**Table S2.** Summary of key findings in differences between predicted metagenomes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predicted Functional | Sample 1 | Propotion of metagenome (%) | Sample 2 | Propotion of metagenome (%) | *p* value |
| Metabolic Diseases | SJL-E | 11.30  | CZ-E | 12.63  | 0.034  |
|  | SJL-M | 12.38  | CZ-M | 11.01  | 0.003  |
|  | SJL-L | 12.90  | CZ-L | 16.46  |  <0.001 |
| Carbohydrate Metabolism | SJL-E | 8.46  | CZ-E | 9.19  | 0.002  |
|  | SJL-M | 8.93  | CZ-M | 8.82  | 0.655  |
|  | SJL-L | 9.10  | CZ-L | 10.98  |  <0.001 |
| Amino Acid Metabolism | SJL-E | 8.57  | CZ-E | 9.36  |  <0.001 |
|  | SJL-M | 8.75  | CZ-M | 9.52  |  <0.001 |
|  | SJL-L | 8.89  | CZ-L | 9.70  |  <0.001 |
| Sensory System | SJL-E | 8.25  | CZ-E | 8.34  | 0.708  |
|  | SJL-M | 8.03  | CZ-M | 9.47  |  <0.001 |
|  | SJL-L | 8.14  | CZ-L | 7.08  |  <0.001 |
| Transport and Catabolism | SJL-E | 5.34  | CZ-E | 5.57  | 0.290  |
|  | SJL-M | 5.07  | CZ-M | 6.37  |  <0.001 |
|  | SJL-L | 5.14  | CZ-L | 4.20  |  <0.001 |
| Replication and Repair | SJL-E | 4.90  | CZ-E | 4.64  |  <0.001 |
|  | SJL-M | 4.99  | CZ-M | 4.48  |  <0.001 |
|  | SJL-L | 5.00  | CZ-L | 5.12  | 0.004  |
| Circulatory System | SJL-E | 3.60  | CZ-E | 3.85  | 0.042  |
|  | SJL-M | 3.73  | CZ-M | 3.48  | 0.021  |
|  | SJL-L | 3.93  | CZ-L | 3.77  | 0.220  |
| Membrane Transport | SJL-E | 2.74  | CZ-E | 2.78  | 0.582  |
|  | SJL-M | 2.77  | CZ-M | 3.12  | 0.002  |
|  | SJL-L | 2.77  | CZ-L | 3.07  |  <0.001 |
| Glycan Biosynthesis and Metabolism | SJL-E | 3.04  | CZ-E | 3.02  | 0.909  |
|  | SJL-M | 2.93  | CZ-M | 2.68  | 0.027  |
|  | SJL-L | 2.84  | CZ-L | 2.26  |  <0.001 |
| Genetic Information Processing | SJL-E | 2.92  | CZ-E | 2.62  | 0.010  |
|  | SJL-M | 2.65  | CZ-M | 3.02  | 0.003  |
|  | SJL-L | 2.53  | CZ-L | 2.17  |  <0.001 |
| Metabolism of Cofactors and Vitamins | SJL-E | 2.60  | CZ-E | 2.53  | 0.320  |
|  | SJL-M | 2.72  | CZ-M | 2.22  |  <0.001 |
|  | SJL-L | 2.78  | CZ-L | 2.73  | 0.262  |
| Cellular Processes and Signaling | SJL-E | 2.06  | CZ-E | 3.46  |  <0.001 |
|  | SJL-M | 2.08  | CZ-M | 2.62  | 0.078  |
| 　 | SJL-L | 2.36  | CZ-L | 1.99  | 0.010  |