**Supplementary Table 5. Number of reactions per subsystem present only in control models and GBA-PD models, respectively.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pathway** | **Rxn number in CTRL models** | **Pathway** | **Rxn number in GBA-PD models** |
| Transport, extracellular | 116 | Transport, extracellular | 292 |
| Fatty acid oxidation | 75 | Exchange/demand reaction | 275 |
| Exchange/demand reaction | 55 | Peptide metabolism | 242 |
| Sphingolipid metabolism | 26 | Fatty acid oxidation | 60 |
| Transport, mitochondrial | 17 | Glycerophospholipid metabolism | 19 |
| Valine, leucine, and isoleucine metabolism | 9 | Nucleotide interconversion | 16 |
| Transport, golgi apparatus | 9 | Transport, mitochondrial | 13 |
| Miscellaneous | 9 | Keratan sulfate degradation | 13 |
| Transport, endoplasmic reticular | 8 | Keratan sulfate synthesis | 11 |
| Phosphatidylinositol phosphate metabolism | 7 | Transport, peroxisomal | 9 |
| NAD metabolism | 6 | Transport, endoplasmic reticular | 9 |
| Bile acid synthesis | 5 | Drug metabolism | 7 |
| Glycerophospholipid metabolism | 5 | Tryptophan metabolism | 6 |
| Transport, nuclear | 5 | Transport, lysosomal | 6 |
| Transport, peroxisomal | 5 | Folate metabolism | 6 |
| Glycosphingolipid metabolism | 5 | Eicosanoid metabolism | 5 |
| Folate metabolism | 5 | Transport, nuclear | 4 |
| Tyrosine metabolism | 4 | Chondroitin sulfate degradation | 4 |
| Transport, lysosomal | 4 | Pentose phosphate pathway | 4 |
| Nucleotide interconversion | 4 | Lysine metabolism | 4 |
| Steroid metabolism | 4 | Phosphatidylinositol phosphate metabolism | 4 |
| Urea cycle | 4 | Glycine, serine, alanine, and threonine metabolism | 3 |
| Vitamin B6 metabolism | 4 | Pyrimidine catabolism | 3 |
| C5-branched dibasic acid metabolism | 4 | O-glycan metabolism | 3 |
| Tryptophan metabolism | 3 | Glycosphingolipid metabolism | 3 |
| N-glycan synthesis | 3 | Inositol phosphate metabolism | 3 |
| Fructose and mannose metabolism | 3 | Bile acid synthesis | 3 |
| Glyoxylate and dicarboxylate metabolism | 3 | Aminosugar metabolism | 2 |
| Pentose phosphate pathway | 3 | Blood group synthesis | 2 |
| Phenylalanine metabolism | 3 | Sphingolipid metabolism | 2 |
| Fatty acid synthesis | 3 | Transport, golgi apparatus | 2 |
| Eicosanoid metabolism | 3 | Pyruvate metabolism | 2 |
| Butanoate metabolism | 2 | Phenylalanine metabolism | 2 |
| Propanoate metabolism | 2 | Purine catabolism | 2 |
| Aminosugar metabolism | 2 | Chondroitin synthesis | 2 |
| Cholesterol metabolism | 2 | Propanoate metabolism | 1 |
| Androgen and estrogen synthesis and metabolism | 2 | Glutathione metabolism | 1 |
| N-glycan metabolism | 2 | ROS detoxification | 1 |
| Inositol phosphate metabolism | 2 | Cholesterol metabolism | 1 |
| Purine catabolism | 2 | Purine synthesis | 1 |
| Methionine and cysteine metabolism | 2 | NAD metabolism | 1 |
| Ubiquinone synthesis | 1 | Pyrimidine synthesis | 1 |
| Glycolysis/gluconeogenesis | 1 | Starch and sucrose metabolism | 1 |
| Lysine metabolism | 1 | Heme degradation | 1 |
| Vitamin C metabolism | 1 | Glycolysis/gluconeogenesis | 1 |
| Oxidative phosphorylation | 1 |  |  |
| Leukotriene metabolism | 1 |  |  |
| Glycine, serine, alanine, and threonine metabolism | 1 |  |  |
| Pyrimidine catabolism | 1 |  |  |
| Vitamin B2 metabolism | 1 |  |  |
| Triacylglycerol synthesis | 1 |  |  |
| Chondroitin synthesis | 1 |  |  |
| Galactose metabolism | 1 |  |  |