

Supp Table 4: Gene Ontology of genes dysregulated in NOTCH overexpressing murine kidney tubules

GO terms	# of genes	gene list	p-value	Benjamini FDR	# of up-regulate d genes in RCC	gene list
cell cycle phase	75	E2F1, KIF23, KIF22, PRC1, TUBB2B, TUBB2A, DBF4, KNTC1, TTK, AURKB, CD2AP, KIF2C, CDCA8, CDKN2B, INCENP, H2AFX, FANCA, CCNA2, ASPM, CDCA3, EGFR, ARHGEF2, KIF11, POLE, KIF15, TPX2, NUSAP1, CDK6, PBK, MYH9, CDK4, TACC3, RAD50, NCAPD2, RAD51, CCND1, MAD2L1, TIMELESS, SPAG5, BUB1B, STMN1, GADD45A, BLM, NEK2, POLA1, CHEK1, CEP55, TUBB, NCAPH, NCAPG, NCAPG2, BCL2, BUB1, FBXO5, ZWILCH, HELLS, TRIP13, EXO1, MKI67, DLGAP5, KIF18A, BRCA2, CENPF, CDC20, CENPE, SMC2, RAD54L, SMC4, CCNB1, CDKN1A, CCNB2, PLK1, POLD1, ID4, RAD54B	1.80E-28	5.50E-25	56	NBN, DBF4, TTK, RBM7, CUL2, APP, RAD21, CDKN2C, TARDBP, CCNA2, ASPM, STAG1, EGFR, CDC7, KHDRBS1, CDK1, KIF11, SKP2, NUSAP1, RB1, PBK, PPP1CB, RAD50, DCTN1, INHBA, PPM1D, CCND1, MAD2L1, CCND2, ADAM17, HAUS3, MRE11A, ANAPC10, CEP55, CCNG2, TUBB, NIPBL, PPP3CA, BUB3, TERF1, APC, YEATS4, PDS5B, ILF3, NDC80, RPL24, HGF, SMC3, ATM, SMC4, CDKN1B, GSPT1, RAD54B, ID4, ZNF318, MAP9
response to wounding	61	PDGFB, ELF3, F13A1, LY86, F2RL1, NFKB1, ADORA1, TGFB1, CXCL10, CFP, MYD88, DYSF, CD44, CXCR4, SERPINE1, CFI, LBP, RELA, PLAUR, C1QA, C1QB, ALOX15, SDC1, CCR5, PLA2G7, DSP, C3AR1, TF, C3, TNC, PABPC4, COL3A1, CLU, CDH3, CCL5, TNFRSF1A, CD9, TNFRSF1B, FGA, FGB, BCL2, MAP3K1, ITGB6, SCARB1, THBS1, SPP1, FN1, PLAT, KLF6, IL1RN, ITGA2, STAT3, CCNB1, NOTCH3, NOTCH2, CYBB, NOTCH1, CCL13, ITGA5, CD14, MYH10	2.30E-13	7.10E-11	117	AZM, S100A8, PDGFA, S100A9, ILK1, ILK3, HPS6KB1, SGM51, IL15, MMRN1, TGFB1, CXCL10, CD44, SERPINE1, LOX, CFD, TFP12, RAB27A, PIK3CB, CD40, C1QA, TNFAIP6, C1QB, CD36, THBD, CCR5, CX3CR1, CCR2, TFPI, C3AR1, CCL2, TXN2, ERBB3, ERBB2, PABPC4, CLU, ELK3, CCL5, TIMP3, CCL4, PROCR, SCARB1, ENTPD1, FN1, BLNK, KLF6, EFEMP2, TGFB2, EPHA3, NOTCH3, NOTCH2, ITGA5, CD59, PARP4, CLEC7A, HDAC9, ACVRL1, NRP1, LY86, FOS, GPX1, CASP3, CXCR4, AOA, HMOX1, MGLL, SERPINA1, FGF2, LYN, LY96, LYZ, CHST2, CD163, SIGLEC1, ADM, PLA2G7, ADAM17, VCAN, AOC3, YWHAZ, NMI, C3, CCR1, COL3A1, CXCL2, MIF, TMED7, CD9, TNFRSF1B, HRH1, CCL20, IL10RB, THBS1, PAPS2, SCG2, LY75, CEBPB, LIPA, OLR1, PLEK, MAP1B, NF1, IDO1, ANXA5, STAT3, SOD2, CYBA, VWF, PLSCR1, NUPR1, STAB1, BAX, C1RL, ALOX5, ID3, CD300A, CD14, F2R
cell adhesion	58	CLDN7, CLDN4, CLDN3, BCAM, CD2AP, VCL, DAB1, CD44, TGFB1, RHOB, MSN, LOXL2, SPON1, EGFR, ICAM1, CLCA2, PTPRS, ACTN1, MYH9, NCAM1, HES1, CLDN1, LAMC2, LAMC1, TNFRSF12A, TNC, COL3A1, ITGB4, CDH1, CDH3, SOX9, CCL5, ITGAM, CDH6, SEMA5A, CD9, BCL2, AGT, ITGB6, SCARB1, THBS1, SPP1, FN1, RPSA, BMP1, LPP, COL15A1, ITGA2, CELSR2, NID2, CELSR1, MCAM, LAMA1, DSG2, ITGA5, LAMA5, DSC2, CDH11	2.40E-07	2.10E-05	115	MPZL2, CADM1, POSTN, MMRN1, CXCL12, PNN, CTNNA1, APP, S1PR1, CD44, ROBO1, TGFB1, CLEC4A, FNDC3A, SPON1, ADAM9, EGFR, PTPRF, PIK3CB, MGP, ACTN1, SSPN, HES1, TNFAIP6, RND3, CD36, CX3CR1, LAMC1, PLXNC1, CCL2, ITGB5, CCL5, SOX9, CCL4, ITGAM, SCARB1, LAMB1, ENTPD1, FN1, LPP, PPFIBP1, ITGA4, MCAM, PCDH17, LAMA4, CORO1A, COL14A1, ATP2A2, HSPB11, DSG2, CD300A, ITGA5, PKP4, CLEC7A, PDZD2, AEBP1, NRP1, ARHGAP5, CD93, RHOA, RHOB, LOXL2, CYR61, ICAM1, NRXN2, ICAM2, CD84, DDR1, SIGLEC1, ADAM17, VCAN, JAM2, AOC3, LIMS1, CCR1, COL3A1, CTNND1, CBLL1, CDH4, CDH5, SCARF1, DCHS1, CDH6, VCAM1, CD9, LPXN, EZR, SORBS1, FAT4, AGT, COL6A3, PKD2, COL6A2, CD2, GPNMB, THBS1, THBS2, APC, PTPRC, HAPLN1, PLEK, OLR1, COL13A1, NLGN1, HSPG2, NID1, NID2, COL5A3, VWF, CDH13, ERBB2IP, STAB1, PECAM1, PERP, CDH11

regulation of cell cycle	46	E2F1, CAV2, CKS1B, BLM, NEK2, EDN1, KNTC1, TTK, CHEK1, ASNS, TGFB1, CDT1, BAK1, CDKN2B, BCL2, NPM1, BUB1, RHOB, FBXO5, H2AFX, ZWILCH, MYC, CCNA2, EGFR, DLGAP5, SPHK1, CENPF, BRIP1, NUSAP1, BRCA2, CDK6, CENPE, TACC3, CDK4, BRCA1, CCNB1, PLK4, CDKN1A, CCND1, MAD2L1, TIMELESS, JUN, BUB1B, FOXC1, GADD45B, GADD45A	5.00E-13	1.40E-10	60	CCNT2, XPO1, NBN, EDN1, TTK, PDCD4, PTEN, TGFB1, CITED2, CCNE2, APP, CASP3, FNTA, CDKN2C, TGFA, RHOB, TPR, CCNA2, MYC, EGFR, CDC7, CDK1, RINT1, SKP2, TP53, NUSAP1, RB1, CDK7, PPP1CB, JUNB, INHBA, CCND1, MAD2L1, CCND2, JUN, BTG3, ADAM17, CAV2, CKS1B, RPS15A, ASNS, ANAPC10, CCNG2, CDC37, MYCBP2, NPM1, BCL6, RUNX3, BUB3, TERF1, CD28, APC, PTPRC, MSH2, RPL24, ATM, CDKN1B, ID2, BAX, ID3 ACVRL1, NRP1, PLXNA2, WASF1, CAPZA2, CAPZA1, S100A9, RPS6KB1, ZEB2, TNFSF12, CXCL12, PTEN, TGFB1, ACTG1, ACTR3, EDNRB, ACTR2, GPX1, BDNF, APP, CD44, ANG, ROBO1, CXCR4, SEMA3C, NR2F2, FGF2, RPS27A, TWIST1, ICAM1, SATB2, CCDC88A, VASP, ELMO1, VEGFC, ARPC1B, BTG1, NCK1, LYST, UBC, PDGFRB, SDCBP, ADAM17, HSPB1, VCAN, AMFR, LAMC1, CAV2, CCL2, FUT8, ENPP2, ERBB2, VIM, PRKDC, ARPC5, CCL5, CDH4, CCL4, ITGAM, MYCBP2, VCAM1, CD9, TUBB, DOCK2, ARPC3, ARPC2, CKLF, SCARB1, THBS1, RUNX3, DCLK1, ARHGDI, FN1, APC, ARHGDIB, SCG2, ACTB, FLT1, MSH2, MET, NR4A2, RPL24, ITGA4, STAT3, KDR, SEMA6A, CDH13, CORO1A, ITGA5, BAX
cell motion	44	CAV2, PDGFB, TNFRSF12A, VIM, CCL5, EPHB3, CD2AP, TGFB1, ITGAM, TPM3, VCL, SEMA5A, CD9, TUBB, DAB1, CD44, CXCR4, SCARB1, MSN, UNC5C, THBS1, FN1, PLAT, ICAM1, SATB2, EGR2, PLXNB1, TGFB1, ITGA2, MYH9, MMP14, STAT3, PLAUR, NCK2, ARPC1B, LAMA1, EPHA7, ID1, BTG1, LAMA5, ITGA5, FOXC1, LAMC1, MYH10	4.90E-07	3.70E-05	90	HAUS3, CAV2, CAV1, TTK, ARPC4, CTNBN1, KIF13A, TUBGCP3, APP, RANBP9, TUBB, KLC1, NPM1, TUBB6, TUBA1B, TUBA1C, KIF11, KIF3A, CRYAB, MAP1B, TBCE, NUSAP1, NDC80, UBE2B, GABARAP, SMC3, FGFR1OP, TUBD1, RHOT1, SPAST ACVRL1, NRP1, PDGFA, PGF, LEPR, IL18, DICER1, EDN1, CSPG4, NAA15, ANPEP, TNFSF12, JAG1, GJA4, CXCL12, MMP2, PTEN, CTNBN1, CITED2, EDNRA, ARHGAP22, GPX1, S1PR1, HEY1, CD44, ANG, ROBO1, CXCR4, FOXF1, HMOX1, HEY2, CASP8, SEMA3C, TGFA, ERAP1, RHOB, QKI, LOX, NR2F2, ANGPT2, FGF2, CYR61, APOLD1, JUNB, VEGFC, JUN, PLXDC1, VEGFA, COL1A2, ZFPM2, COL1A1, CAV1, COL3A1, ELK3, TCF7L2, CDH5, ZFP36L1, TYMP, AGT, TGM2, VEZF1, THBS1, PLXND1, RASA1, SCG2, ANGPTL4, FLT1, EPAS1, SMAD7, NF1, TGFB2, ITGA4, KDR, CDH13, GPI, LAMA4, BAX, NOTCH4, GLMN, RBPJ, TMX1, DBF4, MRE11A, NAP1L1, KIN, POT1, RPA3, PRIM1, CCNE2, TFAM, TYMS, TYMP, TOP2A, RBMS1, TERF1, CDC7, GINS1, MCM3AP, POLI, RBBP4, REV1, CCDC88A, SSBP1, DTL, NASP, MCM3, SIRT1, RAD50, PURA, RFC2, RRM2, RRM1, PCNA, REV3L, DUT, MED1
microtubule-based process	33	KIF23, CAV2, KIF22, KIF4A, PRC1, TUBB2B, NEK2, TUBB2A, TTK, KIF2C, TUBB, CENPA, NPM1, FBXO5, TUBA1A, TUBA1B, HAP1, KIF14, KIF11, KIF15, PSRC1, KIF18A, BRCA2, NUSAP1, CENPE, MYH9, TACC3, BRCA1, SPAG5, BUB1B, STMN1, GADD45A, KIF20A	7.80E-09	1.00E-06	30	ACVRL1, NRP1, PDGFA, PGF, LEPR, IL18, DICER1, EDN1, CSPG4, NAA15, ANPEP, TNFSF12, JAG1, GJA4, CXCL12, MMP2, PTEN, CTNBN1, CITED2, EDNRA, ARHGAP22, GPX1, S1PR1, HEY1, CD44, ANG, ROBO1, CXCR4, FOXF1, HMOX1, HEY2, CASP8, SEMA3C, TGFA, ERAP1, RHOB, QKI, LOX, NR2F2, ANGPT2, FGF2, CYR61, APOLD1, JUNB, VEGFC, JUN, PLXDC1, VEGFA, COL1A2, ZFPM2, COL1A1, CAV1, COL3A1, ELK3, TCF7L2, CDH5, ZFP36L1, TYMP, AGT, TGM2, VEZF1, THBS1, PLXND1, RASA1, SCG2, ANGPTL4, FLT1, EPAS1, SMAD7, NF1, TGFB2, ITGA4, KDR, CDH13, GPI, LAMA4, BAX, NOTCH4, GLMN, RBPJ, TMX1, DBF4, MRE11A, NAP1L1, KIN, POT1, RPA3, PRIM1, CCNE2, TFAM, TYMS, TYMP, TOP2A, RBMS1, TERF1, CDC7, GINS1, MCM3AP, POLI, RBBP4, REV1, CCDC88A, SSBP1, DTL, NASP, MCM3, SIRT1, RAD50, PURA, RFC2, RRM2, RRM1, PCNA, REV3L, DUT, MED1
blood vessel development	33	RTN4, TNFRSF12A, COL3A1, EDN1, JAG1, ZFP36L1, SEMA5A, BAK1, HEY1, CD44, CXCR4, APOE, AGT, HEY2, RHOB, THBS1, PLAT, SMAD7, MYO1E, TGFB1, COL15A1, MYH9, MMP14, ANXA2, NOTCH1, ID1, LAMA5, ZMIZ1, JUN, COL1A2, FOXC1, COL1A1, TNFAIP2	3.50E-09	5.00E-07	80	ACVRL1, PDGFA, IL6ST, EDN1, RPS6KB1, JAG1, PTEN, CXCL12, TGFB1, CITED2, CXCL10, S1PR1, ARHGAP5, CXCR4, HMOX1, TIE1, FGF2, ADAM9, EGFR, ICAM1, IRS2, ADAM10, VEGFC, SPAG9, VEGFA, ADAM17, PDGFRB, ENPP2, CBLL1, GREM1, IGF1R, AGT, SCARB1, LAMB1, THBS1, PIK3R1, APC, FLT1, SMAD7, NF1, MYO1F, KDR, CDH13, CORO1A, LAMA4, PTP4A1, HDAC9, ARAP3, IGFBP3, F2R
DNA replication	32	CLSPN, HMGB2, PDGFB, BLM, DBF4, POLA1, CHEK1, CDT1, MCM7, POLE2, TOP2A, GINS1, DTL, LIG1, POLE, CENPF, BRCA2, MCM2, MCM3, RAD50, BRCA1, MCM5, RAD51, MCM6, POLD3, RFC3, RRM2, POLD1, RRM1, PCNA, CHAF1A, CHAF1B	2.20E-11	4.80E-09	36	ACVRL1, PDGFA, IL6ST, EDN1, RPS6KB1, JAG1, PTEN, CXCL12, TGFB1, CITED2, CXCL10, S1PR1, ARHGAP5, CXCR4, HMOX1, TIE1, FGF2, ADAM9, EGFR, ICAM1, IRS2, ADAM10, VEGFC, SPAG9, VEGFA, ADAM17, PDGFRB, ENPP2, CBLL1, GREM1, IGF1R, AGT, SCARB1, LAMB1, THBS1, PIK3R1, APC, FLT1, SMAD7, NF1, MYO1F, KDR, CDH13, CORO1A, LAMA4, PTP4A1, HDAC9, ARAP3, IGFBP3, F2R
regulation of cell migration	28	RTN4, ERBB4, PDGFB, CSF1, EDN1, F2RL1, JAG1, ADORA1, TGFB1, VCL, CXCL10, CXCR4, APOE, MAP3K1, BCL2, AGT, RRAS, SCARB1, UNC5C, THBS1, EGFR, ICAM1, SMAD7, SPHK1, ITGA2, LAMA1, LAMA5, HDAC7	7.10E-10	1.40E-07	50	ACVRL1, PDGFA, IL6ST, EDN1, RPS6KB1, JAG1, PTEN, CXCL12, TGFB1, CITED2, CXCL10, S1PR1, ARHGAP5, CXCR4, HMOX1, TIE1, FGF2, ADAM9, EGFR, ICAM1, IRS2, ADAM10, VEGFC, SPAG9, VEGFA, ADAM17, PDGFRB, ENPP2, CBLL1, GREM1, IGF1R, AGT, SCARB1, LAMB1, THBS1, PIK3R1, APC, FLT1, SMAD7, NF1, MYO1F, KDR, CDH13, CORO1A, LAMA4, PTP4A1, HDAC9, ARAP3, IGFBP3, F2R

translational elongation	25	RPL18, EEF1B2, RPL35, RPL27A, RPL39, RPS3, RPL7, RPL31, RPLP0, RPL5, RPL4, RPL10A, RPL12, RPS24, RPSA, RPS9, RPS6, RPS5, RPS8, RPS18, RPS16, RPL23, RPL13A, RPS14, RPS12	1.00E-12	2.70E-10	47	RPL18, RPL17, EEF1B2, RPL19, RPL13, RPL27A, RPS15A, RPL36, RPLP2, RPL38, RPS2, RPS3, RPS26, RPL30, RPL7, RPL31, RPLP0, RPL3, FAU, RPL5, RPL11, RPL10A, RPS20, RPL4, RPS27A, RPS24, RPL35A, RPS9, EEF2, RPL24, RPS5, SELT, RPL28, RPS8, RPS7, RPS18, RPS19, RPL23, RPS16, RPL13A, RPS14, RPL21, UBC, RPL37A, RPS10, RPS11, EEF1D
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GO terms	# of genes		p-value	Benjamini	# of down-regulated genes in RCC	gene list
generation of precursor metabolites and energy	72	ATP5D, UQCRC1, GNPDA1, PHKB, CYC1, AQP7, UQCRCF1, OGDH, UQCRCQ, IDH3G, NDUFS4, PPP1R1A, NDUFS8, CAT, NDUFS3, SUCLA2, DHTKD1, NDUFS1, ACO2, ACO1, SUCLG2, CYCS, PFKM, NDUFC1, ATP6V1D, ACADVL, ATP6V1A, G6PC, DLD, PGM1, PKLR, CROT, XYLB, MDH1, NDUFB5, NDUFB6, ECH1, ENPP1, NDUFB8, FDX1, ALDOB, ATP6V1B1, GCGR, ATP5G3, NDUFB2, ATP6V0C, ETFDH, GYS2, ETFB, FH, GLRX, NDUF44, DLST, NDUF45, NDUF49, KL, ATP5F1, CRAT, DLAT, NDUF41, SOD2, SDHA, CYBA, SDHB, SLC25A13, GBE1, SDHC, ATP6V1E1, NDUFV1, NDUFV2, AVPR1A, COX6A1	7.70E-35	9.00E-32	35	LDHB, GNPDA1, UQCRC1, ENPP1, SNCA, OGDHL, PDX1, ATP5G1, ATP6V1B1, NDUF4F1, PDHB, ADRB3, NDUFS6, PPP1R1A, ATP5L, ENO3, ATP5O, FH, FECH, ACO2, NDUF46, SUCLG1, EPM2A, COX411, ATP6V1D, PPARGC1A, PCK1, SLC25A12, KIAA0100, G6PC, ATP6V0E2, PKLR, ATP6V0A1, ATP6V0A4, ACAA1
transmembrane transport	68	SLC5A3, ATP5D, SLC9A8, SLC5A2, SLC22A18, CPT2, SLC22A13, SLC9A3, SLC9A2, AQP7, AQP6, SLC26A1, AQP3, SLC25A21, SLC2A5, SLC2A4, SLC2A2, SLC22A4, SLC22A6, SLC22A5, SLC22A2, SLC22A1, SLC12A6, ATP4A, SLC22A7, SLC22A8, TCN2, ATP6V1D, SLC26A4, ATP6V1A, SIL1, TMCO3, SLC37A4, CLCNKB, MFSD1, SFXN1, ATP6V1B1, SLC47A1, ATP5G3, ATP6V0C, FOLR1, ABCD3, SLC25A42, TRPC1, SLC8A1, SLC12A1, CUBN, SLC12A2, SLC12A3, ATP5F1, SLC25A11, SLC16A2, SLC17A5, SLC16A4, SLC25A13, SLC17A3, SLC16A7, SLC17A1, ATP6V1E1, SLC25A10, SLC13A3, SLC18A1, SLC25A16, SLC46A3, SLC25A15, PDZK1, CLCN5, SLC5A12	3.70E-16	8.70E-14	57	SLC5A2, SLC22A18, SLC22A13, KCNAB2, TIMM17A, EIF5A, AQP6, AQP2, SLC2A2, TRPV5, ATP5L, ATP5O, SLC22A6, SLC12A6, KCND3, PDPN, SLC22A7, SLC22A8, ATP6V1D, SLC26A4, RHCG, SLC25A38, KCNH2, TMCO3, RBP4, KCNA2, RHBG, CLCNKB, KCNA6, ATP5G1, SLC19A1, ATP6V1B1, KCNS1, MTCH2, FOLR1, SLC2A9, ABCB9, SLC12A1, SLC12A3, SLC12A5, ABCB1, SLC25A12, SLC17A7, SLC16A5, ATP6V0E2, SLC17A1, SLC25A10, SLC13A1, SLC13A2, ATP6V0A1, SLC13A3, SLC5A6, ATP6V0A4, SLC46A3, SLC25A17, ABCC6, SLC5A12
cofactor metabolic process	47	ME1, COASY, ALDH1L1, ALDOB, UROS, NFS1, KMO, PDSS1, GCLM, TPK1, MTHFD1, GPX1, GPHN, IDH3G, FOLR1, CPOX, GSTK1, MCCC1, GPX3, VKORC1, HAAO, SUCLA2, HMGCL, FH, GPD1, DLST, MOCS2, ACO2, ACO1, SUCLG2, COQ9, DLAT, OXSM, SOD2, SDHA, HAGH, BLVRA, SDHB, DBT, ISCU, GLYAT, MLYCD, SDHC, DLD, FPGS, DCXR, MDH1	1.40E-23	8.40E-21	31	LDHB, KYNU, KMO, PNP, PDSS2, PIPOX, PDHB, GCH1, GSR, ALAS1, FOLR1, HMGCL, FH, GPD1, SHMT1, FECH, PDXK, ACO2, SUCLG1, FTCD, NADK, HAGH, KIAA0100, COQ3, GLYAT, CTH, SLC25A38, NFE2L1, QPRT, CTNS, DCXR
carboxylic acid catabolic process	37	ACOX2, BCAT1, CPT2, ECH1, AMT, EHHADH, AASS, PAH, KMO, ASL, ACOX3, AUH, HADHB, MTHFD1, MCCC2, ASPA, MCCC1, ETFDH, ALDH4A1, BDH2, ACAD8, HSD17B4, SARDH, HPD, BCKDHA, ALDH6A1, ACADM, ACADS, BCKDHB, HGD, CRAT, DDO, ACADVL, HAO2, HIBCH, AKR1D1, PRODH	8.00E-24	6.30E-21	25	ACOX2, KYNU, AMT, ECHS1, AASS, PAH, KMO, GOT2, AKR1A1, ALDH4A1, GAD1, HPD, SHMT1, ALDH6A1, HGD, DECR1, CDO1, HAO1, GLS, HAO2, PON1, PRODH2, HIBCH, PON3, ACAA1

monosaccharide metabolic process	35	FUT9, GNPDA1, SORD, FUT8, PHKB, SLC37A4, FN3K, HEXB, ALDOB, OGDH, PPP1R1A, GYS2, DHTKD1, GPD2, PDK2, GPD1, PDK3, FBP1, PFKM, DLAT, FUCA1, KHK, RENBP, AMDHD2, G6PC, GBE1, CHST7, SLC25A10, PKLR, PGM1, DCXR, UGP2, MDH1, PC, XYLB	7.50E-12	1.20E-09	24	GPD1, LDHB, RBP4, SORD, GNPDA1, GMDS, OGDHL, EPM2A, RBKS, PDX1, PPARGC1A, PDHB, PCK1, KHK, G6PC, LARGE, AKR1A1, PPP1R1A, SLC25A10, PKLR, ST3GAL6, ENO3, DCXR, PC
response to nutrient levels	26	ARSB, ALPL, CCKAR, CYP24A1, HSD17B2, ALDOB, TTPA, ASL, GCGR, TIMP3, AQP3, APOM, GHR, BCKDHA, SUOX, SLC8A1, CUBN, GATM, ACADS, BCKDHB, SOD2, G6PC, TFRC, MTOR, LRP2, AAC	2.10E-07	1.10E-05	22	SUOX, RBP4, CYP24A1, KYNU, SCAMP3, RARG, GATM, SOX2, COX4I1, PPARGC1A, ALDH1A2, VDR, G6PC, CYP27B1, HMGCS2, BCHE, ALB, PEMT, SERPINC1, HSD11B2, BMP7, APOM
carboxylic acid biosynthetic process	25	BCAT1, LPL, SEPHS2, BHMT2, PTGES2, ASS1, SCD, AMACR, UROS, PAH, ASL, OXSM, MTHFD1, CYP7B1, PECR, GLUL, C1QTNF3, MLYCD, SRR, HAAO, ALDH4A1, SUCLA2, AKR1D1, MECR, UGP2, PRODH	7.70E-09	4.90E-07	16	SHMT1, KYNU, HTT, ABHD5, PAH, ACACB, CDO1, AGXT, ADI1, GOT2, CTH, AKR1A1, BHMT, PHGDH, PRODH2, ALDH4A1
anion transport	23	SLC12A6, SLC12A1, PTGER3, ENPP1, SLC12A2, SLC12A3, SLC22A7, SLC22A8, AMACR, SLC34A1, CLCNKB, AQP6, SLC26A1, SLC10A2, SLC26A4, SLC17A5, SLC25A13, SLC16A7, C1QTNF3, SLC17A1, SLC22A6, SLC13A3, SLC4A1, CLCN5	3.70E-08	2.10E-06	25	ENPP1, CLCNKB, AQP6, SLC4A2, SLC22A6, SLC4A1, SLC4A4, SLC12A6, PTGER3, SLC12A1, SLC12A3, HTT, SLC22A7, SLC22A8, SLC12A5, SLC34A1, SLC17A7, TST, SLC26A4, SLC25A12, SLC16A5, SLC17A1, CLIC5, SLC13A1, SLC13A3
cellular amide metabolic process	15	ME1, DLST, GPD1, ASS1, ALDOB, KMO, ASL, IDH3G, MCCC1, DLD, HAAO, SLC25A15, DCXR, GHR, MDH1	2.20E-08	1.30E-06	10	GPD1, LDHB, KYNU, HTT, ARG2, NADK, KMO, QPRT, PNP, DCXR
acetyl-CoA metabolic process	14	DLST, ACO2, ACO1, SUCLG2, DLAT, SDHA, SDHB, IDH3G, MLYCD, SDHC, DLD, SUCLA2, FH, MDH1	4.80E-11	5.60E-09	6	KIAA0100, KYNU, ACO2, SUCLG1, PDHB, FH