

Supplementary Table 1: Underlying functional modules of biological processes of 145 core targets.

Functional module	GO term	Biological process	Genes	Count	LogP
regulation of inflammation	GO:0050727	regulation of inflammatory response	ALOX5, MAPK14, CYP19A1, EGFR, ESR1, F2, GSTP1, IL1B, IL2, IL4, IL6, IL10, LDLR, MMP3, MMP9, ABCC1, NOS2, SERPINE1, PPARG, PTGER3, PTGS2, RELA, SELE, SOD1, TNF, ADIPOQ	26	-16.3336
	GO:0002526	acute inflammatory response	CRP, F2, F3, GSTP1, ICAM1, IL1A, IL1B, IL6, OPRM1, PPARG, PTGER3, PTGS2, TNF, CD163, PTGES, UGT1A1	16	-12.3888
	GO:0150076	neuroinflammatory response	EGFR, IFNG, IL1B, IL4, IL6, JUN, LDLR, MMP3, MMP9, PTGS2, TNF	11	-11.9921
	GO:0150077	regulation of neuroinflammatory response	IL1B, IL4, IL6, LDLR, MMP3, MMP9, PTGS2, TNF	8	-9.86073
	GO:0002246	wound healing involved in inflammatory response	HIF1A, HMOX1, IL1A, TGFB1, TIMP1	5	-9.39649
	GO:0070555	response to interleukin-1	CHUK, HIF1A, ICAM1, IKBKB, IL1A, IL1B, IL6, CXCL8, PRKCA, MAPK3, RELA, CCL2, SELE	13	-9.37797
	GO:0090594	inflammatory response to wounding	HIF1A, HMOX1, IL1A, TGFB1, TIMP1	5	-8.04561
	GO:0050728	negative regulation of inflammatory response	ALOX5, CYP19A1, F2, GSTP1, IL2, IL4, IL10, LDLR, PPARG, SOD1, ADIPOQ	11	-7.90898
	GO:0071347	cellular response to interleukin-1	CHUK, HIF1A, ICAM1, IKBKB, IL1A, IL1B, IL6, CXCL8, MAPK3, RELA, CCL2	11	-7.90898
	GO:0050729	positive regulation of inflammatory response	EGFR, IL1B, IL2, IL6, LDLR, ABCC1, SERPINE1, PTGER3, PTGS2, TNF	10	-7.5677
	GO:0002248	connective tissue replacement involved in inflammatory response wound healing	HIF1A, IL1A, TGFB1, TIMP1	4	-7.36667
	GO:0032637	interleukin-8 production	CRP, IL1B, IL10, NOS2, SERPINE1, RELA, TNF, ADIPOQ	8	-7.30441
	GO:0032677	regulation of interleukin-8 production	CRP, IL1B, IL10, SERPINE1, RELA, TNF, ADIPOQ	7	-6.34749
	GO:0002675	positive regulation of acute inflammatory response	IL1B, IL6, PTGER3, PTGS2, TNF	5	-5.96276
	GO:0002437	inflammatory response to antigenic stimulus	ICAM1, IL1A, IL1B, IL10, OPRM1, TNF	6	-5.6246
	GO:0070498	interleukin-1-mediated signaling pathway	CHUK, IKBKB, IL1A, IL1B, IL6, MAPK3, RELA	7	-5.61279
	GO:0002544	chronic inflammatory response	CYP19A1, IL10, TNF, PTGES	4	-5.44735

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GO:0002673	regulation of acute inflammatory response	F2, GSTP1, IL1B, IL6, PPARG, PTGER3, PTGS2, TNF	8	-5.22093
GO:0002269	leukocyte activation involved in inflammatory response	IFNG, IL6, JUN, LDLR, TNF	5	-4.95037
GO:0032757	positive regulation of interleukin-8 production	IL1B, SERPINE1, RELA, TNF, ADIPOQ	5	-4.82217
GO:0002676	regulation of chronic inflammatory response	CYP19A1, IL10, TNF	3	-4.76118
GO:0032655	regulation of interleukin-12 production	CD40LG, MAPK14, IFNG, IL10, RELA	5	-4.6633
GO:0032615	interleukin-12 production	CD40LG, MAPK14, IFNG, IL10, RELA	5	-4.58846
GO:0032660	regulation of interleukin-17 production	IFNG, IL2, IL6, TGFB1	4	-4.29919
GO:0032735	positive regulation of interleukin-12 production	CD40LG, MAPK14, IFNG, RELA	4	-4.19938
GO:0032620	interleukin-17 production	IFNG, IL2, IL6, TGFB1	4	-4.10543
GO:0032612	interleukin-1 production	CASP8, GSTP1, HSPB1, IFNG, IL1B, IL10	6	-4.05643
GO:0002532	production of molecular mediator involved in inflammatory response	ALOX5, MAPK14, F2, NOS2, SERPINE1	5	-3.96679
GO:0032740	positive regulation of interleukin-17 production	IL2, IL6, TGFB1	3	-3.86827
GO:0150078	positive regulation of neuroinflammatory response	IL1B, IL6, TNF	3	-3.791
GO:0071354	cellular response to interleukin-6	ICAM1, IL6, RELA, STAT1	4	-3.77706
GO:0002689	negative regulation of leukocyte chemotaxis	CYP19A1, DPP4, CCL2	3	-3.64961
GO:0070741	response to interleukin-6	ICAM1, IL6, RELA, STAT1	4	-3.63552
GO:0006925	inflammatory cell apoptotic process	CDKN2A, IL6, SIRT1	3	-3.52281
GO:1902106	negative regulation of leukocyte differentiation	ERBB2, IL2, IL4, MYC, ADIPOQ	5	-3.38185
GO:0032611	interleukin-1 beta production	CASP8, GSTP1, HSPB1, IFNG, IL1B	5	-3.34384
GO:0072604	interleukin-6 secretion	IL1A, IL1B, NOS2, TNF	4	-3.30244
GO:0032652	regulation of interleukin-1 production	CASP8, GSTP1, HSPB1, IFNG, IL10	5	-3.28831
GO:0032635	interleukin-6 production	IL1A, IL1B, IL6, IL10, NOS2, TNF	6	-3.2387
GO:0050901	leukocyte tethering or rolling	SELE, TNF, VCAM1	3	-3.16092
GO:0002695	negative regulation of leukocyte activation	CASP3, ERBB2, HMOX1, IL2, IL10, LDLR	6	-3.12138
GO:1903038	negative regulation of leukocyte cell-cell adhesion	AKT1, CASP3, ERBB2, IL2, IL10	5	-2.92789

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	GO:2000778	positive regulation of interleukin-6 secretion	IL1A, IL1B, TNF	3	-2.88332
	GO:0032755	positive regulation of interleukin-6 production	IL1A, IL1B, IL6, TNF	4	-2.63599
	GO:0032651	regulation of interleukin-1 beta production	CASP8, GSTP1, HSPB1, IFNG	4	-2.56885
	GO:0035722	interleukin-12-mediated signaling pathway	IFNG, IL10, SOD1	3	-2.548
	GO:0032675	regulation of interleukin-6 production	IL1A, IL1B, IL6, IL10, TNF	5	-2.54752
	GO:1900015	regulation of cytokine production involved in inflammatory response	MAPK14, F2, NOS2	3	-2.49632
	GO:0071349	cellular response to interleukin-12	IFNG, IL10, SOD1	3	-2.49632
	GO:0070671	response to interleukin-12	IFNG, IL10, SOD1	3	-2.47135
	GO:0002534	cytokine production involved in inflammatory response	MAPK14, F2, NOS2	3	-2.423
	GO:0032731	positive regulation of interleukin-1 beta production	CASP8, HSPB1, IFNG	3	-2.39959
	GO:0032732	positive regulation of interleukin-1 production	CASP8, HSPB1, IFNG	3	-2.24825
regulation of steroid hormone	GO:0032870	cellular response to hormone stimulus	PARP1, AKT1, APOB, AR, CASP9, CAV1, CCNA2, CREB1, AKR1C1, EGFR, ELK1, ESR1, ESR2, FOS, GSK3B, GSTP1, ICAM1, IGF2, IL1B, IL10, INSR, JUN, NR3C2, NFE2L2, OPRM1, PGR, PPARG, PRKACA, PRKCB, PTEN, PTPN1, RELA, SLC2A4, SPP1, STAT1, AKR1C3, NR1I2, ADIPOQ, NCOA2, CHEK2, SIRT1, UGT1A1	42	-29.2732
	GO:0048545	response to steroid hormone	PARP1, AR, BAD, CCND1, BCL2, CASP3, CASP9, CAV1, CDKN1A, COL1A1, EGFR, ESR1, ESR2, FOS, GSTP1, ICAM1, IL6, IL10, NR3C2, PGR, PPARG, PTGS2, RELA, SPP1, TGFB1, TNF, AKR1C3, NR1I2, ADIPOQ, NCOA2, SIRT1, UGT1A1	32	-26.6184
	GO:0043434	response to peptide hormone	PARP1, AKT1, CAT, CAV1, CCNA2, CHUK, COL1A1, CREB1, GSK3B, GSTP1, ICAM1, IGF2, IL1B, IL10, INSR, NFE2L2, PPARG, PRKACA, PRKCB, PTEN, PTGS2, PTPN1, RELA, SLC2A4, STAT1, TIMP1, ADIPOQ, SIRT1	28	-20.0262
	GO:0008202	steroid metabolic process	AKR1B1, APOB, CAT, CETP, CYP1A1, CYP1A2, CYP3A4, CYP19A1, AKR1C1, ESR1, FASN, HMGCR, IFNG, IL1B, IL4, LDLR, PON1, SOD1,	24	-18.494

GO:0071375	cellular response to peptide hormone stimulus	SPP1, TNF, AKR1C3, NR1I2, SIRT1, UGT1A1 PARP1, AKT1, CAV1, CCNA2, CREB1, GSK3B, GSTP1, IGF2, IL1B, INSR, NFE2L2, PPARG, PRKACA, PRKCB, PTEN, PTPN1, RELA, SLC2A4, STAT1, ADIPOQ, SIRT1	21	-15.1559
GO:0010817	regulation of hormone levels	AKR1B1, BAD, CREB1, CYP1A1, CYP1A2, CYP3A4, CYP19A1, AKR1C1, DPP4, EGFR, ESR1, HIF1A, HMGCR, IFNG, IL1B, IL6, NOS2, PRKCA, RAF1, SPP1, TNF, AKR1C3, ADIPOQ, UGT1A1	24	-13.7738
GO:0071383	cellular response to steroid hormone stimulus	PARP1, AR, CASP9, EGFR, ESR1, ESR2, GSTP1, ICAM1, NR3C2, PGR, PPARG, AKR1C3, NR1I2, SIRT1, UGT1A1	15	-10.5242
GO:0046879	hormone secretion	BAD, CREB1, CYP19A1, DPP4, EGFR, HIF1A, HMGCR, IFNG, IL1B, IL6, NOS2, PRKCA, RAF1, SPP1, TNF, ADIPOQ	16	-10.0696
GO:0009914	hormone transport	BAD, CREB1, CYP19A1, DPP4, EGFR, HIF1A, HMGCR, IFNG, IL1B, IL6, NOS2, PRKCA, RAF1, SPP1, TNF, ADIPOQ	16	-9.90927
GO:0042445	hormone metabolic process	AKR1B1, CYP1A1, CYP1A2, CYP3A4, CYP19A1, AKR1C1, ESR1, HIF1A, IFNG, IL1B, SPP1, TNF, AKR1C3, UGT1A1	14	-9.6437
GO:0006694	steroid biosynthetic process	AKR1B1, APOB, CYP1A1, CYP3A4, CYP19A1, FASN, HMGCR, IFNG, IL1B, SOD1, TNF, AKR1C3, SIRT1	13	-9.53498
GO:0019218	regulation of steroid metabolic process	APOB, FASN, HMGCR, IFNG, IL1B, LDLR, SOD1, TNF, AKR1C3, SIRT1, UGT1A1	11	-9.51586
GO:0046883	regulation of hormone secretion	BAD, CREB1, CYP19A1, DPP4, EGFR, HIF1A, HMGCR, IFNG, IL1B, NOS2, PRKCA, SPP1, TNF, ADIPOQ	14	-9.01966
GO:0034754	cellular hormone metabolic process	AKR1B1, CYP1A1, CYP1A2, CYP3A4, CYP19A1, AKR1C1, ESR1, SPP1, AKR1C3, UGT1A1	10	-8.19352
GO:0050810	regulation of steroid biosynthetic process	APOB, FASN, HMGCR, IFNG, IL1B, SOD1, TNF, AKR1C3, SIRT1	9	-8.14327
GO:0030072	peptide hormone secretion	BAD, DPP4, EGFR, HIF1A, HMGCR, IFNG, IL1B, IL6, NOS2, PRKCA, RAF1, TNF	12	-7.35372
GO:0042446	hormone biosynthetic process	AKR1B1, CYP3A4, CYP19A1, HIF1A, IFNG, IL1B, TNF, AKR1C3	8	-7.26471
GO:0032570	response to progesterone	BAD, CAV1, FOS, RELA, TGFB1, NCOA2	6	-6.54794
GO:0046886	positive regulation of hormone biosynthetic process	HIF1A, IFNG, IL1B, TNF	4	-6.40035
GO:0046885	regulation of hormone	HIF1A, IFNG, IL1B, TNF, AKR1C3	5	-6.19422

		biosynthetic process			
	GO:0008210	estrogen metabolic process	CYP1A1, CYP1A2, CYP3A4, CYP19A1, UGT1A1	5	-5.89107
	GO:0043401	steroid hormone mediated signaling pathway	PARP1, AR, ESR1, ESR2, NR3C2, PGR, PPARG, NR1I2, SIRT1	9	-5.79192
	GO:0032352	positive regulation of hormone metabolic process	HIF1A, IFNG, IL1B, TNF	4	-5.66894
	GO:0032350	regulation of hormone metabolic process	HIF1A, IFNG, IL1B, TNF, AKR1C3	5	-5.33923
	GO:0043627	response to estrogen	CCND1, CAV1, ESR1, HMOX1, PPARG, MAPK1	6	-5.28772
	GO:0009755	hormone-mediated signaling pathway	PARP1, AR, ESR1, ESR2, NR3C2, PGR, PPARG, NR1I2, SIRT1	9	-4.91916
	GO:0006706	steroid catabolic process	CYP1A2, CYP3A4, CYP19A1, SPP1	4	-4.70704
	GO:0030518	intracellular steroid hormone receptor signaling pathway	PARP1, AR, ESR1, ESR2, PGR, SIRT1	6	-3.86484
	GO:0046887	positive regulation of hormone secretion	BAD, CREB1, CYP19A1, EGFR, HIF1A, SPP1	6	-3.81061
	GO:0010893	positive regulation of steroid biosynthetic process	IFNG, IL1B, TNF	3	-3.58457
	GO:0030520	intracellular estrogen receptor signaling pathway	PARP1, AR, ESR1, ESR2	4	-3.4449
	GO:0045940	positive regulation of steroid metabolic process	IFNG, IL1B, TNF	3	-3.11707
	GO:0033143	regulation of intracellular steroid hormone receptor signaling pathway	PARP1, AR, ESR1, SIRT1	4	-2.89992
	GO:0033146	regulation of intracellular estrogen receptor signaling pathway	PARP1, AR, ESR1	3	-2.78183
	GO:0008207	C21-steroid hormone metabolic process	AKR1B1, AKR1C1, AKR1C3	3	-2.74987
	GO:0046888	negative regulation of hormone secretion	HMGCR, IL1B, ADIPOQ	3	-2.17032
angiogenesis and hemostasis	GO:0009611	response to wounding	BAX, BCL2, CASP3, CAV1, CCNB1, CD40LG, CDKN1A, COL1A1, CYP1A1, EGFR, ERBB2, ERBB3, F2, F3, F10, HIF1A, HMGCR, HMOX1, HSPB1, IL1A, IL6, IL10, JUN, NFE2L2, NOS3, OPRM1, SERPINE1, PECAM1, PLAT, PLAU, PRKACA, PRKCA, PRKCB, MAPK1, MAPK3, PTEN, RAF1, SOD1, SPP1, TGFB1, THBD, TIMP1	42	-29.7968
	GO:0042060	wound healing	CASP3, CAV1, CCNB1, CD40LG, CDKN1A, COL1A1, EGFR, ERBB2, ERBB3, F2, F3, F10, HIF1A, HMGCR, HMOX1, HSPB1, IL1A, IL6, NFE2L2, NOS3, OPRM1, SERPINE1, PECAM1,	35	-24.6022

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		PLAT, PLAU, PRKACA, PRKCA, PRKCB, MAPK1, MAPK3, PTEN, RAF1, TGFB1, THBD, TIMP1		
GO:0007596	blood coagulation	CAV1, CD40LG, COL1A1, F2, F3, F10, HSPB1, IL6, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKACA, PRKCA, PRKCB, MAPK1, MAPK3, RAF1, THBD	20	-13.8175
GO:0007599	hemostasis	CAV1, CD40LG, COL1A1, F2, F3, F10, HSPB1, IL6, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKACA, PRKCA, PRKCB, MAPK1, MAPK3, RAF1, THBD	20	-13.6963
GO:0050817	coagulation	CAV1, CD40LG, COL1A1, F2, F3, F10, HSPB1, IL6, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKACA, PRKCA, PRKCB, MAPK1, MAPK3, RAF1, THBD	20	-13.6723
GO:1903034	regulation of response to wounding	CAV1, CDKN1A, F2, F3, HMGCR, IL10, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKCA, PTEN, SPP1, THBD	15	-12.3506
GO:0043535	regulation of blood vessel endothelial cell migration	AKT1, MAPK14, HIF1A, HMOX1, HSPB1, KDR, NFE2L2, NOS3, PPARG, PRKCA, PTGS2, TGFB1, VEGFA, SIRT1	14	-12.0798
GO:0061041	regulation of wound healing	CAV1, CDKN1A, F2, F3, HMGCR, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKCA, PTEN, THBD	13	-11.0154
GO:0030193	regulation of blood coagulation	CAV1, F2, F3, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKCA, THBD	10	-10.4616
GO:1900046	regulation of hemostasis	CAV1, F2, F3, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKCA, THBD	10	-10.4043
GO:0050818	regulation of coagulation	CAV1, F2, F3, NFE2L2, NOS3, SERPINE1, PLAT, PLAU, PRKCA, THBD	10	-10.1826
GO:1903035	negative regulation of response to wounding	CDKN1A, F2, HMGCR, NOS3, SERPINE1, PLAT, PLAU, PTEN, SPP1, THBD	10	-9.82208
GO:0030168	platelet activation	CD40LG, COL1A1, F2, HSPB1, IL6, NOS3, PRKCA, PRKCB, MAPK1, MAPK3, RAF1, THBD	12	-9.79739
GO:0002246	wound healing involved in inflammatory response	HIF1A, HMOX1, IL1A, TGFB1, TIMP1	5	-9.39649
GO:0061045	negative regulation of wound healing	CDKN1A, F2, HMGCR, NOS3, SERPINE1, PLAT, PLAU, PTEN, THBD	9	-9.20419
GO:0002576	platelet degranulation	CALM1, EGF, IGF2, SERPINE1, PECAM1, SOD1, TGFB1, TIMP1, VEGFA, ABCC4	10	-8.2589
GO:0030195	negative regulation of blood coagulation	F2, NOS3, SERPINE1, PLAT, PLAU, THBD	6	-6.32178
GO:0030194	positive regulation of blood coagulation	F2, F3, NFE2L2, SERPINE1, THBD	5	-6.27755

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	GO:1900048	positive regulation of hemostasis	F2, F3, NFE2L2, SERPINE1, THBD	5	-6.27755
	GO:1900047	negative regulation of hemostasis	F2, NOS3, SERPINE1, PLAT, PLAU, THBD	6	-6.2684
	GO:0050820	positive regulation of coagulation	F2, F3, NFE2L2, SERPINE1, THBD	5	-6.19422
	GO:0050819	negative regulation of coagulation	F2, NOS3, SERPINE1, PLAT, PLAU, THBD	6	-6.11504
	GO:0048008	platelet-derived growth factor receptor signaling pathway	F3, PLAT, PTEN, PTPN1, VEGFA, ADIPOQ	6	-5.87948
	GO:1903522	regulation of blood circulation	AKT1, CALM1, CAV1, EGFR, HTR2A, ICAM1, IL2, KCNH2, NOS3, PRKACA, PTGS2	11	-5.66563
	GO:1903524	positive regulation of blood circulation	AKT1, CAV1, EGFR, HTR2A, ICAM1, PTGS2	6	-5.21906
	GO:0010543	regulation of platelet activation	F2, NOS3, PRKCA, THBD	4	-4.40562
	GO:0090303	positive regulation of wound healing	F2, F3, NFE2L2, SERPINE1, THBD	5	-4.2218
	GO:1903036	positive regulation of response to wounding	F2, F3, NFE2L2, SERPINE1, THBD	5	-3.86371
	GO:0010544	negative regulation of platelet activation	F2, NOS3, THBD	3	-3.71828
	GO:0072378	blood coagulation, fibrin clot formation	F2, F3, F10	3	-3.25375
	GO:0001974	blood vessel remodeling	BAX, NOS3, TGFB1	3	-2.6302
	GO:2000181	negative regulation of blood vessel morphogenesis	E2F2, CXCL10, SERPINE1, PPARG, STAT1	5	-2.31983
response to decreased oxygen levels	GO:0000302	response to reactive oxygen species	AKT1, BAD, BCL2, CASP3, CAT, CCNA2, CHUK, COL1A1, NQO1, EGFR, FOS, GSTP1, HMOX1, IL6, IL10, JUN, MET, MMP2, MMP3, MMP9, MPO, NFE2L2, NOS3, MAPK1, MAPK3, MAPK8, RELA, SOD1, STAT1, TNF, AKR1C3, SIRT1	32	-33.5389
	GO:0072593	reactive oxygen species metabolic process	AKT1, BCL2, CAT, CAV1, CDKN1A, CRP, MAPK14, CYP1A1, CYP1A2, NQO1, EGFR, F2, GSTP1, HIF1A, HK2, ICAM1, IFNG, IL1B, IL10, INSR, MMP3, MPO, NFE2L2, NOS2, NOS3, PTGS2, SOD1, TGFB1, TNF, TP53, AKR1C3	31	-29.3759
	GO:0070482	response to oxygen levels	AKT1, BAD, BCL2, CASP3, CAT, CAV1, CCNA2, CCNB1, CDKN1A, COL1A1, CREB1, CYP1A1, DPP4, E2F1, HIF1A, HK2, HMOX1, ICAM1, MMP2, MYC, NFE2L2, NOS2, PLAT, PLAU, PPARG, PTEN, PTGS2, RAF1, SLC2A4, TP53,	33	-27.6189

		VEGFA, ADIPOQ, SIRT1		
GO:0034614	cellular response to reactive oxygen species	AKT1, CCNA2, CHUK, NQO1, EGFR, FOS, IL6, IL10, JUN, MET, MMP2, MMP3, MMP9, MPO, NFE2L2, NOS3, MAPK1, MAPK3, MAPK8, RELA, SOD1, TNF, AKR1C3, SIRT1	24	-25.4988
GO:0036293	response to decreased oxygen levels	AKT1, BAD, BCL2, CASP3, CAT, CAV1, CCNA2, CCNB1, CREB1, CYP1A1, DPP4, E2F1, HIF1A, HK2, HMOX1, ICAM1, MMP2, MYC, NFE2L2, NOS2, PLAT, PLAU, PTEN, PTGS2, RAF1, SLC2A4, TP53, VEGFA, ADIPOQ, SIRT1	30	-24.6325
GO:2000377	regulation of reactive oxygen species metabolic process	AKT1, BCL2, CAV1, CDKN1A, CRP, MAPK14, EGFR, F2, GSTP1, HIF1A, HK2, ICAM1, IFNG, IL1B, IL10, INSR, MMP3, NFE2L2, PTGS2, SOD1, TGFB1, TNF, TP53, AKR1C3	24	-23.9134
GO:2000379	positive regulation of reactive oxygen species metabolic process	AKT1, CDKN1A, CRP, MAPK14, EGFR, F2, GSTP1, ICAM1, IFNG, IL1B, INSR, NFE2L2, PTGS2, SOD1, TGFB1, TNF, TP53, AKR1C3	18	-20.91
GO:1903409	reactive oxygen species biosynthetic process	AKT1, CAV1, CYP1A1, CYP1A2, NQO1, ICAM1, IFNG, IL1B, IL10, INSR, MPO, NOS2, NOS3, PTGS2, SOD1, TNF	16	-16.3616
GO:0071453	cellular response to oxygen levels	AKT1, BAD, BCL2, CAV1, CCNA2, CCNB1, E2F1, HIF1A, HMOX1, ICAM1, MYC, NFE2L2, PPARG, PTEN, PTGS2, SLC2A4, TP53, VEGFA, SIRT1	19	-15.571
GO:0071456	cellular response to hypoxia	AKT1, BAD, BCL2, CCNA2, CCNB1, E2F1, HIF1A, HMOX1, ICAM1, MYC, NFE2L2, PTEN, PTGS2, SLC2A4, TP53, VEGFA, SIRT1	17	-14.0426
GO:0036294	cellular response to decreased oxygen levels	AKT1, BAD, BCL2, CCNA2, CCNB1, E2F1, HIF1A, HMOX1, ICAM1, MYC, NFE2L2, PTEN, PTGS2, SLC2A4, TP53, VEGFA, SIRT1	17	-13.7041
GO:0032768	regulation of monooxygenase activity	AKT1, CALM1, CAV1, EGFR, HIF1A, IFNG, IL1B, NOS3, TNF	9	-9.78563
GO:1903426	regulation of reactive oxygen species biosynthetic process	AKT1, CAV1, ICAM1, IFNG, IL1B, IL10, INSR, PTGS2, TNF	9	-7.87484
GO:0036296	response to increased oxygen levels	CAT, CAV1, CDKN1A, COL1A1, CYP1A1, PPARG	6	-7.84636
GO:0071450	cellular response to oxygen radical	NQO1, MPO, NFE2L2, NOS3, SOD1, TNF	6	-7.84636
GO:0061419	positive regulation of transcription from RNA polymerase II promoter in response to hypoxia	HIF1A, NFE2L2, TP53, VEGFA	4	-7.73261
GO:0000305	response to oxygen radical	NQO1, MPO, NFE2L2, NOS3, SOD1, TNF	6	-7.56179

	GO:1903428	positive regulation of reactive oxygen species biosynthetic process	AKT1, ICAM1, IFNG, IL1B, INSR, PTGS2, TNF	7	-7.30157
	GO:2000378	negative regulation of reactive oxygen species metabolic process	BCL2, CAV1, HIF1A, HK2, IL10, MMP3, TP53	7	-6.85194
	GO:0060559	positive regulation of calcidiol 1-monoxygenase activity	IFNG, IL1B, TNF	3	-6.67395
	GO:0019371	cyclooxygenase pathway	PTGS1, PTGS2, AKR1C3, PTGES	4	-6.40035
	GO:0032770	positive regulation of monoxygenase activity	AKT1, HIF1A, IFNG, IL1B, TNF	5	-6.19422
	GO:0060558	regulation of calcidiol 1-monoxygenase activity	IFNG, IL1B, TNF	3	-5.13756
	GO:0019372	lipoxygenase pathway	ALOX5, PON1, PTGS2	3	-3.95068
	GO:1901031	regulation of response to reactive oxygen species	IL10, MET, NFE2L2, TNF	4	-3.85296
	GO:1901032	negative regulation of response to reactive oxygen species	IL10, MET, NFE2L2	3	-3.46402
	GO:0061418	regulation of transcription from RNA polymerase II promoter in response to hypoxia	HIF1A, NFE2L2, TP53, VEGFA	4	-2.92077
effects on myeloma cell	GO:0002573	myeloid leukocyte differentiation	PARP1, CASP8, CREB1, MAPK14, FASN, FOS, IFNG, IL4, JUN, MMP9, MYC, PPARG, PRKCA, TGFB1, TNF, VEGFA, ADIPOQ, SIRT1	18	-15.2883
	GO:0030099	myeloid cell differentiation	PARP1, CASP3, CASP8, CASP9, CREB1, MAPK14, FASN, FOS, HIF1A, IFNG, IL4, JUN, MMP9, MYC, PPARG, PRKCA, PRKCB, STAT1, TGFB1, TNF, VEGFA, ADIPOQ, SIRT1	23	-15.0139
	GO:0045639	positive regulation of myeloid cell differentiation	CASP8, CREB1, MAPK14, FOS, HIF1A, IFNG, JUN, PRKCA, STAT1, TGFB1, TNF	11	-10.7989
	GO:0045637	regulation of myeloid cell differentiation	CASP8, CREB1, MAPK14, FOS, HIF1A, IFNG, IL4, JUN, MYC, PRKCA, PRKCB, STAT1, TGFB1, TNF, ADIPOQ	15	-10.3062
	GO:0002761	regulation of myeloid leukocyte differentiation	CASP8, CREB1, FOS, IFNG, IL4, JUN, MYC, PRKCA, TGFB1, TNF, ADIPOQ	11	-9.78284
	GO:0002763	positive regulation of myeloid leukocyte differentiation	CASP8, CREB1, FOS, IFNG, JUN, PRKCA, TGFB1, TNF	8	-8.81099
	GO:0002274	myeloid leukocyte activation	ALOX5, CAT, MAPK14, CTSD, GSTP1, HMOX1, IFNG, IL4, IL6, CXCL8, IL10, JUN, LDLR, MMP9, MPO, PECAM1, PLA2G2A, MAPK1, TNF,	20	-8.57886

		MGAM			
GO:0097529	myeloid leukocyte migration	MAPK14, CYP19A1, DPP4, IL1B, IL6, CXCL8, CXCL10, SERPINE1, PECAM1, MAPK3, CCL2, VEGFA	12	-8.20692	
GO:0033028	myeloid cell apoptotic process	BCL2, CDKN2A, IL6, PTEN, ADIPOQ, SIRT1	6	-7.38875	
GO:0002262	myeloid cell homeostasis	BAX, CASP3, MAPK14, HIF1A, HMOX1, IL6, SOD1, STAT1, VEGFA	9	-6.54583	
GO:0033032	regulation of myeloid cell apoptotic process	BCL2, CDKN2A, PTEN, ADIPOQ, SIRT1	5	-6.11413	
GO:0002444	myeloid leukocyte mediated immunity	ALOX5, CAT, MAPK14, CTSD, F2, GSTP1, HMOX1, IL6, MMP9, MPO, PECAM1, PLAU, MAPK1, MGAM	14	-5.17225	
GO:0033034	positive regulation of myeloid cell apoptotic process	CDKN2A, ADIPOQ, SIRT1	3	-4.93536	
GO:0002275	myeloid cell activation involved in immune response	ALOX5, CAT, MAPK14, CTSD, GSTP1, HMOX1, MMP9, MPO, PECAM1, PLAU, MAPK1, MGAM	12	-3.92463	
GO:0061082	myeloid leukocyte cytokine production	HMOX1, TGFB1, SIRT1	3	-3.07477	
GO:0002762	negative regulation of myeloid leukocyte differentiation	IL4, MYC, ADIPOQ	3	-2.47135	
GO:0002244	hematopoietic progenitor cell differentiation	BCL2, NFE2L2, TGFB1, TOP2A, TP53	5	-2.45677	
response to metal ion	GO:0010038	response to metal ion	PARP1, AKT1, BAD, CCND1, BCL2, CALM1, CASP3, CASP8, CASP9, CAT, CAV1, CCNB1, CHUK, CREB1, CYP1A1, CYP1A2, NQO1, EGFR, FOS, HIF1A, HMOX1, HSPA5, ICAM1, IL1A, JUN, MMP9, NFE2L2, MAPK1, MAPK3, MAPK8, PTEN, PTGS2, SOD1, AKR1C3, PTGES	35	-31.4803
	GO:0071248	cellular response to metal ion	PARP1, AKT1, CCNB1, CHUK, CREB1, CYP1A1, CYP1A2, NQO1, EGFR, FOS, HMOX1, HSPA5, JUN, MMP9, NFE2L2, MAPK1, MAPK3, MAPK8, PTGS2, SOD1, AKR1C3	21	-19.978
	GO:0010959	regulation of metal ion transport	ADRB2, AKT1, BAX, BCL2, CALM1, CAV1, DRD1, EGF, F2, HTR2A, ICAM1, IFNG, CXCL10, KCNH2, NOS3, PRKACA, PTEN, PTGS2, CCL2	19	-11.4431
	GO:0070838	divalent metal ion transport	BAX, BCL2, CALM1, CAV1, DRD1, EGF, F2, HTR2A, ICAM1, IFNG, CXCL10, NOS3, OPRM1, PRKACA, PRKCB, PTGS2, CCL2	17	-8.10069
	GO:0055065	metal ion homeostasis	BAX, BCL2, CALM1, CAV1, DRD1, EGFR, ESR1, F2, HIF1A, HMOX1, HTR2A, IL2,	19	-7.68335

		CXCL10, KCNH2, MYC, PRKACA, PRKCB, PTGER3, SOD1		
GO:0010039	response to iron ion	CCND1, BCL2, CCNB1, CYP1A1, HIF1A, HMOX1	6	-7.38875
GO:0006875	cellular metal ion homeostasis	BAX, BCL2, CALM1, CAV1, DRD1, ESR1, F2, HIF1A, HMOX1, HTR2A, IL2, CXCL10, MYC, PRKACA, PRKCB, PTGER3, SOD1	17	-6.93184
GO:0006879	cellular iron ion homeostasis	HIF1A, HMOX1, MYC, SOD1	4	-3.24901
GO:1905048	regulation of metalloproteinase activity	MAPK14, MAPK3, TIMP1	3	-3.11707
GO:0055072	iron ion homeostasis	HIF1A, HMOX1, MYC, SOD1	4	-2.85909
GO:0046916	cellular transition metal ion homeostasis	HIF1A, HMOX1, MYC, SOD1	4	-2.35681
GO:0055076	transition metal ion homeostasis	HIF1A, HMOX1, MYC, SOD1	4	-2.07988

Supplementary Table 2: Informations about 6 clusters of the PPI network identified using MCODE.

Cluster No	Score	Node	Edges	Gene list
1	49.051	60	1447	TNF, CXCL10, SPP1, AKT1, KDR, VEGFA, MPO, CASP3, IL2, FOS, TP53, JUN, MMP2, MAPK8, EGF, EGFR, BCL2L1, CASP8, TGFB1, CCND1, CDKN1A, CREB1, AR, MMP1, SERPINE1, VCAM1, PLAU, CASP9, ADIPOQ, MAPK14, ESR1, CCL2, MAPK3, PTGS2, PECAM1, CXCL8, CRP, ERBB2, ICAM1, HMOX1, MYC, CAT, SIRT1, HIF1A, IL4, MAPK1, SELE, TIMP1, MMP9, PTEN, IL1B, MMP3, IL6, CDKN2A, IL10, IFNG, STAT1, RELA, PPARG, NOS3
2	3.429	15	24	HSPA5, MET, CAV1, NOS2, SOD1, RAF1, F2, PARP1, CCNB1, PGR, CD40LG, F3, HSPB1, IGF2, CCNA2
3	3	9	12	APOB, LDLR, THBD, CD163, GSK3B, SLC2A4, DPP4, PTPN1, PLAT
4	3	3	3	CHUK, PRKCA, BCL2
5	3	3	3	AKR1C3, CYP1A1, CYP1A2
6	3	3	3	ABCC1, NR1I2, UGT1A1