## Supplementary Tables

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## Supplementary Table S1. List and expression of ISIAH specific 113 DEGs

| ISIAH_specific DEGs | GeneID | log2 Fold Change | padj | description |
|---|---|---|---|---|
| *Adamts18* | 361412 | -1,084 | 5,36E-03 | ADAM metallopeptidase with thrombospondin type 1 motif, 18 |
| *Alg10* | 245960 | -0,656 | 9,17E-04 | ALG10, alpha-1,2-glucosyltransferase |
| *Alox15* | 81639 | 1,236 | 1,98E-02 | arachidonate 15-lipoxygenase |
| *Angptl2* | 171100 | -0,663 | 6,44E-05 | angiopoietin-like 2 |
| *Aox3* | 493909 | -0,719 | 5,75E-04 | aldehyde oxidase 3 |
| *Apoa1* | 25081 | 0,754 | 2,24E-03 | apolipoprotein A1 |
| *Ar* | 24208 | -0,840 | 6,27E-03 | androgen receptor |
| *Arid5b* | 309728 | -0,597 | 1,45E-04 | AT-rich interaction domain 5B |
| *Clcn5* | 25749 | -0,761 | 5,75E-03 | chloride voltage-gated channel 5 |
| *Cldn2* | 300920 | -2,024 | 3,85E-02 | claudin 2 |
| *Clec4a* | 474143 | -0,835 | 1,01E-02 | C-type lectin domain family 4, member A |
| *Cmtm4* | 498902 | -0,639 | 4,86E-04 | CKLF-like MARVEL transmembrane domain containing 4 |
| *Col4a3* | 363265 | -0,691 | 4,48E-03 | collagen type IV alpha 3 chain |
| *Col8a1* | 304021 | -0,691 | 1,19E-02 | collagen type VIII alpha 1 chain |
| *Cxcl13* | 498335 | -0,635 | 2,69E-02 | C-X-C motif chemokine ligand 13 |
| *Cybb* | 66021 | -0,778 | 1,27E-02 | cytochrome b-245 beta chain |
| *Cyp1b1* | 25426 | -0,784 | 3,50E-03 | cytochrome P450, family 1, subfamily b, polypeptide 1 |
| *Disc1* | 307940 | -0,684 | 3,98E-02 | DISC1 scaffold protein |
| *Dok6* | 498898 | -0,850 | 3,53E-03 | docking protein 6 |
| *Egr4* | 25129 | 0,983 | 1,55E-03 | early growth response 4 |
| *Epb41l4b* | 500464 | -0,590 | 3,44E-04 | erythrocyte membrane protein band 4.1 like 4B |
| *F5* | 304929 | -1,790 | 4,62E-02 | coagulation factor V |
| *Fblim1* | 362650 | -0,677 | 1,51E-02 | filamin binding LIM protein 1 |
| *Fndc11* | 499953 | -0,697 | 4,93E-02 | fibronectin type III domain containing 11 |

| | | | | |
|---|---|---|---|---|
| *Fos* | 314322 | 0,760 | 2,94E-02 | Fos proto-oncogene, AP-1 transcription factor subunit |
| *Foxn3* | 314374 | -0,619 | 1,64E-04 | forkhead box N3 |
| *Frem2* | 310418 | -0,894 | 3,31E-03 | FRAS1 related extracellular matrix 2 |
| *Fscn2* | 303741 | -0,745 | 3,28E-02 | fascin actin-bundling protein 2, retinal |
| *Gabrb2* | 25451 | -0,621 | 1,19E-02 | gamma-aminobutyric acid type A receptor subunit beta 2 |
| *Gfod1* | 306842 | -0,626 | 2,50E-03 | glucose-fructose oxidoreductase domain containing 1 |
| *Glra3* | 114516 | -0,774 | 4,70E-02 | glycine receptor, alpha 3 |
| *Gpr151* | 307475 | 2,207 | 2,51E-02 | G protein-coupled receptor 151 |
| *Grm5* | 24418 | -0,606 | 2,10E-04 | glutamate metabotropic receptor 5 |
| *Gucy2d* | 79222 | -1,028 | 1,51E-02 | guanylate cyclase 2D, retinal |
| *Hivep3* | 313557 | -0,662 | 1,39E-05 | HIVEP zinc finger 3 |
| *Hs6st3* | 364476 | -0,672 | 4,42E-03 | heparan sulfate 6-O-sulfotransferase 3 |
| *Itga1* | 25118 | -0,782 | 2,71E-02 | integrin subunit alpha 1 |
| *Itgal* | 308995 | -0,587 | 1,20E-02 | integrin subunit alpha L |
| *Jmjd7* | 1E+08 | -0,600 | 1,52E-02 | jumonji domain containing 7 |
| *Kcna2* | 25468 | -0,703 | 1,63E-02 | potassium voltage-gated channel subfamily A member 2 |
| *Kcna3* | 29731 | -0,663 | 4,83E-02 | potassium voltage-gated channel subfamily A member 3 |
| *Kcne2* | 171138 | -0,786 | 3,34E-03 | potassium voltage-gated channel subfamily E regulatory subunit 2 |
| *Kcnj10* | 29718 | -0,664 | 4,01E-02 | potassium inwardly-rectifying channel, subfamily J, member 10 |
| *Kcnj13* | 94341 | -0,910 | 3,69E-03 | potassium inwardly-rectifying channel, subfamily J, member 13 |
| *Kcnmb1* | 29747 | -0,874 | 3,08E-02 | potassium calcium-activated channel subfamily M regulatory beta subunit 1 |
| *Kcnq2* | 170848 | -0,710 | 2,23E-03 | potassium voltage-gated channel subfamily Q member 2 |
| *Kcnv2* | 294065 | -1,220 | 1,33E-02 | potassium voltage-gated channel modifier subfamily V member 2 |
| *Kel* | 297025 | 0,883 | 2,82E-02 | Kell metallo-endopeptidase (Kell blood group) |
| *Kirrel1* | 310695 | -0,722 | 2,56E-03 | kirre like nephrin family adhesion molecule 1 |
| *Klf12* | 306110 | -0,616 | 3,98E-02 | Kruppel-like factor 12 |
| *Klf13* | 499171 | -0,949 | 1,65E-03 | Kruppel-like factor 13 |
| *Klrk1* | 24934 | -0,996 | 4,67E-03 | killer cell lectin like receptor K1 |
| *Lancl3* | 302540 | -0,793 | 3,37E-02 | LanC like 3 |
| *Maml3* | 310405 | -0,601 | 1,91E-02 | mastermind-like transcriptional coactivator 3 |
| *Map2* | 25595 | -0,710 | 1,13E-02 | microtubule-associated protein 2 |
| *Mas1* | 25153 | -0,631 | 1,09E-02 | MAS1 proto-oncogene, G protein-coupled receptor |
| *Mbtps2* | 302705 | -0,603 | 3,95E-03 | membrane-bound transcription factor peptidase, site 2 |
| *Mob3b* | 366352 | -0,680 | 4,98E-04 | MOB kinase activator 3B |
| *Nemp1* | 679504 | -0,736 | 2,66E-02 | nuclear envelope integral membrane protein 1 |
| *Nfe2l3* | 312331 | 1,122 | 2,50E-05 | nuclear factor, erythroid 2-like 3 |

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|---|---|---|---|---|
| *Nmnat2* | 289095 | -0,590 | 5,33E-07 | nicotinamide nucleotide adenylyltransferase 2 |
| *Nox4* | 85431 | -0,737 | 2,85E-02 | NADPH oxidase 4 |
| *Npr3* | 25339 | -0,975 | 1,25E-02 | natriuretic peptide receptor 3 |
| *Optc* | 304802 | -0,843 | 3,77E-03 | opticin |
| *Palm2* | 1,04E+08 | -0,680 | 1,72E-02 | paralemmin 2 |
| *Pcdha2* | 116741 | -0,781 | 7,09E-03 | #Н/Д |
| *Pcdhb21* | 307487 | -0,885 | 4,68E-02 | protocadherin beta 21 |
| *Pcdhga1* | 553129 | -0,592 | 3,34E-02 | protocadherin gamma subfamily A, 1 |
| *Pcdhga9* | 252895 | -0,677 | 1,17E-02 | protocadherin gamma subfamily A, 9 |
| *Pde11a* | 140928 | -0,636 | 1,11E-02 | phosphodiesterase 11A |
| *Pde5a* | 171115 | -0,605 | 4,75E-03 | phosphodiesterase 5A |
| *Pdpk1* | 81745 | -0,655 | 2,61E-03 | 3-phosphoinositide dependent protein kinase-1 |
| *Phf11* | 361051 | -0,606 | 3,83E-02 | PHD finger protein 11 |
| *Pkp1* | 304822 | -0,642 | 4,64E-05 | plakophilin 1 |
| *Plcxd3* | 310358 | -0,684 | 2,89E-05 | phosphatidylinositol-specific phospholipase C, X domain containing 3 |
| *Pld5* | 289270 | -0,773 | 6,10E-05 | phospholipase D family, member 5 |
| *Pnpla1* | 361812 | -0,601 | 4,18E-02 | patatin-like phospholipase domain containing 1 |
| *Prkaa2* | 78975 | -0,762 | 1,11E-02 | protein kinase AMP-activated catalytic subunit alpha 2 |
| *Prlh* | 63850 | 1,030 | 4,65E-02 | prolactin releasing hormone |
| *Prox1* | 305066 | -0,649 | 3,37E-04 | prospero homeobox 1 |
| *Psca* | 680210 | -1,043 | 3,54E-02 | prostate stem cell antigen |
| *Ptbp3* | 83515 | -0,616 | 3,54E-03 | polypyrimidine tract binding protein 3 |
| *Ptpn14* | 305064 | -0,710 | 1,71E-02 | protein tyrosine phosphatase, non-receptor type 14 |
| *Rasgrp4* | 170668 | -0,611 | 2,85E-02 | RAS guanyl releasing protein 4 |
| *RGD1305347* | 362576 | -0,628 | 3,77E-02 | similar to RIKEN cDNA 2610528J11 |
| *Rnf125* | 361296 | -0,940 | 3,22E-02 | ring finger protein 125 |
| *Scn4a* | 25722 | -0,803 | 3,44E-07 | sodium voltage-gated channel alpha subunit 4 |
| *Scn8a* | 29710 | -0,644 | 1,58E-07 | sodium voltage-gated channel alpha subunit 8 |
| *Siah3* | 692004 | -0,948 | 1,84E-02 | siah E3 ubiquitin protein ligase family member 3 |
| *Slc10a1* | 24777 | -1,011 | 4,34E-02 | solute carrier family 10 member 1 |
| *Slc16a14* | 316578 | -0,713 | 1,65E-02 | solute carrier family 16, member 14 |
| *Slc4a1* | 24779 | 1,231 | 2,55E-02 | solute carrier family 4 member 1 (Diego blood group) |
| *Slc4a8* | 315311 | -0,656 | 4,01E-05 | solute carrier family 4 member 8 |
| *Slc6a12* | 50676 | -0,730 | 1,91E-04 | solute carrier family 6 member 12 |
| *Slfn4* | 114247 | -0,797 | 2,80E-04 | schlafen family member 4 |
| *Sox6* | 293165 | -0,713 | 1,01E-03 | SRY-box transcription factor 6 |
| *Spata18* | 289586 | -0,700 | 1,06E-02 | spermatogenesis associated 18 |
| *Spata32* | 287747 | -0,624 | 4,46E-02 | spermatogenesis associated 32 |
| *Spry3* | 498159 | -0,656 | 1,11E-02 | sprouty RTK signaling antagonist 3 |
| *Srgap3* | 500287 | -0,766 | 4,05E-03 | SLIT-ROBO Rho GTPase activating protein 3 |
| *St8sia6* | 291325 | -1,116 | 3,44E-02 | ST8 alpha-N-acetyl-neuraminide alpha-2,8-sialyltransferase 6 |
| *Stk32a* | 364858 | -0,861 | 8,44E-03 | serine/threonine kinase 32A |

| | | | | |
|---|---|---|---|---|
| *Ston2* | 314349 | -0,747 | 2,22E-02 | stonin 2 |
| *Stox2* | 306459 | -0,634 | 6,10E-05 | storkhead box 2 |
| *Tekt4* | 302991 | 0,624 | 3,02E-09 | tektin 4 |
| *Tgfbr3* | 29610 | -0,617 | 4,49E-06 | transforming growth factor beta receptor 3 |
| *Tnfsf10* | 246775 | -0,952 | 3,51E-05 | TNF superfamily member 10 |
| *Tnr* | 25567 | -0,616 | 5,54E-05 | tenascin R |
| *Trim67* | 307938 | -0,878 | 2,53E-02 | tripartite motif-containing 67 |
| *Trim72* | 365377 | -0,692 | 4,99E-04 | tripartite motif containing 72 |
| *Trpc5* | 140933 | -0,685 | 6,28E-04 | transient receptor potential cation channel, subfamily C, member 5 |
| *Vof16* | 259227 | -0,754 | 1,06E-02 | ischemia related factor vof-16 |
| *Wnk3* | 317420 | -0,588 | 7,27E-03 | WNK lysine deficient protein kinase 3 |

## Supplementary Table S2: List and expression of WAG specific 85 DEGs

| WAG_specific DEGs | GeneID | log2 Fold Change | padj | description |
|---|---|---|---|---|
| *Adgrg5* | 307645 | 1,187 | 3,83E-02 | adhesion G protein-coupled receptor G5 |
| *Adra1b* | 24173 | 0,593 | 8,45E-03 | adrenoceptor alpha 1B |
| *Adra2b* | 24174 | 0,933 | 1,98E-02 | adrenoceptor alpha 2B |
| *Akap5* | 171026 | -0,681 | 2,29E-02 | A-kinase anchoring protein 5 |
| *Alkal2* | 679566 | 0,767 | 8,81E-04 | ALK and LTK ligand 2 |
| *Aox2* | 316421 | 0,735 | 6,49E-03 | aldehyde oxidase 2 |
| *Arrdc2* | 306344 | 0,709 | 8,01E-15 | arrestin domain containing 2 |
| *Asb18* | 316614 | 1,153 | 2,20E-03 | ankyrin repeat and SOCS box-containing 18 |
| *Atp2a1* | 116601 | 0,623 | 2,86E-03 | ATPase sarcoplasmic/endoplasmic reticulum Ca2+ transporting 1 |
| *Baat* | 29725 | -0,596 | 3,27E-02 | bile acid CoA:amino acid N-acyltransferase |
| *Best3* | 314847 | 1,031 | 2,24E-02 | bestrophin 3 |
| *Car7* | 291819 | 1,378 | 4,25E-11 | carbonic anhydrase 7 |
| *Cck* | 25298 | 0,818 | 8,82E-03 | cholecystokinin |
| *Ccl24* | 288593 | -0,729 | 3,45E-02 | C-C motif chemokine ligand 24 |
| *Ccl9* | 360579 | -0,901 | 2,98E-02 | chemokine (C-C motif) ligand 9 |
| *Ccn1* | 83476 | -0,850 | 1,10E-03 | cellular communication network factor 1 |
| *Cd101* | 310727 | 0,673 | 1,08E-03 | CD101 molecule |
| *Cga* | 116700 | 0,745 | 2,59E-07 | glycoprotein hormones, alpha polypeptide |
| *Chrna10* | 64574 | -0,670 | 4,83E-02 | cholinergic receptor nicotinic alpha 10 subunit |
| *Chrna9* | 65024 | 1,003 | 2,76E-02 | cholinergic receptor nicotinic alpha 9 subunit |
| *Chst5* | 307859 | 0,705 | 1,02E-05 | carbohydrate sulfotransferase 5 |
| *Cldn1* | 65129 | 0,642 | 7,98E-03 | claudin 1 |
| *Cytl1* | 498392 | 0,614 | 1,63E-03 | cytokine like 1 |
| *Eaf2* | 266787 | 1,029 | 3,42E-02 | ELL associated factor 2 |
| *Epha1* | 312279 | 0,750 | 1,58E-02 | Eph receptor A1 |
| *Errfi1* | 313729 | 0,621 | 1,98E-06 | ERBB receptor feedback inhibitor 1 |
| *Esr1* | 24890 | -0,763 | 4,84E-03 | estrogen receptor 1 |
| *Fam163a* | 498257 | 0,644 | 3,50E-02 | family with sequence similarity 163, member A |
| *Fgf3* | 170633 | -1,081 | 1,27E-02 | fibroblast growth factor 3 |
| *Fzd5* | 317674 | -0,627 | 8,32E-04 | frizzled class receptor 5 |
| *Gabrd* | 29689 | 1,138 | 1,68E-02 | gamma-aminobutyric acid type A receptor subunit delta |
| *Gabrq* | 65187 | -0,588 | 9,26E-07 | gamma-aminobutyric acid type A receptor subunit theta |
| *Gh1* | 24391 | -7,283 | 8,09E-03 | growth hormone 1 |
| *Hif3a* | 64345 | 1,398 | 4,62E-08 | hypoxia inducible factor 3 subunit alpha |
| *Il12rb2* | 171334 | 1,029 | 2,60E-03 | interleukin 12 receptor subunit beta 2 |
| *Il20rb* | 501043 | 0,979 | 1,11E-02 | interleukin 20 receptor subunit beta |
| *Itgb3* | 29302 | -0,989 | 4,10E-03 | integrin subunit beta 3 |
| *Kcnj2* | 29712 | -0,659 | 4,77E-03 | potassium inwardly-rectifying channel, subfamily J, member 2 |

| | | | | |
|---|---|---|---|---|
| *Kcnk15* | 156873 | -0,637 | 1,84E-02 | potassium two pore domain channel subfamily K member 15 |
| *Klra2* | 494194 | -0,598 | 3,22E-02 | killer cell lectin-like receptor, subfamily A, member 2 |
| *Lca5l* | 498065 | -0,617 | 1,72E-03 | lebercilin LCA5 like |
| *Lilrb4* | 292594 | -1,074 | 2,13E-02 | leukocyte immunoglobulin like receptor B4 |
| *LOC310926* | 310926 | 1,451 | 1,26E-02 | hypothetical protein LOC310926 |
| *Met* | 24553 | -0,628 | 1,56E-02 | MET proto-oncogene, receptor tyrosine kinase |
| *Mlnr* | 252859 | 0,765 | 3,16E-03 | motilin receptor |
| *Mob3c* | 313511 | -0,646 | 1,52E-02 | MOB kinase activator 3C |
| *Mybpc1* | 362867 | 1,312 | 2,94E-02 | myosin binding protein C1 |
| *Nmu* | 63887 | 0,999 | 2,40E-09 | neuromedin U |
| *Nos2* | 24599 | -0,963 | 4,90E-02 | nitric oxide synthase 2 |
| *Nxf3* | 302591 | -0,856 | 3,79E-02 | nuclear RNA export factor 3 |
| *Pax4* | 83630 | -0,681 | 3,26E-02 | paired box 4 |
| *Pcdh12* | 116808 | -0,791 | 1,63E-02 | protocadherin 12 |
| *Pdk4* | 89813 | 1,169 | 2,90E-12 | pyruvate dehydrogenase kinase 4 |
| *Phex* | 25512 | -0,835 | 2,31E-02 | phosphate regulating endopeptidase homolog, X-linked |
| *Pou3f4* | 29589 | -0,702 | 5,35E-05 | POU class 3 homeobox 4 |
| *Ppm1j* | 295341 | 0,657 | 4,73E-03 | protein phosphatase, Mg2+/Mn2+ dependent, 1J |
| *Prkcd* | 170538 | 1,185 | 2,16E-02 | protein kinase C, delta |
| *Ramp3* | 56820 | 0,900 | 6,22E-03 | receptor activity modifying protein 3 |
| *RGD1560775* | 501031 | -0,679 | 2,79E-02 | similar to RIKEN cDNA 4930579C12 gene |
| *RT1-M1-4* | 294213 | -1,007 | 3,45E-02 | RT1 class I, locus M1, gene 4 |
| *Rxfp1* | 295144 | -0,633 | 4,29E-02 | relaxin family peptide receptor 1 |
| *Saxo2* | 293061 | -0,612 | 2,87E-02 | stabilizer of axonemal microtubules 2 |
| *Sema3a* | 29751 | -0,756 | 7,95E-03 | semaphorin 3A |
| *Serpine1* | 24617 | 0,585 | 2,13E-04 | serpin family E member 1 |
| *Sgk1* | 29517 | 1,197 | 7,82E-05 | serum/glucocorticoid regulated kinase 1 |
| *Shisa8* | 315163 | -0,678 | 4,84E-03 | shisa family member 8 |
| *Shox2* | 25546 | 1,662 | 1,24E-04 | short stature homeobox 2 |
| *Slc10a6* | 289459 | 0,731 | 3,81E-03 | solute carrier family 10 member 6 |
| *Slc19a3* | 316559 | 1,232 | 2,66E-23 | solute carrier family 19 member 3 |
| *Slitrk6* | 290467 | 0,633 | 1,07E-05 | SLIT and NTRK-like family, member 6 |
| *Smpx* | 84416 | 1,417 | 3,47E-02 | small muscle protein, X-linked |
| *Smyd1* | 297333 | -0,799 | 2,88E-02 | SET and MYND domain containing 1 |
| *Synpo2* | 499702 | 0,720 | 4,41E-02 | synaptopodin 2 |
| *Tcf7l2* | 679869 | 0,693 | 1,68E-02 | transcription factor 7 like 2 |
| *Tent5b* | 313019 | 1,009 | 9,21E-03 | terminal nucleotidyltransferase 5B |
| *Tlr8* | 684440 | -0,758 | 1,92E-02 | toll-like receptor 8 |
| *Tmem140* | 362334 | 0,604 | 9,87E-09 | transmembrane protein 140 |
| *Tmem252* | 361744 | 1,345 | 2,06E-19 | transmembrane protein 252 |
| *Tnnc2* | 296369 | 0,608 | 2,92E-02 | troponin C2, fast skeletal type |
| *Treml1* | 501096 | -0,945 | 3,54E-02 | triggering receptor expressed on myeloid cells-like 1 |
| *Trib1* | 78969 | 0,611 | 3,38E-03 | tribbles pseudokinase 1 |

| | | | | |
|---|---|---|---|---|
| *Trpm5* | 365391 | -1,216 | 4,51E-02 | transient receptor potential cation channel, subfamily M, member 5 |
| *Tshb* | 25653 | 1,102 | 9,96E-08 | thyroid stimulating hormone subunit beta |
| *Ttk* | 315852 | -0,799 | 5,99E-03 | Ttk protein kinase |
| *Wnt9b* | 303586 | 1,048 | 2,40E-02 | Wnt family member 9B |

## Supplementary Table S3: List and expression of 144 common ISIAH DEGs

| Common ISIAH_DEGs | GeneID | log2 Fold Change | padj | description |
|---|---|---|---|---|
| *Abca4* | 310836 | -0,690 | 7,51E-03 | ATP binding cassette subfamily A member 4 |
| *Abcc1* | 24565 | -0,605 | 2,97E-06 | ATP binding cassette subfamily C member 1 |
| *Abcc6* | 81642 | -0,612 | 3,13E-06 | ATP binding cassette subfamily C member 6 |
| *Acr* | 24163 | -0,755 | 4,92E-03 | acrosin |
| *Adamts12* | 294809 | -0,723 | 4,70E-07 | ADAM metallopeptidase with thrombospondin type 1 motif, 12 |
| *Alox12* | 287454 | -0,716 | 3,07E-02 | arachidonate 12-lipoxygenase, 12S type |
| *Apln* | 58812 | 0,469 | 7,24E-06 | apelin |
| *Aspa* | 79251 | 0,368 | 3,76E-03 | aspartoacylase |
| *Atp2b4* | 29600 | -1,000 | 2,75E-03 | ATPase plasma membrane Ca2+ transporting 4 |
| *B3gntl1* | 367384 | -0,667 | 1,11E-03 | UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase-like 1 |
| *Bin2* | 366988 | -0,435 | 4,58E-07 | bridging integrator 2 |
| *Cables1* | 307585 | 0,392 | 6,96E-05 | Cdk5 and Abl enzyme substrate 1 |
| *Cacna2d1* | 25399 | -0,661 | 1,83E-02 | calcium voltage-gated channel auxiliary subunit alpha2delta 1 |
| *Cacna2d2* | 300992 | -0,621 | 2,52E-03 | calcium voltage-gated channel auxiliary subunit alpha2delta 2 |
| *Ccdc117* | 498404 | 0,665 | 3,61E-03 | coiled-coil domain containing 117 |
| *Cd180* | 294706 | -1,194 | 1,70E-16 | CD180 molecule |
| *Cd274* | 499342 | -0,665 | 1,51E-02 | CD274 molecule |
| *Cdkn1a* | 114851 | 0,934 | 2,04E-15 | cyclin-dependent kinase inhibitor 1A |
| *Cds2* | 114101 | -0,609 | 9,12E-05 | CDP-diacylglycerol synthase 2 |
| *Chordc1* | 315447 | 0,593 | 5,41E-08 | cysteine and histidine rich domain containing 1 |
| *Chrm5* | 53949 | -0,733 | 4,89E-03 | cholinergic receptor, muscarinic 5 |
| *Chrna7* | 25302 | -0,946 | 1,70E-06 | cholinergic receptor nicotinic alpha 7 subunit |
| *Clec10a* | 64195 | 0,417 | 6,72E-03 | C-type lectin domain containing 10A |
| *Cpne3* | 313087 | -0,639 | 1,67E-03 | copine 3 |
| *Creb5* | 500131 | -0,635 | 2,61E-02 | cAMP responsive element binding protein 5 |
| *Cryab* | 25420 | 0,670 | 2,22E-19 | crystallin, alpha B |
| *Cx3cr1* | 171056 | -0,704 | 9,57E-11 | C-X3-C motif chemokine receptor 1 |
| *Cxadr* | 89843 | -0,644 | 1,38E-05 | CXADR, Ig-like cell adhesion molecule |
| *Cyp26b1* | 312495 | -0,759 | 1,79E-04 | cytochrome P450, family 26, subfamily b, polypeptide 1 |
| *Dab2* | 79128 | -0,633 | 7,21E-05 | DAB adaptor protein 2 |
| *Ddit4* | 140942 | 0,611 | 3,21E-03 | DNA-damage-inducible transcript 4 |
| *Dhrs9* | 170635 | -1,598 | 1,19E-04 | dehydrogenase/reductase 9 |
| *Dio2* | 65162 | 0,536 | 1,50E-04 | iodothyronine deiodinase 2 |
| *Dnajb1* | 361384 | 0,882 | 9,85E-04 | DnaJ heat shock protein family (Hsp40) member B1 |
| *Edem3* | 289085 | -0,591 | 1,09E-03 | ER degradation enhancer, mannosidase alpha-like 3 |
| *Efnb2* | 306636 | -0,734 | 6,98E-05 | ephrin B2 |

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|---|---|---|---|---|
| *Eva1a* | 500221 | 0,397 | 9,90E-03 | eva-1 homolog A, regulator of programmed cell death |
| *Evi2b* | 1,01E+08 | -0,621 | 3,80E-03 | ecotropic viral integration site 2B |
| *Fibin* | 499856 | 0,420 | 2,26E-05 | fin bud initiation factor homolog |
| *Fkbp5* | 361810 | 0,785 | 1,98E-11 | FKBP prolyl isomerase 5 |
| *Flvcr2* | 314323 | -0,697 | 7,79E-05 | FLVCR heme transporter 2 |
| *Fmo2* | 246245 | 0,690 | 3,09E-03 | flavin containing dimethylaniline monoxygenase 2 |
| *Fndc3b* | 294925 | -0,597 | 2,44E-02 | fibronectin type III domain containing 3B |
| *Fosb* | 1E+08 | 1,747 | 3,36E-19 | FosB proto-oncogene, AP-1 transcription factor subunit |
| *Fosl1* | 25445 | 1,233 | 7,82E-04 | FOS like 1, AP-1 transcription factor subunit |
| *Fosl2* | 25446 | 0,679 | 2,28E-02 | FOS like 2, AP-1 transcription factor subunit |
| *Frem1* | 298185 | -0,901 | 8,30E-03 | Fras1 related extracellular matrix 1 |
| *Gabrb3* | 24922 | -0,652 | 2,88E-05 | gamma-aminobutyric acid type A receptor subunit beta 3 |
| *Gpatch4* | 295228 | 0,575 | 1,98E-04 | G patch domain containing 4 |
| *Gpd1* | 60666 | 1,020 | 1,68E-05 | glycerol-3-phosphate dehydrogenase 1 |
| *Gpr101* | 317608 | -0,678 | 3,37E-02 | G protein-coupled receptor 101 |
| *Gpr34* | 554353 | -0,558 | 2,94E-06 | G protein-coupled receptor 34 |
| *Gpr4* | 308408 | 0,467 | 7,33E-03 | G protein-coupled receptor 4 |
| *Grik3* | 298521 | -0,715 | 2,92E-03 | glutamate ionotropic receptor kainate type subunit 3 |
| *Grk3* | 25372 | -0,726 | 2,80E-05 | G protein-coupled receptor kinase 3 |
| *Hpd* | 29531 | 0,686 | 8,16E-04 | 4-hydroxyphenylpyruvate dioxygenase |
| *Hspa1b* | 24472 | 2,881 | 1,76E-03 | heat shock protein family A (Hsp70) member 1B |
| *Hspb1* | 24471 | 1,030 | 3,04E-02 | heat shock protein family B (small) member 1 |
| *Htr1a* | 24473 | -0,575 | 3,95E-03 | 5-hydroxytryptamine receptor 1A |
| *Idua* | 360904 | -0,611 | 5,02E-11 | alpha-L-iduronidase |
| *Il17rd* | 498576 | -0,759 | 3,19E-03 | interleukin 17 receptor D |
| *Il21r* | 308977 | -0,600 | 3,50E-02 | interleukin 21 receptor |
| *Irf8* | 292060 | -0,387 | 2,17E-02 | interferon regulatory factor 8 |
| *Kantr* | 1,06E+08 | -0,661 | 2,90E-03 | KDM5C adjacent transcript |
| *Kcnk9* | 84429 | -0,977 | 6,44E-03 | potassium two pore domain channel subfamily K member 9 |
| *Kdr* | 25589 | -0,607 | 2,31E-13 | kinase insert domain receptor |
| *Kif1b* | 117548 | -0,596 | 3,36E-03 | kinesin family member 1B |
| *Lims2* | 361303 | 0,590 | 9,11E-05 | LIM zinc finger domain containing 2 |
| *Lmod2* | 296935 | 1,066 | 1,69E-02 | leiomodin 2 |
| *LOC100362783* | 1E+08 | 0,805 | 3,94E-04 | Uncharacterized protein C7orf61 homolog |
| *Lonrf3* | 298322 | 0,573 | 1,92E-05 | LON peptidase N-terminal domain and ring finger 3 |
| *Lrg1* | 367455 | 0,477 | 1,20E-02 | leucine-rich alpha-2-glycoprotein 1 |
| *Lrrc58* | 303919 | -0,608 | 3,37E-03 | leucine rich repeat containing 58 |
| *Lyve1* | 293186 | 0,565 | 6,26E-04 | lymphatic vessel endothelial hyaluronan receptor 1 |
| *Maff* | 366960 | 0,590 | 3,12E-04 | MAF bZIP transcription factor F |
| *Map3k6* | 313022 | 1,211 | 6,69E-05 | mitogen-activated protein kinase kinase kinase 6 |

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|---|---|---|---|---|
| *Mapkbp1* | 362197 | -0,656 | 4,45E-05 | mitogen activated protein kinase binding protein 1 |
| *Mlxipl* | 171078 | -0,464 | 3,77E-03 | MLX interacting protein-like |
| *Mpeg1* | 64552 | -0,610 | 1,63E-06 | macrophage expressed 1 |
| *Mt2A* | 689415 | 0,655 | 1,68E-02 | metallothionein 2A |
| *Nav3* | 314814 | -0,599 | 5,64E-10 | neuron navigator 3 |
| *Ncoa2* | 83724 | -0,819 | 2,25E-04 | nuclear receptor coactivator 2 |
| *Ndst4* | 362035 | -0,833 | 6,03E-04 | N-deacetylase and N-sulfotransferase 4 |
| *Nfib* | 29227 | -0,666 | 1,46E-02 | nuclear factor I/B |
| *Nfix* | 81524 | -0,601 | 4,10E-04 | nuclear factor I X |
| *Niban1* | 63912 | -0,767 | 2,35E-02 | niban apoptosis regulator 1 |
| *Nos1* | 24598 | -0,816 | 1,59E-02 | nitric oxide synthase 1 |
| *Npas4* | 266734 | 1,087 | 2,92E-02 | neuronal PAS domain protein 4 |
| *Nr2c2* | 50659 | -0,611 | 5,60E-03 | nuclear receptor subfamily 2, group C, member 2 |
| *Nrp2* | 81527 | -0,588 | 4,60E-04 | neuropilin 2 |
| *Opcml* | 116597 | -0,627 | 2,72E-04 | opioid binding protein/cell adhesion molecule-like |
| *P2ry13* | 310444 | -0,613 | 1,18E-04 | purinergic receptor P2Y13 |
| *P2ry4* | 63843 | -1,139 | 4,35E-02 | pyrimidinergic receptor P2Y4 |
| *Pak3* | 29433 | -0,664 | 4,31E-05 | p21 (RAC1) activated kinase 3 |
| *Pcdh11x* | 317204 | -0,611 | 2,50E-02 | protocadherin 11 X-linked |
| *Pcdh7* | 360942 | -0,590 | 4,28E-04 | protocadherin 7 |
| *Pcdhga2* | 498846 | -0,611 | 1,05E-04 | protocadherin gamma subfamily A, 2 |
| *Pex11a* | 85249 | 0,463 | 8,20E-06 | peroxisomal biogenesis factor 11 alpha |
| *Pgap1* | 316400 | -0,618 | 1,01E-03 | post-GPI attachment to proteins inositol deacylase 1 |
| *Pgr15l* | 296867 | -0,516 | 3,63E-02 | G protein-coupled receptor 15-like |
| *Pik3ap1* | 294048 | -0,625 | 3,00E-03 | phosphoinositide-3-kinase adaptor protein 1 |
| *Pla2g3* | 289733 | 0,781 | 1,41E-03 | phospholipase A2, group III |
| *Plag1* | 297804 | -0,623 | 1,82E-02 | PLAG1 zinc finger |
| *Plcb2* | 85240 | -0,431 | 3,41E-02 | phospholipase C, beta 2 |
| *Plek* | 364206 | -0,607 | 3,49E-07 | pleckstrin |
| *Plekhf1* | 308543 | 0,521 | 6,54E-04 | pleckstrin homology and FYVE domain containing 1 |
| *Pou2f2* | 117058 | -1,003 | 1,56E-05 | POU class 2 homeobox 2 |
| *Ppargc1a* | 83516 | -0,630 | 1,31E-04 | PPARG coactivator 1 alpha |
| *Ppp1r9a* | 84685 | -0,666 | 7,98E-04 | protein phosphatase 1, regulatory subunit 9A |
| *Pspn* | 25525 | 0,743 | 1,99E-02 | persephin |
| *Ptch1* | 89830 | -0,644 | 8,17E-08 | patched 1 |
| *Rasgrf2* | 114513 | -0,720 | 2,22E-07 | RAS protein-specific guanine nucleotide-releasing factor 2 |
| *Rasgrp3* | 313874 | -0,662 | 8,28E-11 | RAS guanyl releasing protein 3 |
| *Rin3* | 314397 | 0,595 | 1,89E-10 | Ras and Rab interactor 3 |
| *Scml4* | 309859 | -0,360 | 1,78E-03 | Scm polycomb group protein like 4 |
| *Scrt2* | 366229 | 0,654 | 3,04E-06 | scratch family transcriptional repressor 2 |
| *Slc16a2* | 259248 | -0,603 | 2,27E-03 | solute carrier family 16 member 2 |
| *Slc4a4* | 84484 | -0,674 | 4,77E-03 | solute carrier family 4 member 4 |

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|---|---|---|---|---|
| *Slc7a14* | 499587 | -0,947 | 4,44E-04 | solute carrier family 7, member 14 |
| *Slc7a2* | 64554 | -0,775 | 1,46E-03 | solute carrier family 7 member 2 |
| *Smad9* | 85435 | -0,645 | 2,68E-02 | SMAD family member 9 |
| *Sned1* | 316638 | -0,992 | 8,46E-07 | sushi, nidogen and EGF-like domains 1 |
| *Spata13* | 305938 | -0,844 | 4,58E-04 | spermatogenesis associated 13 |
| *Srxn1* | 296271 | 0,530 | 8,97E-16 | sulfiredoxin 1 |
| *Sult1a1* | 83783 | 0,436 | 5,79E-04 | sulfotransferase family 1A member 1 |
| *Sv2c* | 29643 | -0,823 | 8,85E-04 | synaptic vesicle glycoprotein 2c |
| *Tanc2* | 303599 | -0,695 | 6,65E-05 | tetratricopeptide repeat, ankyrin repeat and coiled-coil containing 2 |
| *Tenm2* | 117242 | -0,602 | 4,63E-07 | teneurin transmembrane protein 2 |
| *Tenm4* | 308831 | -0,733 | 7,10E-06 | teneurin transmembrane protein 4 |
| *Tgfbr2* | 81810 | -0,667 | 4,75E-04 | transforming growth factor, beta receptor 2 |
| *Tinagl1* | 94174 | 0,549 | 3,51E-07 | tubulointerstitial nephritis antigen-like 1 |
| *Tlr2* | 310553 | -0,544 | 2,71E-05 | toll-like receptor 2 |
| *Tmc7* | 499254 | -0,868 | 1,14E-08 | transmembrane channel-like 7 |
| *Tmem119* | 304581 | 0,528 | 2,88E-07 | transmembrane protein 119 |
| *Tnfrsf11a* | 498206 | 0,821 | 2,99E-09 | TNF receptor superfamily member 11A |
| *Tnfrsf12a* | 302965 | 0,558 | 1,41E-06 | TNF receptor superfamily member 12A |
| *Tppp* | 361466 | -0,676 | 6,21E-03 | tubulin polymerization promoting protein |
| *Tsc22d3* | 83514 | 0,550 | 4,67E-13 | TSC22 domain family, member 3 |
| *Ttll10* | 298692 | -0,679 | 1,16E-02 | tubulin tyrosine ligase like 10 |
| *Tub* | 25609 | -0,588 | 7,06E-04 | TUB bipartite transcription factor |
| *Unc5d* | 306534 | -0,690 | 7,74E-05 | unc-5 netrin receptor D |
| *Xylt1* | 64133 | -0,648 | 5,75E-04 | xylosyltransferase 1 |
| *Zbtb16* | 353227 | 1,228 | 9,41E-07 | zinc finger and BTB domain containing 16 |
| *Zim1* | 308322 | -0,630 | 1,16E-02 | zinc finger, imprinted 1 |

## Supplementary Table S4: List and expression of 144 common WAG DEGs

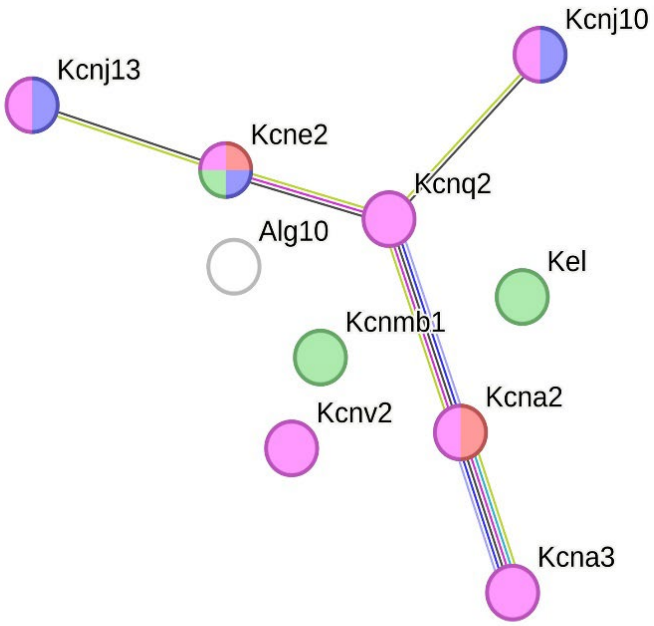
| Common WAG_DEGs | GeneID | log2 Fold Change | padj | description |
|---|---|---|---|---|
| *Abca4* | 310836 | -0,466 | 2,73E-02 | ATP binding cassette subfamily A member 4 |
| *Abcc1* | 24565 | -0,400 | 1,63E-07 | ATP binding cassette subfamily C member 1 |
| *Abcc6* | 81642 | -0,447 | 1,51E-07 | ATP binding cassette subfamily C member 6 |
| *Acr* | 24163 | -0,764 | 4,95E-03 | acrosin |
| *Adamts12* | 294809 | -0,289 | 2,41E-02 | ADAM metallopeptidase with thrombospondin type 1 motif, 12 |
| *Alox12* | 287454 | -0,779 | 8,06E-03 | arachidonate 12-lipoxygenase, 12S type |
| *Apln* | 58812 | 0,715 | 6,87E-24 | apelin |
| *Aspa* | 79251 | 0,595 | 2,06E-19 | aspartoacylase |
| *Atp2b4* | 29600 | -0,613 | 2,65E-08 | ATPase plasma membrane Ca2+ transporting 4 |
| *B3gntl1* | 367384 | -0,389 | 2,33E-02 | UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase-like 1 |
| *Bin2* | 366988 | -0,817 | 1,36E-20 | bridging integrator 2 |
| *Cables1* | 307585 | 0,615 | 3,85E-32 | Cdk5 and Abl enzyme substrate 1 |
| *Cacna2d1* | 25399 | -0,411 | 1,69E-04 | calcium voltage-gated channel auxiliary subunit alpha2delta 1 |
| *Cacna2d2* | 300992 | -0,407 | 3,73E-07 | calcium voltage-gated channel auxiliary subunit alpha2delta 2 |
| *Ccdc117* | 498404 | 0,348 | 1,74E-04 | coiled-coil domain containing 117 |
| *Cd180* | 294706 | -1,614 | 8,45E-32 | CD180 molecule |
| *Cd274* | 499342 | -0,463 | 3,06E-02 | CD274 molecule |
| *Cdkn1a* | 114851 | 1,352 | 4,53E-64 | cyclin-dependent kinase inhibitor 1A |
| *Cds2* | 114101 | -0,327 | 5,19E-03 | CDP-diacylglycerol synthase 2 |
| *Chordc1* | 315447 | 0,460 | 8,80E-11 | cysteine and histidine rich domain containing 1 |
| *Chrm5* | 53949 | -0,463 | 6,71E-03 | cholinergic receptor, muscarinic 5 |
| *Chrna7* | 25302 | -0,675 | 8,21E-05 | cholinergic receptor nicotinic alpha 7 subunit |
| *Clec10a* | 64195 | 0,666 | 2,73E-05 | C-type lectin domain containing 10A |
| *Cpne3* | 313087 | -0,364 | 2,19E-02 | copine 3 |
| *Creb5* | 500131 | -0,664 | 2,42E-04 | cAMP responsive element binding protein 5 |
| *Cryab* | 25420 | 0,824 | 4,04E-63 | crystallin, alpha B |
| *Cx3cr1* | 171056 | -0,441 | 8,04E-11 | C-X3-C motif chemokine receptor 1 |
| *Cxadr* | 89843 | -0,573 | 2,75E-05 | CXADR, Ig-like cell adhesion molecule |
| *Cyp26b1* | 312495 | -0,801 | 2,79E-03 | cytochrome P450, family 26, subfamily b, polypeptide 1 |
| *Dab2* | 79128 | -0,271 | 3,22E-02 | DAB adaptor protein 2 |
| *Ddit4* | 140942 | 0,646 | 1,57E-04 | DNA-damage-inducible transcript 4 |
| *Dhrs9* | 170635 | -1,398 | 1,92E-03 | dehydrogenase/reductase 9 |
| *Dio2* | 65162 | 0,939 | 3,93E-19 | iodothyronine deiodinase 2 |
| *Dnajb1* | 361384 | 0,453 | 4,23E-12 | DnaJ heat shock protein family (Hsp40) member B1 |
| *Edem3* | 289085 | -0,397 | 3,01E-04 | ER degradation enhancer, mannosidase alpha-like 3 |
| *Efnb2* | 306636 | -0,558 | 7,33E-06 | ephrin B2 |

| | | | | |
|---|---|---|---|---|
| *Eva1a* | 500221 | 0,768 | 1,38E-20 | eva-1 homolog A, regulator of programmed cell death |
| *Evi2b* | 1,01E+08 | -0,682 | 3,32E-03 | ecotropic viral integration site 2B |
| *Fibin* | 499856 | 0,643 | 2,20E-15 | fin bud initiation factor homolog |
| *Fkbp5* | 361810 | 1,382 | 1,24E-88 | FKBP prolyl isomerase 5 |
| *Flvcr2* | 314323 | -0,587 | 3,77E-04 | FLVCR heme transporter 2 |
| *Fmo2* | 246245 | 0,965 | 9,20E-09 | flavin containing dimethylaniline monoxygenase 2 |
| *Fndc3b* | 294925 | -0,398 | 6,91E-03 | fibronectin type III domain containing 3B |
| *Fosb* | 1E+08 | 1,226 | 1,50E-03 | FosB proto-oncogene, AP-1 transcription factor subunit |
| *Fosl1* | 25445 | 1,699 | 2,15E-06 | FOS like 1, AP-1 transcription factor subunit |
| *Fosl2* | 25446 | 0,744 | 3,49E-03 | FOS like 2, AP-1 transcription factor subunit |
| *Frem1* | 298185 | -0,573 | 4,03E-02 | Fras1 related extracellular matrix 1 |
| *Gabrb3* | 24922 | -0,405 | 2,19E-03 | gamma-aminobutyric acid type A receptor subunit beta 3 |
| *Gpatch4* | 295228 | 1,009 | 5,51E-40 | G patch domain containing 4 |
| *Gpd1* | 60666 | 1,677 | 1,09E-134 | glycerol-3-phosphate dehydrogenase 1 |
| *Gpr101* | 317608 | -0,544 | 1,11E-03 | G protein-coupled receptor 101 |
| *Gpr34* | 554353 | -1,030 | 7,02E-38 | G protein-coupled receptor 34 |
| *Gpr4* | 308408 | 0,733 | 1,77E-06 | G protein-coupled receptor 4 |
| *Grik3* | 298521 | -0,406 | 3,98E-04 | glutamate ionotropic receptor kainate type subunit 3 |
| *Grk3* | 25372 | -0,389 | 1,93E-04 | G protein-coupled receptor kinase 3 |
| *Hpd* | 29531 | 0,616 | 1,40E-03 | 4-hydroxyphenylpyruvate dioxygenase |
| *Hspa1b* | 24472 | 1,006 | 1,72E-08 | heat shock protein family A (Hsp70) member 1B |
| *Hspb1* | 24471 | 0,479 | 2,64E-05 | heat shock protein family B (small) member 1 |
| *Htr1a* | 24473 | -0,639 | 9,84E-06 | 5-hydroxytryptamine receptor 1A |
| *Idua* | 360904 | -0,377 | 2,94E-07 | alpha-L-iduronidase |
| *Il17rd* | 498576 | -0,655 | 1,92E-02 | interleukin 17 receptor D |
| *Il21r* | 308977 | -0,659 | 5,56E-03 | interleukin 21 receptor |
| *Irf8* | 292060 | -0,606 | 4,24E-09 | interferon regulatory factor 8 |
| *Kantr* | 1,06E+08 | -0,496 | 7,83E-03 | KDM5C adjacent transcript |
| *Kcnk9* | 84429 | -0,444 | 2,19E-03 | potassium two pore domain channel subfamily K member 9 |
| *Kdr* | 25589 | -0,565 | 4,42E-10 | kinase insert domain receptor |
| *Kif1b* | 117548 | -0,307 | 2,04E-02 | kinesin family member 1B |
| *Lims2* | 361303 | 1,019 | 5,02E-27 | LIM zinc finger domain containing 2 |
| *Lmod2* | 296935 | 1,003 | 5,19E-03 | leiomodin 2 |
| *LOC100362783* | 1E+08 | 0,437 | 2,30E-02 | Uncharacterized protein C7orf61 homolog |
| *Lonrf3* | 298322 | 0,769 | 1,57E-15 | LON peptidase N-terminal domain and ring finger 3 |
| *Lrg1* | 367455 | 0,691 | 8,56E-11 | leucine-rich alpha-2-glycoprotein 1 |
| *Lrrc58* | 303919 | -0,480 | 3,06E-04 | leucine rich repeat containing 58 |
| *Lyve1* | 293186 | 0,878 | 2,87E-10 | lymphatic vessel endothelial hyaluronan receptor 1 |
| *Maff* | 366960 | 0,815 | 4,57E-09 | MAF bZIP transcription factor F |
| *Map3k6* | 313022 | 1,183 | 2,15E-13 | mitogen-activated protein kinase kinase kinase 6 |

| | | | | |
|---|---|---|---|---|
| *Mapkbp1* | 362197 | -0,353 | 9,49E-06 | mitogen activated protein kinase binding protein 1 |
| *Mlxipl* | 171078 | -0,607 | 1,07E-06 | MLX interacting protein-like |
| *Mpeg1* | 64552 | -0,289 | 2,70E-08 | macrophage expressed 1 |
| *Mt2A* | 689415 | 0,592 | 1,66E-03 | metallothionein 2A |
| *Nav3* | 314814 | -0,338 | 3,22E-04 | neuron navigator 3 |
| *Ncoa2* | 83724 | -0,356 | 1,01E-02 | nuclear receptor coactivator 2 |
| *Ndst4* | 362035 | -0,441 | 4,46E-02 | N-deacetylase and N-sulfotransferase 4 |
| *Nfib* | 29227 | -0,400 | 4,13E-02 | nuclear factor I/B |
| *Nfix* | 81524 | -0,254 | 3,35E-02 | nuclear factor I X |
| *Niban1* | 63912 | -0,577 | 2,71E-02 | niban apoptosis regulator 1 |
| *Nos1* | 24598 | -0,499 | 3,80E-04 | nitric oxide synthase 1 |
| *Npas4* | 266734 | -0,674 | 2,47E-03 | neuronal PAS domain protein 4 |
| *Nr2c2* | 50659 | -0,333 | 2,04E-02 | nuclear receptor subfamily 2, group C, member 2 |
| *Nrp2* | 81527 | -0,396 | 5,40E-05 | neuropilin 2 |
| *Opcml* | 116597 | -0,363 | 1,06E-02 | opioid binding protein/cell adhesion molecule-like |
| *P2ry13* | 310444 | -0,464 | 4,54E-03 | purinergic receptor P2Y13 |
| *P2ry4* | 63843 | -0,765 | 3,32E-02 | pyrimidinergic receptor P2Y4 |
| *Pak3* | 29433 | -0,392 | 4,72E-02 | p21 (RAC1) activated kinase 3 |
| *Pcdh11x* | 317204 | -0,688 | 7,82E-05 | protocadherin 11 X-linked |
| *Pcdh7* | 360942 | -0,416 | 1,55E-05 | protocadherin 7 |
| *Pcdhga2* | 498846 | -0,432 | 4,74E-05 | protocadherin gamma subfamily A, 2 |
| *Pex11a* | 85249 | 0,740 | 1,72E-39 | peroxisomal biogenesis factor 11 alpha |
| *Pgap1* | 316400 | -0,314 | 3,70E-02 | post-GPI attachment to proteins inositol deacylase 1 |
| *Pgr15l* | 296867 | -0,786 | 9,34E-06 | G protein-coupled receptor 15-like |
| *Pik3ap1* | 294048 | -0,952 | 7,63E-08 | phosphoinositide-3-kinase adaptor protein 1 |
| *Pla2g3* | 289733 | 1,856 | 1,65E-45 | phospholipase A2, group III |
| *Plag1* | 297804 | -0,495 | 1,52E-02 | PLAG1 zinc finger |
| *Plcb2* | 85240 | -0,596 | 2,20E-04 | phospholipase C, beta 2 |
| *Plek* | 364206 | -0,896 | 1,03E-13 | pleckstrin |
| *Plekhf1* | 308543 | 0,898 | 8,82E-25 | pleckstrin homology and FYVE domain containing 1 |
| *Pou2f2* | 117058 | -0,556 | 2,19E-03 | POU class 2 homeobox 2 |
| *Ppargc1a* | 83516 | -0,496 | 4,50E-04 | PPARG coactivator 1 alpha |
| *Ppp1r9a* | 84685 | -0,446 | 2,52E-03 | protein phosphatase 1, regulatory subunit 9A |
| *Pspn* | 25525 | 0,493 | 4,66E-02 | persephin |
| *Ptch1* | 89830 | -0,821 | 1,21E-30 | patched 1 |
| *Rasgrf2* | 114513 | -0,277 | 3,57E-03 | RAS protein-specific guanine nucleotide-releasing factor 2 |
| *Rasgrp3* | 313874 | -0,620 | 1,32E-17 | RAS guanyl releasing protein 3 |
| *Rin3* | 314397 | 1,068 | 5,76E-48 | Ras and Rab interactor 3 |
| *Scml4* | 309859 | -0,608 | 9,87E-09 | Scm polycomb group protein like 4 |
| *Scrt2* | 366229 | 0,645 | 4,68E-06 | scratch family transcriptional repressor 2 |
| *Slc16a2* | 259248 | -0,289 | 2,09E-02 | solute carrier family 16 member 2 |
| *Slc4a4* | 84484 | -0,350 | 3,07E-04 | solute carrier family 4 member 4 |

| | | | | |
|---|---|---|---|---|
| *Slc7a14* | 499587 | -0,453 | 7,10E-03 | solute carrier family 7, member 14 |
| *Slc7a2* | 64554 | -0,454 | 8,76E-03 | solute carrier family 7 member 2 |
| *Smad9* | 85435 | -0,486 | 3,86E-02 | SMAD family member 9 |
| *Sned1* | 316638 | -0,383 | 2,60E-02 | sushi, nidogen and EGF-like domains 1 |
| *Spata13* | 305938 | -0,418 | 4,77E-03 | spermatogenesis associated 13 |
| *Srxn1* | 296271 | 0,725 | 1,30E-38 | sulfiredoxin 1 |
| *Sult1a1* | 83783 | 0,629 | 1,82E-22 | sulfotransferase family 1A member 1 |
| *Sv2c* | 29643 | -0,522 | 9,70E-03 | synaptic vesicle glycoprotein 2c |
| *Tanc2* | 303599 | -0,259 | 4,31E-02 | tetratricopeptide repeat, ankyrin repeat and coiled-coil containing 2 |
| *Tenm2* | 117242 | -0,280 | 1,76E-04 | teneurin transmembrane protein 2 |
| *Tenm4* | 308831 | -0,374 | 7,75E-04 | teneurin transmembrane protein 4 |
| *Tgfbr2* | 81810 | -0,268 | 2,82E-02 | transforming growth factor, beta receptor 2 |
| *Tinagl1* | 94174 | 0,751 | 9,21E-21 | tubulointerstitial nephritis antigen-like 1 |
| *Tlr2* | 310553 | -0,805 | 1,53E-11 | toll-like receptor 2 |
| *Tmc7* | 499254 | -0,718 | 1,75E-06 | transmembrane channel-like 7 |
| *Tmem119* | 304581 | 0,649 | 3,07E-28 | transmembrane protein 119 |
| *Tnfrsf11a* | 498206 | 1,185 | 2,02E-70 | TNF receptor superfamily member 11A |
| *Tnfrsf12a* | 302965 | 0,590 | 2,12E-09 | TNF receptor superfamily member 12A |
| *Tppp* | 361466 | -0,360 | 5,41E-04 | tubulin polymerization promoting protein |
| *Tsc22d3* | 83514 | 0,739 | 2,98E-37 | TSC22 domain family, member 3 |
| *Ttll10* | 298692 | -0,861 | 1,05E-03 | tubulin tyrosine ligase like 10 |
| *Tub* | 25609 | -0,304 | 3,25E-04 | TUB bipartite transcription factor |
| *Unc5d* | 306534 | -0,456 | 2,39E-03 | unc-5 netrin receptor D |
| *Xylt1* | 64133 | -0,259 | 1,99E-02 | xylosyltransferase 1 |
| *Zbtb16* | 353227 | 2,046 | 2,79E-52 | zinc finger and BTB domain containing 16 |
| *Zim1* | 308322 | -0,487 | 2,71E-03 | zinc finger, imprinted 1 |

## Supplementary Figures




| Biological Process (Gene Ontology) | | | |
|---|---|---|---|
| *GO-term* | *description* | *count in network* | *false discovery rate* |
| GO:0097623 | Potassium ion export across plasma membrane | 2 of 17 | 0.0171 |
| GO:1990573 | Potassium ion import across plasma membrane | 3 of 42 | 0.00072 |
| GO:1901379 | Regulation of potassium ion transmembrane transport | 3 of 94 | 0.0070 |
| GO:0005249 | Voltage-gated potassium channel activity | 7 of 96 | 6.44e-12 |

**Figure S1.** Functional annotation of 10 ISIAH strain specific DEGs associated with Potassium ion transmembrane transport. Edges represent protein–protein associations. Purple lines indicate experimentally determined interactions; blue lines denote known interactions from curated databases; dark blue lines represent gene co-occurrence; black lines indicate coexpression; green lines represent results of text mining. Protein-protein interaction (PPI) enrichment p-value: 0.000192.

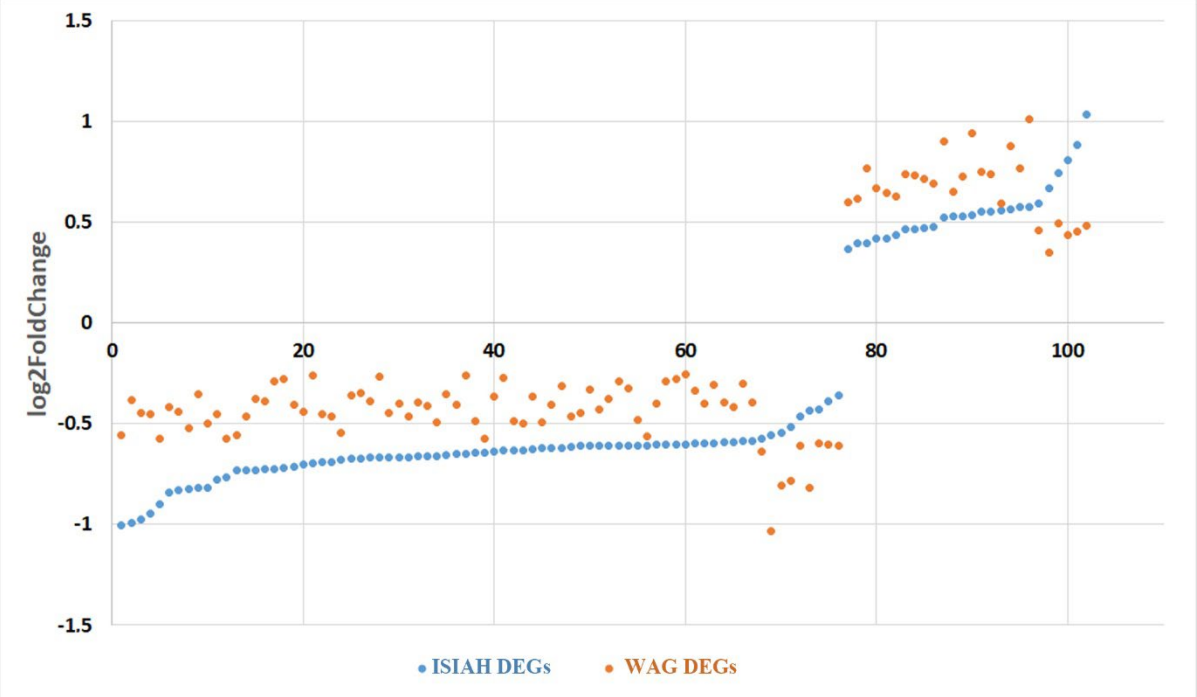
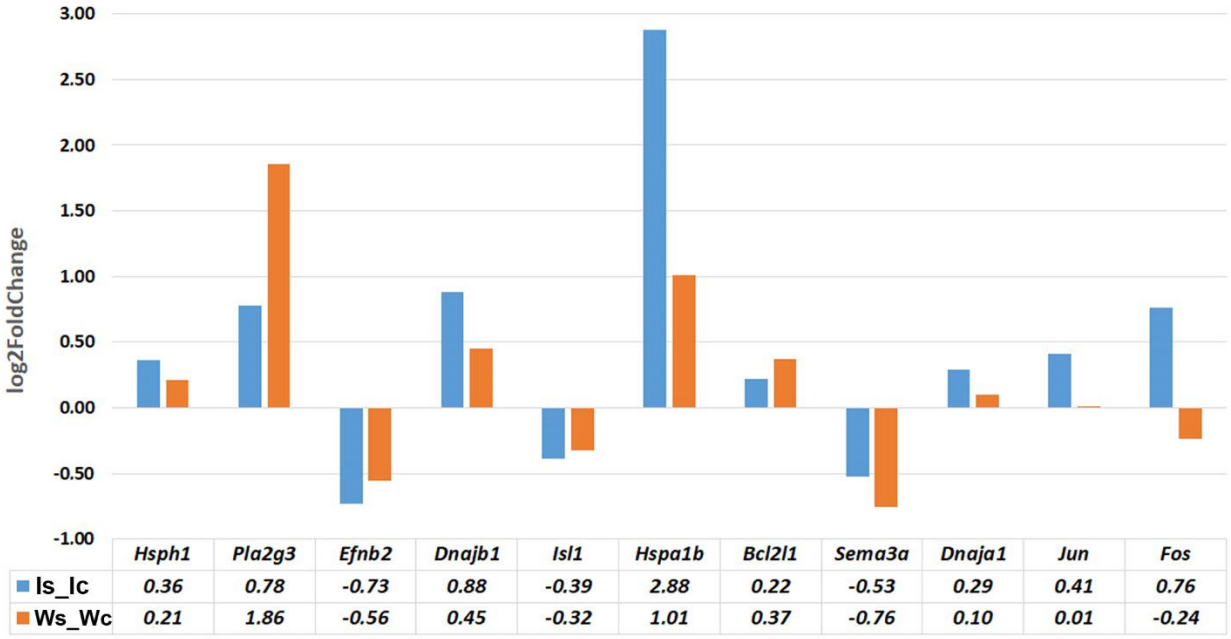



**Figure S2.** DEGs that altered transcription levels by 1.5-fold in the hypothalamus of only one of the rat strains.




| | Hsph1 | Pla2g3 | Efnb2 | Dnajb1 | Isl1 | Hspa1b | Bcl2l1 | Sema3a | Dnaja1 | Jun | Fos |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Is_Ic | 0.36 | 0.78 | -0.73 | 0.88 | -0.39 | 2.88 | 0.22 | -0.53 | 0.29 | 0.41 | 0.76 |
| Ws_Wc | 0.21 | 1.86 | -0.56 | 0.45 | -0.32 | 1.01 | 0.37 | -0.76 | 0.10 | 0.01 | -0.24 |

**Figure S3.** Comparison of key DEG expression changes in the hypothalamus of ISIAH and WAG rats when exposed to restraint stress. Ic, ISIAH_control; Wc, WAG_control; Is, ISIAH_stress; Ws, WAG_stress;