1. Calculation method: Topology-Weighted

	Enriched gained GO terms	P-value	Enriched lost GO terms	P-value
Unikonta	• protein import into peroxisome matrix, docking • cAMP catabolic process	9.5E-3 1.9E-2		
Opisthokonta	• regulation of transcription • regulation of nucleobase, nucleoside, nucleotide and nucleic acid metabolic process	2.3E-2 2.8E-2	• protein-heme linkage • asparagine biosynthetic process	5.2E-3 1.0E-2
Metazoa & Choanoflagellata	• cell communication • galactosylceramide catabolic process	3.6E-6 9.2E-3	• xylan catabolic process • hemicellulose metabolic process • polysaccharide catabolic process *	1.6E-5 1.5E-4 3.2E-4
Metazoa	• regulation of transcription, DNA-dependent • transcription, DNA-dependent	1.2E-7 1.8E-6	• aromatic amino acid family biosynthetic process, prephenate pathway • histidine biosynthetic process	1.1E-4 2.3E-3
Bilaterian & Cnidaria	• apoptosis • peptide cross-linking	3.1E-4 4.7E-4	• protein folding • transcription initiation	1.7E-3 3.8E-3
Bilateria	• mitochondrial electron transport, NADH to ubiquinone • mitochondrial ATP synthesis coupled electron transport	8.3E-6 1.1E-5	• branched chain family amino acid biosynthetic process • cellular amino acid biosynthetic process • water-soluble vitamin biosynthetic process *	3.3E-4 6.3E-4 5.0E-3
Deuterostomia	• protein transport • protein localization	8.1E-2 8.6E-2	• dicarboxylic acid metabolic process • phosphoenolpyruvate-dependent sugar phosphotransferase system	1.6E-3 3.2E-3
Chordata	• feeding behavior • G-protein coupled receptor protein signaling pathway	4.3E-5 7.0E-4	• proteolysis	2.1E-2
Urochordata & Vertebrata	• antigen processing and presentation • protein amino acid phosphorylation	5.5E-3 1.8E-2	• folic acid and derivative metabolic process • group transfer coenzyme metabolic process	2.3E-3 5.8E-3
Vertebrata	• immune response • cell surface receptor linked signal transduction	4.4E-11 2.0E-6	• DNA topological change	2.0E-3
Tetrapoda	• regulation of growth • synaptic transmission	1.3E-2 2.0E-2	• valyl-tRNA aminoacylation • response to water	4.3E-3 8.6E-3
Amniota	• immune response • defense response	1.8E-3 2.0E-3	• regulation of transcription, DNA-dependent • protein secretion • riboflavin biosynthetic process * • thiamin biosynthetic process *	9.2E-8 5.1E-5 1.0E-3 1.8E-3
Mammalia	• hemopoiesis • reciprocal meiotic recombination	2.8E-3 8.3E-3	• aromatic amino acid family biosynthetic process • chorismate metabolic process	1.1E-2 1.3E-2

2. Calculation method: Parent-Child-Union, multiple testing correction (MTC): Bonferroni

	Enriched gained GO terms	P-value (adjusted)	Enriched lost GO terms	P-value (adjusted)
Unikonta				
Opisthokonta				
Metazoa & Choanoflagellata	• cell communication • biological regulation	1.3E-3 8.3E-2	• carbohydrate metabolic process • polysaccharide metabolic process	3.5E-4 3.0E-2
Metazoa	• regulation of cellular process • regulation of nitrogen compound metabolic process	6.4E-15 6.5E-6	• organic acid biosynthetic process	9.1E-2
Bilaterian & Cnidaria	• regulation of biosynthetic process	3.6E-2		
Bilateria	• electron transport chain • phosphorus metabolic process • regulation of cellular process *	2.0E-2 3.4E-2 4.1E-2		
Deuterostomia			• organic acid metabolic process • cellular amino acid and derivative metabolic process	4.7E-3 2.7E-2
Chordata				
Urochordata & Vertebrata		5.5E-3 1.8E-2	• carbohydrate metabolic process	3.5E-2
Vertebrata	• immune system process • regulation of cellular process	3.8E-8 4.9E-8	• carbohydrate metabolic process	3.3E-2
Tetrapoda				
Amniota	• response to stimulus • immune system process	1.9E-2 8.3E-2	• regulation of macromolecule metabolic process • regulation of gene expression	2.9E-3 1.4E-2
Mammalia				

3. Calculation method: Parent-Child-Intersection, multiple testing correction (MTC): Bonferroni

	Enriched gained GO terms	P-value (adjusted)	Enriched lost GO terms	P-value (adjusted)
Unikonta				
Opisthokonta				
Metazoa & Choanoflagellata	• cell communication • biological regulation	1.0E-3 6.3E-2	• carbohydrate metabolic process	2.6E-4
Metazoa	• biological regulation	4.3E-13		
Bilaterian & Cnidaria				
Bilateria	• phosphorus metabolic process • biological regulation	2.4E-2 3.4E-2		
Deuterostomia			• organic acid metabolic process • cellular amino acid and derivative metabolic process	3.3E-3 8.0E-3
Chordata				
Urochordata & Vertebrata		5.5E-3 1.8E-2	• cellular nitrogen compound metabolic process • carbohydrate metabolic process	2.2E-2 2.7E-2
Vertebrata	• immune system process • biological regulation	2.2E-8 1.7E-7	• carbohydrate metabolic process	2.6E-2
Tetrapoda				
Amniota	• response to stimulus • immune system process	1.6E-2 7.2E-2		
Mammalia				

4. Calculation method: Term-For-Term, multiple testing correction (MTC): Bonferroni

	Enriched gained GO terms	P-value (adjusted)	Enriched lost GO terms	P-value (adjusted)
Unikonta				
Opisthokonta				
Metazoa & Choanoflagellata	• cell communication • signal transduction	1.0E-3 3.4E-2	• carbohydrate metabolic process • xylan metabolic process	1.5E-4 7.6E-3
Metazoa	• regulation of cellular process • regulation of biological process • regulation of RNA metabolic process *	5.2E-11 3.0E-10 5.1E-5	• aromatic amino acid family biosynthetic process, prephenate pathway	2.6E-2
Bilaterian & Cnidaria				
Bilateria	• mitochondrial electron transport, NADH to ubiquinone • ATP synthesis coupled electron transport	3.7E-3 6.1E-2	• organic acid biosynthetic process	5.1E-2
Deuterostomia			• organic acid metabolic process • cellular amino acid and derivative metabolic process	4.8E-3 9.9E-3
Chordata	• feeding behavior • digestion	9.1E-3 2.7E-2		
Urochordata & Vertebrata		5.5E-3 1.8E-2	• carbohydrate metabolic process	3.5E-2
Vertebrata	• immune response • biological regulation	2.2E-8 9.0E-6	• carbohydrate metabolic process	1.3E-2
Tetrapoda				
Amniota	• response to stimulus • immune response	4.6E-2 9.1E-2	• regulation of RNA metabolic process • transcription, DNA-dependent	4.9E-5 2.5E-4
Mammalia	• system development	2.7E-2		

5. Calculation method: Term-For-Term, multiple testing correction (MTC): Westfall-Young-Single-Step

	Enriched gained GO terms	P-value (adjusted)	Enriched lost GO terms	P-value (adjusted)
Unikonta				
Opisthokonta				
Metazoa & Choanoflagellata	• cell communication • signal transduction	2.0E-3 4.2E-2	• carbohydrate metabolic process • xylan metabolic process	0 6.0E-3
Metazoa	• biological regulation • transcription • signal transduction *	0 3.8E-2 4.6E-2	• aromatic amino acid family biosynthetic process, prephenate pathway	6.4E-2
Bilaterian & Cnidaria	• programmed cell death	7.6E-2		
Bilateria	• mitochondrial electron transport, NADH to ubiquinone • ATP synthesis coupled electron transport	2.0E-3 3.2E-2	• organic acid biosynthetic process	6.8E-2
Deuterostomia			• organic acid metabolic process • cellular amino acid and derivative metabolic process	4.0E-3 8.0E-3
Chordata	• feeding behavior • digestion	2.0E-2 5.8E-2		
Urochordata & Vertebrata				
Vertebrata	• biological regulation • cell surface receptor linked signal transduction • antigen processing and presentation	0 2.0E-3 6.0E-3	• carbohydrate metabolic process	2.0E-2
Tetrapoda				
Amniota			• regulation of RNA metabolic process • regulation of macromolecule metabolic process	0 2.0E-3
Mammalia	• system development	4.4E-2		

6. Calculation method: Term-For-Term, multiple testing correction (MTC): Westfall-Young-Step-Down

	Enriched gained GO terms	P-value (adjusted)	Enriched lost GO terms	P-value (adjusted)
Unikonta				
Opisthokonta				
Metazoa & Choanoflagellata	• cell communication • signal transduction	0 3.6E-2	• carbohydrate metabolic process • xylan metabolic process	1.0E-3 8.0E-3
Metazoa	• regulation of cellular process • transcription • signal transduction *	0 3.9E-2 5.4E-2	• aromatic amino acid family biosynthetic process, prephenate pathway	4.8E-2
Bilaterian & Cnidaria	• programmed cell death	7.1E-2		
Bilateria	• mitochondrial electron transport, NADH to ubiquinone • ATP synthesis coupled electron transport	1.0E-3 2.7E-2	• organic acid metabolic process • organic acid biosynthetic process	1.0E-3 5.0E-3
Deuterostomia			• organic acid metabolic process • cellular amino acid and derivative metabolic process	4.8E-3 9.9E-3
Chordata	• feeding behavior • digestion	2.8E-2 6.1E-2		
Urochordata & Vertebrata				
Vertebrata	• biological regulation • multicellular organismal process • antigen processing and presentation *	1.0E-3 5.0E-3 9.0E-3	• carbohydrate metabolic process	3.2E-2
Tetrapoda				
Amniota	• response to stimulus	9.9E-2	• regulation of RNA metabolic process • RNA biosynthetic process	0 1.0E-3
Mammalia	• system development	5.5E-2		