Supplementary Table 2C: Ingenuity Pathway Analysis (IPA) results of genes significantly modulated by perifosine/sorafenib combined treatment (per+sor treatment) in the HDLM-2 cell line. These genes belong to the subsets identified by the lower right circles (red or green) of the Venn diagrams shown in Figure 4.13. The gene symbols highlighted in bold red (upregulated genes) or in bold green (downregulated genes) identify the most modulated genes, i.e. the genes indicated with red/green symbols in the Volcano plots of Figure 4.14. The Table lists IPA results according to top networks, top functions and top canonical pathways.

GENES UPREGULATED BY PER+SOR TREATMENT				
TOP NETWORKS				
ID	**Molecules in Network**	**Score**	**Focus Molecules**	**Top Functions**
1	AARS, **ASNS**, ATF3, ATF4, CEBPG, CGB, CX3CL1, DDIT3, DUSP10, DUSP16, GADD45G, GARS, JUND, LMO4, LPIN1, MAPK11, MTHFD2, NFE2L1, PCK2, PMAIP1, PSPH, S100A10, SCD, SLA, WARS	36	25	Carbohydrate Metabolism, Cell Morphology, Cellular Function and Maintenance
2	ANXA4, BBS2, CASP1, CD80, CDKN2D, CLIP2, DDX58, FAIM, HAVCR2, IFIT3, IFITM3, ISG20, NOTCH4, OAS3, PYCARD, RARRES3, S100P, TNFRSF9, TNFSF13B, TRAF5, TSC22D3	28	21	Cellular Function and Maintenance, Organismal Injury and Abnormalities, Infection Mechanism
3	CCL17, CSRP1, EML1, FHIT, MT1F, MYH9, MYL5, MYL6, PIK3IP1, PLD1, RABAC1, RASSF1, RASSF2, RHOC, RHOF, SEMA4D, SH3KBP1, TMEM158, TUBB2A, VAMP1, ZYX	28	21	Cellular Assembly and Organization, Cell Morphology, Digestive System Development and Function
4	AKTIP, ASS1, **CAMK2B**, CAT, CAV1, CD99, CTH, FHL2, ITGB7, KLF11, LAMP2, NISCH, NME2, NTRK1, PLAU, PPP2R5B, PRKCA, SNURF, ULBP1	24	19	Cellular Movement, Cellular Development, Nervous System Development and Function
5	ACACB, ADAM8, ARHGEF6, CD151, FCER2, GRN, LHB, MAP2K6, NCF1C, PIK3C2B, **PSAT1**, RSU1, S100A4, SERPINA1, SH2B3, TIMP2, VCAM1, YARS	22	18	Hematological System Development and Function, Organismal Development, Cellular Movement
6	ATP9A, BCAS1, CD44, CD46, FILIP1L, FSCN1, JUN, KLF10, MAP6, MAP1A, MAP1LC3A, NR5A2, P4HA2, PAG1, SRD5A1, ST6GAL1, TPM1, UPP1	22	18	Drug Metabolism, Lipid Metabolism, Small Molecule Biochemistry
7	AGPAT4, **ASNS**, C4BPB, FAM134B, KLHL12, LANCL1, LRBA, NFIB, PHYH, PLEKHB1, SEPT6, SNX7, SPARCL1, STX7, TOX2, TRIM9	19	16	Cellular Function and Maintenance, Respiratory System Development and Function, Carbohydrate Metabolism
8	ABCA13, CHST7, CHST10, CMYA5, CNPY3, DENND5A, DNAJC12, ECM2, FAM171A1, HS1BP3, IFITM3, KCNMB4, NFIB, ST3GAL1, SYNC, UBE2Q2	19	16	Small Molecule Biochemistry, Carbohydrate Metabolism, Cell-To-Cell Signaling and Interaction
9	BPHL, CRIP1, EDEM2, EPPK1, EXTL2, HHLA2, INHBE, MGST2, NR5A2, PLEKHA9, PRDX5, SLC35A1, TAGLN2, TMEM140, TUBE1	17	15	Lipid Metabolism, Small Molecule Biochemistry, Vitamin and Mineral Metabolism
10	ANXA8/ANXA8L1, C4orf34, CLIC4, CX3CL1, EXT2, FHL2, HCFC1R1, NMT2, P2RX4, PKP4, PQLC3, REEP5, SNRPN, TMEM71, TMSB10/TMSB4X	17	15	Cellular Development, Cellular Growth and Proliferation, Hair and Skin Development and Function
11	AFAP1L2, AGT, ATP2B4, BCAR3, CCL5, CFD, CLIC4, CXCL12, IDH1, IL9, LBH, LSS, TRAF1, VLDLR	15	14	Neurological Disease, Cellular Movement, Embryonic Development
12	CACNB3, CCDC24, CLIP3, COLQ, ERP29, KIF25, LRMP, MARCH2, NAAA, OLFM1, RAB26, SPARCL1, SYNGR3, TSC22D3	15	14	Lipid Metabolism, Small Molecule Biochemistry, Cell Death
13	CMTM3, CORO2A, DENND2D, DPM3, DUSP22, GPER, GPT2, ISG20, PHF11, SH3RF2, SKAP1,	15	14	Cellular Growth and Proliferation, Hematological System Development and Function, Cell-To-Cell Signaling and
14	C10orf10, CCDC85B, CD274, CHI3L2, CLIP2, CYB5A, CYP4Z1, GALNT12, MANBA, SLAMF6, SLC1A5, SNTB1, TBC1D9B, TNFRSF9, ZNF821	14	13	Cell Death, Cell-To-Cell Signaling and Interaction, Hematological System Development and Function
15	APBB3, APP, ASB9, C5orf13, ECH1, ENO3, GNG2, ITM2C, RAGE, SERPINI1, SMYD3, TNFRSF21, TWF2	12	12	Nervous System Development and Function, Organ Morphology, Tissue Morphology
16	ANXA8L2, ARHGAP21, CCNB1IP1, GYPC, KANK1, MARS, RN7SK, RNASET2, SIRT5, SPTLC1, TMEM14A	11	11	Gene Expression, Infection Mechanism, Genetic Disorder
17	ALDH5A1, AP3M2, ARHGEF3, C20orf26, FKBP2, GLDC, OPRL1, PLEKHF1, RAB11FIP1, SYTL3	9	10	Cell Signaling, Molecular Transport, Nucleic Acid Metabolism
18	CAV1, KHDRBS3, KLHL3, RNASE4, S100A4, SPAG6, TMEM98, TNFRSF10A, TPM1, WDFY1	8	9	Cell Cycle, Cell Death, Cellular Growth and Proliferation
19	ERMP1	1	1	Reproductive System Disease, Cell Cycle, Cellular Development
20	KLHDC9	1	1	Cell Cycle, Respiratory System Development and Function, Connective Tissue Development and Function
21	VNN2	1	1	Cell Morphology, Cellular Assembly and Organization, Cell-To-Cell Signaling and Interaction
22	B3GALT4	1	1	Lipid Metabolism, Small Molecule Biochemistry, Molecular Transport
23	LPCAT4	1	1	Carbohydrate Metabolism, Lipid Metabolism, Small Molecule Biochemistry
24	CCDC89	1	1	Organismal Injury and Abnormalities, Cardiovascular Disease, Genetic Disorder
25	NRBP2	1	1	Cellular Movement, Connective Tissue Development and Function, Connective Tissue Disorders

TOP FUNCTIONS			
ID	**Molecules**	**p-value**	**Category**
1	ST6GAL1, SPAG6, NME2, S100A4, CCL17, ADAM8, FHL2, IL9, CAV1, JUND, SKAP1, TNFSF13B, TIMP2, S100A10, TNFRSF21, PIK3C2B, TNFRSF9, ATF3, BCAR3, VLDLR, PLD1, YARS, FSCN1, ARHGEF6, ZYX, CX3CL1, TAGLN2, CD151, S100P, CD99, TPM1, SH2B3, CCL5, CLIC4, APP, MAPK11, ITGB7, JUN, NTRK1, CASP1, CHST10, SERPINA1, PIK3IP1, AGT, PRKCA, RASSF1, FHIT, SPTLC1, VCAM1, TMSB10/TMSB4X, RHOC, GRN, WARS, SEMA4D, CD80, CXCL12, CAT, CD44, MYH9, PLAU, C5orf13, ATP2B4, NISCH	1.89E-07-7.01E-03	Cellular Movement
2	ST6GAL1, SH2B3, CD99, NCF1C, PYCARD, S100A4, CCL17, CD46, CCL5, APP, ITGB7, CASP1, IL9, SERPINA1, SKAP1, TNFSF13B, S100A10, TIMP2, AGT, PRKCA, TNFRSF21, TNFRSF9, VCAM1, TMSB10/TMSB4X, ULBP1, GRN, SLAMF6, SEMA4D, CD80, YARS, PAG1, CXCL12, ARHGEF6, CD44, MYH9, PLAU, CX3CL1, CD151	7.91E-07-7.01E-03	Immune Cell Trafficking
3	ST6GAL1, SERPINI1, S100A4, NME2, CCL17, CD46, ADAM8, FHL2, CAV1, IL9, JUND, SKAP1, TNFSF13B, S100A10, TNFRSF9, ULBP1, PLD1, SLAMF6, DDX58, HAVCR2, CNPY3, RARRES3, ZYX, GNG2, CX3CL1, CD151, SH2B3, TPM1, CD99, NCF1C, PYCARD, KLF10, CCL5, CLIC4, APP, ITGB7, JUN, NTRK1, CASP1, CHST10, ARHGEF3, AGT, PRKCA, FCER2, RASSF1, VCAM1, RHOC, SEMA4D, CD80, PAG1, CXCL12, CAT, CD44, MYH9, PLAU	9.32E-07-7.01E-03	Cell-To-Cell Signaling and Interaction
4	ST6GAL1, SERPINI1, NME2, S100A4, CD46, CEBPG, FHL2, CCNB1IP1, CGB (includes others), CAV1, IL9, ATF4, JUND, TRAF5, SH3KBP1, TNFSF13B, KLF11, TIMP2, S100A10, TNFRSF21, TNFRSF9, ATF3, CDKN2D, ULBP1, PLD1, SLAMF6, YARS, PLEKHF1, ST3GAL1, BBS2, DDX58, ARHGEF6, ZYX, AARS, GNG2, TMEM158, CX3CL1, S100P, MAP2K6, SCD, TPM1, CD99, DDIT3, PRDX5, GADD45G, PYCARD, KLF10, AKTIP, DUSP22, CACNB3, CCL5, **ASNS**, CLIC4, MAPK11, APP, JUN, DUSP10, NTRK1, CASP1, FAIM, SERPINA1, ARHGEF3, ALPK2, PIK3IP1, **CAMK2B**, TRAF1, AGT, RASSF1, PRKCA, FCER2, PPM1M, PMAIP1, FHIT, TMSB10/TMSB4X, RHOC, APBB3, P2RX4, OAS3, NFE2L1, GRN, LAMP2, CD80, DPM3, CXCL12, RASSF2, CAT, CD44, ITM2C, CTH, CYB5A, PLAU, ATP2B4, ISG20	1.86E-06-7.06E-03	Cell Death
5	MYL6, ASS1, SNX7, TSPAN15, ADAM8, FHL2, IL9, MTHFD2, CAV1, EML1, TIMP2, IFIT3, TNFRSF9, TUBB2A, PLD1, FSCN1, ZYX, MAP2K6, CD99, DDIT3, SRD5A1, CCL5, LHB, KLHDC9, IDH1, EPPK1, EXT2, JUN, MT1F, NTRK1, SERPINA1, ALDH5A1, **CAMK2B**, FCER2, C14orf159, PMAIP1, FHIT, TMSB10/TMSB4X, RHOC, ANXA4, ECM2, GRN, SEMA4D, CD80, CYP4Z1, CD44, PLAU, CFD, TRIM9, ENO3, S100A4, NME2, CCL17, CEBPG, NAAA, CRIP1, CGB (includes others), RAB11FIP1, JUND, KLF11, TNFSF13B, PSPH, ATF3, LMO4, CDKN2D, SPARCL1, TUBE1, BBS2, FAM171A1, CX3CL1, S100P, CD151, SH2B3, SCD, TPM1, PYCARD, KLF10, MAPK11, IFITM3, CASP1, PIK3IP1, PRKCA, AGT, RASSF1, ANXA8L2, **PSAT1**, VCAM1, FAM134B, AQP11, UPP1, PLEKHB1, OLFM1, NFE2L1, NOTCH4, WARS, MGST2,	3.57E-06-7.01E-03	Cancer
6	ST6GAL1, S100A4, CCL17, CD46, TSC22D3, LPIN1, IL9, CAV1, ATF4, JUND, SKAP1, TRAF5, HS1BP3, TNFSF13B, TIMP2, S100A10, TNFRSF21, TNFRSF9, ATF3, CDKN2D, ULBP1, SLAMF6, YARS, ST3GAL1, HAVCR2, CX3CL1, CD151, SH2B3, CD99, NCF1C, GADD45G, PYCARD, KLF10, AKTIP, CCL5, APP, ITGB7, JUN, DUSP10, NTRK1, CASP1, SERPINA1, TRAF1, PRKCA, AGT, PMAIP1, VCAM1, TMSB10/TMSB4X, SLA, P2RX4, GRN, NOTCH4, SEMA4D, CD80, PAG1, CXCL12, CD44, MYH9, PLAU, ISG20	8.12E-06-7.01E-03	Hematological System Development and Function
7	CD99, TPM1, ST6GAL1, SERPINI1, GADD45G, NME2, CCL17, CCL5, CLIC4, APP, ITGB7, ADAM8, CGB (includes others), NTRK1, IL9, CHST10, SKAP1, TIMP2, AGT, RASSF1, PRKCA, FCER2, TNFRSF21, FHIT, VCAM1, ATF3, VLDLR, PLD1, GRN, SEMA4D, CD80, CXCL12, CAT, CD44, ZYX, MYH9, PLAU, CX3CL1, CD151	8.12E-06-7.01E-03	Tissue Development

8	CD99, GADD45G, KLF10, AKTIP, S100A4, CCL17, CCL5, APP, ITGB7, JUN, IL9, CAV1, CASP1, SKAP1, TNFSF13B, HS1BP3, TRAF1, TIMP2, AGT, TNFRSF21, TNFRSF9, PMAIP1, VCAM1, CD80, PAG1, CXCL12, ST3GAL1, CD44, MYH9, PLAU, CX3CL1, CD151	8.21E-06-7.01E-03	Cell-mediated Immune Response
9	ST6GAL1, CFD, PHF11, SERPINI1, TRIM9, S100A4, SNX7, CCL17, ADAM8, TSPAN15, SNRPN, LPIN1, SMYD3, CCNB1IP1, VNN2, C20orf26, IL9, EML1, KLHL3, TNFSF13B, TIMP2, S100A10, TNFRSF21, LRBA, TNFRSF9, TUBB2A, CDKN2D, CMYA5, ATP9A, GPT2, PLD1, TUBE1, DDX58, HAVCR2, ZYX, GNG2, ABCA13, MAP2K6, SH2B3, SCD, METTL21B, NCF1C, DDIT3, SRD5A1, PYCARD, DUSP22, CCL5, APP, MAPK11, IFITM3, ITGB7, AOAH, C21orf34, JUN, DUSP10, NTRK1, CASP1, SERPINA1, MRAP2, ALPK2, ALDH5A1, TRAF1, FCER2, PRKCA, AGT, P4HA2, VCAM1, FHIT, RHOC, NMT2, PLEKHB1, OAS3, NFE2L1, PLEKHG1, GRN, NOTCH4, SEMA4D, CD80, EDEM2, CXCL12, CAT, CD44, NR5A2, CORO2A, ANO3, MYH9, CYP4F12, PLAU, CYB5A, COLQ	9.1E-06-5.16E-03	Inflammatory Disease
10	FSCN1, CXCL12, CCL5, PLAU, APP, AGT	2.12E-05-2.85E-05	Hair and Skin Development and Function
11	KLF10, CCL5, APP, ITGB7, JUN, CAV1, KLF11, RASSF1, TIMP2, AGT, VCAM1, ATF3, P2RX4, CDKN2D, GRN, NOTCH4, WARS, SEMA4D, GPER, CXCL12, CAT, STX7, CD44, KCNMB4, AP3M2, PLAU, CX3CL1, ATP2B4, CD151	2.3E-05-7.01E-03	Cardiovascular System Development and Function
12	ST6GAL1, TRIM9, S100A4, DUSP22, CCL17, CCL5, CACNB3, APP, MAPK11, AFAP1L2, SYTL3, NTRK1, CAV1, RASSF1, AGT, PRKCA, TIMP2, PIK3C2B, VCAM1, P2RX4, ULBP1, PLD1, GPER, PAG1, CXCL12, RAB26, CAT, STX7, CD44, RSU1, CX3CL1, ATP2B4, DUSP16	2.61E-05-7.09E-03	Cell Signaling
13	SCD, NCF1C, DDIT3, PRDX5, SRD5A1, TRIM9, S100A4, CCL17, CCL5, CACNB3, LHB, APP, IDH1, JUN, LPIN1, ZACN, SYTL3, CGB (includes others), IL9, CAV1, CASP1, ATF4, LSS, PRKCA, AGT, PIK3C2B, VCAM1, ACACB, ATF3, P2RX4, SNTB1, CDKN2D, VLDLR, NFE2L1, PLD1, GPER, CXCL12, RAB26, CAT, STX7, NR5A2, CX3CL1, ATP2B4	2.61E-05-7.09E-03	Molecular Transport
14	PIK3C2B, SCD, VCAM1, SRD5A1, P2RX4, S100A4, CCL17, CCL5, CACNB3, LHB, APP, GPER, DPM3, CXCL12, CAT, CAV1, NR5A2, LSS, SERPINA1, ATP2B4, AGT, PRKCA	2.61E-05-6.75E-03	Vitamin and Mineral Metabolism
15	PIK3C2B, RHOC, CXCL12, CAT, CD44, CCL17, CCL5, PLAU, APP, CX3CL1, TIMP2, AGT	2.85E-05-7.01E-03	Embryonic Development
16	SPAG6, S100A4, NME2, CCL17, FHL2, SMYD3, LPIN1, CCNB1IP1, CAV1, IL9, JUND, TNFSF13B, HS1BP3, TIMP2, TNFRSF9, ATF3, CDKN2D, BCAR3, PLD1, ST3GAL1, HAVCR2, RARRES3, CX3CL1, CD151, MAP2K6, TPM1, SH2B3, CD99, DDIT3, GADD45G, KLF10, AKTIP, CCL5, APP, LHB, ITGB7, JUN, NTRK1, CASP1, FCER2, TRAF1, PRKCA, AGT, RASSF1, DENND2D, FHIT, PMAIP1, VCAM1, TMSB10/TMSB4X, OAS3, GRN, NOTCH4, GPER, SEMA4D, CD80, CXCL12, PAG1, CAT, CD44, MYH9, PLAU, SEPT6	5.13E-05-6.85E-03	Cellular Development
17	ST6GAL1, S100A4, NME2, CD46, TSC22D3, FHL2, SMYD3, LPIN1, CRIP1, CGB (includes others), CAV1, IL9, ATF4, JUND, TRAF5, SKAP1, TNFSF13B, KLF11, TIMP2, TNFRSF21, IFIT3, TNFRSF9, ATF3, CDKN2D, ULBP1, BCAR3, VLDLR, PLD1, FSCN1, HAVCR2, ZYX, RARRES3, GNG2, CX3CL1, S100P, TAGLN2, CD151, MAP2K6, CD99, TPM1, SH2B3, DDIT3, GADD45G, PYCARD, AKTIP, KLF10, DUSP22, CACNB3, CCL5, IFITM3, APP, MAPK11, JUN, DUSP10, NTRK1, CASP1, SERPINA1, PIK3IP1, FCER2, TRAF1, AGT, PRKCA, RASSF1, VCAM1, FHIT, TMSB10/TMSB4X, RHOC, UPP1, OAS3, GRN, NOTCH4, WARS, GPER, SEMA4D, CD80, PAG1, RASSF2, CXCL12, CAT, CD44, NR5A2, NFIB, CTH, PLAU, SEPT6, C5orf13, ISG20	5.13E-05-7.1E-03	Cellular Growth and Proliferation
18	PYCARD, CXCL12, DDX58, CASP1, CD44, RARRES3, CCL5, CD46	5.13E-05-7.01E-03	Infectious Disease
19	TPM1, PPP2R5B, S100A4, CSRP1, APP, MAPK11, ITGB7, FHL2, LPIN1, JUN, NTRK1, CAV1, MAP1A, CLIP3, FAIM, ARHGEF3, LRMP, TNFSF13B, AGT, RASSF1, PRKCA, FHIT, VCAM1, TMSB10/TMSB4X, RHOC, P2RX4, VLDLR, PLD1, KANK1, LAMP2, SEMA4D, FSCN1, CXCL12, STX7, CAT, CD44, ZYX, MYH9, GNG2, PLAU, NISCH	5.48E-05-6.44E-03	Cellular Assembly and Organization
20	MAP2K6, SH2B3, TNFRSF9, FHIT, ATF3, DDIT3, SLA, CDKN2D, APP, JUN, CXCL12, CAT, CAV1, CD44, PLAU, AGT, TIMP2, RASSF1, PRKCA	6.48E-05-5.11E-03	Cell Cycle
21	MAP2K6, TPM1, VCAM1, ATF3, JUN, CXCL12, CD44, JUND, CCL5, SEPT6, AGT	6.48E-05-5.16E-03	Connective Tissue Development and Function

22	VCAM1, TMSB10/TMSB4X, CCL17, CCL5, APP, YARS, CXCL12, CD44, SERPINA1, PLAU, CX3CL1, AGT, PRKCA, CD151	7.01E-05-3.42E-03	Lymphoid Tissue Structure and Development
23	SERPINI1, PYCARD, PPP2R5B, S100A4, CCL5, MAPK11, APP, JUN, NTRK1, CAV1, JUND, FAIM, TNFSF13B, AGT, PRKCA, VCAM1, CDKN2D, VLDLR, PLD1, SEMA4D, CXCL12, CAT, MYH9, TMEM158, CX3CL1	8.24E-05-6.89E-03	Nervous System Development and Function
24	ST6GAL1, SH2B3, NCF1C, PRDX5, PYCARD, ASS1, S100A4, CCL17, CD46, CCL5, IFITM3, APP, ADAM8, CEBPG, AOAH, AFAP1L2, CASP1, CAV1, IL9, SERPINA1, TNFSF13B, FCER2, S100A10, TIMP2, AGT, PRKCA, TNFRSF21, VCAM1, TNFRSF9, TMSB10/TMSB4X, ULBP1, PLD1, NFE2L1, GRN, SLAMF6, SEMA4D, CD80, YARS, PAG1, CXCL12, DDX58, HAVCR2, CD44, RARRES3, PLAU, CX3CL1, ISG20, CD151	9.04E-05-7.01E-03	Inflammatory Response
25	SH2B3, VCAM1, TNFRSF9, SLA, APP, ITGB7, LPIN1, SEMA4D, CD80, CXCL12, NTRK1, IL9, TNFSF13B	9.88E-05-6.89E-03	Humoral Immune Response

TOP CANONICAL PATHWAYS

ID	Molecules	-log(p-value)	Ratio	Ingenuity Canonical Pathways
1	MAP2K6, PIK3C2B, TMSB10/TMSB4X, MYL6, RHOC, MYL5, PPP2R5B, ITGB7, JUN, ARHGEF6, MYH9, ATF4, RSU1, RHOF	5.23E00	7.69E-02	ILK Signaling
2	MAP2K6, PIK3C2B, JUN, TRAF5, MAPK11, FCER2, TRAF1	3.79E00	1.03E-01	CD40 Signaling
3	WARS, YARS, GARS, AARS, MARS	3.33E00	1.43E-01	Aminoacyl-tRNA Biosynthesis
4	PIK3C2B, RHOC, CD44, PLAU, RHOF, TIMP2	3.2E00	1.02E-01	Glioma Invasiveness Signaling
5	PIK3C2B, MYL6, RHOC, MYL5, ARHGEF6, ARHGEF3, GNG2, RHOF, MAPK11, **CAMK2B**, PRKCA	3.14E+00	5.67E-02	Thrombin Signaling
6	JUN, TRAF5, MAPK11, TNFSF13B, TRAF1	3.05E00	1.14E-01	B Cell Activating Factor Signaling
7	MAP2K6, PIK3C2B, VCAM1, JUN, RHOC, RHOF, MAPK11	2.75E00	7.22E-02	HMGB1 Signaling
8	JUN, CXCL12, CCL5, MAPK11, **CAMK2B**, PRKCA	2.72E00	8.7E-02	Chemokine Signaling
9	MAP2K6, PIK3C2B, JUN, ERP29, MGST2, CAT, CYP4Z1, ATF4, JUND, PRKCA	2.67E00	5.29E-02	NRF2-mediated Oxidative Stress Response
10	PIK3C2B, JUN, MYL6, RHOC, CXCL12, MYL5, GNG2, RHOF, PRKCA	2.66E00	5.66E-02	CXCR4 Signaling
11	PIK3C2B, JUN, NCF1C, RHOC, CAT, PPP2R5B, RHOF, MAPK11, PRKCA	2.6E00	5.56E-02	Production of Nitric Oxide and Reactive Oxygen Species in Macrophages
12	PIK3C2B, CD99, VCAM1, NCF1C, MYL6, CXCL12, CD44, MAPK11, TIMP2, PRKCA	2.56E00	5.29E-02	Leukocyte Extravasation Signaling
13	MAP2K6, PIK3C2B, VCAM1, CCL5, CEBPG, JUN, CXCL12, ATF4, TRAF5, TNFSF13B, **CAMK2B**, PRKCA, TRAF1	2.54E00	4.19E-02	Role of Macrophages, Fibroblasts and Endothelial Cells in Rheumatoid Arthritis
14	ASS1, AARS, GPT2, **ASNS**	2.34E00	1.08E-01	Alanine and Aspartate Metabolism
15	JUN, TRAF5, MAPK11, TRAF1	2.26E00	9.52E-02	April Mediated Signaling
16	JUN, CCL5, GNG2, MAPK11, PRKCA	2.21E00	6.33E-02	CCR5 Signaling in Macrophages
17	MAP2K6, PIK3C2B, JUN, NTRK1, ATF4	2.15E00	7.04E-02	Neurotrophin/TRK Signaling
18	MAP2K6, PIK3C2B, MGST2, CHST7, CAT, PPP2R5B, CHST10, MAPK11, ALDH5A1, **CAMK2B**, PRKCA	2.07E00	4.25E-02	Xenobiotic Metabolism Signaling
19	MYL6, RHOC, MYL5, ARHGEF6, ATF4, ARHGEF3, GNG2, RHOF, PLD1, PRKCA	2.07E00	4.12E-02	Phospholipase C Signaling
20	**PSAT1**, PSPH, GARS, CTH, GLDC	2.06E00	7.46E-02	Glycine, Serine and Threonine Metabolism
21	MAP2K6, JUN, ATF4, MAPK11, LHB, **CAMK2B**, PRKCA	2.06E00	5.34E-02	GNRH Signaling
22	JUN, CCL5, MAPK11	1.95E00	1.2E-01	IL-17A Signaling in Gastric Cells
23	PIK3C2B, DDX58, CASP1, CCL5, OAS3	1.91E00	6.49E-02	Role of Pattern Recognition Receptors in Recognition of Bacteria and Viruses
24	MAP2K6, PIK3C2B, JUN, MAPK11, PRKCA	1.91E00	6.33E-02	LPS-stimulated MAPK Signaling
25	NAAA, SPTLC1, LPIN1, VNN2, DUSP16	1.84E00	6.41E-02	Sphingolipid Metabolism

GENES DOWNREGULATED BY PER+SOR TREATMENT

TOP NETWORKS

ID	Molecules in Network	Score	Focus Molecules	Top Functions
1	ADRM1, AHCY, AHSA1, C20orf24, DNAJB1, DNAJC30, EIF4A1, EIF4G1, EXOSC2, GAR1, GZMB, HIST2H2AC, HNRNPD, HSP90AB1, ILF3, NCL, NOLC1, PRMT5, PSMC6, PSMD3, RAGE, RPS15, UBQLN1, UPF2, VCP	42	25	RNA Damage and Repair, Drug Metabolism, Endocrine System Development and Function
2	CCNE1, CCT2, CCT3, CCT4, CLDND1, CSNK2A1, DLEU1, DLEU2, EGR1, EPAS1, FAM83D, FBXW7, FEN1, HIST1H1C, HIST1H3A, HIST1H4C, MAFF, MERTK, RRM2, RRN3, TP63	32	21	Cancer, Cellular Development, Hematological System Development and Function
3	ABCG1, BCL3, CD274, CDKN2C, CXCL10, DUSP5, FURIN, GAD1, IGLL1/IGLL5, IRF5, NHP2L1, PAK1IP1, STAT1, STRA13, TGFB3, Tlr, TNFRSF10A, WTAP	24	17	Cellular Movement, Gene Expression, Infection Mechanism
4	ACP2, CITED1, F3, FOS, GNL3, IL8, NFIC, NOP2, PA2G4, PHLDA2, RCC1, RPL13, SNRPD1, SULF2, THBS1	20	15	Cardiovascular System Development and Function, Cellular Movement, Hematological System Development and Function

5	DDX23, DDX39A, ELAC2, GLCCI1, GMEB1, H2AFJ, MAFF, MRPL20, MSH3, NUFIP2, OSBPL10, SCAF4, TAF13, TLE2, TP63	20	15	Cell Morphology, Cellular Function and Maintenance, DNA Replication, Recombination, and Repair
6	BYSL, C10orf2, C1QBP, CCDC85B, ELOVL6, HNRNPH2, MRPL38, PSPC1, RBMX, SLC4A7, SURF6, TCF20, UTP14A, WNK1, ZNF174	20	15	Genetic Disorder, Metabolic Disease, Cancer
7	ATAD5, ECE2, IFRD2, KLHDC3, KRTAP9-3, LANCL2, MRPL11, OPA3, RIOK1, SPATA5L1, UBE2D3, UBR3, UTP11L	17	13	Tissue Development, Post-Translational Modification, Cell Death
8	ABCG1, AKAP11, ALG13, BCCIP, C3orf26, FAM167A, HIST2H2AA3/HIST2H2AA4, HIST2H2BE, MLLT11, POP1, RQCD1, SEL1L, TROVE2	17	13	Cell Morphology, Hepatic System Development and Function, Cellular Development
9	DHX9, GPR15, GPR183, KTN1, PTHLH, RAD51, RBM15, RBPJ, RRAD, SHC1, WDR20, XRCC5	15	12	Cell Signaling, Organismal Injury and Abnormalities, Renal Fibrosis
10	ALG11, FAM86B1, IPO4, LOXL3, PRPF38A, PSMB2, PTGES2, RNF144A, RPL6, RRM2, SAMD9, UBE2D3	15	12	Infectious Disease, Antimicrobial Response, Inflammatory Response
11	CISD1, EIF4G1, METTL11A, PCBP1, PTRH2, RPS24, SSBP4, SYNCRIP, TNFRSF10A	10	9	DNA Replication, Recombination, and Repair, Molecular Transport, Cell Cycle
12	ZNF264/ZNF805	2	1	Cardiovascular System Development and Function, Skeletal and Muscular System Development and Function, Tissue Morphology
13	PRPSAP2	2	1	Nucleic Acid Metabolism
14	SNORD21	2	1	Cell Death, Molecular Transport, Protein Trafficking
15	ANKLE1	2	1	Gene Expression, Cancer, Connective Tissue Disorders
16	DPH2	2	1	Cellular Development, Cellular Growth and Proliferation, Tissue Morphology
17	WDR74	2	1	Cell Morphology, Skeletal and Muscular System Development and Function, Tissue Morphology
18	PRPS2	1	1	Nucleic Acid Metabolism, Small Molecule Biochemistry, DNA Replication, Recombination, and Repair
19	UNKL	1	1	Cell Morphology, Cell-To-Cell Signaling and Interaction, Cellular Assembly and Organization

TOP FUNCTIONS			
ID	**Molecules**	**p-value**	**Category**
1	FURIN, ILF3, MSH3, PAK1IP1, PTHLH, NOLC1, CCT2, FBXW7, CDKN2C, ABCG1, CXCL10, WTAP, MERTK, ECE2, RCC1, HIST2H2AA3/HIST2H2AA4, CSNK2A1, CD274, C1QBP, AHCY, IL8, HIST1H4C (includes others), RRAD, THBS1, RRM2, SLC4A7, ELOVL6, GAD1, RPS15, TGFB3, CCT3, FAM83D, XRCC5, HIST2H2BE (includes others), PA2G4, DDX39A, PHLDA2, RAGE, STRA13, BYSL, IGLL1/IGLL5, CCT4, RAD51, SHC1, DUSP5, HSP90AB1, ZNF654, VCP, CLDND1, ELAC2, BCCIP, RBM15, DNAJB1, STAT1, NCL, TNFRSF10A, EPAS1, TP63, EGR1, DLEU1, BCL3, HIST1H3A (includes others), F3, GPR183, FOS, CCNE1, DLEU2, EIF4A1, FEN1, WNK1, GZMB	3.72E-07-2.13E-02	Cancer
2	FURIN, ILF3, MSH3, PTHLH, CCT2, NOLC1, GMEB1, CDKN2C, FBXW7, ABCG1, CXCL10, AHSA1, WTAP, MERTK, CSNK2A1, CD274, C1QBP, AHCY, IL8, THBS1, RRAD, RRM2, CITED1, MAFF, SEL1L, PSMB2, GAD1, TGFB3, CCT3, GNL3, XRCC5, PA2G4, PHLDA2, STRA13, EIF4G1, BYSL, IGLL1/IGLL5, RAD51, SHC1, DUSP5, RRN3, ELAC2, BCCIP, RBM15, DNAJB1, STAT1, NCL, TNFRSF10A, TP63, NFIC, EPAS1, EGR1, SURF6, HNRNPD, BCL3, F3, FOS, CCNE1, CCDC85B, NOP2, EIF4A1, PRMT5, RBPJ, WNK1, UBE2D3, GZMB	1.61E-06-2.13E-02	Cellular Growth and Proliferation
3	FURIN, PTHLH, CCT2, NOLC1, GMEB1, FBXW7, CDKN2C, ABCG1, WTAP, PTRH2, AHSA1, MERTK, CSNK2A1, CD274, C1QBP, IL8, THBS1, IRF5, TGFB3, CCT3, GNL3, XRCC5, UTP11L, HIST1H1C, PA2G4, UBQLN1, PHLDA2, CCT4, RAD51, SHC1, HSP90AB1, VCP, RRN3, DNAJB1, STAT1, NCL, TNFRSF10A, DHX9, NFIC, TP63, ADRM1, EPAS1, EGR1, BCL3, F3, FOS, CCNE1, FEN1, GZMB	2.46E-05-2.13E-02	Cell Death
4	HIST1H1C, FURIN, ILF3, HIST2H2BE (includes others), CCT2, C20orf24, IGLL1/IGLL5, CXCL10, MERTK, CLDND1, HIST2H2AA3/HIST2H2AA4, CD274, DNAJB1, C1QBP, STAT1, PRPF38A, DHX9, TCF20, IL8, EPAS1, DDX23, EGR1, RRM2, SLC4A7, BCL3, FAM86B1 (includes others), F3, RNF144A, WNK1, TROVE2, SAMD9, XRCC5	4.36E-05-2.13E-02	Infectious Disease
5	HIST1H1C, FURIN, HIST2H2BE (includes others), CDKN2C, ABCG1, C20orf24, CXCL10, AHSA1, HSP90AB1, RCC1, HIST2H2AA3/HIST2H2AA4, CD274, STAT1, TNFRSF10A, IL8, TP63, EPAS1, THBS1, RRAD, EGR1, RRM2, BCL3, PSMD3, F3, EIF4A1, WNK1, TROVE2, XRCC5, GZMB	4.36E-05-2.09E-02	Respiratory Disease
6	IL8, ILF3, EPAS1, BCL3, IRF5, CXCL10, FOS, HSP90AB1, TGFB3, DNAJB1, NCL, SULF2, STAT1, DHX9	7.21E-05-2.13E-02	Infection Mechanism

7	DDX39A, PA2G4, MSH3, RAGE, CDKN2C, STRA13, FBXW7, BYSL, IGLL1/IGLL5, CXCL10, RAD51, CCT4, DUSP5, HSP90AB1, CD274, STAT1, TNFRSF10A, AHCY, IL8, EPAS1, HIST1H4C (includes others), RRAD, RRM2, HIST1H3A (includes others), F3, GAD1, TGFB3, FEN1, FAM83D, XRCC5	1.35E-04-1.09E-02	Gastrointestinal Disease
8	FURIN, DDX39A, MSH3, SYNCRIP, STRA13, CDKN2C, BYSL, RAD51, CCT4, CXCL10, SHC1, DUSP5, HSP90AB1, RCC1, CD274, C1QBP, STAT1, TNFRSF10A, AHCY, IL8, EPAS1, TP63, HIST1H4C (includes others), THBS1, RRAD, EGR1, RRM2, F3, OPA3, FOS, CCNE1, GAD1, EIF4A1, TGFB3, FEN1, WNK1, TROVE2, SAMD9, XRCC5, GZMB	1.35E-04-2.13E-02	Genetic Disorder
9	DDX23, PCBP1, DDX39A, SYNCRIP, NOLC1, HNRNPD, RPS24, SCAF4, RBMX, EIF4A1, RPS15, SNRPD1, NHP2L1, HNRNPH2, DHX9	1.48E-04-1.73E-02	RNA Post-Transcriptional Modification
10	IL8, FURIN, THBS1, EGR1, PTHLH, STRA13, F3, FOS, SHC1, CCNE1, WTAP, MERTK, TGFB3, RBM15, STAT1, TNFRSF10A	1.75E-04-2.13E-02	Skeletal and Muscular System Development and Function
11	CXCL10, FOS, HIST1H1C, SHC1, IL8, THBS1, EGR1, FBXW7, BCL3, CD274, STAT1, GZMB	1.83E-04-2.13E-02	Cell-mediated Immune Response
12	HIST1H1C, PA2G4, PTHLH, FBXW7, STRA13, IGLL1/IGLL5, BYSL, CXCL10, SHC1, DUSP5, AHSA1, MERTK, ELAC2, BCCIP, RBM15, CD274, C1QBP, STAT1, IL8, NFIC, TP63, EPAS1, RRAD, THBS1, HIST1H4C (includes others), EGR1, RRM2, RQCD1, BCL3, CITED1, MAFF, SEL1L, FOS, CCNE1, CCDC85B, TGFB3, RBPJ, GNL3, UBE2D3, XRCC5, GZMB	1.83E-04-2.13E-02	Cellular Development
13	HIST1H1C, NFIC, THBS1, EGR1, FBXW7, BCL3, F3, SHC1, FOS, MERTK, TGFB3, CSNK2A1, RBPJ, CD274, C1QBP, STAT1, GZMB	1.83E-04-2.13E-02	Cellular Function and Maintenance
14	HIST1H1C, PTHLH, FBXW7, CDKN2C, ABCG1, IGLL1/IGLL5, CXCL10, SHC1, DUSP5, MERTK, CD274, RBM15, C1QBP, STAT1, TNFRSF10A, IL8, TP63, NFIC, EPAS1, HIST1H4C (includes others), THBS1, EGR1, BCL3, F3, FOS, GAD1, RBPJ, XRCC5, GZMB	1.83E-04-2.13E-02	Hematological System Development and Function
15	IL8, HIST1H1C, EPAS1, HIST1H4C (includes others), THBS1, EGR1, PTHLH, FBXW7, BCL3, IGLL1/IGLL5, CXCL10, FOS, SHC1, DUSP5, MERTK, RBPJ, RBM15, CD274, STAT1, XRCC5, GZMB	1.83E-04-2.13E-02	Hematopoiesis
16	SHC1, FOS, IL8, CCNE1, MERTK, RRAD, THBS1, EGR1, FBXW7, GZMB	2.43E-04-2.13E-02	Cell Morphology
17	PA2G4, PTHLH, NOLC1, CDKN2C, CXCL10, RAD51, SHC1, RCC1, CSNK2A1, CD274, ELAC2, C1QBP, STAT1, AHCY, IL8, TP63, THBS1, RRAD, EGR1, BCL3, SEL1L, FOS, CCNE1, TGFB3, PRMT5, GNL3, WNK1, XRCC5, UBE2D3	2.76E-04-2.13E-02	Cell Cycle
18	FURIN, ADRM1, PCBP1, THBS1, BCL3, EIF4G1, UBR3, RPS24, RPL6, VCP, EIF4A1, RPS15, NCL, UBE2D3, RPL13, DHX9	2.87E-04-1.52E-02	Protein Synthesis
19	CXCL10, IL8, THBS1, PTHLH, ABCG1, C1QBP, SULF2	3.39E-04-1.07E-02	Carbohydrate Metabolism
20	IL8, TP63, NFIC, RRAD, THBS1, EGR1, PTHLH, F3, CXCL10, MERTK, TGFB3, CD274, C1QBP, NCL, STAT1, TNFRSF10A, GZMB	3.39E-04-2.13E-02	Cell-To-Cell Signaling and Interaction
21	IL8, FOS, FURIN, TP63, PTHLH, TGFB3, RBPJ, FEN1, C1QBP, F3, DHX9, BYSL	3.39E-04-2.13E-02	Embryonic Development
22	EPAS1, TP63, HSP90AB1, GAD1, PTHLH, TGFB3, CSNK2A1, RBPJ, ELAC2, CITED1	3.39E-04-2.13E-02	Reproductive System Development and Function
23	IL8, ILF3, FURIN, EPAS1, THBS1, EGR1, PTHLH, RRM2, ABCG1, MAFF, ELOVL6, CXCL10, FOS, HSP90AB1, ECE2, RCC1, GAD1, PRMT5, DNAJB1, SULF2, AHCY	3.39E-04-2.13E-02	Small Molecule Biochemistry
24	IL8, FURIN, EPAS1, THBS1, CCT2, PTHLH, FBXW7, CITED1, F3, CXCL10, SHC1, RBPJ, RBM15, NCL	6.07E-04-2.13E-02	Cardiovascular System Development and Function
25	IL8, SHC1, CCNE1, IPO4, THBS1, SURF6, VCP, RRN3, NOLC1, F3, XRCC5, GZMB	6.07E-04-2.13E-02	Cellular Assembly and Organization

TOP CANONICAL PATHWAYS				
ID	**Molecules**	**-log(p-value)**	**Ratio**	**Ingenuity Canonical Pathways**
1	SHC1, FOS, CSNK2A1, STAT1	2.84E00	8.33E-02	EGF Signaling
2	CXCL10, IL8, FOS	2.63E00	1.2E-01	IL-17A Signaling in Gastric Cells
3	RAD51, CCNE1, PA2G4, TGFB3, STAT1	2.27E00	4.39E-02	Pancreatic Adenocarcinoma Signaling
4	SHC1, EPAS1, STAT1	2.25E00	8.82E-02	Oncostatin M Signaling
5	HSP90AB1, PSMC6, PSMB2, FBXW7, DNAJB1, PSMD3, DNAJC30, UBE2D3	2.21E00	2.97E-02	Protein Ubiquitination Pathway
6	SHC1, FOS, CSNK2A1, STAT1	2.15E00	5.48E-02	PDGF Signaling
7	CCNE1, PA2G4, TGFB3, CDKN2C	2.03E00	4.6E-02	Cyclins and Cell Cycle Regulation
8	MSH3, FEN1	1.91E00	1E-01	Mismatch Repair in Eukaryotes
9	FOS, CCNE1, NFIC, HSP90AB1, TGFB3	1.85E00	3.55E-02	Aryl Hydrocarbon Receptor Signaling
10	PRPS2, PRMT5, ELOVL6	1.84E00	6.25E-02	Histidine Metabolism
11	TP63, THBS1, GNL3, TNFRSF10A	1.75E00	4.21E-02	p53 Signaling
12	IL8, SHC1, FOS, CSNK2A1	1.74E00	4.08E-02	IL-6 Signaling
13	SHC1, FOS, CSNK2A1	1.72E00	5.36E-02	IL-2 Signaling
14	CCNE1, PA2G4, TGFB3	1.7E00	5.08E-02	Cell Cycle: G1/S Checkpoint Regulation

15	IL8, SHC1, FOS, HSP90AB1, TGFB3, STAT1, TAF13	1.69E00	2.53E-02	Glucocorticoid Receptor Signaling
16	SHC1, FOS, STAT1	1.68E00	5.08E-02	Thrombopoietin Signaling
17	CCNE1, TGFB3	1.51E00	7.69E-02	Antiproliferative Role of TOB in T Cell Signaling
18	SHC1, FOS, STAT1	1.39E00	4.11E-02	IL-3 Signaling
19	PRMT5, AHCY	1.39E00	6.67E-02	Selenoamino Acid Metabolism
20	SHC1, FOS, STAT1	1.36E00	3.9E-02	Prolactin Signaling
21	SHC1, STAT1	1.34E00	5.71E-02	Role of JAK2 in Hormone-like Cytokine Signaling
22	BCL3, STAT1	1.29E00	5.26E-02	IL-9 Signaling
23	CCNE1, PA2G4, HSP90AB1	1.28E00	3.33E-02	Prostate Cancer Signaling
24	SHC1, EIF4A1, EIF4G1	1.26E00	3.3E-02	EIF2 Signaling
25	FURIN, RBPJ	1.23E00	4.88E-02	Notch Signaling