Chapter 6

Appendix of Supplementary Material

Name of Process	Number of relevant gene ontology terms
Metabolic cell signalling pathways	49
Immunity	32
Cellular formation and structure	23
Embryogenesis	19
Synaptic function	18
Cellular transport	9
Kidney development	9
Post translational modification	8
Apoptosis	6
Plasma membrane transport	6
Endocytosis and exocytosis	6
Neuronal function	5
Transcription	5
Negative regulation of cell proliferation	4
Metabolic functions	4
Protein degradation	3
Positive regulation of cell proliferation	3
Wnt signalling	3
Cell division	3
Translational machinery	3
Nuclear replication	2
Cell replication	2
Plasma membrane function	2
Cellular enzyme function	1
Intestinal function	1
Membrane excitation	1
Mitochondrial translation	1

Miscellaneous	31

Supplementary Table 6.1. Table summarising the gene ontology processes that are differentially

positively enriched.

Metabolic processes36Nucleoside and nucleotide processing25Metabolic energy processes17Catabolic processes15Cellular response to external stimuli14Immunity12Cell signalling11Endocytosis/exocytosis10Cellular formation and structure9Ion and cation transport8Hormone production8Calicum-dependent processes6Calicum-dependent processes5Acidic pH response4Cellular transport4Calicum transport3Pertilization3Cellular transport3Calicum-dependent processes5Acidic pH response4Calicum transport3Pertilization3Cellular transport/trafficking3Post-translational modification3Calcium homeostasis3Synaptic processes3Calicum homeostasis3Synaptic processes3Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Kidney function1	Name of Process	Number of relevant gene ontology terms
Metabolic energy processes17Catabolic processes15Cellular response to external stimuli14Immunity12Cell signalling11Endocytosis/exocytosis10Cellular formation and structure9Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular transport4Urinary system3Fertilization3Cellular transport/trafficking3Post-translational modification3Synaptic processes3Synaptic processes3Calcium homeostasis3Synaptic processes3Calcium homeostasis3Calcium homeostasis3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2	Metabolic processes	36
Catabolic processes15Cellular response to external stimuli14Immunity12Cell signalling11Endocytosis/exocytosis10Cellular formation and structure9Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Post-translational modification3Synaptic processes3Interleukin 103Calcium homeostasis3Synaptic processes3Interleukin 102Phospholipid catabolism2Hormone transport2	Nucleoside and nucleotide processing	25
Cellular response to external stimuli14Immunity12Cell signalling11Endocytosis/exocytosis10Cellular formation and structure9Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Calcium transport4Urinary system3Fertilization3Cellular transport/rafficking3Plasma membrane transport3DNA repair3Synaptic processes3Calcium homeostasis3Synaptic processes3Cellular response to hypoxia2Cellular response to hypoxia2Cellular response to hypoxia2	Metabolic energy processes	17
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Endocytosis/exocytosis10Cellular formation and structure9Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Immunity	12
Cellular formation and structure9Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Hormone transport2	Cell signalling	11
Ion and cation transport8Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Hormone transport2	Endocytosis/exocytosis	10
Hormone production8Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Cellular formation and structure	9
Cardiac function7Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Ion and cation transport	8
Embryogenetic processes6Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Hormone transport2	Hormone production	8
Calcium-dependent processes5Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Cardiac function	7
Acidic pH response4Acidic pH response4Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Embryogenetic processes	6
Cellular secretion4Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Calcium-dependent processes	5
Calcium transport4Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Acidic pH response	4
Urinary system3Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Cellular secretion	4
Fertilization3Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Calcium transport	4
Cellular transport/trafficking3Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Urinary system	3
Plasma membrane transport3DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Fertilization	3
DNA repair3Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Cellular transport/trafficking	3
Post-translational modification3Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Plasma membrane transport	3
Calcium homeostasis3Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	DNA repair	3
Synaptic processes3Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Post-translational modification	3
Interleukin 103Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Calcium homeostasis	3
Cellular response to hypoxia2Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Synaptic processes	3
Phospholipid catabolism2Mitochondrial energy production2Enzyme function2Hormone transport2	Interleukin 10	3
Mitochondrial energy production2Enzyme function2Hormone transport2	Cellular response to hypoxia	2
Enzyme function2Hormone transport2	Phospholipid catabolism	2
Hormone transport 2	Mitochondrial energy production	2
	Enzyme function	2
Kidney function1	Hormone transport	2
	Kidney function	1

Neuronal function	1
Cellular processes	1
Apoptosis	1
Hormonal homeostasis	1
Miscellaneous	5

Supplementary Table 6.2. Table summarising the gene ontology processes that are differentially

negatively enriched.

	NES
c	
Ribosome biogenesis	•
NCRNA processing -	•
DNA dependent DNA replication -	•
NCRNA metabolic process –	•
Ribonucleoprotein complex biogenesis 🗕	•
DNA replication -	•
Sister chromatid cohesion	•
rRNA metabolic process –	•
Chromosome segregation –	•
tRNA metabolic process –	•
Cell cycle G1-S phase transition –	•
DNA recombination -	•
Nuclear chromosome segregation	•
tRNA processing -	•
RNA processing –	•
Sister chromatid segregation	•
DNA repair -	•
DNA metabolic process –	•
DNA replication initiation -	•
DNA integrity checkpoint –	•
Multicellular organismal macromol. metabolic process	•
Multi-organism metabolic process	•
DNA geometric change –	•
Centromere complex assembly	•
Regulation of chromosome segregation	•
DNA biosynthesis process	•
Ribonucleoprotein complex localization -	•
Anaphase promoting complex dependent catabolic process	•
Organelle fission –	•
tRNA modification -	•
DNA strand elongation –	•
Meiotic cell cycle -	•
DNA strand elongation involvedin DNA replication -	•
DNA templated transcription termination	•
Meiotic cell cycle process	•
Mitotic nnuclear division –	•
Ribosomal large subunit biogenesis 🗕	•
Cell cycle phase transition –	•
G1 DNA damage checkpoint –	•
Strand displacement –	•
Cell cycle checkpoint –	•
Histone exchange –	•
Negative regulation of nuclear division	•
Ribosomal small subunit biogenesis 🗕	•
RNA 3'-end processing –	•
Mitotic DNA integrity checkpoint -	•
Translational initiation –	•
tRNA transport –	•
RNA catabolic process –	•
Mitotic cell cycle –	•

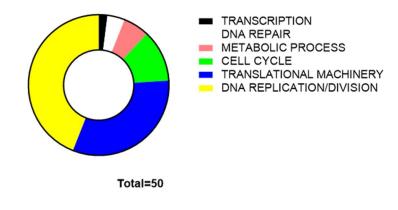
Supplementary Figure 6.1. Graphical representation of the top 50 positively enriched GO terms.

		NES					
	- <u>3</u> .0	-3.0 -3.0		-0.5	0		
	ю Ц	G	.o -	Сл	.o -	СЛ	o L
Bicarbonate transport	1		•				÷
GPCR signalling pathway coupled to cyclic nucleotide second messenger	1		•				1
Adenylate cyclase modulating GPCR signalling pathway	1		•				
Complement activation	1		•				÷
Digestion	1		•				÷
Protein activation cascade	1		•				1
Multicellular organismal signalling	1		•				
Cellular response to cadmium ion	1		•				÷
Action potential	1		•				÷
B cell receptor signalling pathway	1						
Response to zinc ion	1						1
Muscle system process	1						÷
Sodium ion transport	1						÷
Sodium ion transmembrane transport	1						÷
Regulation of blood circulation	1						
Falvonoid metabolic process	1						
Humoral immune response mediated by circulating Ig	1						
Regulation of heart contraction	1						:
Cellular response to zinc ion	1						÷
Regulation of cytosolic calcium concentration	1						÷
Adenylate cyclase activating GPCR signalling pathway	1						
Regulation of membrane potential	1						
Membrane depolarization during action potential	1						
Monovalent inorganic cation homeostasis	1						÷
Lipid oxidation Regulation of heart rate]						÷
Phagocytosis recognition	1						-
Regulation of post-synaptic membrane potential]						
Transmission of nerve impulse]						÷
Regulation of muscle contraction]						÷
Muscle contraction]						÷
Regulation of ion homeostasis]						
Humoral immune response]						
B cell mediated immunity							÷
Cellular lipid catabolic process							÷
Inorganic ion transmembrane transport							
Metal ion transport			-				
Adaptive immune response	1						÷
Regulation of potassium ion transport	1						÷
Regulation of calcium ion transmembrane transporter activity	1						:
Membrane depolarization	1						-
Cardiac conduction	4		•				÷
Regulation of cardiac conduction	4		•				÷
Catecholamine metabolic process	4		•				-
Uronic acid metabolic process	4		•				
Response to prostaglandin	-		•				:
Divalent inorganic cation homeostasis	-		•				÷
Regulation of neurotransmitter transport	4		•				÷
Muscle relaxation	4						
Regulation of sequestered calcium ion into cytosol by SE	4		•				
							1

Supplementary Table 3. Graphical representation of the top 50 negatively enriched GO terms.

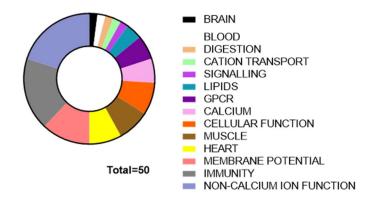
А

Top 50 Positively Enriched GO Terms

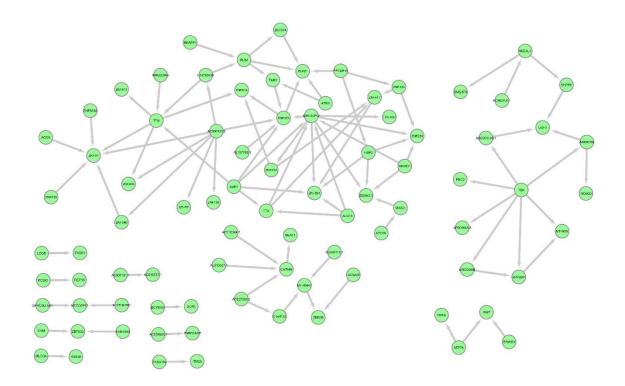


В

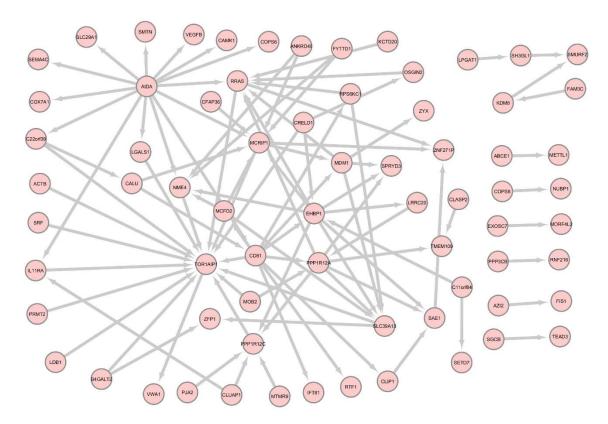
Top 50 Negatively Enriched GO Terms



Supplementary Figure 6.3. Pie charts summarising the top 50 enriched GO terms: A. Pos



Supplementary Figure 6.4. Network representation of the interaction between the 100 strongest correlated gene pairs.



Supplementary Figure 6.5. Network representation of the interaction between the 100 strongest correlated gene pairs.