

## **Air-liquid interface cultures trigger a metabolic shift in intestinal epithelial cells (IPEC-1)**

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**Tab. S1** The table contains a list of the significantly regulated genes of the top 10 regulated KEGG-pathways.

<b>gene</b>	<b>HIF-signaling pathway</b>
1	MAPK interacting serine/threonine kinase 2(MKNK2)
2	aldolase, fructose-bisphosphate C(ALDOC)
3	cyclin dependent kinase inhibitor 1A(CDKN1A)
4	egl-9 family hypoxia inducible factor 1(EGLN1)
5	egl-9 family hypoxia inducible factor 3(EGLN3)
6	enolase 1(ENO1)
7	eukaryotic translation initiation factor 4E binding protein 1(EIF4EBP1)
8	fms related receptor tyrosine kinase 1(FLT1)
9	glyceraldehyde-3-phosphate dehydrogenase(GAPDH)
10	hexokinase 1(HK1)
11	inhibitor of carbonic anhydrase(INHCA)
12	interleukin 6 receptor(IL6R)
13	lactate dehydrogenase A(LDHA)
14	phosphofructokinase, liver type(PFKL)
15	phosphoglycerate kinase 1(PGK1)
16	toll like receptor 4(TLR4)
17	transferrin(TF)

  

<b>gene</b>	<b>glycolysis/gluconeogenesis</b>
1	acyl-CoA synthetase short chain family member 2(ACSS2)
2	aldehyde dehydrogenase 2 family member(ALDH2)
3	aldolase, fructose-bisphosphate C(ALDOC)

- 4 enolase 1(ENO1)
- 5 glucose-6-phosphate isomerase(GPI)
- 6 glyceraldehyde-3-phosphate dehydrogenase(GAPDH)
- 7 hexokinase 1(HK1)
- 8 lactate dehydrogenase A(LDHA)
- 9 phosphofructokinase, liver type(PFKL)
- 10 phosphoglucomutase 1(PGM1)
- 11 phosphoglycerate kinase 1(PGK1)
- 12 pyruvate kinase, muscle(PKM)
- 13 triosephosphate isomerase 1(TPI1)

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**gene metabolic pathways**

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- 1 3'-phosphoadenosine 5'-phosphosulfate synthase 1(PAPSS1)
- 2 3'-phosphoadenosine 5'-phosphosulfate synthase 2(PAPSS2)
- 3 3-hydroxy-3-methylglutaryl-CoA synthase 1(HMGCS1)
- 4 7-dehydrocholesterol reductase(DHCR7)
- 5 ATPase H+ transporting V1 subunit A(ATP6V1A)
- 6 ATPase H+/K+ transporting non-gastric alpha2 subunit(ATP12A)
- 7 ChaC glutathione specific gamma-glutamylcyclotransferase 1(CHAC1)
- 8 EBP cholesterol delta-isomerase(EBP)
- 9 L-threonine dehydrogenase(TDH)
- 10 NAD(P)H quinone dehydrogenase 1(NQO1)
- 11 ST3 beta-galactoside alpha-2,3-sialyltransferase 1(ST3GAL1)  
UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase  
2(B3GNT2)
- 12 2(B3GNT2)
- 13 acyl-CoA synthetase long chain family member 1(ACSL1)
- 14 acyl-CoA synthetase short chain family member 2(ACSS2)
- 15 adenylosuccinylase like 1(AHCYL1)
- 16 adenylosuccinate synthase 1(ADSS1)
- 17 aldehyde dehydrogenase 2 family member(ALDH2)
- 18 aldolase, fructose-bisphosphate C(ALDOC)
- 19 alkaline ceramidase 3(ACER3)
- 20 beta-1,3-N-acetylgalactosaminyltransferase 1(B3GALNT1)
- 21 beta-1,4-galactosyltransferase 6(B4GALT6)
- 22 branched chain amino acid transaminase 1(BCAT1)
- 23 carbonyl reductase 1(CBR1)
- 24 carbonyl reductase 2(CBR2)
- 25 catalase(CAT)
- 26 creatine kinase B(CKB)
- 27 cytidine deaminase(CDA)
- 28 cytochrome P450 family 2 subfamily J member 93(CYP2J93)
- 29 dihydropyrimidine dehydrogenase(DPYD)
- 30 dopa decarboxylase(DDC)
- 31 ectonucleoside triphosphate diphosphohydrolase 4(ENTPD4)
- 32 enolase 1(ENO1)
- 33 farnesyl-diphosphate farnesyltransferase 1(FDFT1)
- 34 fatty acid desaturase 1(FADS1)

- 35 flavin containing dimethylaniline monooxygenase 1(FMO1)
  - 36 galactosidase alpha(GLA)
  - 37 glucosaminyl (N-acetyl) transferase 4(GCNT4)
  - 38 glucose-6-phosphate isomerase(GPI)
  - 39 glutaminase(GLS)
  - 40 glutathione S-transferase A4(LOC100510917)
  - 41 glutathione S-transferase alpha 4(GSTA4)
  - 42 glutathione S-transferase omega 1(GSTO1)
  - 43 glyceraldehyde-3-phosphate dehydrogenase(GAPDH)
  - 44 hexokinase 1(HK1)
  - 45 hypoxanthine phosphoribosyltransferase 1(HPRT1)
  - 46 lactate dehydrogenase A(LDHA)
  - 47 lipin 2(LPIN2)
  - 48 malic enzyme 1(ME1)
  - 49 mannose phosphate isomerase(MPI)
  - 50 mannosidase alpha class 1C member 1(MAN1C1)
  - 51 membrane bound O-acyltransferase domain containing 1(MBOAT1)
  - 52 methylsterol monooxygenase 1(MSMO1)
  - 53 myotubularin related protein 2(MTMR2)
  - 54 neuraminidase 1(NEU1)
  - 55 nicotinamide phosphoribosyltransferase(NAMPT)
  - 56 ornithine aminotransferase(OAT)
  - 57 pancreatic lipase related protein 2(PNLIPRP2)
  - 58 phosphodiesterase 7A(PDE7A)
  - 59 phosphofructokinase, liver type(PFKL)
  - 60 phosphoglucomutase 1(PGM1)
  - 61 phosphoglucomutase 3(PGM3)
  - 62 phosphoglycerate kinase 1(PGK1)
  - 63 phospholipase A and acyltransferase 3(PLAAT3)
  - 64 phosphoserine phosphatase(PSPH)
  - 65 polypeptide N-acetylgalactosaminyltransferase 1(GALNT1)
  - 66 procollagen-lysine,2-oxoglutarate 5-dioxygenase 1(PLOD1)
  - 67 procollagen-lysine,2-oxoglutarate 5-dioxygenase 2(PLOD2)
  - 68 prolyl 4-hydroxylase subunit alpha 1(P4HA1)
  - 69 prolyl 4-hydroxylase subunit alpha 2(P4HA2)
  - 70 pyruvate carboxylase(PC)
  - 71 pyruvate kinase, muscle(PKM)
  - 72 selenophosphate synthetase 2(SEPHS2)
  - 73 spermine oxidase(SMOX)
  - 74 stearoyl-CoA desaturase(SCD)
  - 75 sterol-C5-desaturase(SC5D)
  - 76 sulfotransferase family 1E, estrogen-preferring, member 1(SULT1E1)
  - 77 thiosulfate sulfurtransferase(TST)
  - 78 triosephosphate isomerase 1(TPI1)
  - 79 uridine phosphorylase 1(UPP1)
  - 80 uroporphyrinogen decarboxylase(UROD)
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**gene carbon metabolism**


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- 1 acyl-CoA synthetase short chain family member 2(ACSS2)
- 2 aldolase, fructose-bisphosphate C(ALDOC)
- 3 catalase(CAT)
- 4 enolase 1(ENO1)
- 5 glucose-6-phosphate isomerase(GPI)
- 6 glyceraldehyde-3-phosphate dehydrogenase(GAPDH)
- 7 hexokinase 1(HK1)
- 8 malic enzyme 1(ME1)
- 9 phosphofructokinase, liver type(PFKL)
- 10 phosphoglycerate kinase 1(PGK1)
- 11 phosphoserine phosphatase(PSPH)
- 12 pyruvate carboxylase(PC)
- 13 pyruvate kinase, muscle(PKM)
- 14 triosephosphate isomerase 1(TPI1)

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**gene biosynthesis of amino acids**


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- 1 aldolase, fructose-bisphosphate C(ALDOC)
- 2 branched chain amino acid transaminase 1(BCAT1)
- 3 enolase 1(ENO1)
- 4 glyceraldehyde-3-phosphate dehydrogenase(GAPDH)
- 5 phosphofructokinase, liver type(PFKL)
- 6 phosphoglycerate kinase 1(PGK1)
- 7 phosphoserine phosphatase(PSPH)
- 8 pyruvate carboxylase(PC)
- 9 pyruvate kinase, muscle(PKM)
- 10 triosephosphate isomerase 1(TPI1)

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**gene biosynthesis of amino acids**


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- 1 7-dehydrocholesterol reductase(DHCR7)
- 2 EBP cholesterol delta-isomerase(EBP)
- 3 farnesyl-diphosphate farnesyltransferase 1(FDFT1)
- 4 methylsterol monooxygenase 1(MSMO1)
- 5 sterol-C5-desaturase(SC5D)

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**gene cholesterol metabolism**


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- 1 ATP binding cassette subfamily A member 1(ABCA1)
- 2 NPC intracellular cholesterol transporter 2(NPC2)
- 3 apolipoprotein H(APOH)
- 4 cell death inducing DFFA like effector b(CIDEB)
- 5 low density lipoprotein receptor(LDLR)
- 6 myosin regulatory light chain interacting protein(MYLIP)
- 7 voltage dependent anion channel 3(VDAC3)

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**gene pyruvate metabolism**


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- 1 acyl-CoA synthetase short chain family member 2(ACSS2)

- 2 aldehyde dehydrogenase 2 family member(ALDH2)
- 3 lactate dehydrogenase A(LDHA)
- 4 malic enzyme 1(ME1)
- 5 pyruvate carboxylase(PC)
- 6 pyruvate kinase, muscle(PKM)

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**gene cell cycle**

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- 1 PTTG1 regulator of sister chromatid separation, securin(PTTG1)
- 2 SMAD family member 2(SMAD2)
- 3 WEE1 G2 checkpoint kinase(WEE1)
- 4 cell division cycle 20(CDC20)
- 5 cyclin A2(CCNA2)
- 6 cyclin B1(CCNB1)
- 7 cyclin B2(CCNB2)
- 8 cyclin dependent kinase inhibitor 1A(CDKN1A)
- 9 cyclin dependent kinase inhibitor 2D(CDKN2D)
- 10 extra spindle pole bodies like 1, separase(ESPL1)

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**gene drug-metabolism - other enzymes**

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- 1 cytidine deaminase(CDA)
- 2 dihydropyrimidine dehydrogenase(DPYD)
- 3 glutathione S-transferase A4(LOC100510917)
- 4 glutathione S-transferase alpha 4(GSTA4)
- 5 glutathione S-transferase omega 1(GSTO1)
- 6 hypoxanthine phosphoribosyltransferase 1(HPRT1)
- 7 uridine phosphorylase 1(UPP1)