

BioInfoMiner

Subject: Enrichment Analysis Report (extended version)

Job tag: Common ECGstim / FISstim vs DMSOstim 695 p.val 0.05

Database: Gene Ontology Biological Process (GO_P)

Hypergeometric p-value threshold: 0.05

Corrected p-value threshold: 0.05

Short Description: Input genes list contained 686 genes. Excluding genes without annotation or mapping to Gene Ontology Biological Process, BioInfoMiner analyzed 611 genes and reveals 25 ontological terms as statistically significant. This enriched set of terms corresponds to 168 input genes. Significant terms, in conjunction with their correlated genes, are displayed in Table 1. A brief delineation of results is visualized in Figure 1.

Table 1: Statistically significant terms ranking according to corrected p-value

Rank	Term id	Definition	Enrichment	Hyp/metric pvalue	Corrected pvalue
1	GO:0030198	extracellular matrix organization	29/195	1.534E-6	0.0013

Gene Symbol	Definition
TGFB2	transforming growth factor beta 2
MMP11	matrix metalloproteinase 11
ITGA2	integrin subunit alpha 2
ITGA6	integrin subunit alpha 6
SOX9	SRY-box 9
MFAP2	microfibrillar associated protein 2
ELF3	E74 like ETS transcription factor 3
LAMB2	laminin subunit beta 2
SERPINE1	serpin family E member 1
ADAMTSL4	ADAMTS like 4
SPARC	secreted protein acidic and cysteine rich
NID1	nidogen 1
CDH1	cadherin 1
PDGFA	platelet derived growth factor subunit A
LAMA4	laminin subunit alpha 4
CD44	CD44 molecule (Indian blood group)
COL1A1	collagen type I alpha 1 chain
COL9A2	collagen type IX alpha 2 chain
VTN	vitronectin
DAG1	dystroglycan 1
TNC	tenascin C
COL16A1	collagen type XVI alpha 1 chain
OLFML2A	olfactomedin like 2A

CCDC80	coiled-coil domain containing 80
ITGAM	integrin subunit alpha M
MMP9	matrix metalloproteinase 9
COL6A1	collagen type VI alpha 1 chain
COL6A3	collagen type VI alpha 3 chain
COL6A2	collagen type VI alpha 2 chain

2 GO:0042060 wound healing 15/85 6.815E-5 0.0037

Gene Symbol	Definition
TGFB1	transforming growth factor beta 1
PDGFRB	platelet derived growth factor receptor beta
TGFB2	transforming growth factor beta 2
DCBLD2	discoïdin, CUB and LCCL domain containing 2
TIMP1	TIMP metalloproteinase inhibitor 1
TGFBR2	transforming growth factor beta receptor 2
SDC1	syndecan 1
ITGA2	integrin subunit alpha 2
TPM1	tropomyosin 1 (alpha)
ELK3	ELK3, ETS transcription factor
SPARC	secreted protein acidic and cysteine rich
TNC	tenascin C
COL1A1	collagen type I alpha 1 chain
CCL20	C-C motif chemokine ligand 20
PDGFA	platelet derived growth factor subunit A

3 GO:0045662 negative regulation of myoblast differentiation 7/21 9.753E-5 0.0056

Gene Symbol	Definition
IL18	interleukin 18
TGFB1	transforming growth factor beta 1
ANKRD2	ankyrin repeat domain 2
NMRK2	nicotinamide riboside kinase 2
NOTCH1	notch 1
TBX3	T-box 3
SOX9	SRY-box 9

4 GO:0030195 negative regulation of blood coagulation 5/11 1.880E-4 0.0069

Gene Symbol	Definition
EDN1	endothelin 1
APOE	apolipoprotein E
SERPINE1	serpin family E member 1
SERPINE2	serpin family E member 2
VTN	vitronectin

5 **GO:0030325** **adrenal gland develop-
ment** **6/20** **5.920E-4** **0.0096**

Gene Symbol	Definition
MDK	midkine (neurite growth-promoting factor 2)
ARID5B	AT-rich interaction domain 5B
HMGA2	high mobility group AT-hook 2
FSTL3	follistatin like 3
CITED2	Cbp/p300 interacting transactivator with Glu/Asp rich carboxy-terminal domain 2
TSPO	translocator protein

6 **GO:0008360** **regulation of cell
shape** **19/138** **2.551E-4** **0.0097**

Gene Symbol	Definition
DLG1	discs large MAGUK scaffold protein 1
MYH10	myosin heavy chain 10
EPB41L3	erythrocyte membrane protein band 4.1 like 3
MYH14	myosin heavy chain 14
FMNL3	formin like 3
SLC9A3R1	SLC9A3 regulator 1
MYH9	myosin heavy chain 9
RDX	radixin
TPM1	tropomyosin 1 (alpha)
SHROOM3	shroom family member 3
MSN	moesin
PTK2B	protein tyrosine kinase 2 beta
GNA12	G protein subunit alpha 12
EPS8	epidermal growth factor receptor pathway substrate 8
FGD1	FYVE, RhoGEF and PH domain containing 1
WIPF1	WAS/WASL interacting protein family member 1
PLXNB2	plexin B2
SEMA4D	semaphorin 4D
LIMD1	LIM domains containing 1

7 **GO:0060412** **ventricular septum
morphogenesis** **7/28** **7.034E-4** **0.014**

Gene Symbol	Definition
TGFBR2	transforming growth factor beta receptor 2
TGFB2	transforming growth factor beta 2
FZD1	frizzled class receptor 1
NOTCH1	notch 1
TBX3	T-box 3
CITED2	Cbp/p300 interacting transactivator with Glu/Asp rich carboxy-terminal domain 2
SOX4	SRY-box 4

8 **GO:0043122** **regulation of I-kappaB kinase/NF-kappaB signaling** **5/14** **7.075E-4** **0.015**

Gene Symbol	Definition
F2RL1	F2R like trypsin receptor 1
OPTN	optineurin
IL1B	interleukin 1 beta
CPNE1	copine 1
HSPB1	heat shock protein family B (small) member 1

9 **GO:0007565** **female pregnancy** **13/86** **9.521E-4** **0.0174**

Gene Symbol	Definition
PGF	placental growth factor
TGFB1	transforming growth factor beta 1
ITGA2	integrin subunit alpha 2
GJB2	gap junction protein beta 2
NAMPT	nicotinamide phosphoribosyltransferase
ETS1	ETS proto-oncogene 1, transcription factor
FOSL1	FOS like 1, AP-1 transcription factor subunit
STS	steroid sulfatase (microsomal), isozyme S
COL16A1	collagen type XVI alpha 1 chain
AGT	angiotensinogen
PSG2	pregnancy specific beta-1-glycoprotein 2
PSG4	pregnancy specific beta-1-glycoprotein 4
PSG1	pregnancy specific beta-1-glycoprotein 1

10 **GO:0033627** **cell adhesion mediated by integrin** **4/9** **9.734E-4** **0.0174**

Gene Symbol	Definition
ITGA2	integrin subunit alpha 2
COL16A1	collagen type XVI alpha 1 chain
ITGA6	integrin subunit alpha 6
VTN	vitronectin

11 **GO:0001558** **regulation of cell growth** **11/69** **1.471E-3** **0.0188**

Gene Symbol	Definition
MAD2L2	MAD2 mitotic arrest deficient-like 2 (yeast)
EPB41L3	erythrocyte membrane protein band 4.1 like 3
CRIM1	cysteine rich transmembrane BMP regulator 1
SGK1	serum/glucocorticoid regulated kinase 1
WISP2	WNT1 inducible signaling pathway protein 2

TMC8	transmembrane channel like 8
TMEM97	transmembrane protein 97
IGFBP3	insulin like growth factor binding protein 3
CTGF	connective tissue growth factor
IGFBP4	insulin like growth factor binding protein 4
AGT	angiotensinogen

12	GO:0032270	positive regulation of cellular protein metabolic process	5/15	1.013E-3	0.0214
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Gene Symbol	Definition
TGFB1	transforming growth factor beta 1
PTK2B	protein tyrosine kinase 2 beta
AGT	angiotensinogen
CSF1	colony stimulating factor 1
INHBA	inhibin beta A subunit

13	GO:0000188	inactivation of MAPK activity	6/25	2.127E-3	0.0257
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Gene Symbol	Definition
SPRED1	sprouty related EVH1 domain containing 1
SPRED2	sprouty related EVH1 domain containing 2
DUSP8	dual specificity phosphatase 8
DUSP5	dual specificity phosphatase 5
DUSP7	dual specificity phosphatase 7
DUSP6	dual specificity phosphatase 6

14	GO:0043691	reverse cholesterol transport	5/18	2.510E-3	0.0277
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Gene Symbol	Definition
CLU	clusterin
ABCA5	ATP binding cassette subfamily A member 5
APOE	apolipoprotein E
APOA2	apolipoprotein A2
ABCA1	ATP binding cassette subfamily A member 1

15	GO:0030336	negative regulation of cell migration	13/94	2.180E-3	0.0279
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Gene Symbol	Definition
TCAF1	TRPM8 channel associated factor 1
DPYSL3	dihydropyrimidinase like 3

ENG	endoglin
SLC9A3R1	SLC9A3 regulator 1
TPM1	tropomyosin 1 (alpha)
NISCH	nischarin
PKP2	plakophilin 2
BST2	bone marrow stromal cell antigen 2
CITED2	Cbp/p300 interacting transactivator with Glu/Asp rich carboxy-terminal domain 2
TIE1	tyrosine kinase with immunoglobulin like and EGF like domains 1
PTPRK	protein tyrosine phosphatase, receptor type K
SERPINE1	serpin family E member 1
DAG1	dystroglycan 1

16 GO:0030335 positive regulation of cell migration 20/180 2.704E-3 0.0279

Gene Symbol	Definition
PDGFRB	platelet derived growth factor receptor beta
SEMA3C	semaphorin 3C
SEMA3B	semaphorin 3B
PDGFA	platelet derived growth factor subunit A
RDX	radixin
TGFB1	transforming growth factor beta 1
MYO1C	myosin 1C
CSF1	colony stimulating factor 1
MCAM	melanoma cell adhesion molecule
NOTCH1	notch 1
PODXL	podocalyxin like
EDN1	endothelin 1
PTK2B	protein tyrosine kinase 2 beta
ETS1	ETS proto-oncogene 1, transcription factor
COL1A1	collagen type I alpha 1 chain
PDCD10	programmed cell death 10
F2RL1	F2R like trypsin receptor 1
SEMA4C	semaphorin 4C
SEMA4D	semaphorin 4D
FERMT3	fermitin family member 3

17 GO:0009612 response to mechanical stimulus 10/64 2.769E-3 0.0308

Gene Symbol	Definition
TGFBR2	transforming growth factor beta receptor 2
SOST	sclerostin
JUND	JunD proto-oncogene, AP-1 transcription factor subunit
PTK2B	protein tyrosine kinase 2 beta
ETS1	ETS proto-oncogene 1, transcription factor
FOSL1	FOS like 1, AP-1 transcription factor subunit
TNC	tenascin C
COL1A1	collagen type I alpha 1 chain
ANGPT2	angiopoietin 2
CITED2	Cbp/p300 interacting transactivator with Glu/Asp rich carboxy-terminal domain 2

18	GO:0060762	regulation of branching involved in mammary gland duct morphogenesis	3/6	3.059E-3	0.0319
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Gene Symbol	Definition
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TGFB1	transforming growth factor beta 1
ETV5	ETS variant 5
ETV4	ETS variant 4

19	GO:0014911	positive regulation of smooth muscle cell migration	5/19	3.251E-3	0.0355
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Gene Symbol	Definition
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PDGFRB	platelet derived growth factor receptor beta
ITGA2	integrin subunit alpha 2
FOXO4	forkhead box O4
NRP1	neuropilin 1
VTN	vitronectin

20	GO:0098609	cell-cell adhesion	27/276	3.558E-3	0.0358
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Gene Symbol	Definition
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USP8	ubiquitin specific peptidase 8
KTN1	kinectin 1
SPTAN1	spectrin alpha, non-erythrocytic 1
EPHA2	EPH receptor A2
ITGA6	integrin subunit alpha 6
HSPA1A	heat shock protein family A (Hsp70) member 1A
STXBP6	syntaxin binding protein 6
NDRG1	N-myc downstream regulated 1
VASP	vasodilator-stimulated phosphoprotein
EHD1	EH domain containing 1
CGN	cingulin
PPL	periplakin
PPME1	protein phosphatase methylesterase 1
PERP	PERP, TP53 apoptosis effector
ZC3HAV1	zinc finger CCCH-type containing, antiviral 1
EPB41L1	erythrocyte membrane protein band 4.1 like 1
IDH1	isocitrate dehydrogenase (NADP(+)) 1, cytosolic
RDX	radixin
RPL15	ribosomal protein L15
SND1	staphylococcal nuclease and tudor domain containing 1
MMP24	matrix metalloproteinase 24
EPS8L2	EPS8 like 2
CALD1	caldesmon 1
SHTN1	shootin 1
CNN3	calponin 3

KIF5B
PPFIBP1

kinesin family member 5B
PPFIA binding protein 1

21 **GO:0010595** **positive regulation of endothelial cell migration** **8/46** **3.643E-3** **0.0373**

Gene Symbol

Definition

ANXA3	annexin A3
PTK2B	protein tyrosine kinase 2 beta
SPARC	secreted protein acidic and cysteine rich
GPLD1	glycosylphosphatidylinositol specific phospholipase D1
EDN1	endothelin 1
AGT	angiotensinogen
NRP1	neuropilin 1
ETS1	ETS proto-oncogene 1, transcription factor

22 **GO:0001568** **blood vessel development** **9/57** **4.122E-3** **0.0382**

Gene Symbol

Definition

TGFB2	transforming growth factor beta receptor 2
PLPP3	phospholipid phosphatase 3
LAMA4	laminin subunit alpha 4
TGFB2	transforming growth factor beta 2
EPHA2	EPH receptor A2
TBX3	T-box 3
COL1A1	collagen type I alpha 1 chain
CITED2	Cbp/p300 interacting transactivator with Glu/Asp rich carboxy-terminal domain 2
TIE1	tyrosine kinase with immunoglobulin like and EGF like domains 1

23 **GO:0001525** **angiogenesis** **23/227** **4.425E-3** **0.042**

Gene Symbol

Definition

TGFB2	transforming growth factor beta 2
EPHA2	EPH receptor A2
PTK2B	protein tyrosine kinase 2 beta
PDCD10	programmed cell death 10
SERPINE1	serpin family E member 1
ECSCR	endothelial cell surface expressed chemotaxis and apoptosis regulator
FMNL3	formin like 3
MYH9	myosin heavy chain 9
HTATIP2	HIV-1 Tat interactive protein 2
ARHGAP22	Rho GTPase activating protein 22
ANGPT2	angiopoietin 2
PDGFA	platelet derived growth factor subunit A
ENG	endoglin
MCAM	melanoma cell adhesion molecule
PLCD3	phospholipase C delta 3

VEGFC	vascular endothelial growth factor C
NRP1	neuropilin 1
IL18	interleukin 18
ROBO4	roundabout guidance receptor 4
ELK3	ELK3, ETS transcription factor
CTGF	connective tissue growth factor
ANPEP	alanyl aminopeptidase, membrane
TIE1	tyrosine kinase with immunoglobulin like and EGF like domains 1

24	GO:0032967	positive regulation of collagen biosynthetic process	5/20	4.138E-3	0.0428
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Gene Symbol	Definition
TGFB1	transforming growth factor beta 1
PDGFRB	platelet derived growth factor receptor beta
ITGA2	integrin subunit alpha 2
CTGF	connective tissue growth factor
ENG	endoglin

25	GO:0016525	negative regulation of angiogenesis	9/59	5.212E-3	0.0479
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Gene Symbol	Definition
TIE1	tyrosine kinase with immunoglobulin like and EGF like domains 1
ECSCR	endothelial cell surface expressed chemotaxis and apoptosis regulator
EPHA2	EPH receptor A2
SPARC	secreted protein acidic and cysteine rich
FOXO4	forkhead box O4
ANGPT2	angiopoietin 2
AGT	angiotensinogen
NPPB	natriuretic peptide B
AMOT	angiomotin