0.005791549 |
| 830 | Retinol metabolism | Metabolism | Metabolism of cofactors and vitamins | 13 | 582 | 216 | 27723 | 0.06018519 | 0.047721002 |
| 4218 | Cellular senescence | Cellular Processes | Cell growth and death | 29 | 582 | 727 | 27723 | 0.03988996 | 0.047721002 |
| 4360 | Axon guidance | Organismal Systems | Development | 39 | 582 | 1110 | 27723 | 0.03513514 | 0.05006444 |
| 4922 | Glucagon signaling pathway | Organismal Systems | Endocrine system | 22 | 582 | 509 | 27723 | 0.043222 | 0.05006444 |
| 3320 | PPAR signaling pathway | Organismal Systems | Endocrine system | 19 | 582 | 432 | 27723 | 0.04398148 | 0.062608999 |
| 4115 | p53 signaling pathway | Cellular Processes | Cell growth and death | 14 | 582 | 273 | 27723 | 0.05128205 | 0.062608999 |
| 4152 | AMPK signaling pathway | Environmental Information Processing | Signal transduction | 23 | 582 | 605 | 27723 | 0.03801653 | 0.113595691 |
| 4920 | Adipocytokine signaling pathway | Organismal Systems | Endocrine system | 17 | 582 | 396 | 27723 | 0.04292929 | 0.113595691 |
| 4066 | HIF-1 signaling pathway | Environmental Information Processing | Signal transduction | 17 | 582 | 406 | 27723 | 0.04187192 | 0.123195775 |
| 4151 | PI3K-Akt signaling pathway | Environmental Information Processing | Signal transduction | 44 | 582 | 1421 | 27723 | 0.03096411 | 0.13170814 |
| 51 | Fructose and mannose metabolism | Metabolism | Carbohydrate metabolism | 8 | 582 | 134 | 27723 | 0.05970149 | 0.133302988 |
| 4910 | Insulin signaling pathway | Organismal Systems | Endocrine system | 23 | 582 | 634 | 27723 | 0.0362776 | 0.139129903 |
| 4726 | Serotonergic synapse | Organismal Systems | Nervous system | 16 | 582 | 403 | 27723 | 0.03970223 | 0.17742896 |
| 4921 | Oxytocin signaling pathway | Organismal Systems | Endocrine system | 26 | 582 | 768 | 27723 | 0.03385417 | 0.17742896 |
| 4213 | Longevity regulating pathway - multiple species | Organismal Systems | Aging | 12 | 582 | 276 | 27723 | 0.04347826 | 0.195846348 |
| 1200 | Carbon metabolism | Metabolism | Global and overview maps | 14 | 582 | 348 | 27723 | 0.04022989 | 0.206785596 |
| 1100 | Metabolic pathways | Metabolism | Global and overview maps | 116 | 582 | 4632 | 27723 | 0.02504318 | 0.256074971 |
| 4137 | Mitophagy - animal | Cellular Processes | Transport and catabolism | 13 | 582 | 330 | 27723 | 0.03939394 | 0.256074971 |
| 4710 | Circadian rhythm | Organismal Systems | Environmental adaptation | 9 | 582 | 196 | 27723 | 0.04591837 | 0.256074971 |
| 4744 | Phototransduction | Organismal Systems | Sensory system | 4 | 582 | 55 | 27723 | 0.07272727 | 0.297855098 |
| 4977 | Vitamin digestion and absorption | Organismal Systems | Digestive system | 5 | 582 | 85 | 27723 | 0.05882353 | 0.336860974 |
| 4510 | Focal adhesion | Cellular Processes | Cellular community - eukaryotes | 28 | 582 | 930 | 27723 | 0.03010753 | 0.358275377 |
| 30 | Pentose phosphate pathway | Metabolism | Carbohydrate metabolism | 5 | 582 | 92 | 27723 | 0.05434783 | 0.369117054 |
| 71 | Fatty acid degradation | Metabolism | Lipid metabolism | 7 | 582 | 153 | 27723 | 0.04575163 | 0.369117054 |
| 311 | Penicillin and cephalosporin biosynthesis | Metabolism | Biosynthesis of other secondary metabolites | 1 | 582 | 2 | 27723 | 0.5 | 0.369117054 |
| 472 | D-Arginine and D-ornithine metabolism | Metabolism | Metabolism of other amino acids | 1 | 582 | 2 | 27723 | 0.5 | 0.369117054 |
| 4750 | Inflammatory mediator regulation of TRP channels | Organismal Systems | Sensory system | 17 | 582 | 516 | 27723 | 0.03294574 | 0.37245384 |
| 620 | Pyruvate metabolism | Metabolism | Carbohydrate metabolism | 7 | 582 | 164 | 27723 | 0.04268293 | 0.443790698 |
| 640 | Propanoate metabolism | Metabolism | Carbohydrate metabolism | 5 | 582 | 100 | 27723 | 0.05 | 0.443790698 |

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| 4370 | VEGF signaling pathway | Environmental Information Processing | Signal transduction | 10 | 582 | 271 | 27723 | 0.03690037 | 0.443790698 |
| 4068 | FoxO signaling pathway | Environmental Information Processing | Signal transduction | 17 | 582 | 539 | 27723 | 0.03153989 | 0.452370262 |
| 330 | Arginine and proline metabolism | Metabolism | Amino acid metabolism | 7 | 582 | 172 | 27723 | 0.04069767 | 0.487532374 |
| 4964 | Proximal tubule bicarbonate | Organismal Systems | Excretory system | 4 | 582 | 77 | 27723 | 0.05194805 | 0.522132969 |
| 4010 | MAPK signaling pathway | Environmental Information Processing | Signal transduction | 36 | 582 | 1350 | 27723 | 0.02666667 | 0.548976767 |
| 591 | Linoleic acid metabolism | Metabolism | Lipid metabolism | 4 | 582 | 82 | 27723 | 0.04878049 | 0.575637032 |
| 4062 | Chemokine signaling pathway | Organismal Systems | Immune system | 22 | 582 | 776 | 27723 | 0.02835052 | 0.575637032 |
| 4215 | Apoptosis - multiple species | Cellular Processes | Cell growth and death | 6 | 582 | 149 | 27723 | 0.04026846 | 0.575637032 |
| 770 | Pantothenate and CoA biosynthesis | Metabolism | Metabolism of cofactors and vitamins | 4 | 582 | 85 | 27723 | 0.04705882 | 0.60236596 |
| 380 | Tryptophan metabolism | Metabolism | Amino acid metabolism | 6 | 582 | 156 | 27723 | 0.03846154 | 0.630172546 |
| 52 | Galactose metabolism | Metabolism | Carbohydrate metabolism | 4 | 582 | 94 | 27723 | 0.04255319 | 0.6431272 |
| 410 | beta-Alanine metabolism | Metabolism | Metabolism of other amino acids | 4 | 582 | 92 | 27723 | 0.04347826 | 0.6431272 |
| 600 | Sphingolipid metabolism | Metabolism | Lipid metabolism | 6 | 582 | 164 | 27723 | 0.03658537 | 0.6431272 |
| 630 | Glyoxylate and dicarboxylate metabolism | Metabolism | Carbohydrate metabolism | 4 | 582 | 94 | 27723 | 0.04255319 | 0.6431272 |
| 4014 | Ras signaling pathway | Environmental Information Processing | Signal transduction | 26 | 582 | 979 | 27723 | 0.02655771 | 0.6431272 |
| 4141 | Protein processing in endoplasmic reticulum | Genetic Information Processing | Folding, sorting and degradation | 18 | 582 | 631 | 27723 | 0.02852615 | 0.6431272 |
| 4530 | Tight junction | Cellular Processes | Cellular community - eukaryotes | 24 | 582 | 892 | 27723 | 0.02690583 | 0.6431272 |
| 4979 | Cholesterol metabolism | Organismal Systems | Digestive system | 6 | 582 | 161 | 27723 | 0.03726708 | 0.6431272 |
| 534 | Glycosaminoglycan biosynthesis - heparan sulfate / heparin | Metabolism | Glycan biosynthesis and metabolism | 3 | 582 | 64 | 27723 | 0.046875 | 0.691860847 |
| 4918 | Thyroid hormone synthesis | Organismal Systems | Endocrine system | 9 | 582 | 287 | 27723 | 0.03135889 | 0.691860847 |
| 3460 | Fanconi anemia pathway | Genetic Information Processing | Replication and repair | 7 | 582 | 213 | 27723 | 0.03286385 | 0.7136552 |
| 4727 | GABAergic synapse | Organismal Systems | Nervous system | 10 | 582 | 332 | 27723 | 0.03012048 | 0.7136552 |
| 4728 | Dopaminergic synapse | Organismal Systems | Nervous system | 18 | 582 | 677 | 27723 | 0.02658789 | 0.788259096 |
| 563 | Glycosylphosphatidylinositol (GPI)- anchor biosynthesis | Metabolism | Glycan biosynthesis and metabolism | 4 | 582 | 108 | 27723 | 0.03703704 | 0.796622129 |
| 4371 | Apelin signaling pathway | Environmental Information Processing | Signal transduction | 16 | 582 | 597 | 27723 | 0.02680067 | 0.796622129 |
| 1230 | Biosynthesis of amino acids | Metabolism | Global and overview maps | 7 | 582 | 225 | 27723 | 0.03111111 | 0.797787354 |
| 650 | Butanoate metabolism | Metabolism | Carbohydrate metabolism | 3 | 582 | 74 | 27723 | 0.04054054 | 0.8132496 |
| 520 | Amino sugar and nucleotide sugar metabolism | Metabolism | Carbohydrate metabolism | 5 | 582 | 150 | 27723 | 0.03333333 | 0.819253342 |
| 340 | Histidine metabolism | Metabolism | Amino acid metabolism | 3 | 582 | 77 | 27723 | 0.03896104 | 0.823226929 |
| 500 | Starch and sucrose metabolism | Metabolism | Carbohydrate metabolism | 4 | 582 | 113 | 27723 | 0.03539823 | 0.823226929 |
| 4974 | Protein digestion and absorption | Organismal Systems | Digestive system | 10 | 582 | 357 | 27723 | 0.0280112 | 0.823226929 |
| 140 | Steroid hormone biosynthesis | Metabolism | Lipid metabolism | 5 | 582 | 156 | 27723 | 0.03205128 | 0.837613525 |

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|------|---|--------------------------------------|---|----|-----|-----|-------|------------|-------------|
| 4713 | Circadian entrainment | Organismal Systems | Environmental adaptation | 13 | 582 | 488 | 27723 | 0.02663934 | 0.837613525 |
| 400 | Phenylalanine, tyrosine and tryptophan biosynthesis | Metabolism | Amino acid metabolism | 1 | 582 | 14 | 27723 | 0.07142857 | 0.849062644 |
| 524 | Neomycin, kanamycin and gentamicin biosynthesis | Metabolism | Biosynthesis of other secondary metabolites | 1 | 582 | 13 | 27723 | 0.07692308 | 0.849062644 |
| 3440 | Homologous recombination | Genetic Information Processing | Replication and repair | 6 | 582 | 201 | 27723 | 0.02985075 | 0.849062644 |
| 4120 | Ubiquitin mediated proteolysis | Genetic Information Processing | Folding, sorting and degradation | 18 | 582 | 723 | 27723 | 0.02489627 | 0.849062644 |
| 4340 | Hedgehog signaling pathway | Environmental Information Processing | Signal transduction | 7 | 582 | 247 | 27723 | 0.02834008 | 0.849062644 |
| 4614 | Renin-angiotensin system | Organismal Systems | Endocrine system | 3 | 582 | 84 | 27723 | 0.03571429 | 0.849062644 |
| 4630 | Jak-STAT signaling pathway | Environmental Information Processing | Signal transduction | 15 | 582 | 589 | 27723 | 0.02546689 | 0.849062644 |
| 4724 | Glutamatergic synapse | Organismal Systems | Nervous system | 14 | 582 | 541 | 27723 | 0.025878 | 0.849062644 |
| 20 | Citrate cycle (TCA cycle) | Metabolism | Carbohydrate metabolism | 3 | 582 | 86 | 27723 | 0.03488372 | 0.850328565 |
| 430 | Taurine and hypotaurine metabolism | Metabolism | Metabolism of other amino acids | 2 | 582 | 49 | 27723 | 0.04081633 | 0.850328565 |
| 4270 | Vascular smooth muscle contraction | Organismal Systems | Circulatory system | 15 | 582 | 596 | 27723 | 0.02516779 | 0.850328565 |
| 4114 | Oocyte meiosis | Cellular Processes | Cell growth and death | 13 | 582 | 512 | 27723 | 0.02539063 | 0.859089895 |
| 260 | Glycine, serine and threonine metabolism | Metabolism | Amino acid metabolism | 4 | 582 | 134 | 27723 | 0.02985075 | 0.90020437 |
| 3013 | RNA transport | Genetic Information Processing | Translation | 15 | 582 | 613 | 27723 | 0.02446982 | 0.90020437 |
| 4392 | Hippo signaling pathway - multiple species | Environmental Information Processing | Signal transduction | 4 | 582 | 132 | 27723 | 0.03030303 | 0.90020437 |
| 4658 | Th1 and Th2 cell differentiation | Organismal Systems | Immune system | 10 | 582 | 391 | 27723 | 0.02557545 | 0.90020437 |
| 480 | Glutathione metabolism | Metabolism | Metabolism of other amino acids | 4 | 582 | 141 | 27723 | 0.02836879 | 0.91803182 |
| 604 | Glycosphingolipid biosynthesis - ganglio series | Metabolism | Glycan biosynthesis and metabolism | 2 | 582 | 58 | 27723 | 0.03448276 | 0.91803182 |
| 4071 | Sphingolipid signaling pathway | Environmental Information Processing | Signal transduction | 12 | 582 | 493 | 27723 | 0.02434077 | 0.91803182 |
| 4610 | Complement and coagulation cascades | Organismal Systems | Immune system | 6 | 582 | 225 | 27723 | 0.02666667 | 0.91803182 |
| 4625 | C-type lectin receptor signaling pathway | Organismal Systems | Immune system | 12 | 582 | 497 | 27723 | 0.02414487 | 0.91803182 |
| 4640 | Hematopoietic cell lineage | Organismal Systems | Immune system | 10 | 582 | 397 | 27723 | 0.02518892 | 0.91803182 |
| 4659 | Th17 cell differentiation | Organismal Systems | Immune system | 12 | 582 | 492 | 27723 | 0.02439024 | 0.91803182 |
| 4810 | Regulation of actin cytoskeleton | Cellular Processes | Cell motility | 21 | 582 | 906 | 27723 | 0.02317881 | 0.91803182 |
| 4973 | Carbohydrate digestion and absorption | Organismal Systems | Digestive system | 5 | 582 | 180 | 27723 | 0.02777778 | 0.91803182 |
| 230 | Purine metabolism | Metabolism | Nucleotide metabolism | 15 | 582 | 654 | 27723 | 0.02293578 | 0.928929353 |
| 270 | Cysteine and methionine metabolism | Metabolism | Amino acid metabolism | 4 | 582 | 155 | 27723 | 0.02580645 | 0.928929353 |
| 450 | Selenocompound metabolism | Metabolism | Metabolism of other amino acids | 2 | 582 | 70 | 27723 | 0.02857143 | 0.928929353 |
| 512 | Mucin type O-glycan biosynthesis | Metabolism | Glycan biosynthesis and metabolism | 4 | 582 | 148 | 27723 | 0.02702703 | 0.928929353 |

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|------|--|--------------------------------------|--|----|-----|-----|-------|------------|-------------|
| 514 | Other types of O-glycan biosynthesis | Metabolism | Glycan biosynthesis and metabolism | 3 | 582 | 119 | 27723 | 0.02521008 | 0.928929353 |
| 533 | Glycosaminoglycan biosynthesis - keratan sulfate | Metabolism | Glycan biosynthesis and metabolism | 2 | 582 | 71 | 27723 | 0.02816901 | 0.928929353 |
| 592 | alpha-Linolenic acid metabolism | Metabolism | Lipid metabolism | 2 | 582 | 66 | 27723 | 0.03030303 | 0.928929353 |
| 670 | One carbon pool by folate | Metabolism | Metabolism of cofactors and vitamins | 2 | 582 | 74 | 27723 | 0.02702703 | 0.928929353 |
| 780 | Biotin metabolism | Metabolism | Metabolism of cofactors and vitamins | 1 | 582 | 22 | 27723 | 0.04545455 | 0.928929353 |
| 900 | Terpenoid backbone biosynthesis | Metabolism | Metabolism of terpenoids and polyketides | 2 | 582 | 70 | 27723 | 0.02857143 | 0.928929353 |
| 1040 | Biosynthesis of unsaturated fatty acids | Metabolism | Lipid metabolism | 2 | 582 | 71 | 27723 | 0.02816901 | 0.928929353 |
| 3410 | Base excision repair | Genetic Information Processing | Replication and repair | 3 | 582 | 117 | 27723 | 0.02564103 | 0.928929353 |
| 3420 | Nucleotide excision repair | Genetic Information Processing | Replication and repair | 4 | 582 | 156 | 27723 | 0.02564103 | 0.928929353 |
| 4024 | cAMP signaling pathway | Environmental Information Processing | Signal transduction | 20 | 582 | 926 | 27723 | 0.02159827 | 0.928929353 |
| 4211 | Longevity regulating pathway | Organismal Systems | Aging | 11 | 582 | 459 | 27723 | 0.02396514 | 0.928929353 |
| 4217 | Necroptosis | Cellular Processes | Cell growth and death | 14 | 582 | 606 | 27723 | 0.02310231 | 0.928929353 |
| 4310 | Wnt signaling pathway | Environmental Information Processing | Signal transduction | 16 | 582 | 727 | 27723 | 0.02200825 | 0.928929353 |
| 4380 | Osteoclast differentiation | Organismal Systems | Development | 13 | 582 | 589 | 27723 | 0.02207131 | 0.928929353 |
| 4391 | Hippo signaling pathway - fly | Environmental Information Processing | Signal transduction | 8 | 582 | 335 | 27723 | 0.0238806 | 0.928929353 |
| 4512 | ECM-receptor interaction | Environmental Information Processing | Signaling molecules and interaction | 9 | 582 | 383 | 27723 | 0.02349869 | 0.928929353 |
| 4612 | Antigen processing and presentation | Organismal Systems | Immune system | 7 | 582 | 311 | 27723 | 0.02250804 | 0.928929353 |
| 4660 | T cell receptor signaling pathway | Organismal Systems | Immune system | 11 | 582 | 468 | 27723 | 0.02350427 | 0.928929353 |
| 4662 | B cell receptor signaling pathway | Organismal Systems | Immune system | 8 | 582 | 353 | 27723 | 0.02266289 | 0.928929353 |
| 4664 | Fc epsilon RI signaling pathway | Organismal Systems | Immune system | 7 | 582 | 300 | 27723 | 0.02333333 | 0.928929353 |
| 4670 | Leukocyte transendothelial migration | Organismal Systems | Immune system | 12 | 582 | 510 | 27723 | 0.02352941 | 0.928929353 |
| 4722 | Neurotrophin signaling pathway | Organismal Systems | Nervous system | 13 | 582 | 580 | 27723 | 0.02241379 | 0.928929353 |
| 4745 | Phototransduction - fly | Organismal Systems | Sensory system | 4 | 582 | 164 | 27723 | 0.02439024 | 0.928929353 |
| 4924 | Renin secretion | Organismal Systems | Endocrine system | 8 | 582 | 337 | 27723 | 0.02373887 | 0.928929353 |
| 4972 | Pancreatic secretion | Organismal Systems | Digestive system | 9 | 582 | 404 | 27723 | 0.02227723 | 0.928929353 |
| 4975 | Fat digestion and absorption | Organismal Systems | Digestive system | 3 | 582 | 112 | 27723 | 0.02678571 | 0.928929353 |
| 4976 | Bile secretion | Organismal Systems | Digestive system | 8 | 582 | 356 | 27723 | 0.02247191 | 0.928929353 |
| 72 | Synthesis and degradation of ketone bodies | Metabolism | Lipid metabolism | 1 | 582 | 33 | 27723 | 0.03030303 | 0.935074144 |
| 510 | N-Glycan biosynthesis | Metabolism | Glycan biosynthesis and metabolism | 5 | 582 | 223 | 27723 | 0.02242152 | 0.935074144 |
| 4012 | ErbB signaling pathway | Environmental Information Processing | Signal transduction | 11 | 582 | 503 | 27723 | 0.02186879 | 0.935074144 |
| 4142 | Lysosome | Cellular Processes | Transport and catabolism | 9 | 582 | 411 | 27723 | 0.02189781 | 0.935074144 |
| 4915 | Estrogen signaling pathway | Organismal Systems | Endocrine system | 11 | 582 | 508 | 27723 | 0.02165354 | 0.935074144 |

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|------|---|------------------------|------------------------------------|----|-----|------|-------|------------|-------------|
| 4261 | Adrenergic signaling in | Organismal Systems | Circulatory system | 15 | 582 | 707 | 27723 | 0.02121641 | 0.953530961 |
| 4916 | Melanogenesis | Organismal Systems | Endocrine system | 10 | 582 | 468 | 27723 | 0.02136752 | 0.953530961 |
| 190 | Oxidative phosphorylation | Metabolism | Energy metabolism | 6 | 582 | 284 | 27723 | 0.02112676 | 0.973850823 |
| 515 | Mannose type O-glycan biosynthesis | Metabolism | Glycan biosynthesis and metabolism | 2 | 582 | 88 | 27723 | 0.02272727 | 0.973850823 |
| 920 | Sulfur metabolism | Metabolism | Energy metabolism | 1 | 582 | 38 | 27723 | 0.02631579 | 0.973850823 |
| 4013 | MAPK signaling pathway - fly | Environmental | Signal transduction | 8 | 582 | 394 | 27723 | 0.02030457 | 0.973850823 |
| 4015 | Rap1 signaling pathway | Information Processing | Signal transduction | 21 | 582 | 1018 | 27723 | 0.02062868 | 0.973850823 |
| 4064 | NF-kappa B signaling pathway | Environmental | Signal transduction | 9 | 582 | 437 | 27723 | 0.02059497 | 0.973850823 |
| 4150 | mTOR signaling pathway | Information Processing | Signal transduction | 14 | 582 | 680 | 27723 | 0.02058824 | 0.973850823 |
| 4621 | NOD-like receptor signaling pathway | Organismal Systems | Immune system | 14 | 582 | 689 | 27723 | 0.0203193 | 0.973850823 |
| 4714 | Thermogenesis | Organismal Systems | Environmental adaptation | 16 | 582 | 782 | 27723 | 0.02046036 | 0.973850823 |
| 4720 | Long-term potentiation | Organismal Systems | Nervous system | 7 | 582 | 333 | 27723 | 0.02102102 | 0.973850823 |
| 4919 | Thyroid hormone signaling pathway | Organismal Systems | Endocrine system | 11 | 582 | 542 | 27723 | 0.0202952 | 0.973850823 |
| 4923 | Regulation of lipolysis in adipocytes | Organismal Systems | Endocrine system | 5 | 582 | 245 | 27723 | 0.02040816 | 0.973850823 |
| 4966 | Collecting duct acid secretion | Organismal Systems | Excretory system | 2 | 582 | 88 | 27723 | 0.02272727 | 0.973850823 |
| 4214 | Apoptosis - fly | Cellular Processes | Cell growth and death | 6 | 582 | 297 | 27723 | 0.02020202 | 0.977909946 |
| 2010 | ABC transporters | Environmental | Membrane transport | 5 | 582 | 249 | 27723 | 0.02008032 | 0.982814575 |
| 250 | Alanine, aspartate and glutamate metabolism | Information Processing | Membrane transport | 5 | 582 | 249 | 27723 | 0.02008032 | 0.982814575 |
| 250 | Alanine, aspartate and glutamate metabolism | Metabolism | Amino acid metabolism | 2 | 582 | 98 | 27723 | 0.02040816 | 0.994082036 |
| 310 | Lysine degradation | Metabolism | Amino acid metabolism | 6 | 582 | 305 | 27723 | 0.01967213 | 0.998988939 |
| 53 | Ascorbate and aldarate metabolism | Metabolism | Carbohydrate metabolism | 1 | 582 | 55 | 27723 | 0.01818182 | 0.9999997 |
| 61 | Fatty acid biosynthesis | Metabolism | Lipid metabolism | 1 | 582 | 62 | 27723 | 0.01612903 | 0.9999997 |
| 62 | Fatty acid elongation | Metabolism | Lipid metabolism | 1 | 582 | 73 | 27723 | 0.01369863 | 0.9999997 |
| 100 | Steroid biosynthesis | Metabolism | Lipid metabolism | 1 | 582 | 52 | 27723 | 0.01923077 | 0.9999997 |
| 240 | Pyrimidine metabolism | Metabolism | Nucleotide metabolism | 5 | 582 | 334 | 27723 | 0.01497006 | 0.9999997 |
| 280 | Valine, leucine and isoleucine degradation | Metabolism | Amino acid metabolism | 3 | 582 | 157 | 27723 | 0.01910828 | 0.9999997 |
| 350 | Tyrosine metabolism | Metabolism | Amino acid metabolism | 1 | 582 | 94 | 27723 | 0.0106383 | 0.9999997 |
| 360 | Phenylalanine metabolism | Metabolism | Amino acid metabolism | 1 | 582 | 72 | 27723 | 0.01388889 | 0.9999997 |
| 532 | Glycosaminoglycan biosynthesis - chondroitin sulfate / dermatan sulfate | Metabolism | Glycan biosynthesis and metabolism | 1 | 582 | 68 | 27723 | 0.01470588 | 0.9999997 |
| 561 | Glycerolipid metabolism | Metabolism | Lipid metabolism | 3 | 582 | 298 | 27723 | 0.01006711 | 0.9999997 |
| 562 | Inositol phosphate metabolism | Metabolism | Carbohydrate metabolism | 2 | 582 | 370 | 27723 | 0.00540541 | 0.9999997 |
| 564 | Glycerophospholipid metabolism | Metabolism | Lipid metabolism | 9 | 582 | 467 | 27723 | 0.01927195 | 0.9999997 |
| 565 | Ether lipid metabolism | Metabolism | Lipid metabolism | 3 | 582 | 201 | 27723 | 0.01492537 | 0.9999997 |
| 601 | Glycosphingolipid biosynthesis - lacto and neolacto series | Metabolism | Glycan biosynthesis and metabolism | 2 | 582 | 146 | 27723 | 0.01369863 | 0.9999997 |
| 603 | Glycosphingolipid biosynthesis - globo and isoglobo series | Metabolism | Glycan biosynthesis and metabolism | 1 | 582 | 82 | 27723 | 0.01219512 | 0.9999997 |

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|------|--|--------------------------------------|--------------------------------------|----|-----|-----|-------|------------|-----------|
| 730 | Thiamine metabolism | Metabolism | Metabolism of cofactors and vitamins | 1 | 582 | 62 | 27723 | 0.01612903 | 0.9999997 |
| 760 | Nicotinate and nicotinamide metabolism | Metabolism | Metabolism of cofactors and vitamins | 2 | 582 | 129 | 27723 | 0.01550388 | 0.9999997 |
| 790 | Folate biosynthesis | Metabolism | Metabolism of cofactors and vitamins | 1 | 582 | 92 | 27723 | 0.01086957 | 0.9999997 |
| 910 | Nitrogen metabolism | Metabolism | Energy metabolism | 1 | 582 | 55 | 27723 | 0.01818182 | 0.9999997 |
| 980 | Metabolism of xenobiotics by cytochrome P450 | Metabolism | Xenobiotics biodegradation and | 2 | 582 | 142 | 27723 | 0.01408451 | 0.9999997 |
| 982 | Drug metabolism - cytochrome P450 | Metabolism | Xenobiotics biodegradation and | 1 | 582 | 146 | 27723 | 0.00684932 | 0.9999997 |
| 983 | Drug metabolism - other enzymes | Metabolism | Xenobiotics biodegradation and | 2 | 582 | 225 | 27723 | 0.00888889 | 0.9999997 |
| 1212 | Fatty acid metabolism | Metabolism | Global and overview maps | 3 | 582 | 162 | 27723 | 0.01851852 | 0.9999997 |
| 3008 | Ribosome biogenesis in eukaryotes | Genetic Information Processing | Translation | 1 | 582 | 201 | 27723 | 0.00497512 | 0.9999997 |
| 3010 | Ribosome | Genetic Information Processing | Translation | 5 | 582 | 303 | 27723 | 0.01650165 | 0.9999997 |
| 3015 | mRNA surveillance pathway | Genetic Information Processing | Translation | 7 | 582 | 388 | 27723 | 0.01804124 | 0.9999997 |
| 3018 | RNA degradation | Genetic Information Processing | Folding, sorting and degradation | 4 | 582 | 306 | 27723 | 0.0130719 | 0.9999997 |
| 3022 | Basal transcription factors | Genetic Information Processing | Transcription | 2 | 582 | 155 | 27723 | 0.01290323 | 0.9999997 |
| 3030 | DNA replication | Genetic Information Processing | Replication and repair | 1 | 582 | 118 | 27723 | 0.00847458 | 0.9999997 |
| 3040 | Spliceosome | Genetic Information Processing | Transcription | 9 | 582 | 512 | 27723 | 0.01757813 | 0.9999997 |
| 3050 | Proteasome | Genetic Information Processing | Folding, sorting and degradation | 1 | 582 | 74 | 27723 | 0.01351351 | 0.9999997 |
| 3430 | Mismatch repair | Genetic Information Processing | Replication and repair | 1 | 582 | 70 | 27723 | 0.01428571 | 0.9999997 |
| 3450 | Non-homologous end-joining | Genetic Information Processing | Replication and repair | 1 | 582 | 51 | 27723 | 0.01960784 | 0.9999997 |
| 4020 | Calcium signaling pathway | Environmental Information Processing | Signal transduction | 17 | 582 | 969 | 27723 | 0.01754386 | 0.9999997 |
| 4022 | cGMP-PKG signaling pathway | Environmental Information Processing | Signal transduction | 13 | 582 | 794 | 27723 | 0.0163728 | 0.9999997 |
| 4060 | Cytokine-cytokine receptor interaction | Environmental Information Processing | Signaling molecules and interaction | 10 | 582 | 779 | 27723 | 0.01283697 | 0.9999997 |
| 4070 | Phosphatidylinositol signaling system | Environmental Information Processing | Signal transduction | 4 | 582 | 553 | 27723 | 0.00723327 | 0.9999997 |
| 4072 | Phospholipase D signaling pathway | Environmental Information Processing | Signal transduction | 8 | 582 | 813 | 27723 | 0.0098401 | 0.9999997 |
| 4080 | Neuroactive ligand-receptor interaction | Environmental Information Processing | Signaling molecules and interaction | 10 | 582 | 874 | 27723 | 0.01144165 | 0.9999997 |

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|------|--|---|-------------------------------------|----|-----|------|-------|------------|-----------|
| 4110 | Cell cycle | Cellular Processes | Cell growth and death | 6 | 582 | 539 | 27723 | 0.01113173 | 0.9999997 |
| 4136 | Autophagy - other | Cellular Processes | Transport and catabolism | 2 | 582 | 157 | 27723 | 0.01273885 | 0.9999997 |
| 4140 | Autophagy - animal | Cellular Processes | Transport and catabolism | 13 | 582 | 668 | 27723 | 0.01946108 | 0.9999997 |
| 4144 | Endocytosis | Cellular Processes | Transport and catabolism | 22 | 582 | 1203 | 27723 | 0.01828761 | 0.9999997 |
| 4145 | Phagosome | Cellular Processes | Transport and catabolism | 10 | 582 | 604 | 27723 | 0.01655629 | 0.9999997 |
| 4146 | Peroxisome | Cellular Processes | Transport and catabolism | 5 | 582 | 307 | 27723 | 0.01628664 | 0.9999997 |
| 4210 | Apoptosis | Cellular Processes | Cell growth and death | 9 | 582 | 534 | 27723 | 0.01685393 | 0.9999997 |
| 4212 | Longevity regulating pathway - worm | Organismal Systems | Aging | 5 | 582 | 281 | 27723 | 0.01779359 | 0.9999997 |
| 4216 | Ferroptosis | Cellular Processes | Cell growth and death | 3 | 582 | 216 | 27723 | 0.01388889 | 0.9999997 |
| 4260 | Cardiac muscle contraction | Organismal Systems | Circulatory system | 1 | 582 | 257 | 27723 | 0.00389105 | 0.9999997 |
| 4320 | Dorso-ventral axis formation | Organismal Systems | Development | 1 | 582 | 128 | 27723 | 0.0078125 | 0.9999997 |
| 4330 | Notch signaling pathway | Environmental Information Processing | Signal transduction | 3 | 582 | 214 | 27723 | 0.01401869 | 0.9999997 |
| 4341 | Hedgehog signaling pathway - fly | Environmental Information Processing | Signal transduction | 1 | 582 | 147 | 27723 | 0.00680272 | 0.9999997 |
| 4350 | TGF-beta signaling pathway | Environmental Information Processing | Signal transduction | 4 | 582 | 294 | 27723 | 0.01360544 | 0.9999997 |
| 4390 | Hippo signaling pathway | Environmental Information Processing | Signal transduction | 9 | 582 | 647 | 27723 | 0.01391036 | 0.9999997 |
| 4514 | Cell adhesion molecules (CAMs) | Environmental Information Processing | Signaling molecules and interaction | 14 | 582 | 832 | 27723 | 0.01682692 | 0.9999997 |
| 4520 | Adherens junction | Cellular Processes | Cellular community - eukaryotes | 7 | 582 | 575 | 27723 | 0.01217391 | 0.9999997 |
| 4540 | Gap junction | Cellular Processes | Cellular community - eukaryotes | 2 | 582 | 347 | 27723 | 0.00576369 | 0.9999997 |
| 4550 | Signaling pathways regulating pluripotency of stem cells | Cellular Processes | Cellular community - eukaryotes | 8 | 582 | 537 | 27723 | 0.01489758 | 0.9999997 |
| 4611 | Platelet activation | Organismal Systems | Immune system | 8 | 582 | 548 | 27723 | 0.01459854 | 0.9999997 |
| 4620 | Toll-like receptor signaling pathway | Organismal Systems | Immune system | 8 | 582 | 439 | 27723 | 0.01822323 | 0.9999997 |
| 4622 | RIG-I-like receptor signaling pathway | Organismal Systems | Immune system | 4 | 582 | 257 | 27723 | 0.0155642 | 0.9999997 |
| 4623 | Cytosolic DNA-sensing pathway | Organismal Systems | Immune system | 1 | 582 | 180 | 27723 | 0.00555556 | 0.9999997 |
| 4624 | Toll and Imd signaling pathway | Organismal Systems | Immune system | 2 | 582 | 158 | 27723 | 0.01265823 | 0.9999997 |
| 4650 | Natural killer cell mediated | Organismal Systems | Immune system | 6 | 582 | 422 | 27723 | 0.01421801 | 0.9999997 |
| 4657 | IL-17 signaling pathway | Organismal Systems | Immune system | 3 | 582 | 299 | 27723 | 0.01003344 | 0.9999997 |
| 4666 | Fc gamma R-mediated phagocytosis | Organismal Systems | Immune system | 6 | 582 | 449 | 27723 | 0.01336303 | 0.9999997 |
| 4668 | TNF signaling pathway | Environmental Information Processing | Signal transduction | 8 | 582 | 428 | 27723 | 0.01869159 | 0.9999997 |
| 4672 | Intestinal immune network for IgA production | Organismal Systems | Immune system | 1 | 582 | 164 | 27723 | 0.00609756 | 0.9999997 |
| 4711 | Circadian rhythm - fly | Organismal Systems | Environmental adaptation | 1 | 582 | 70 | 27723 | 0.01428571 | 0.9999997 |
| 4721 | Synaptic vesicle cycle | Organismal Systems | Nervous system | 5 | 582 | 322 | 27723 | 0.01552795 | 0.9999997 |
| 4723 | Retrograde endocannabinoid signaling | Organismal Systems | Nervous system | 6 | 582 | 541 | 27723 | 0.01109057 | 0.9999997 |
| 4725 | Cholinergic synapse | Organismal Systems | Nervous system | 11 | 582 | 558 | 27723 | 0.01971326 | 0.9999997 |
| 4730 | Long-term depression | Organismal Systems | Nervous system | 4 | 582 | 246 | 27723 | 0.01626016 | 0.9999997 |
| 4740 | Olfactory transduction | Organismal Systems | Sensory system | 12 | 582 | 1738 | 27723 | 0.00690449 | 0.9999997 |
| 4742 | Taste transduction | Organismal Systems | Sensory system | 2 | 582 | 229 | 27723 | 0.00873362 | 0.9999997 |

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|------|---|--------------------|------------------|----|-----|-----|-------|------------|-----------|
| 4911 | Insulin secretion | Organismal Systems | Endocrine system | 5 | 582 | 463 | 27723 | 0.01079914 | 0.9999997 |
| 4912 | GnRH signaling pathway | Organismal Systems | Endocrine system | 9 | 582 | 484 | 27723 | 0.01859504 | 0.9999997 |
| 4913 | Ovarian steroidogenesis | Organismal Systems | Endocrine system | 2 | 582 | 190 | 27723 | 0.01052632 | 0.9999997 |
| 4914 | Progesterone-mediated oocyte maturation | Organismal Systems | Endocrine system | 3 | 582 | 431 | 27723 | 0.00696056 | 0.9999997 |
| 4917 | Prolactin signaling pathway | Organismal Systems | Endocrine system | 2 | 582 | 321 | 27723 | 0.00623053 | 0.9999997 |
| 4925 | Aldosterone synthesis and secretion | Organismal Systems | Endocrine system | 9 | 582 | 504 | 27723 | 0.01785714 | 0.9999997 |
| 4926 | Relaxin signaling pathway | Organismal Systems | Endocrine system | 7 | 582 | 553 | 27723 | 0.01265823 | 0.9999997 |
| 4927 | Cortisol synthesis and secretion | Organismal Systems | Endocrine system | 1 | 582 | 305 | 27723 | 0.00327869 | 0.9999997 |
| 4928 | Parathyroid hormone synthesis, secretion and action | Organismal Systems | Endocrine system | 10 | 582 | 599 | 27723 | 0.01669449 | 0.9999997 |
| 4961 | Endocrine and other factor-regulated calcium reabsorption | Organismal Systems | Excretory system | 2 | 582 | 231 | 27723 | 0.00865801 | 0.9999997 |
| 4970 | Salivary secretion | Organismal Systems | Digestive system | 4 | 582 | 400 | 27723 | 0.01 | 0.9999997 |
| 4971 | Gastric acid secretion | Organismal Systems | Digestive system | 7 | 582 | 393 | 27723 | 0.0178117 | 0.9999997 |
| 4978 | Mineral absorption | Organismal Systems | Digestive system | 2 | 582 | 128 | 27723 | 0.015625 | 0.9999997 |