

Supplementary Table 2B: Ingenuity Pathway Analysis (IPA) results of genes significantly modulated by perifosine/sorafenib combined treatment (per+sor treatment) in the L-540 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	AP3M2, ATG12, BRE, C14orf135, CCNI, CEP63, DAP, EIF3E, FNTA, IRF1, JAK1, PSPH, RAPGEF1, RHOQ, RIPK2, SH3GLB1, SH3KBP1, SHMT2, STAT4, STYXL1, TBCD, TCP11L1, TGOLN2, TNFRSF14, TNFSF13B, TRAPPC8, TUBA3C/TUBA3D	39	27	Amino Acid Metabolism, Small Molecule Biochemistry, Cellular Development
2	APP, APPBP2, ASCC2, BAX, BMI1, CD160, DIABLO, DNAA3, FAF1, FAF2, GUSB, Hsp70, LETMD1, LMO4, MAD2L2, NLRX1, NUB1, PPP1R13B, RBBP8, SH2D1A, SNX17, STK4, TNFRSF21, TSEN15, UBL4A	32	24	Carbohydrate Metabolism, Cellular Growth and Proliferation, Cellular Compromise
3	ADCY1, ANXA1, ARHGDI1, COL4A3, COL4A5, FGF9, GARS, IARS, ITGAL, ITGB1BP1, KLF6, KLHL12, MTHFD2, PEA15, PLA2G4B, PLCG2, PPP3CB, PSAT1, RCAN1, TMOD1, TPM1, TRIB3	28	22	Genetic Disorder, Renal and Urological Disease, Dermatological Diseases and Conditions
4	AKTIP, BTG1, BTG2, CCDC92, CSNK2A2, CXCR4, DDIT3 , FOXO1, FST, GOT1, HOXA5, LHB, OBF1, PHLDA1, PPP1R11, PPP1R15A , PPP2R2B, PPP2R5A, SNURF, STK39, TMBIM6, UPP1	28	22	Cell Cycle, Amino Acid Metabolism, Small Molecule Biochemistry
5	ACSL3, ADAP1, ALOX5AP , CEBPB , CEBPG, CSF1R, CSK, DGCR6, DPF2, IL10RB, JUN, LIPA, OSBPL6, PARP3, PARP10, PTC2, RNF187, SARS, SLC6A9, TAF12	25	20	Connective Tissue Development and Function, Tissue Morphology, Cancer
6	BBS2, CARD8, CD74, CORO1A, HLA-B, HLA-DMB, HLA-DOA, HLA-DQA1, HLA-DQB1, KIR2DL3 , KIR2DL4/LOC100287534 , KIR3DL2 , KPNA4, MBP, PCMI, POLR3C, RFX5, SMOX, TCR	23	19	Immunological Disease, Inflammatory Disease, Neurological Disease
7	ADAT1, BNIPI, DPH5, DYNC2LI1, FIG4, GHITM, IER5, MOCOS, MUTYH, PPCS, PPP2R3C, PRR14, SLC22A18, TMEM216, UROS, ZNF277	20	16	Small Molecule Biochemistry, Endocrine System Disorders, Gastrointestinal Disease
8	ANAPC4, ATP6V0A2, ATP6V1E2, BCL2L13, BTG1, CCDC92, MITD1, NXT1, PRKAB1, RCC2, RFX5, RHOC, SMC1B, STIM1, TMEM203, ZFAND2A	19	17	Cell Cycle, Amino Acid Metabolism, Molecular Transport
9	ASF1A, CECR1, DUSP12, GVIN1, HCP5, KIR2DL3 , KIR2DL4/LOC100287534 , MANBA, MX2, NAPB, NFU1, PI4KB, RUNX3, STX16, TPPI1, UBE2L6	18	16	Cell Signaling, Cellular Function and Maintenance, Molecular Transport
10	AMD1, AP4B1, ARHGAP19, ARSG, C3orf19, C6orf130, C7orf50, FAM110B, FAM53B, FGF9, HNRPD1, HSF2BP, LRRFIP2, RUNX3, SLC41A2, TPST2, ZNF821	18	16	Cellular Development, Cellular Growth and Proliferation, Cellular Movement
11	ANO8, BTG1, CCDC90B, CSNK1G1, GBE1, GPR108, HOXA5, MYOM2, PAAF1, PLEKHG4, PNP, PPP1R13B, PPP1R15A , PYGB, SPECC1L, ZBTB25, ZFAND2B, ZNF277	18	16	Gene Expression, Carbohydrate Metabolism, Cell-To-Cell Signaling and Interaction
12	BBS2, BTG2, CCNB1IP1, CDC25A, COMMD8, DENR, DNAJB2, EIF1, FBXW4, NGRN, PHYH, RFNG, SIRT5, TRIB3 , TRIM68, ZNF22	16	15	Cell Cycle, Organ Morphology, Organismal Injury and Abnormalities
13	ALKBH8, C12orf41, CUEDC1, CYP4V2, DDX19B, DUS4L, FLAD1, MYL5, RAD51L3, SNX2, SNX5, TBCD, TMEM71, TRAF3IP3, TTC4	16	15	Cell Cycle, Genetic Disorder, Ophthalmic Disease
14	AARS, CMBL, CMTM3, FAM65B, GPER, MAN1B1, MED10, MTF2, SPSB2, TMEM79, TPRG1L, TTC13, USP38	13	13	Cellular Assembly and Organization, Cellular Development, Connective Tissue Development and Function
15	ACAD11, ACSL3, ANGEL2, C4orf34, CDC14B, CNDP2, PDRG1, PIH1D1, PQLC3, PROSC, RAD17, SNRPN, TTC7A	12	12	Cell Morphology, Cellular Assembly and Organization, Genetic Disorder
16	CACNB3, GNPDA1, GNS, ITFG2, MSI2, RPP40, SKAP2, SNX17, TGOLN2, TLN2, WWP2, XPOT	12	12	Cell Morphology, Connective Tissue Development and Function, Carbohydrate Metabolism
17	AMZ2, C20orf30, CCDC50, ITGB7, PPM1H, RNF115, ROD1, SH3RF2 , SPATA20, SPG11, TOM1L2, UPF3A	12	12	Lipid Metabolism, Small Molecule Biochemistry, Post-Translational Modification
18	ALOX5AP , ARHGFE18, CMAH, COG2, CYTH4, DMXL2, INPP1, MPPE1, ST3GAL1, SUMF2, TRAM1	10	11	Gastrointestinal Disease, Genetic Disorder, Inflammatory Disease
19	AGPAT9, ERP29, FAM129A, FR53, LRMP, PARP10, PEX10, RCOR3, RPL22, RRM2B, TBC1D2B	10	11	Nucleic Acid Metabolism, Small Molecule Biochemistry, Cell Morphology
20	C19orf2, DOCK2, EBAG9, HEY2, LZTS1, PBX3, PLCL2, RAPGEF1, TCEA1 , WARS	9	10	Cell Signaling, Cell Morphology, Cell-To-Cell Signaling and Interaction
21	EVI5L	1	1	Cellular Assembly and Organization
22	IFT27	1	1	Cell Death
23	COBLL1	1	1	Cellular Assembly and Organization, Cell Morphology, Nervous System Development and Function
24	SGSM1	1	1	Cell Cycle, Cellular Development, Embryonic Development
25	BTBD6	1	1	Cell Cycle, Hepatic System Development and Function, Gene Expression

TOP FUNCTIONS			
ID	Molecules	p-value	Category
1	HLA-DOA, RPL22, AKTIP, MBP, HLA-DQA1, HLA-DQB1 (includes others), CD74, ITGB7, JUN, BMI1, SH2D1A, PPP3CB, ANXA1, DOCK2, DNAJA3, RIPK2, TNFSF13B, RUNX3, KIR2DL3 (includes others), CXCR4, CSK, CEBPB , BAX, ITGAL, IRF1, WWP2, STAT4, RCAN1, ST3GAL1, CORO1A	1.07E-05-3.04E-02	Cell-mediated Immune Response
2	HLA-DOA, RPL22, DDIT3 , AKTIP, MBP, HLA-DQA1, TMBIM6, DNAJB2, HLA-DQB1 (includes others), CD74, APP, ITGB7, JUN, BMI1, SH2D1A, PPP3CB, ANXA1, DOCK2, HLA-B, DNAJA3, RIPK2, TNFSF13B, RUNX3, KIR2DL3 (includes others), CXCR4, CSK, PPP1R15A , TRIB3 , CEBPB , BAX, CSF1R, ITGAL, IRF1, WWP2, STAT4, RCAN1, ST3GAL1, CORO1A, AARS, TMOD1	1.07E-05-3.52E-02	Cellular Function and Maintenance
3	RAPGEF1, RPL22, HLA-DOA, JAK1, MBP, HLA-DQB1 (includes others), STK4, BMI1, DNAJA3, RIPK2, TNFSF13B, TNFRSF21, KIR2DL3 (includes others), FST, TSPAN33, IRF1, WWP2, ST3GAL1, PLCG2, BTG2, CMAH, DDIT3 , AKTIP, HLA-DQA1, CD74, APP, ITGB7, LIPA, JUN, SH2D1A, PPP3CB, DOCK2, ANXA1, HOXA5, HLA-B, STIM1, TCEA1 , RUNX3, CD160, CXCR4, CSK, CEBPB , BAX, CSF1R, ITGAL, TNFRSF14, STAT4, RCAN1, TTC7A, CORO1A, PEA15, TNFSF14	1.07E-05-3.39E-02	Hematological System Development and Function
4	PTCD2, RAPGEF1, HLA-DOA, RPL22, JAK1, ITGB1BP1, MBP, EIF1, HLA-DQB1 (includes others), STK4, BMI1, CCNB1IP1, PPP1R13B, DNAJA3, HEY2, RIPK2, TNFSF13B, KIR2DL3 (includes others), FST, FGF9, BTG1, TSPAN33, FIG4, FOXC1, IRF1, WWP2, PLCG2, ST3GAL1, BTG2, DIABLO, TPM1, DDIT3 , COL4A3, AKTIP, HLA-DQA1, CD74, APP, LHB, ITGB7, LIPA, JUN, SH2D1A, PPP3CB, DOCK2, ANXA1, HOXA5, TCEA1 , RUNX3, MEI1, CXCR4, CSK, BAX, CEBPB , MSI2, ITGAL, CSF1R, STAT4, CSNK2A2, RCAN1, PBX3, TTC7A, CORO1A, TNFSF14	1.18E-05-3.39E-02	Cellular Development
5	HLA-DOA, RPL22, JAK1, AKTIP, MBP, HLA-DQA1, HLA-DQB1 (includes others), CD74, APP, ITGB7, STK4, SH2D1A, BMI1, JUN, PPP3CB, ANXA1, DOCK2, HOXA5, DNAJA3, RIPK2, TNFSF13B, KIR2DL3 (includes others), RUNX3, FST, CXCR4, CSK, TSPAN33, BAX, CEBPB , CSF1R, ITGAL, IRF1, WWP2, STAT4, RCAN1, ST3GAL1, PLCG2, TTC7A	1.18E-05-3.26E-02	Hematopoiesis
6	JUN, PPP3CB, ATP6V0A2, HLA-B, TRAM1, BAX, CD74, HLA-DQB1 (includes others), ITGAL, IRF1	2.18E-04-2.04E-02	Dermatological Diseases and Conditions
7	RAPGEF1, HLA-DOA, FLAD1, MBP, GARS, EIF1, HLA-DMB, HLA-DQB1 (includes others), H2AFY2, PRSS16, SNRPN, CCNB1IP1, MAD2L2, MOCOS, CARD8, APPBP2, TNFSF13B, TNFRSF21, KPNA4, FGF9, TSPAN33, PPP1R11, PLCL2, EIF3E, RAD51L3, ARHGDIB, IRF1, COL4A5, ANAPC4, HCG4, TLN2, ERP29, PLCG2, PPP2R2B, PPM1H, CMAH, ARHGEF18, TUBA3C/TUBA3D, KRTAP17-1, DIABLO, METTL21B, AP4B1, COL4A3, HLA-DQA1, TRAM1, CD74, FNTA, RFX5, ITGB7, ALKBH8, TMEM116, HCP5, SH2D1A, JUN, PPP3CB, PEX10, ANXA1, HLA-B, LRMP, RUNX3, DAP, CXCR4, PPP1R15A , C7orf13, BAX, CEBPB , MSI2, CSF1R, ITGAL, UBE2L6, TNFRSF14, CUEDC1, STAT4, FAF1, WARS , PBX3, PCMI, FAM129A, ADCY1, TTC7A, CORO1A, IL10RB, C6orf48, TPP1, TNFSF14	2.18E-04-3.21E-02	Immunological Disease
8	DDIT3 , MBP, COL4A3, HLA-DQA1, TRAM1, HLA-DQB1 (includes others), CD74, APP, JUN, SH2D1A, PPP3CB, BNIP1, ANXA1, HLA-B, TNFSF13B, TNFRSF21, RUNX3, FST, CXCR4, ALOX5AP , TSPAN33, BAX, ITGAL, IRF1, TNFRSF14, STAT4, CORO1A, IL10RB, TNFSF14	2.18E-04-2.93E-02	Inflammatory Disease
9	JAK1, AKTIP, COL4A3, MBP, EIF1, HLA-DQB1 (includes others), CD74, APP, BMI1, SH2D1A, JUN, PPP1R13B, ANXA1, LZTS1, DOCK2, HOXA5, DNAJA3, HEY2, RIPK2, TNFSF13B, TNFRSF21, MEI1, RUNX3, KIR2DL3 (includes others), FST, CD160, RHOC, CXCR4, BAX, CEBPB , CSF1R, ITGAL, TNFRSF14, IRF1, WWP2, STAT4, PLCG2, CORO1A, PEA15, DIABLO, TNFSF14	2.34E-04-3.39E-02	Cellular Growth and Proliferation
10	ADAT1, AARS, SARS	2.77E-04-2.77E-04	RNA Post-Transcriptional Modification

11	RAPGEF1, PHLDA1, JAK1, CCNI, MBP, RRM2B, KLF6, SH3GLB1, TMIM6, STYXL1, DNAJB2, CEBPG, STK4, BMI1, CCNB1IP1, CARD8, PPP1R13B, DNAJA3, DUSP12, RIPK2, SH3KBP1, TNFSF13B, TNFRSF21, ATG12, KIR2DL3 (includes others), EBAG9, FST, FGF9, DPP2, BTG1, PPP1R11, RAD51L3, KIR2DL4/LOC100287534 , FOXC1, IRF1, WWP2, BBS2, ST3GAL1, PLCG2, PPP2R2B, BTG2, ARHGFE18, AARS, DIABLO, BRE, TPM1, FGD3, INPP1, DDIT3 , COL4A3, AKTIP, CD74, FNTA, APP, ALKBH8, BCL2L13, SH2D1A, JUN, PPP3CB, BNIP1, PHYH, ANXA1, HOXA5, HLA-B, SMOX, PI4KB, RUNX3, DAP, PPM1M, CD160, RHOC, CXCR4, CSK, PPP1R15A , TRIB3 , BAX, CEBPB , CSF1R, ITGAL, PPP2R5A, TNFRSF14, STAT4, FAF1, RCAN1, CSNK2A2, PEA15, TPP1, TNFSF14	2.88E-04-3.65E-02	Cell Death
12	TPM1, RCAN1, FST, PPP3CB, PBX3, BAX, CEBPB , APP, LHB	4.15E-04-2.04E-02	Developmental Disorder
13	ATG12, STAT4, CXCR4, PLCG2, NLRX1, APP, TNFSF14, TNFRSF14, IRF1, WWP2	4.15E-04-2.39E-02	Infection Mechanism
14	FST, JAK1, AKTIP, KLF6, BAX, CACNB3, GUSB, LHB, APP, RCAN1, STK4, PPP3CB, ANXA1, TMOD1, TNFSF13B	4.15E-04-3.01E-02	Organ Morphology
15	FST, BBS2, BAX, LHB	4.15E-04-3.21E-02	Reproductive System Disease
16	HLA-DOA, RRM2B, GARS, GHITM, ASCC2, HLA-DMB, HLA-DQB1 (includes others), ILDR1, BMI1, TGOLN2, RIPK2, C20orf196, TNFRSF21, SURF1, ARSG, ARHGDIB, NGRN, ACAD11, SPG11, PLCG2, ST3GAL1, PPP2R2B, BTG2, PPM1H, SMC1B, BRE, INPP1, DDIT3 , COL4A3, HLA-DQA1, TMEM185A, CD74, FNTA, LRRC20, TRIM68, ALKBH8, NEIL3, JUN, PEX10, TTC39C, DOCK2, HLA-B, STIM1, TCEA1 , TBCD, COG2, NAPB, RHOC, MYOM2, ATP6V1E2, FAM53B, ALOX5AP , STAT4, NUB1, CYTH4, PCM1, TPP1, CYP4V2, C12orf41, HNRPD, UPF3A, MBP, KLF6, DNAJB2, GUSB, PLEKHG4, STK4, MOCOS, GOT1, SH3KBP1, ROD1, LMO4, STK39, BTG1, FIG4, EIF3E, FOXC1, WWP2, LRRFIP2, BBS2, TUBA3C/TUBA3D, DIABLO, OBF1, OSBP1, LETMD1, TRAM1, CACNB3, APP, PPP3CB, ANXA1, PHYH, IER5, CCDC50, RUNX3, PSAT1, CD160, TPST2, SGSM1, CXCR4, BAX, MS12, CSF1R, ITGAL, TNFRSF14, RCAN1, PBX3, TTC7A, CORO1A, AP3M2, GVIN1, TNFSF14	5.31E-04-3.4E-02	Neurological Disease
17	JAK1, MBP, KLF6, TMIM6, CACNB3, CD74, APP, JUN, ANXA1, DOCK2, STIM1, RIPK2, CXCR4, ADAP1, CSK, PLCL2, BAX, CEBPB , ITGAL, IRF1, STAT4, FAF1, GPER, PLCG2, IL10RB, TNFSF14	6.18E-04-2.6E-02	Cell Signaling
18	DDIT3 , SLC6A9, AP4B1, MBP, AKTIP, RRM2B, TMIM6, CACNB3, CD74, APP, LIPA, PEX10, ANXA1, STIM1, APPBP2, COG2, KPNA4, CXCR4, CSK, FGF9, CCDC92, PLCL2, BAX, NXT1, ITGAL, WWP2, XPOT, FAF1, GPER, ERP29, PLCG2, TNFSF14	6.18E-04-2.88E-02	Molecular Transport
19	CXCR4, CSK, MBP, PLCL2, BAX, CACNB3, TMIM6, APP, ITGAL, FAF1, GPER, MOCOS, PLCG2, ANXA1, STIM1, TNFSF14	6.18E-04-2.04E-02	Vitamin and Mineral Metabolism
20	RAPGEF1, JAK1, DDIT3 , LMO4, CXCR4, BTG1, TRIB3 , BAX, CEBPB , APP, FOXC1, CEBPG , PPP2R5A, IRF1, STAT4, RCAN1, STK4, JUN, BTG2, HEY2, TNFSF14	6.34E-04-2.91E-02	Gene Expression
21	ACSL3, ALOX5AP , TRIB3 , CEBPB , CD74, BAX, CSF1R, APP, PPP2R5A, LIPA, RHOQ, ANXA1, PHYH, GOT1	2.12E-03-3.42E-02	Lipid Metabolism
22	GNPDA1, JAK1, DDIT3 , SLC6A9, CHST7, MBP, ITGB1BP1, RRM2B, KLF6, CD74, GUSB, APP, LIPA, JUN, DOCK2, ANXA1, PHYH, GOT1, RIPK2, ACSL3, PSPH, ADAP1, UROS, FGF9, UPP1, ARSG, ALOX5AP , CCDC92, TRIB3 , BAX, CEBPB , FOXC1, IRF1, ARHGDIB, STAT4, RHOQ, ADAT1, CMAH, AARS, GNS, SHMT2	2.12E-03-3.65E-02	Small Molecule Biochemistry
23	TNFRSF21, RAPGEF1, JAK1, CXCR4, RHOC, COL4A3, FGF9, CD74, APP, ITGAL, FOXC1, CSF1R, ITGB7, TNFRSF14, LIPA, JUN, ANXA1, DOCK2, PLCG2, TNFSF13B, TNFSF14	2.42E-03-3.4E-02	Cellular Movement
24	JAK1, DDIT3 , RNF115, CSNK1G1, COL4A3, AKTIP, SH3GLB1, MAN1B1, CD74, DNAJB2, FNTA, APP, LHB, TRIM68, STK4, SH2D1A, PPP3CB, DNAJA3, COG2, TBCD, DUSP12, RIPK2, KIR2DL3 (includes others), PPM1M, TPST2, STK39, SIRT5, CSK, CSF1R, UBE2L6, UBL4A, WWP2, STAT4, CSNK2A2, ANAPC4, NUB1, ERP29, FAM129A, ST3GAL1, CDC14B, AARS	2.42E-03-3.71E-03	Post-Translational Modification
25	NXT1, XPOT	2.42E-03-2.42E-03	RNA Trafficking

TOP CANONICAL PATHWAYS

ID	Molecules	-log(p-value)	Ratio	Ingenuity Canonical Pathways
1	PSAT1, PSPH, PLCG2, GARS, GOT1, SMOX, PLCL2, SARS, SHMT2	5.09E00	1.34E-01	Glycine, Serine and Threonine Metabolism
2	WARS , GARS, HARS2, AARS, SARS, IARS	4.17E00	1.71E-01	Aminoacyl-tRNA Biosynthesis
3	KIR2DL3 (includes others), HLA-DOA, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	3.9E00	1.3E-01	Graft-versus-Host Disease Signaling
4	HLA-DOA, JUN, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	3.39E00	9.84E-02	OX40 Signaling Pathway
5	HLA-DOA, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	3.23E00	9.43E-02	Autoimmune Thyroid Disease Signaling

6	HLA-DOA, HLA-DQA1, HLA-B, HLA-DMB, CD74	3.01E00	1.16E-01	Antigen Presentation Pathway
7	HLA-DOA, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	2.95E00	8.47E-02	Allograft Rejection Signaling
8	HLA-DOA, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.88E00	1.33E-01	B Cell Development
9	STAT4, HLA-DOA, HLA-DQA1, IL10RB, HLA-DMB, HLA-DQB1 (includes others)	2.79E00	8.7E-02	T Helper Cell Differentiation
10	HLA-DOA, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	2.76E00	9.62E-02	Cytotoxic T Lymphocyte-mediated Apoptosis of Target Cells
11	HLA-DOA, PPP3CB, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.63E00	8.77E-02	Nur77 Signaling in T Lymphocytes
12	FGD3, HLA-DOA, JUN, MYL5, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others)	2.45E00	5.63E-02	Cdc42 Signaling
13	JAK1, JUN, RHOQ, RHOQ, PLCG2, PPP2R2B, PPP1R11, IRF1, PPP2R5A	2.38E00	5.56E-02	Production of Nitric Oxide and Reactive Oxygen Species in Macrophages
14	HLA-DOA, PPP3CB, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.36E00	8.2E-02	Calcium-induced T Lymphocyte Apoptosis
15	HLA-DOA, JAK1, HLA-DQA1, HLA-B, HLA-DMB, HLA-DQB1 (includes others), IRF1	2.31E00	6.14E-02	Type I Diabetes Mellitus Signaling
16	PPP2R2B, BTG2, BTG1, PPP2R5A	2.27E00	1.11E-01	Cell Cycle Regulation by BTG Family Proteins
17	RCAN1, HLA-DOA, JUN, CSNK1G1, PPP3CB, PLCG2, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.25E00	4.86E-02	Role of NFAT in Regulation of the Immune Response
18	HLA-DOA, JUN, PPP3CB, CSK, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.18E00	5.74E-02	CD28 Signaling in T Helper Cells
19	HLA-DOA, JUN, PPP3CB, PLCG2, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.18E00	5.51E-02	PKC θ Signaling in T Lymphocytes
20	HLA-DOA, PPP2R2B, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others), PPP2R5A	2.11E00	6.32E-02	CTLA4 Signaling in Cytotoxic T Lymphocytes
21	KIR2DL3 (includes others), TLN2, HLA-B, KIR3DL2, KIR2DL4/LOC100287534 , ITGAL	2.04E00	6.52E-02	Crosstalk between Dendritic Cells and Natural Killer Cells
22	HLA-DOA, JAK1, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	2.01E00	7.25E-02	IL-4 Signaling
23	HLA-DOA, PPP3CB, CSK, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others)	1.82E00	5.36E-02	iCOS-iCOSL Signaling in T Helper Cells
24	PPP2R2B, ADCY1, PPP1R11, SMOX, PPP2R5A	1.76E00	6.67E-02	Dopamine Receptor Signaling
25	HLA-DOA, HLA-DQA1, HLA-DMB, HLA-DQB1 (includes others), TNFSF13B	1.71E00	5.81E-02	Altered T Cell and B Cell Signaling in Rheumatoid Arthritis

GENES DOWNREGULATED BY PER+SOR TREATMENT

TOP NETWORKS

ID	Molecules in Network	Score	Focus Molecules	Top Functions
1	ALDOA, ARHGDI1A, ATP2A2, DPP3, E2F7, FKBP4, GLA, GNA11, HDGF, HNRNPA3, HSP90AB1, HSPA1A/HSPA1B, HSPH1, LDHA, LIG1, MRPL28, NOP14, PGK1 , PIM1, PIM2, PRDX1, PRDX4, STIP1, TNFRSF8, TNPO2, TRAFD1, TUBB3	44	27	Drug Metabolism, Endocrine System Development and Function, Lipid Metabolism
2	BLZF1, CCNA2, CDC25A, CDT1, EIF4A3, FDP5, FEN1, GPI, H2AFX, HIST1H2AB/HIST1H2AE, HIST1H2BJ/HIST1H2BK, HNRNPA1, IK, INSI1, JARID2, LDLR, ORC1, PFKFB4 , POLR2A, POLR2H, RHEB, SKP2, SUPT5H, TK1, TSEN34, USP5	42	26	Cell Cycle, Lipid Metabolism, Small Molecule Biochemistry
3	BCAP31, CALR, CISH, CSF2, CTTN, EIF4G1, FDFT1, FURIN, G6PD, GARI, HLX, IL22 , IL2RA, MAPK7, NCAPD3, NPEPPS, PDE1B, PFKFB3, PLOD2, SCD, SLC2A1, SPHK1, ZNF668	35	23	Lipid Metabolism, Small Molecule Biochemistry, Gastrointestinal Disease
4	BANF1, BST2, CCNF, CDCA4, CLK2, DHX15, FBL, GLDC, H3F3A/H3F3B, HIST1H1C , HK2, KIF11, NRIH2, PKM2 , PLAT, PSMB3, PSMB7, PSMD1, RBM39, RGS12, SUV39H1, TRIM28, TUFM	35	23	Cell Morphology, Cellular Compromise, Infection Mechanism
5	ALDOA, ATP5G1, ATP6V0C, FAM127A, FKBP4, LYST, NEDD8, NUB1, PDK3, PGAM1, PGAM4, PRDX1, PTGIS, SON, STIP1, TPI1, ZNF395	21	16	Carbohydrate Metabolism, Inflammatory Disease, Respiratory Disease
6	ADIPOR2, AMD1, ELAC2, ESPL1, FKBP2, GBE1, MORF4L2, PIH1D1, RPL29 , SEC61G, SPC24, TMED10, TUBGCP2, TUFM, UBE2O	19	15	Cell Cycle, Cellular Assembly and Organization, DNA Replication, Recombination, and Repair
7	API51, DDX23, FAM57A, HNRNPA2B1, HNRNPH2, KIF11, MRPL14, NAA20, PNP, PRPF4, PTRH2, SETBP1, TKT, TLL12	17	14	RNA Post-Transcriptional Modification, Genetic Disorder, Ophthalmic Disease
8	ARSB, DIS3L2, FAM195A, GYS1, HLX, MANF, MYADM, NSDHL, P2RY11, PDXP, PIK3CD, PNPLA2, RPS24 , SAMD9, UCK2, UPP1	17	14	Cell Death, Cellular Development, Gene Expression
9	ACTN4, ATP2B4, DIAPH1, ENO2 , FBXO32, FKBP1A, GPI, MAPKAPK3, OAS1, P4HB, PRKCH, RAVER1, S100A13	16	13	Cellular Assembly and Organization, Infection Mechanism, Carbohydrate Metabolism
10	DUT, ELOF1, HIST1H2BD, LARS2, MRPL51, NT5DC2, PRPS1, RNFI44A, TEX10, TM9SF2, UBE2L6, UTP11L, VKORC1	14	12	Post-Translational Modification, Endocrine System Disorders, Gastrointestinal Disease
11	CECR5, GEMIN6, GIGYF2, IMPA2, INCENP, RBPJ, RPL32 , RRAGC, STAU1, ZC3H4, ZNF43	12	11	RNA Post-Transcriptional Modification, Cellular Assembly and Organization, Cell Morphology
12	ARID5A, DDX46, EXOSC3, EXOSC9, RASL11B, SAFB2, SDHC, THOP1, ZNF212	9	9	Inflammatory Response, RNA Post-Transcriptional Modification, Infection Mechanism
13	RIMKLA	2	1	Cancer, Cellular Assembly and Organization, Skeletal and Muscular System Development and Function
14	XYLT2	2	1	Liver Fibrosis, Organismal Injury and Abnormalities, Carbohydrate Metabolism
15	KLHL23	2	1	Post-Translational Modification, Cell Cycle

16	SLC35B2	2	1	Nucleic Acid Metabolism, Small Molecule Biochemistry, Cellular Growth and Proliferation
17	NARF	2	1	Cardiovascular Disease, Cellular Assembly and Organization, Connective Tissue Development and Function

TOP FUNCTIONS				
ID	Molecules	p-value		Category
1	PKM2 , PGK1 , SCD, PFKFB3, GLA, SLC2A1, TKT, G6PD, ENO2 , TPI1, XYLT2, GPI, GYS1, LDLR, HK2, PGAM1, IMPA2, GBE1, ALDOA, ARSB, CSF2	7.06E-10-2.71E-02		Carbohydrate Metabolism
2	LIG1, FURIN, HSPA1A/HSPA1B, INSIG1, NPEPPS, ATP2A2, SUPT5H, AMD1, FDFT1, HNRNPA1, PIM1, CDC25A, PTGIS, PGK1 , EXOSC9, HLX, TUBB3, P4HB, SLC2A1, ENO2 , SDHC, BST2, SKP2, FAM57A, SEC61G, STIP1, H2AFX, CLK2, PNP, MANF, ALDOA, IL22 , PRKCH, MAPK7, RBM39, CTTN, LDHA, TK1, KIF11, INCENP, SCD, PRDX1, GNA11, SAFB2, H3F3A/H3F3B, SPC24, FKBP1A, TPI1, EIF4G1, RGS12, CCNA2, DIAPH1, HK2, POLR2A, HSP90AB1, SPHK1, ELAC2, HIST1H2BD, ORC1, PLAT, PKM2 , PLOD2, CALR, DUT, G6PD, LARS2, FDPS, XYLT2, GPI, NR1H2, IL2RA, FEN1, ARHGDI, TNFRSF8, CSF2, PIM2	1.58E-05-2.71E-02		Cancer
3	LIG1, FURIN, INSIG1, HSPA1A/HSPA1B, ATP2A2, AMD1, FDFT1, HNRNPA1, PRPS1, ZNF395, GYS1, PGAM1, CDC25A, FBL, PGK1 , PTGIS, EXOSC9, GLA, TUBB3, P4HB, SLC2A1, TKT, ENO2 , SDHC, BST2, AP1S1, SEC61G, VKORC1, STIP1, H2AFX, CCNE, EIF4A3, PDE1B, ALDOA, MANF, IL22 , TK1, KIF11, LDHA, TUFM, SCD, GNA11, HNRNPA2B1, H3F3A/H3F3B, FKBP1A, TPI1, RGS12, CCNA2, DIAPH1, LYST, POLR2A, HSP90AB1, SPHK1, ARSB, HIST1H2BD, ORC1, PLAT, PKM2 , CALR, PLOD2, NSDHL, OAS1, MAPKAPK3, HSPH1, G6PD, PNPLA2, FDPS, RPS24 , GPI, LDLR, FKBP4, GBE1, IL2RA, ARHGDI, FEN1, TNFRSF8, UCK2, CSF2, SAMD9	1.58E-05-2.71E-02		Genetic Disorder
4	LIG1, HIST1H1C , FURIN, PRDX1, FKBP1A, TPI1, HIST1H2BJ/HIST1H2BK, CCNA2, FDFT1, POLR2A, HSP90AB1, SPHK1, IMPA2, HIST1H2BD, PLAT, PTGIS, P4HB, TUBB3, HLX, TKT, ENO2 , SEC61G, GPI, LDLR, VKORC1, ALDOA, IL22 , IL2RA, TNFRSF8, CSF2, KIF11, TK1, LDHA	1.58E-05-2.71E-02		Respiratory Disease
5	LIG1, H3F3A/H3F3B, FKBP1A, TPI1, RGS12, ATP2A2, AMD1, CCNA2, ZNF395, HSP90AB1, ATP5G1, PGAM1, CDC25A, PLAT, PKM2 , CALR, TUBB3, P4HB, OAS1, MAPKAPK3, HSPH1, SEC61G, LDLR, VKORC1, H2AFX, CCNE, EIF4A3, FKBP4, MANF, PRKCH, IL2RA, ARHGDI, FEN1, IL22 , TNFRSF8, CSF2, SAMD9	2.26E-05-2.43E-02		Dermatological Diseases and Conditions
6	FBL, P2RY11 (includes others), DDX23, HNRNPA2B1, PRPF4, RPS24 , HNRNPA3, HNRNPA1, POLR2A, EXOSC3, POLR2H, HNRNPH2, RBM39	4.03E-05-2.47E-02		RNA Post-Transcriptional Modification
7	LIG1, FURIN, HSPA1A/HSPA1B, SUPT5H, ATP2A2, FDFT1, HNRNPA1, PTRH2, DPP3, PIM1, FBXO32, CDC25A, FBL, PTGIS, P4HB, TUBB3, RHEB, ESPL1, SLC2A1, SDHC, SKP2, SEC61G, STIP1, PDE1B, CLK2, PNP, ALDOA, MANF, PRKCH, ACTN4, MAPK7, CTTN, LDHA, TK1, UTP11L, HIST1H1C , SCD, PRDX1, FKBP1A, HDGF, CCNA2, POLR2A, HK2, HSP90AB1, NEDD8, SPHK1, BCAP31, PLAT, PKM2 , CALR, DUT, OAS1, TRIM28, G6PD, GPI, NR1H2, LDLR, FKBP4, IL2RA, ARHGDI, FEN1, TNFRSF8, CSF2, ATP2B4, PIM2	7.08E-05-2.71E-02		Cell Death
8	LIG1, FURIN, NCAPD3, CDT1, HSPA1A/HSPA1B, SUV39H1, RGS12, HDGF, CCNA2, HNRNPA1, BANF1, SPHK1, CDC25A, ORC1, FBL, CALR, DUT, ESPL1, DNA2, CDCA4, SKP2, LDLR, H2AFX, RBPJ, PRKCH, FEN1, IL2RA, MAPK7, CSF2, INCENP	9.67E-05-2.46E-02		DNA Replication, Recombination, and Repair
9	PSMB3, TUFM, CALR, FURIN, THOP1, EIF4G1, SKP2, RPS24 , MRPL51, DIAPH1, NR1H2, PIM1, DPP3, STIP1, EIF4A3, NEDD8, RPL32 , SPHK1, RPL29 , FBXO32, CSF2, GIGYF2, PLAT	1.06E-04-1.51E-02		Protein Synthesis
10	SCD, INSIG1, GNA11, FKBP1A, TPI1, ATP2A2, HDGF, CCNA2, DIAPH1, HSP90AB1, HIST1H2BD, ORC1, PLAT, PKM2 , PGK1 , PLOD2, EXOSC9, TUBB3, P4HB, SLC2A1, BST2, XYLT2, LDLR, STIP1, FKBP4, IL22 , FEN1, ARHGDI, IL2RA, ADIPOR2, CSF2, CTTN, LDHA, TK1	1.66E-04-2.47E-02		Gastrointestinal Disease
11	FDPS, ATP6V0C, LDLR, HSP90AB1, RBPJ, IL2RA, STAU1, CSF2, BST2	1.85E-04-2.71E-02		Infection Mechanism
12	PGK1 , LDLR, HSP90AB1, STIP1, FKBP4, FKBP1A	1.98E-04-1.36E-02		Drug Metabolism
13	HSP90AB1, STIP1, FKBP4	1.98E-04-2.71E-02		Endocrine System Development and Function
14	PTGIS, SCD, NSDHL, GLA, INSIG1, GNA11, G6PD, FKBP1A, ATP2A2, PNPLA2, FDPS, FDFT1, DIAPH1, NR1H2, LDLR, LYST, HSP90AB1, STIP1, SPHK1, FKBP4, ADIPOR2, CSF2, PLAT	1.98E-04-2.71E-02		Lipid Metabolism
15	SCD, INSIG1, SUV39H1, GNA11, FKBP1A, AMD1, SLC35B2, ATP2A2, FDFT1, DIAPH1, LYST, PRPS1, HSP90AB1, ATP5G1, SPHK1, ARSB, PLAT, PGK1 , PTGIS, PKM2 , NSDHL, GLA, SLC2A1, TKT, G6PD, PNPLA2, FDPS, GPI, LDLR, NR1H2, STIP1, PDE1B, PNP, FKBP4, ALDOA, GLDC, CSF2, ADIPOR2	1.98E-04-2.71E-02		Small Molecule Biochemistry

16	PTGIS, CALR, SCD, NSDHL, INSIG1, G6PD, ATP2A2, FDPS, FDFT1, DIAPH1, NRIH2, LDLR, VKORC1, CSF2	2.32E-04-2.71E-02	Vitamin and Mineral Metabolism
17	NCAPD3, PRDX1, FKBP1A, NPEPPS, TPI1, UBE2O, FDFT1, DIAPH1, LYST, HSP90AB1, PIM1, EXOSC3, DPP3, IMPA2, ARSB, PLAT, CDC25A, PGK1 , PLOD2, HLX, P4HB, TUBB3, TKT, G6PD, DDX46, LARS2, NOP14, PNPLA2, RPS24 , FDPS, LDLR, NRIH2, VKORC1, STIP1, E2F7, PNP, GBE1, ALDOA, PRKCH, PSMD1, IL22 , FEN1, IL2RA, SETBP1, GLDC, CSF2, PIM2	5.32E-04-2.71E-02	Hematological Disease
18	PTGIS, SCD, CALR, PLOD2, OAS1, TUBB3, FURIN, FKBP1A, ATP2A2, HDGF, SKP2, FDFT1, XYLT2, LDLR, VKORC1, SPHK1, IL22 , IL2RA, MAPK7, FBXO32, CSF2, PLAT	5.32E-04-2.71E-02	Organismal Injury and Abnormalities
19	SCD, FURIN, GLA, SLC2A1, HNRNPA2B1, TPI1, PNPLA2, SKP2, FDPS, FDFT1, HNRNPA1, GYS1, LDLR, SPHK1, GBE1, ARSB	6.47E-04-2.71E-02	Metabolic Disease
20	ESPL1, NCAPD3, PRPF4, PDK3, SKP2, CCNA2, GPL, PIM1, CCNF, SPHK1, JARID2, ELAC2, PRKCH, MAPK7, CSF2, KIF11, PIM2, INCENP, CDC25A	8.15E-04-2.71E-02	Cell Cycle
21	PTGIS, CALR, SLC25A26, SCD, GLA, SLC2A1, INSIG1, GNA11, G6PD, ATP2A2, PNPLA2, FDFT1, NRIH2, LDLR, PNP, SPHK1, FKBP4, ARSB, ADIPOR2, CSF2	9.43E-04-2.71E-02	Molecular Transport
22	CCNA2, FURIN, PIM1, HNRNPA2B1, FKBP4, FKBP1A, FEN1, IL2RA, MAPK7, CSF2, PIM2	1.01E-03-2.71E-02	Tissue Development
23	PFKFB3, P4HB, MAPKAPK3, PRDX1, TKT, FKBP1A, H3F3A/H3F3B, TPI1, SKP2, CCNA2, DIAPH1, LYST, LDLR, NRIH2, ZNF395, FKBP4, ALDOA, IL2RA, IL22 , TNFRSF8, CSF2, CDC25A	1.09E-03-2.71E-02	Immunological Disease
24	PGK1 , PKM2 , SCD, OAS1, DUT, TKT, G6PD, SLC35B2, PRPS1, ATP5G1, PDE1B, PNP, ALDOA, TK1	1.09E-03-2.71E-02	Nucleic Acid Metabolism
25	TUFM, SCD, HSPA1A/HSPA1B, FKBP1A, TPI1, ATP2A2, FDFT1, PRPS1, SPHK1, PLAT, PKM2 , FBL, PGK1 , PTGIS, PLOD2, SLC2A1, MAPKAPK3, TKT, ENO2 , AP1S1, FDPS, GPI, LDLR, PDE1B, FKBP4, UCK2, CSF2, LDHA	1.28E-03-2.71E-02	Neurological Disease

TOP CANONICAL PATHWAYS				
ID	Molecules	-log(p-value)	Ratio	Ingenuity Canonical Pathways
1	PKM2 , PGK1 , GPI, HK2, PGAM1, ENO2 , ALDOA, PGAM4, TPI1, LDHA	6.79E00	1.22E-01	Glycolysis/Gluconeogenesis
2	GPI, PRPS1, TKT, G6PD, ALDOA	4.31E00	1.67E-01	Pentose Phosphate Pathway
3	PFKFB3, HK2, PFKFB4 , ALDOA, TPI1	3.55E00	1.16E-01	Fructose and Mannose Metabolism
4	ALDOA, TPI1	2.74E00	4E-01	Inositol Metabolism
5	FDPS, FDFT1, VKORC1	2.56E00	1.43E-01	Biosynthesis of Steroids
6	ESPL1, HSP90AB1, KIF11, CDC25A	2.12E00	6.78E-02	Mitotic Roles of Polo-Like Kinase
7	PSMB3, PSMB7, HSP90AB1, USP5, HSPA1A/HSPA1B, HSPH1, PSMD1, THOP1, SKP2	2.08E00	3.35E-02	Protein Ubiquitination Pathway
8	DUT, POLR2A, PNP, POLR2H, UCK2, TK1	2.04E00	4.44E-02	Pyrimidine Metabolism
9	GPI, GYS1, HK2, GBE1	1.9E00	6.06E-02	Starch and Sucrose Metabolism
10	CALR, POLR2A, GNA11, POLR2H, PRKCH	1.78E00	3.85E-02	Androgen Signaling
11	CCNA2, SUV39H1, SKP2, CDC25A	1.68E00	4.6E-02	Cyclins and Cell Cycle Regulation
12	PKM2 , POLR2A, PRPS1, ATP5G1, PDE1B, DNA2, PNP, POLR2H	1.63E00	3.08E-02	Purine Metabolism
13	SUV39H1, SKP2, CDC25A	1.43E00	5.08E-02	Cell Cycle: G1/S Checkpoint Regulation
14	RHEB, EIF4A3, FKBP1A, PRKCH, EIF4G1	1.38E00	3.42E-02	mTOR Signaling
15	PIM1, PNP, PRKCH, MAPK7	1.37E00	4.17E-02	Nicotinate and Nicotinamide Metabolism
16	CCNA2, SKP2	1.31E00	7.69E-02	Antiproliferative Role of TOB in T Cell Signaling
17	CDT1, ORC1	1.28E00	6.67E-02	Cell Cycle Control of Chromosomal Replication
18	P4HB, HSP90AB1, LDHA	1.28E00	4.55E-02	Hypoxia Signaling in the Cardiovascular System
19	PIM1, CISH, CSF2	1.28E00	4.55E-02	GM-CSF Signaling
20	P4HB, GNA11, CSF2, PDXP	1.26E00	3.7E-02	Role of Tissue Factor in Cancer
21	POLR2A, POLR2H	1.11E00	5.71E-02	Nucleotide Excision Repair Pathway
22	GLA, SPHK1, ARSB	1.07E00	3.85E-02	Sphingolipid Metabolism
23	SCD, NRIH2, LDLR	1.07E00	3.61E-02	LXR/RXR Activation
24	FURIN, RBPJ	1.04E00	4.88E-02	Notch Signaling
25	PIM1, IMPA2, PRKCH, MAPK7	9.72E-01	2.96E-02	Inositol Phosphate Metabolism