**Supplement 2. Target KEGG pathways, GO** **categories and vitality-related DEGs.** The pathways and the top 25 of GO categories significantly enriched (*p* < 0.05) by DEGs from the both comparisons (FCN10 vs FCM10 and FCN25 vs FCM25) were presented. Targeted genes probably associated with vitality regulation were showed in bold. MF: molecular function, CC: cell component, BP: biological progress.

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| --- | --- | --- | --- | --- | --- |
| **No.** | **Term ID** | **Pathway/ GO term** | **Category** | ***p* value** | **Genes’ description** |
| 1 | ko00980 | **Metabolism of xenobiotics by cytochrome P450** | Metabolism | 0.000256 | **dihydrodiol dehydrogenase**,***Dhdh*1**; glutathione S-transferase |
| 2 | ko00040 | **Pentose and glucuronate interconversions** | Metabolism | 0.001906 | **dihydrodiol dehydrogenase**,***Dhdh*1**;Sorbitol dehydrogenase |
| 3 | GO:0004867 | serine-type endopeptidase inhibitor activity | MF | 1.60E-06 | leukocyte elastase inhibitor A-like;alpha2 macroglobulin isoform 2;ADAMTS-like protein 5;papilin-like |
| 4 | GO:0031012 | **extracellular matrix** | CC | 3.45E-06 | **kielin/chordin-like protein, *Itgbl*1**; laminin subunit gamma-1-like;ADAMTS-like protein 5;fibrinogen C domain-containing protein 1-like;papilin-like |
| 5 | GO:0008194 | UDP-glycosyltransferase activity | MF | 3.00E-05 | UDP-glucuronosyltransferase 2B14-like;uncharacterized protein LOC119588212;UDP-glycosyltransferase UGT5-like;N-acetylgalactosaminyltransferase 6-like  |
| 6 | GO:0004857 | enzyme inhibitor activity | MF | 5.85E-05 | leukocyte elastase inhibitor A-like; alpha2 macroglobulin isoform 2;ADAMTS-like protein 5;papilin-like |
| 7 | GO:0015370 | solute:sodium symporter activity | MF | 7.83E-05 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**;sodium- and chloride-dependent glycine transporter 2-like; |
| 8 | GO:0042940 | D-amino acid transport | BP | 0.000163599 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**  |
| 9 | GO:0042943 | D-amino acid transmembrane transporter activity | MF | 0.000163599 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**  |
| 10 | GO:0005342 | organic acid transmembrane transporter activity | MF | 0.000165935 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**;mitochondrial uncoupling protein 4-like isoform X3;hypothetical protein C7M84\_012769 |
| 11 | GO:0046943 | carboxylic acid transmembrane transporter activity | MF | 0.000165935 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**;mitochondrial uncoupling protein 4-like isoform X3;hypothetical protein C7M84\_012769 |
| 12 | GO:0003834 | **monooxygenase activity** | MF | 0.000135766 | protein Skeletor, isoforms B/C-like;cytochrome P450 9e2-like;cytochrome P450 2L1-like isoform X1;**cytochrome P450 3A30-like, *Cyp3a30* 1**;ROT75263.1 putative beta,beta-carotene 9 |
| 13 | GO:0005335 | symporter activity | MF | 0.000158241 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**;sodium- and chloride-dependent glycine transporter 2-like;hypothetical protein C7M84\_012769 |
| 14 | GO:0015179 | L-amino acid transmembrane transporter activity | MF | 0.000236571 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**;hypothetical protein C7M84\_012769  |
| 15 | GO:0005576 | extracellular region | CC | 0.00031419 | alpha-L-fucosidase-like;crustacyanin-A2 subunit-like;bone morphogenetic protein 10-like isoform X1;prophenoloxidase activating enzyme 2;molt-inhibiting hormone-like;phenoloxidase-activating factor 3-like;LOW QUALITY PROTEIN: leukocyte elastase inhibitor A-like;alpha2 macroglobulin isoform 2;venom protease-like;fibrinogen C domain-containing protein 1-like; serine protease 2 |
| 16 | GO:0016021 | integral component of membrane | CC | 0.000316294 | **kielin/chordin-like protein**, ***Itgbl*1**;WSCD family member AAEL009094-like, partial;4-galactosyl-N-acetylglucosaminide 3-alpha-L-fucosyltransferase FUT6-like isoform X1;sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2**, ***Slc6a9* 2**;UDP-glucuronosyltransferase 2B14-like;**solute carrier family 2, facilitated glucose transporter member 8-like**, ***Slc2a8* 1** ;mitochondrial uncoupling protein 4-like isoform X3;uncharacterized protein LOC119588212;sodium- and chloride-dependent glycine transporter 2-like;UDP-glycosyltransferase UGT5-like;tachykinin-like peptides receptor 99D isoform X2;open rectifier potassium channel protein 1-like;putative Neuroglian precursor;sodium/potassium-transporting ATPase subunit beta-like;facilitated trehalose transporter Tret1-like;N-acetylgalactosaminyltransferase 6-like;semaphorin-5B-like;hypothetical protein C7M84\_012769;N-acetylated-alpha-linked acidic dipeptidase 2-like; |
| 17 | GO:0031224 | intrinsic component of membrane | CC | 0.000333493 | **kielin/chordin-like protein**, ***Itgbl*1**;WSCD family member AAEL009094-like, partial;4-galactosyl-N-acetylglucosaminide 3-alpha-L-fucosyltransferase FUT6-like isoform X1;sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2,** , ***Slc6a9* 2**;UDP-glucuronosyltransferase 2B14-like;**solute carrier family 2, facilitated glucose transporter member 8-like, *Slc2a8* 1**;mitochondrial uncoupling protein 4-like isoform X3;uncharacterized protein LOC119588212;sodium- and chloride-dependent glycine transporter 2-like;UDP-glycosyltransferase UGT5-like;tachykinin-like peptides receptor 99D isoform X2;open rectifier potassium channel protein 1-like ;putative Neuroglian precursor; sodium/potassium-transporting ATPase subunit beta-like; facilitated trehalose transporter Tret1-like;N-acetylgalactosaminyltransferase 6-like;semaphorin-5B-like;hypothetical protein C7M84\_012769; N-acetylated-alpha-linked acidic dipeptidase 2-like  |
| 18 | GO:0005887 | integral component of plasma membrane | CC | 0.000376416 | **kielin/chordin-like protein**, ***Itgbl*1**; sodium-dependent nutrient amino acid transporter 1-like; **sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**;tachykinin-like peptides receptor 99D isoform X2;open rectifier potassium channel protein 1-like;putative Neuroglian precursor;sodium/potassium-transporting ATPase subunit beta-like |
| 19 | GO:0031226 | intrinsic component of plasma membrane | CC | 0.000382113 | **kielin/chordin-like protein**, ***Itgbl*1**;sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**;tachykinin-like peptides receptor 99D isoform X2;open rectifier potassium channel protein 1-like; putative Neuroglian precursor;sodium/potassium-transporting ATPase subunit beta-like  |
| 20 | GO:0015294 | solute:cation symporter activity | MF | 0.000460076 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**; sodium- and chloride-dependent glycine transporter 2-like |
| 21 | GO:0008509 | anion transmembrane transporter activity | MF | 0.000476175 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**; **solute carrier family 2, facilitated glucose transporter member 8-like, *Slc2a8* 1**; mitochondrial uncoupling protein 4-like isoform X3;sodium- and chloride-dependent glycine transporter 2-like; facilitated trehalose transporter Tret1-like; hypothetical protein C7M84\_012769  |
| 22 | GO:0005283 | amino acid:sodium symporter activity | MF | 0.000593378 | sodium-dependent nutrient amino acid transporter 1-like; **sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2** |
| 23 | GO:0004252 | serine-type endopeptidase activity | MF | 0.000664548 | prophenoloxidase activating enzyme 2;phenoloxidase-activating factor 3-like; venom protease-like;serine protease 2 |
| 24 | GO:0005343 | organic acid:sodium symporter activity | MF | 0.000710508 | sodium-dependent nutrient amino acid transporter 1-like; **sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**  |
| 25 | GO:0005416 | amino acid:cation symporter activity | MF | 0.00083787 | sodium-dependent nutrient amino acid transporter 1-like; **sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**  |
| 26 | GO:0015171 | amino acid transmembrane transporter activity | MF | 0.000875277 | sodium-dependent nutrient amino acid transporter 1-like;**sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9*****2**;hypothetical protein C7M84\_012769  |
| 27 | GO:0015175 | neutral amino acid transmembrane transporter activity | MF | 0.000975395 | sodium-dependent nutrient amino acid transporter 1-like; **sodium-dependent nutrient amino acid transporter 1-like isoform X2, *Slc6a9* 2**  |

**1**: upregulated in the both comparisons in FCN10 vs FCM10 and FCN25 vs FCM25.

**2**: downregulated in the both comparisons in FCN10 vs FCM10 and FCN25 vs FCM25.