

GO biological processes enrichment analysis of 15 differentially expressed proteins (logFC >1 or <-1, P<0.05)

Term name	Term ID	Adjusted P value	Negative log10 of adjusted P value	Intersections
Collagen fibril organization	GO:0030199	0.00045175	3.34510625	ACAN, COL2A1, ANXA2, COL1A1
Skeletal system development	GO:0001501	0.00067826	3.16860086	HAPLN1, ACAN, COL2A1, ANXA2, COL1A1
Extracellular structure organization	GO:0043062	0.00067826	3.16860086	HAPLN1, ACAN, COL2A1, ANXA2, COL1A1
Neutrophil activation	GO:0042119	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, SERPINA1
Granulocyte activation	GO:0036230	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, SERPINA1
Extracellular matrix organization	GO:0030198	0.00067826	3.16860086	HAPLN1, ACAN, COL2A1, ANXA2, COL1A1
Neutrophil activation involved in immune response	GO:0002283	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, SERPINA1
Neutrophil degranulation	GO:0043312	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, SERPINA1
Leukocyte mediated immunity	GO:0002443	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, IGLV6-57, SERPINA1
Regulated exocytosis	GO:0045055	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
Neutrophil mediated immunity	GO:0002446	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, SERPINA1
Exocytosis	GO:0006887	0.00067826	3.16860086	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
External encapsulating structure organization	GO:0045229	0.00067826	3.16860086	HAPLN1, ACAN, COL2A1, ANXA2, COL1A1
Leukocyte degranulation	GO:0043299	0.00072089	3.14212905	DSG1, DSC1, DSP, ANXA2, SERPINA1
Cell adhesion	GO:0007155	0.00072089	3.14212905	DSG1, HAPLN1, DSC1, DSP, ACAN, ANXA2, COL1A1
Biological	GO:0022	0.00072089	3.14212905	DSG1, HAPLN1, DSC1, DSP,

adhesion	610	89		ACAN, ANXA2, COL1A1
Myeloid leukocyte mediated immunity	GO:0002 444	0.000764 56	3.11658653	DSG1, DSC1, DSP, ANXA2, SERPINA1
Myeloid cell activation involved in immune response	GO:0002 275	0.000764 56	3.11658653	DSG1, DSC1, DSP, ANXA2, SERPINA1
Immune response	GO:0006 955	0.001592 4	2.79794913	DSG1, DSC1, DSP, COL2A1, ANXA2, COL1A1, IGLV6-57, SERPINA1
Myeloid leukocyte activation	GO:0002 274	0.001592 4	2.79794913	DSG1, DSC1, DSP, ANXA2, SERPINA1
Immune effector process	GO:0002 252	0.001592 4	2.79794913	DSG1, DSC1, DSP, ANXA2, IGLV6-57, SERPINA1
Cornification	GO:0070 268	0.001687 8	2.77267903	DSG1, DSC1, DSP
Cell activation involved in immune response	GO:0002 263	0.002044 45	2.68942256	DSG1, DSC1, DSP, ANXA2, SERPINA1
Leukocyte activation involved in immune response	GO:0002 366	0.002044 45	2.68942256	DSG1, DSC1, DSP, ANXA2, SERPINA1
Cartilage condensation	GO:0001 502	0.002820 17	2.54972484	ACAN, COL2A1
Secretion by cell	GO:0032 940	0.003116 97	2.50626734	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
Tissue development	GO:0009 888	0.003341 65	2.47603862	DSG1, DSC1, XP32, DSP, ACAN, COL2A1, COL1A1
Skin development	GO:0043 588	0.003341 65	2.47603862	DSG1, DSC1, DSP, COL1A1
Cell aggregation	GO:0098 743	0.003341 65	2.47603862	ACAN, COL2A1
Replacement ossification	GO:0036 075	0.003341 65	2.47603862	COL2A1, COL1A1
Endochondral ossification	GO:0001 958	0.003341 65	2.47603862	COL2A1, COL1A1
Export from cell	GO:0140 352	0.003341 65	2.47603862	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
Supramolecular fiber organization	GO:0097 435	0.003357 38	2.47399984	DSP, ACAN, COL2A1, ANXA2, COL1A1

Vesicle-mediated transport	GO:0016192	0.0038509	2.41443794	DSG1, DSC1, DSP, ANXA2, IGLV6-57, ITIH4, SERPINA1
Cartilage development involved in endochondral bone morphogenesis	GO:0060351	0.0039293	2.40568444	COL2A1, COL1A1
Secretion	GO:0046903	0.0039293	2.40568444	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
Epidermis development	GO:0008544	0.00402431	2.39530891	DSG1, DSC1, XP32, DSP
Cell activation	GO:0001775	0.00402431	2.39530891	DSG1, DSC1, DSP, ANXA2, COL1A1, SERPINA1
Cartilage development	GO:0051216	0.00485399	2.31390073	ACAN, COL2A1, COL1A1
Bone development	GO:0060348	0.00572695	2.24207636	COL2A1, ANXA2, COL1A1
Wound healing	GO:0042060	0.00660554	2.18009165	DSP, ANXA2, COL1A1, SERPINA1
Skeletal system morphogenesis	GO:0048705	0.00688238	2.16226121	ACAN, COL2A1, COL1A1
Immune system process	GO:0002376	0.00688238	2.16226121	DSG1, DSC1, DSP, COL2A1, ANXA2, COL1A1, IGLV6-57, SERPINA1
Keratinization	GO:0031424	0.00688238	2.16226121	DSG1, DSC1, DSP
Negative regulation of formation of structure involved in a symbiotic process	GO:0044147	0.00756028	2.12146221	ANXA2
Multi-organism catabolic process	GO:0044035	0.00756028	2.12146221	ANXA2
Modulation of formation of structure involved in a symbiotic process	GO:0044145	0.00756028	2.12146221	ANXA2
Cellular response to fluoride	GO:1902618	0.00756028	2.12146221	COL1A1
Metabolism of substance in other	GO:0052214	0.00756028	2.12146221	ANXA2

organism involved in symbiotic interaction				
Negative regulation of peptidase activity	GO:0010466	0.00756028	2.12146221	ANXA2, ITIH4, SERPINA1
Endochondral bone morphogenesis	GO:0060350	0.00756028	2.12146221	COL2A1, COL1A1
Multi-organism metabolic process	GO:0044033	0.00756028	2.12146221	ANXA2
Metabolism by host of substance in symbiont	GO:0052419	0.00756028	2.12146221	ANXA2
Metabolism by organism of protein in other organism involved in symbiotic interaction	GO:0052418	0.00756028	2.12146221	ANXA2
Metabolism by host of symbiont protein	GO:0052417	0.00756028	2.12146221	ANXA2
Metabolism by host of symbiont macromolecule	GO:0052416	0.00756028	2.12146221	ANXA2
Catabolism by host of substance in symbiont	GO:0052364	0.00756028	2.12146221	ANXA2
Catabolism by organism of protein in other organism involved in symbiotic interaction	GO:0052363	0.00756028	2.12146221	ANXA2
Acute-phase response	GO:0006953	0.00756028	2.12146221	ITIH4, SERPINA1
Catabolism by host of symbiont protein	GO:0052362	0.00756028	2.12146221	ANXA2
Catabolism by organism of macromolecule in other organism	GO:0052361	0.00756028	2.12146221	ANXA2

involved in symbiotic interaction				
Catabolism by host of symbiont macromolecule	GO:0052 360	0.007560 28	2.12146221	ANXA2
Metabolism of macromolecule in other organism involved in symbiotic interaction	GO:0052 229	0.007560 28	2.12146221	ANXA2
Catabolism of substance in other organism involved in symbiotic interaction	GO:0052 227	0.007560 28	2.12146221	ANXA2
Connective tissue development	GO:0061 448	0.007560 28	2.12146221	ACAN, COL2A1, COL1A1
Negative regulation of endopeptidase activity	GO:0010 951	0.007560 28	2.12146221	ANXA2, ITIH4, SERPINA1
Positive regulation of low-density lipoprotein particle receptor binding	GO:1905 597	0.007560 28	2.12146221	ANXA2
Circulatory system development	GO:0072 359	0.008036 86	2.09491378	DSP, ACAN, COL2A1, ANXA2, COL1A1
Response to wounding	GO:0009 611	0.008472 83	2.0719716	DSP, ANXA2, COL1A1, SERPINA1
Keratinocyte differentiation	GO:0030 216	0.010235 13	1.98990676	DSG1, DSC1, DSP
Leukocyte activation	GO:0045 321	0.012090 32	1.91756232	DSG1, DSC1, DSP, ANXA2, SERPINA1
Cellular response to vitamin E	GO:0071 306	0.013503 6	1.8695505	COL1A1
Formation of structure involved in a symbiotic process	GO:0044 111	0.013503 6	1.8695505	ANXA2

Negative regulation of low-density lipoprotein particle receptor catabolic process	GO:0032804	0.0135036	1.8695505	ANXA2
Positive regulation of receptor-mediated endocytosis involved in cholesterol transport	GO:1905602	0.0135036	1.8695505	ANXA2
Blood coagulation	GO:0007596	0.0140074	1.85364241	ANXA2, COL1A1, SERPINA1
Negative regulation of proteolysis	GO:0045861	0.01421488	1.84725674	ANXA2, ITIH4, SERPINA1
Hemostasis	GO:0007599	0.01421488	1.84725674	ANXA2, COL1A1, SERPINA1
Coagulation	GO:0050817	0.01426279	1.84579536	ANXA2, COL1A1, SERPINA1
Proteoglycan metabolic process	GO:0006029	0.01490225	1.82674819	ACAN, COL2A1
Epidermal cell differentiation	GO:0009913	0.01529208	1.81553342	DSG1, DSC1, DSP
Peptide cross-linking	GO:0018149	0.01651703	1.78206813	DSP, IGLV6-57
Bone morphogenesis	GO:0060349	0.01665544	1.77844397	COL2A1, COL1A1
Positive regulation of low-density lipoprotein particle clearance	GO:1905581	0.01786698	1.74794873	ANXA2
Negative regulation of receptor catabolic process	GO:2000645	0.01786698	1.74794873	ANXA2
Cell-cell adhesion	GO:0098609	0.01914778	1.7178816	DSG1, DSC1, DSP, ANXA2
Vesicle budding from membrane	GO:0006900	0.01928254	1.7148357	ANXA2, SERPINA1
Chondrocyte	GO:0002	0.019415	1.71184095	ACAN, COL2A1

differentiation	062	97		
Mucopolysaccharide metabolic process	GO:1903 510	0.021535 22	1.66685073	ACAN, ITIH4
Positive regulation of intracellular sterol transport	GO:0032 382	0.021535 22	1.66685073	ANXA2
Regulation of endopeptidase activity	GO:0052 548	0.021535 22	1.66685073	ANXA2, ITIH4, SERPINA1
Acute inflammatory response	GO:0002 526	0.021535 22	1.66685073	ITIH4, SERPINA1
Positive regulation of intracellular cholesterol transport	GO:0032 385	0.021535 22	1.66685073	ANXA2
Regulation of low-density lipoprotein particle receptor binding	GO:1905 595	0.021535 22	1.66685073	ANXA2
Embryonic skeletal system development	GO:0048 706	0.023226 29	1.63402016	COL2A1, COL1A1
Negative regulation of hydrolase activity	GO:0051 346	0.023421 52	1.63038501	ANXA2, ITIH4, SERPINA1
Platelet degranulation	GO:0002 576	0.024221 57	1.61579778	ITIH4, SERPINA1
Regulation of peptidase activity	GO:0052 547	0.024546 46	1.61001117	ANXA2, ITIH4, SERPINA1
Positive regulation of low-density lipoprotein receptor activity	GO:1905 599	0.024559 42	1.60978189	ANXA2
Positive regulation of intracellular lipid transport	GO:0032 379	0.024559 42	1.60978189	ANXA2
Response to	GO:1902	0.024559	1.60978189	COL1A1

fluoride	617	42		
Cellular localization	GO:0051 641	0.024559 42	1.60978189	DSG1, DSC1, DSP, ANXA2, COL1A1, ITIH4, SERPINA1
Negative regulation by host of symbiont molecular function	GO:0052 405	0.024559 42	1.60978189	ANXA2
Regulation of receptor-mediated endocytosis involved in cholesterol transport	GO:1905 600	0.028360 97	1.54727899	ANXA2
Anterior head development	GO:0097 065	0.028360 97	1.54727899	COL2A1
Bundle of His cell-Purkinje myocyte adhesion involved in cell communication	GO:0086 073	0.028360 97	1.54727899	DSP
Regulation of low-density lipoprotein particle receptor catabolic process	GO:0032 803	0.028360 97	1.54727899	ANXA2
Animal organ morphogenesis	GO:0009 887	0.029725 58	1.52686968	DSP, ACAN, COL2A1, COL1A1
Regulation of body fluid levels	GO:0050 878	0.029725 58	1.52686968	ANXA2, COL1A1, SERPINA1
Intramembranous ossification	GO:0001 957	0.029742 18	1.52662717	COL1A1
Cardiac muscle cell-cardiac muscle cell adhesion	GO:0086 042	0.029742 18	1.52662717	DSP
Sensory perception of sound	GO:0007 605	0.029742 18	1.52662717	COL2A1, COL1A1
Modulation by host of symbiont molecular function	GO:0052 428	0.029742 18	1.52662717	ANXA2
Negative	GO:0052	0.029742	1.52662717	ANXA2

regulation of molecular function in other organism involved in symbiotic interaction	204	18		
Direct ossification	GO:0036072	0.02974218	1.52662717	COL1A1
Anatomical structure development	GO:0048856	0.02974218	1.52662717	DSG1, HAPLN1, DSC1, XP32, DSP, ACAN, COL2A1, ANXA2, COL1A1
Animal organ development	GO:0048513	0.02974218	1.52662717	DSG1, DSC1, DSP, ACAN, COL2A1, ANXA2, COL1A1
Tooth eruption	GO:0044691	0.02974218	1.52662717	COL1A1
Negative regulation of molecular function in other organism	GO:0044362	0.02974218	1.52662717	ANXA2
Glycosaminoglycan metabolic process	GO:0030203	0.03037824	1.51743734	ACAN, ITIH4
Ventricular compact myocardium morphogenesis	GO:0003223	0.03234968	1.49013005	DSP
Homophilic cell adhesion via plasma membrane adhesion molecules	GO:0007156	0.03234968	1.49013005	DSG1, DSC1
Receptor-mediated endocytosis involved in cholesterol transport	GO:0090118	0.03234968	1.49013005	ANXA2
Positive regulation of receptor binding	GO:1900122	0.03234968	1.49013005	ANXA2
Establishment of localization in cell	GO:0051649	0.03234968	1.49013005	DSG1, DSC1, DSP, ANXA2, ITIH4, SERPINA1
Aminoglycan	GO:0006	0.034092	1.46734162	ACAN, ITIH4

metabolic process	022	46		
Sensory perception of mechanical stimulus	GO:0050 954	0.034972 16	1.4562776	COL2A1, COL1A1
Modulation of molecular function in other organism involved in symbiotic interaction	GO:0052 205	0.034983 03	1.45614264	ANXA2
Bone trabecula formation	GO:0060 346	0.034983 03	1.45614264	COL1A1
Modulation of molecular function in other organism	GO:0044 359	0.034983 03	1.45614264	ANXA2
System development	GO:0048 731	0.035925 86	1.44459285	DSG1, HAPLN1, DSC1, DSP, ACAN, COL2A1, ANXA2, COL1A1
Heart development	GO:0007 507	0.036475 75	1.43799573	DSP, ACAN, COL2A1
Regulation of intracellular sterol transport	GO:0032 380	0.037143 9	1.43011246	ANXA2
Regulation of intracellular cholesterol transport	GO:0032 383	0.037143 9	1.43011246	ANXA2
Desmosome organization	GO:0002 934	0.037143 9	1.43011246	DSP
Embryonic skeletal joint morphogenesis	GO:0060 272	0.037143 9	1.43011246	COL2A1
Skin morphogenesis	GO:0043 589	0.038846 45	1.41064866	COL1A1
Positive regulation of lipoprotein particle clearance	GO:0010 986	0.038846 45	1.41064866	ANXA2
Regulation of receptor catabolic process	GO:2000 644	0.038846 45	1.41064866	ANXA2
Positive	GO:0031	0.038846	1.41064866	ANXA2

regulation of vesicle fusion	340	45		
Limb bud formation	GO:0060 174	0.038846 45	1.41064866	COL2A1
Regulation of intracellular lipid transport	GO:0032 377	0.038846 45	1.41064866	ANXA2
Transport	GO:0006 810	0.038846 45	1.41064866	DSG1, DSC1, DSP, ANXA2, COL1A1, IGLV6-57, ITIH4, SERPINA1
Collagen-activated tyrosine kinase receptor signaling pathway	GO:0038 063	0.040659 12	1.39084207	COL1A1
Regulation of ventricular cardiac muscle cell action potential	GO:0098 911	0.040659 12	1.39084207	DSP
Membrane raft assembly	GO:0001 765	0.040659 12	1.39084207	ANXA2
Response to vitamin E	GO:0033 197	0.040659 12	1.39084207	COL1A1
Keratan sulfate catabolic process	GO:0042 340	0.040659 12	1.39084207	ACAN
Bone trabecula morphogenesis	GO:0061 430	0.040659 12	1.39084207	COL1A1
Developmental process	GO:0032 502	0.042181 54	1.37487758	DSG1, HAPLN1, DSC1, XP32, DSP, ACAN, COL2A1, ANXA2, COL1A1
Visual perception	GO:0007 601	0.043164 92	1.36486902	COL2A1, COL1A1
Positive regulation of vacuole organization	GO:0044 090	0.043164 92	1.36486902	ANXA2
Establishment of localization	GO:0051 234	0.043310 41	1.36340771	DSG1, DSC1, DSP, ANXA2, COL1A1, IGLV6-57, ITIH4, SERPINA1
Cell-cell junction organization	GO:0045 216	0.043336 65	1.36314471	DSG1, DSP
Sensory perception of light stimulus	GO:0050 953	0.043336 65	1.36314471	COL2A1, COL1A1
Epithelium	GO:0060	0.044147	1.35509245	DSG1, DSC1, DSP, COL2A1

development	429	65		
Low-density lipoprotein particle receptor catabolic process	GO:0032 802	0.044147 65	1.35509245	ANXA2
Low-density lipoprotein receptor particle metabolic process	GO:0032 799	0.044147 65	1.35509245	ANXA2
Embryonic skeletal joint development	GO:0072 498	0.044147 65	1.35509245	COL2A1
Positive regulation of receptor recycling	GO:0001 921	0.044147 65	1.35509245	ANXA2
Bundle of His cell to Purkinje myocyte communication	GO:0086 069	0.046416 4	1.33332857	DSP
Collagen-activated signaling pathway	GO:0038 065	0.046416 4	1.33332857	COL1A1
Otic vesicle development	GO:0071 599	0.046416 4	1.33332857	COL2A1
Osteoclast development	GO:0036 035	0.049194 01	1.3080878	ANXA2

GO, Gene Ontology; FC, fold change.