# BioInfoMiner

**Subject:** Enrichment Analysis Report (extended version)

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

**Database:** Reactome Pathways (Reactome)

**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 Reactome Pathways, BioInfoMiner analyzed 373 genes and reveals 23 ontological terms as statistically significant. This enriched set of terms corresponds to 101 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 | R-HSA-1474244 | Extracellular matrix organization | 39/289 | 4.294E-12 | 0.0027 |

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| TGFB2 | transforming growth factor beta 2 |
| MMP11 | matrix metallopeptidase 11 |
| TIMP1 | TIMP metallopeptidase inhibitor 1 |
| ITGA2 | integrin subunit alpha 2 |
| ITGA6 | integrin subunit alpha 6 |
| PCOLCE2 | procollagen C-endopeptidase enhancer 2 |
| MFAP2 | microfibrillar associated protein 2 |
| MFAP1 | microfibrillar associated protein 1 |
| LAMB2 | laminin subunit beta 2 |
| SERPINE1 | serpin family E member 1 |
| TIMP2 | TIMP metallopeptidase inhibitor 2 |
| LOXL4 | lysyl oxidase like 4 |
| PLOD1 | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 |
| ADAMTS9 | ADAM metallopeptidase with thrombospondin type 1 motif 9 |
| NID1 | nidogen 1 |
| A2M | alpha-2-macroglobulin |
| SPARC | secreted protein acidic and cysteine rich |
| CDH1 | cadherin 1 |
| PDGFA | platelet derived growth factor subunit A |
| LAMA4 | laminin subunit alpha 4 |
| LTBP2 | latent transforming growth factor beta binding protein 2 |
| LTBP1 | latent transforming growth factor beta binding protein 1 |

| | |
|---|---|
| EFEMP1 | EGF containing fibulin like extracellular matrix protein 1 |
| 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 |
| MMP24 | matrix metallopeptidase 24 |
| COL16A1 | collagen type XVI alpha 1 chain |
| SDC1 | syndecan 1 |
| ITGAM | integrin subunit alpha M |
| MMP9 | matrix metallopeptidase 9 |
| COL6A1 | collagen type VI alpha 1 chain |
| COL6A3 | collagen type VI alpha 3 chain |
| COL6A2 | collagen type VI alpha 2 chain |
| MMP1 | matrix metallopeptidase 1 |

| 2 | R-HSA-3000178 | ECM proteoglycans | 15/74 | 7.472E-8 | 0.0036 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| TGFB2 | transforming growth factor beta 2 |
| COL6A2 | collagen type VI alpha 2 chain |
| LAMA4 | laminin subunit alpha 4 |
| ITGA2 | integrin subunit alpha 2 |
| COL9A2 | collagen type IX alpha 2 chain |
| VTN | vitronectin |
| SPARC | secreted protein acidic and cysteine rich |
| DAG1 | dystroglycan 1 |
| TNC | tenascin C |
| COL1A1 | collagen type I alpha 1 chain |
| COL6A1 | collagen type VI alpha 1 chain |
| COL6A3 | collagen type VI alpha 3 chain |
| LAMB2 | laminin subunit beta 2 |
| SERPINE1 | serpin family E member 1 |

| 3 | R-HSA-216083 | Integrin cell surface interactions | 14/84 | 2.435E-6 | 0.0064 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| CD44 | CD44 molecule (Indian blood group) |
| ITGA2 | integrin subunit alpha 2 |
| COL9A2 | collagen type IX alpha 2 chain |
| ITGA6 | integrin subunit alpha 6 |
| VTN | vitronectin |
| COL6A1 | collagen type VI alpha 1 chain |
| ITGAM | integrin subunit alpha M |
| TNC | tenascin C |
| COL1A1 | collagen type I alpha 1 chain |
| CDH1 | cadherin 1 |
| COL16A1 | collagen type XVI alpha 1 chain |

| | |
|---|---|
| COL6A2 | collagen type VI alpha 2 chain |
| COL6A3 | collagen type VI alpha 3 chain |
| DAG1 | dystroglycan 1 |

| 4 | R-HSA-3000171 | Non-integrin membrane-ECM interactions | 11/59 | 9.483E-6 | 0.0083 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| LAMA4 | laminin subunit alpha 4 |
| PDGFA | platelet derived growth factor subunit A |
| SDC1 | syndecan 1 |
| ITGA2 | integrin subunit alpha 2 |
| ITGA6 | integrin subunit alpha 6 |
| VTN | vitronectin |
| DAG1 | dystroglycan 1 |
| TNC | tenascin C |
| COL1A1 | collagen type I alpha 1 chain |
| LAMB2 | laminin subunit beta 2 |

| 5 | R-HSA-1474228 | Degradation of the extracellular matrix | 17/136 | 1.235E-5 | 0.0118 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| COL6A3 | collagen type VI alpha 3 chain |
| MMP11 | matrix metallopeptidase 11 |
| TIMP1 | TIMP metallopeptidase inhibitor 1 |
| TIMP2 | TIMP metallopeptidase inhibitor 2 |
| CD44 | CD44 molecule (Indian blood group) |
| COL1A1 | collagen type I alpha 1 chain |
| ADAMTS9 | ADAM metallopeptidase with thrombospondin type 1 motif 9 |
| COL6A1 | collagen type VI alpha 1 chain |
| NID1 | nidogen 1 |
| COL9A2 | collagen type IX alpha 2 chain |
| MMP9 | matrix metallopeptidase 9 |
| CDH1 | cadherin 1 |
| MMP24 | matrix metallopeptidase 24 |
| COL16A1 | collagen type XVI alpha 1 chain |
| COL6A2 | collagen type VI alpha 2 chain |
| A2M | alpha-2-macroglobulin |
| MMP1 | matrix metallopeptidase 1 |

| 6 | R-HSA-1566948 | Elastic fibre formation | 9/44 | 2.812E-5 | 0.0129 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| TGFB2 | transforming growth factor beta 2 |

| | |
|---|---|
| LOXL4 | lysyl oxidase like 4 |
| LTBP2 | latent transforming growth factor beta binding protein 2 |
| LTBP1 | latent transforming growth factor beta binding protein 1 |
| EFEMP1 | EGF containing fibulin like extracellular matrix protein 1 |
| VTN | vitronectin |
| MFAP2 | microfibrillar associated protein 2 |
| MFAP1 | microfibrillar associated protein 1 |

| 7 | R-HSA-3000170 | Syndecan interactions | 7/27 | 4.353E-5 | 0.0131 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| SDC1 | syndecan 1 |
| ITGA2 | integrin subunit alpha 2 |
| ITGA6 | integrin subunit alpha 6 |
| VTN | vitronectin |
| TNC | tenascin C |
| COL1A1 | collagen type I alpha 1 chain |

| 8 | R-HSA-422475 | Axon guidance | 40/548 | 4.601E-5 | 0.0153 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| MYH10 | myosin heavy chain 10 |
| PDGFRB | platelet derived growth factor receptor beta |
| MYH14 | myosin heavy chain 14 |
| SPTAN1 | spectrin alpha, non-erythrocytic 1 |
| ITGA2 | integrin subunit alpha 2 |
| EPHA4 | EPH receptor A4 |
| GAB2 | GRB2 associated binding protein 2 |
| SPRED1 | sprouty related EVH1 domain containing 1 |
| SPRED2 | sprouty related EVH1 domain containing 2 |
| MYL6 | myosin light chain 6 |
| MSN | moesin |
| PSENEN | presenilin enhancer gamma-secretase subunit |
| SEMA4D | semaphorin 4D |
| DLG1 | discs large MAGUK scaffold protein 1 |
| ITSN1 | intersectin 1 |
| MYH9 | myosin heavy chain 9 |
| PRNP | prion protein |
| DUSP8 | dual specificity phosphatase 8 |
| DUSP5 | dual specificity phosphatase 5 |
| DUSP7 | dual specificity phosphatase 7 |
| DUSP6 | dual specificity phosphatase 6 |
| NRG4 | neuregulin 4 |
| DPYSL3 | dihydropyrimidinase like 3 |
| COL9A2 | collagen type IX alpha 2 chain |
| RDX | radixin |
| EPHA2 | EPH receptor A2 |
| ABLIM1 | actin binding LIM protein 1 |
| VASP | vasodilator-stimulated phosphoprotein |
| NRP1 | neuropilin 1 |

| | |
|---|---|
| PLXNC1 | plexin C1 |
| SHTN1 | shootin 1 |
| GRB10 | growth factor receptor bound protein 10 |
| TUBB4A | tubulin beta 4A class IVa |
| GIT1 | GIT ArfGAP 1 |
| MMP9 | matrix metallopeptidase 9 |
| COL6A1 | collagen type VI alpha 1 chain |
| HSP90AA1 | heat shock protein 90 alpha family class A member 1 |
| COL6A3 | collagen type VI alpha 3 chain |
| COL6A2 | collagen type VI alpha 2 chain |
| PLXNA1 | plexin A1 |

| 9 | R-HSA-2129379 | Molecules associated with elastic fibres | 8/37 | 5.135E-5 | 0.0189 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFB1 | transforming growth factor beta 1 |
| TGFB2 | transforming growth factor beta 2 |
| LTBP2 | latent transforming growth factor beta binding protein 2 |
| LTBP1 | latent transforming growth factor beta binding protein 1 |
| EFEMP1 | EGF containing fibulin like extracellular matrix protein 1 |
| VTN | vitronectin |
| MFAP2 | microfibrillar associated protein 2 |
| MFAP1 | microfibrillar associated protein 1 |

| 10 | R-HSA-3928663 | EPHA-mediated growth cone collapse | 7/32 | 1.403E-4 | 0.0197 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| MYH10 | myosin heavy chain 10 |
| EPHA4 | EPH receptor A4 |
| MYH14 | myosin heavy chain 14 |
| MYH9 | myosin heavy chain 9 |
| EPHA2 | EPH receptor A2 |
| MYL6 | myosin light chain 6 |
| HSP90AA1 | heat shock protein 90 alpha family class A member 1 |

| 11 | R-HSA-373755 | Semaphorin interactions | 10/67 | 1.710E-4 | 0.0227 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| PLXNC1 | plexin C1 |
| MYH10 | myosin heavy chain 10 |
| MYH14 | myosin heavy chain 14 |
| DPYSL3 | dihydropyrimidinase like 3 |
| PLXNA1 | plexin A1 |
| MYH9 | myosin heavy chain 9 |
| MYL6 | myosin light chain 6 |
| HSP90AA1 | heat shock protein 90 alpha family class A member 1 |

| | |
|---|---|
| SEMA4D | semaphorin 4D |
| NRP1 | neuropilin 1 |

| 12 | R-HSA-1474290 | Collagen formation | 11/88 | 4.069E-4 | 0.0236 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| PLOD1 | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 |
| LOXL4 | lysyl oxidase like 4 |
| COL1A1 | collagen type I alpha 1 chain |
| COL9A2 | collagen type IX alpha 2 chain |
| ITGA6 | integrin subunit alpha 6 |
| PCOLCE2 | procollagen C-endopeptidase enhancer 2 |
| MMP9 | matrix metallopeptidase 9 |
| COL6A1 | collagen type VI alpha 1 chain |
| COL16A1 | collagen type XVI alpha 1 chain |
| COL6A2 | collagen type VI alpha 2 chain |
| COL6A3 | collagen type VI alpha 3 chain |

| 13 | R-HSA-2682334 | EPH-Ephrin signaling | 11/92 | 5.975E-4 | 0.0278 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| MYH10 | myosin heavy chain 10 |
| EPHA4 | EPH receptor A4 |
| MYH14 | myosin heavy chain 14 |
| ITSN1 | intersectin 1 |
| MYH9 | myosin heavy chain 9 |
| EPHA2 | EPH receptor A2 |
| HSP90AA1 | heat shock protein 90 alpha family class A member 1 |
| MYL6 | myosin light chain 6 |
| GIT1 | GIT ArfGAP 1 |
| MMP9 | matrix metallopeptidase 9 |
| PSENEN | presenilin enhancer gamma-secretase subunit |

| 14 | R-HSA-1442490 | Collagen degradation | 9/64 | 5.624E-4 | 0.0281 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| MMP11 | matrix metallopeptidase 11 |
| COL1A1 | collagen type I alpha 1 chain |
| COL9A2 | collagen type IX alpha 2 chain |
| MMP9 | matrix metallopeptidase 9 |
| COL6A1 | collagen type VI alpha 1 chain |
| COL16A1 | collagen type XVI alpha 1 chain |
| COL6A2 | collagen type VI alpha 2 chain |
| COL6A3 | collagen type VI alpha 3 chain |
| MMP1 | matrix metallopeptidase 1 |

| 15 | R-HSA-1989781 | PPARA activates gene expression | 12/110 | 7.921E-4 | 0.0319 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| HMGCS1 | 3-hydroxy-3-methylglutaryl-CoA synthase 1 |
| G0S2 | G0/G1 switch 2 |
| CPT2 | carnitine palmitoyltransferase 2 |
| PPARGC1A | PPARG coactivator 1 alpha |
| NPAS2 | neuronal PAS domain protein 2 |
| NFYB | nuclear transcription factor Y subunit beta |
| CTGF | connective tissue growth factor |
| ABCA1 | ATP binding cassette subfamily A member 1 |
| TEAD1 | TEA domain transcription factor 1 |
| AGT | angiotensinogen |
| ACADM | acyl-CoA dehydrogenase, C-4 to C-12 straight chain |
| APOA2 | apolipoprotein A2 |

| 16 | R-HSA-400206 | Regulation of lipid metabolism by Peroxisome proliferator-activated receptor alpha (PPARalpha) | 12/112 | 9.298E-4 | 0.0341 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| HMGCS1 | 3-hydroxy-3-methylglutaryl-CoA synthase 1 |
| G0S2 | G0/G1 switch 2 |
| CPT2 | carnitine palmitoyltransferase 2 |
| PPARGC1A | PPARG coactivator 1 alpha |
| NPAS2 | neuronal PAS domain protein 2 |
| NFYB | nuclear transcription factor Y subunit beta |
| CTGF | connective tissue growth factor |
| ABCA1 | ATP binding cassette subfamily A member 1 |
| TEAD1 | TEA domain transcription factor 1 |
| AGT | angiotensinogen |
| ACADM | acyl-CoA dehydrogenase, C-4 to C-12 straight chain |
| APOA2 | apolipoprotein A2 |

| 17 | R-HSA-1368108 | BMAL1:CLOCK,NPAS2 activates circadian gene expression | 7/42 | 8.143E-4 | 0.0343 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| SIK1 | salt inducible kinase 1 |
| NRIP1 | nuclear receptor interacting protein 1 |
| PPARGC1A | PPARG coactivator 1 alpha |
| NAMPT | nicotinamide phosphoribosyltransferase |
| NPAS2 | neuronal PAS domain protein 2 |
| ARNTL2 | aryl hydrocarbon receptor nuclear translocator like 2 |
| SERPINE1 | serpin family E member 1 |

| 18 | R-HSA-1592389 | Activation of Matrix Metalloproteinases | 6/33 | 1.195E-3 | 0.0348 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| MMP11 | matrix metallopeptidase 11 |
| TIMP2 | TIMP metallopeptidase inhibitor 2 |
| TIMP1 | TIMP metallopeptidase inhibitor 1 |
| MMP9 | matrix metallopeptidase 9 |
| MMP24 | matrix metallopeptidase 24 |
| MMP1 | matrix metallopeptidase 1 |

| 19 | R-HSA-191273 | Cholesterol biosynthesis | 5/23 | 1.330E-3 | 0.0392 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| IDI1 | isopentenyl-diphosphate delta isomerase 1 |
| EBP | emopamil binding protein (sterol isomerase) |
| MVD | mevalonate diphosphate decarboxylase |
| TM7SF2 | transmembrane 7 superfamily member 2 |
| HMGCS1 | 3-hydroxy-3-methylglutaryl-CoA synthase 1 |

| 20 | R-HSA-3642279 | TGFBR2 MSI Frameshift Mutants in Cancer | 2/2 | 1.368E-3 | 0.0407 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| TGFBR2 | transforming growth factor beta receptor 2 |
| TGFB1 | transforming growth factor beta 1 |

| 21 | R-HSA-2173782 | Binding and Uptake of Ligands by Scavenger Receptors | 7/47 | 1.617E-3 | 0.0421 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| APOE | apolipoprotein E |
| SCARF1 | scavenger receptor class F member 1 |
| SAA1 | serum amyloid A1 |
| SPARC | secreted protein acidic and cysteine rich |
| MARCO | macrophage receptor with collagenous structure |
| COL1A1 | collagen type I alpha 1 chain |
| HSP90AA1 | heat shock protein 90 alpha family class A member 1 |

| 22 | R-HSA-448706 | Interleukin-1 processing | 3/7 | 1.582E-3 | 0.0433 |
|---|---|---|---|---|---|

| Gene Symbol | Definition |
|---|---|
| IL18 | interleukin 18 |
| IL1A | interleukin 1 alpha |
| IL1B | interleukin 1 beta |

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|---|---|---|---|---|---|
| **23** | **R-HSA-416572** | **Sema4D induced cell migration and growth-cone collapse** | **5/24** | **1.629E-3** | **0.0444** |

| Gene Symbol | Definition |
|---|---|
| MYH10 | myosin heavy chain 10 |
| MYH14 | myosin heavy chain 14 |
| MYH9 | myosin heavy chain 9 |
| SEMA4D | semaphorin 4D |
| MYL6 | myosin light chain 6 |