# Effective reconstruction of functional organotypic kidney spheroid for *in vitro* nephrotoxicity studies

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**Supplemental information**

**Supplemental figure 1. Characterization of immortalized cells derived from mouse kidney.**

**a.** Schematic diagram of the isolation and immortalization of cells with high proliferative capacity. **b-c**. hTERT (b) and SV40 (c) expression in immortalized cells at different passage. **d**. Cumulative doubling numbers for three primary cell lines and three immortalized cell lines throughout *ex vivo* expansion. **e.** Relative transcript levels of mesenchymal stem cell markers in mouse kidney (mKidney), and immortalized cells at the fifth and 15th passages. n=3 of each group. All data are shown as the means ± s.e.m. *P<0.05 compared to mKidney by unpaired Student's t test.

**Supplemental figure 2. Characterization of primary cells derived from mouse kidney.**

**a.** Morphology of mouse tubular epithelial cells during *in vitro* culture. Cell changed their morphology to fibroblast like cells after passage 4. **b.** Quantitative RT-PCR analysis of EMT markers such as vimentin, fibronectin and e-cadherin in mouse cells at the primary, and $4^{th}$ passages. n=3 of each group. **c.** Related mRNA levels of kidney segment specific markers in the cell at primary, $1^{st}$ and $3^{rd}$ passage. n=3 of each group. All data are shown as the means ± s.e.m. *P<0.05 compared to primary cells by unpaired Student's t test.

**Supplemental figure 3. Characterization of single segment depletion cells from immortalized cells.**

**a.** Morphology of single segment depletion cells after magnetic activated cell sorting. Cells were maintained same methods used for culturing immortalized cells. Cell of

AQP1 or THP depletion cells changed their morphology to fibroblast like cells. **b.** Quantitative RT-PCR analysis of AQP1, AQP2, podocin (PODO), and THP to show to lose of single marker in the depletion cells. **c.** FACS analysis of tubule segment markers in AQP1, AQP2, podocin or THP depletion cells. CTL cells (open black histograms) and each marker depletion cells (open red histograms) were stained with anti-AQP1, AQP2, podocin or THP or isotype control mAb (grey histograms).

**Supplemental figure 4. Analysis of multiple renal progenitor cells in immortalized cells at early and late passage.**

FACS analysis of renal progenitor cells markers such as Cd133 and Sox9 (a) and ureteric bud epithelial cell marker as Hoxb7 (b) in mouse immortalized cells at early ($4^{th}$ passage) and late ($16^{th}$ passage) passage. **a**, Fluorescence data from cells at $4^{th}$ and $16^{th}$ passage clarifies which cells expressed renal progenitor cells markers, Cd133 and Sox9. The percentage of immortalized cells express only Cd133, only Sox9, or both was presented in right table. **b**, Fluorescence data from cells at $4^{th}$ and $16^{th}$ passage clarifies which cells expressed Cd133 and Hoxb7. The percentage of immortalized cells express only CD133, only Hoxb7, or both was presented in right table.

**Supplemental figure 5. Characterization of immortalized cells derived from human kidney.**

**a**. Morphology of human tubular epithelial cells during *in vitro* expansion. **b**. Quantitative RT-PCR analysis of kidney-specific segment markers in immortalized human cells at $1^{st}$ and at the $6^{th}$ passage. n=3 each group. **c**. Representative images of immunostaining of human primary cells at $2^{nd}$ passage and immortalized cells at $6^{th}$ passage for LTL, PNA, AQP2, and nephrin. **d**. GGT activity of human immortalized

primary cells compared to a human primary tubular epithelial cells (hPTECs). n=6 hPTECs and n=8 human renal primary cells. **e**. Dextran uptake by human immortalized cells at 3nd passage after 48 h incubation with Alexa Fluor 488-conjugated dextran. All data are shown as the means ± s.e.m. *$p$<0.05 compared to hPTECs cells by unpaired Student's $t$ test. Scale bar, 20μm.

**Supplemental figure 6. Characterization of cell aggregates and kidney spheroids embedded gel matrix derived from immortalized primary cells using spheroid forming unit (SFU) protocol.**

**a-c.** Relative mRNA expression of kidney segment specific markers (a), basolateral (b) and apical (c) transporters in cell aggregates using SFU (combination of hanging-drop and rotation) compared to 2D cultured cells. n=6 of 2D cells and cell aggregates. **d**. Representative images of mouse kidney spheroids embedded ECM gel (Sigma), matrigel or mixture of ECM and matrigel as 2:1 ratio at day 5 after SFU stained with hematoxylin and eosin (H&E). The tubular structures were marked by a red arrow in the image. **e.** Gel mixture only (left) and cell-embedded gel mixture after 5 days of maturation (right). **f.** Related mRNA levels of kidney segment specific markers in the kidney spheroid embedded in the mixture of ECM and matrigel compared to spheroids embedded in matrigel. **g-h.** Quantitative RT-PCR analysis of basolateral (g) and apical (h) transporters in kidney spheroids cultured in the various combination of maturation factors for 5 days. CTL means kidney spheroids without factors, DIVE means kidney spheroids cultured in DMEM/F12 supplemented with 10% FBS, 1X ITS, 20 ng/mL epidermal growth factor (EGF), 100 nM dexamethasone, and 20 uM 1α,25-Dihydroxyvitamin D3, VR means kidney spheroids cultured in DMEM/F12 supplemented with 10% FBS, 20 uM 1α,25-Dihydroxyvitamin D3 and 5 μM all-trans

retinoic acid (ATRA) and DIVER-DIVE means kidney spheroids cultured in DMEM/F12 supplemented with 10% FBS, 1X ITS, 20 ng/mL epidermal growth factor (EGF), 100 nM dexamethasone, 20 uM 1α,25-Dihydroxyvitamin D3 and 5 μM all-trans retinoic acid (ATRA) for 6h then cultured in same medium with our ATRA. n=3 of each group. All data are shown as the means ± s.e.m. *P<0.05 compared to cells embedded matrigel by unpaired Student's *t* test.

**Supplemental figure 7. Gene Set Enrichment Analysis (GSEA) generated by RNA-seq analysis from kidney spheroids.**

The gene expression data generated by RNA-seq was analyzed using GSEA to extract biological knowledge. Highly, significant enriched gene-sets are shown here. **a.** GSEA analysis highlighting strong enrichment for the glutathione metabolism (left) and heatmap analysis of the expression of transcripts related to glutathione metabolism (right). **b.** GSEA analysis highlighting strong enrichment for the sulfur compound metabolic process (left) and heatmap analysis of the expression of transcripts related to sulfur compound metabolic process (right). **c.** GSEA analysis highlighting strong enrichment for response to toxic substance (left) and heatmap analysis of the expression of transcripts related to response to toxic substance (right).

**Supplemental figure 8. Effects of shear stress by SFU culture condition on kidney spheroid maturation.**

**a-b**. Relative mRNA (a) and protein (b) expression of ER stress markers such as XBP-1, AFT4, ATF6, and CHOP at 1, 3, 6, and 24 hours of SFU protocol compared to spheroids cultured in static medium for 24 hours (0h of SFU). n=3 of each time point. **c-d.** Quantitative mRNA expression related to early renal progenitor markers (c) and mature segment marker (d) at 1, 3, 6, 24, 48 and 72 hours of SFU protocol compared

to spheroids cultured in static medium for 24 hours (0h of SFU). n=4 of each time point. **e.** Promoter sequence of WT1 and transcription factor binding sites identified in the box. Binding motif of XBP-1 identified in the red. **f.** Promoter sequence of AQP1 and transcription factor binding sites identified in the box. Binding motif of WT1 identified in the red. **g.** Western blot analysis to show the sequential expression of XBP-1, WT1, and AQP1 at the different time point of SFU protocol. **h.** Summary animation of findings that SFU induced the renal spheroid maturation. All data are shown as the means ± s.e.m. *P<0.05 compared to spheroid at 0h of SFU protocol by unpaired Student's *t* test.

**Supplemental figure 9. Reproducibility human kidney spheroids**

**a**. FACS analysis of tubule segment markers in human kidney spheroid (hKidS) generated by immortalized cells at the $4^{th}$ and $13^{th}$ passages. Kidney spheroid at the $4^{th}$ and $13^{th}$ passages were stained with anti-AQP1, PNA, Nephrin, or AQP2 (open histograms), or isotype control mAb (grey histograms). **b**. Quantitative RT-PCR analysis of kidney-specific segment markers in hKidS generated by cells at the $4^{th}$ and $13^{th}$ passage compared with 2D controls (2D CTL). n = 6 for 2D CTL and n = 5 for hKidS at the 4th and 20th passages. **c-d**. Relative mRNA expression of apical (c) and basolateral (d) transporters in hKidS at the $4^{th}$ and $13^{th}$ passages compared with 2D cultured cells. n = 6 for 2D CTL and n = 5 for hKidS at the $4^{th}$ and $13^{th}$ passages. **e**. Responses to parathyroid hormone (PTH) of hKidS at the $4^{th}$ and $13^{th}$ passages compared to 3D CTL. **f**. GGT activity in hKidS at the $4^{th}$ and $13^{th}$ passages compared to 3D CTL. n = 5 for 3D CTL and hKidS at the $4^{th}$ and $13^{th}$ passages for e-f. All data are shown as the means ± s.e.m. *p < 0.05 compared with 2D or 3D control by unpaired Student's t-test. Scale bar, 20 μm.

**Supplemental figure 10. Assessments of stability and extended culture effects of human kidney spheroids.**

**a**. Relative mRNA expression of kidney segment specific markers in human kidney spheroids (hKidS) for 21 days (at day 0, 3, 7, 14, and 21) after maturation compared to 2D cultured cells (CTL). n=3 of 2D cells and hKidS at each time point. **b**. Response to parathyroid hormone (PTH) of long-term cultured hKidS at 0d, 3d, 7d, 14d, and 21d compared with 3D control spheroids (without maturation factors, CTL). n = 4 of 3D CTL and hKidS each time point. **c**. GGT activity in hKidS after 21 days of maturation compared to 3D CTL. n=3 of CTL and hKidS at each time point, respectively. **d**. Dextran-fluorescein uptake of long-term cultured hKidS compare to 3D CTL. N = 3 of 3D CTL and hKidS at each time point, respectively. **e**. Apoptosis profile by MUSE analyzer in hKidS at the different time point of extended culture after maturation incubated with 20 μM cisplatin (CPT). Cell viability assay was performed by the Muse Count & Viability reagent (Millipore) following the manufacturer's protocols. The results were obtained with Muse Count & Viability software module and the statistics were shown as the percentage of viable cells and annexin V-positive apoptotic cells. All data are shown as the means ± s.e.m. *P<0.05 compared to untreated control by unpaired Student's *t* test.

**Supplemental figure 11. Assessment of response to nephrotoxicants in kidney spheroids.**

**a**. Live/dead stained images of mouse kidney spheroids incubated with 100μM acyclovir for 24 h. **b**. Relative mRNA expression of kidney injury markers such as Hacvr1, Lcn2, and clusterin after 40uM or 100uM acyclovir treatment compare to

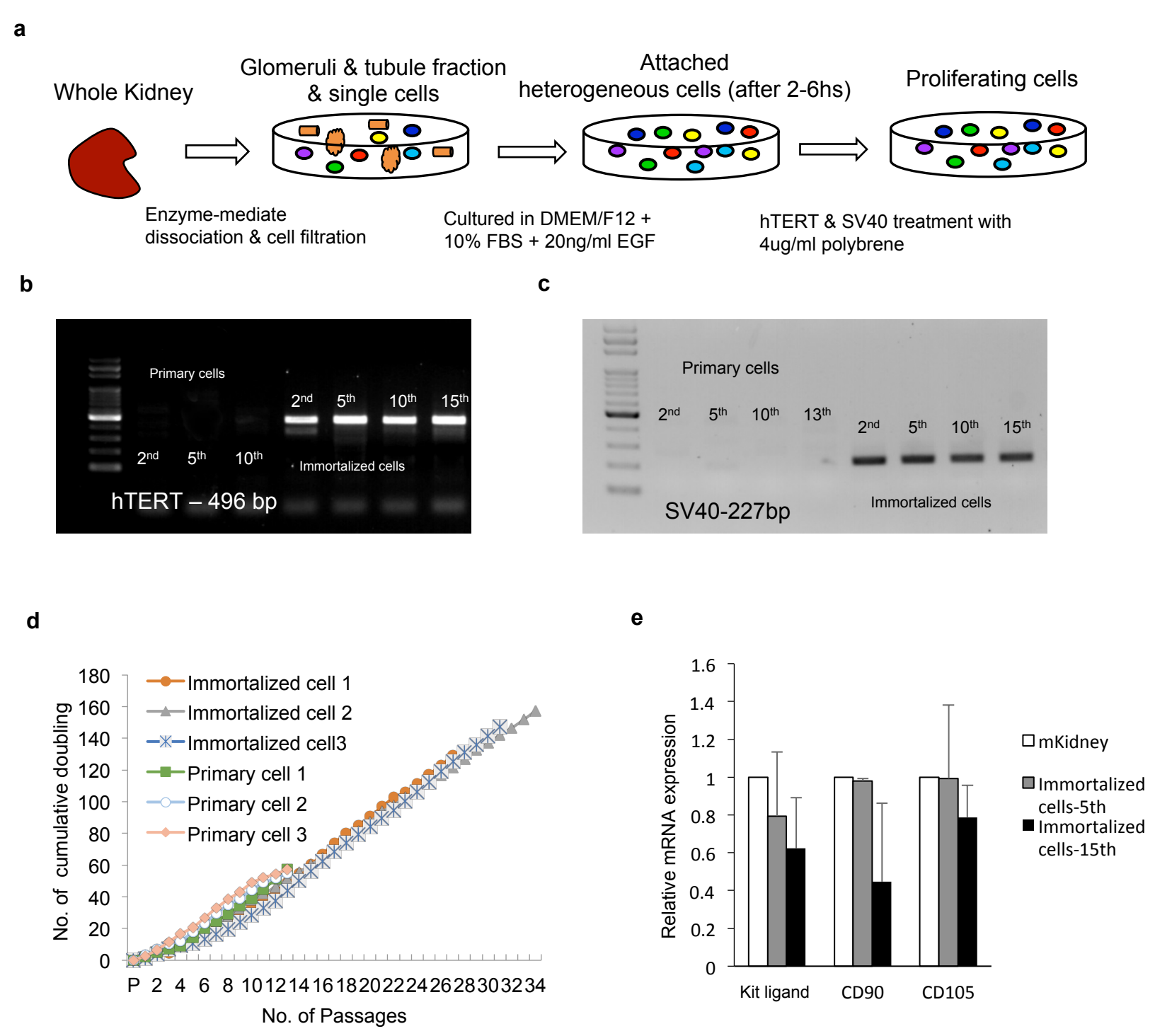
untreated spheroids. n=4 of each group. **c.** Live/dead stained images of mouse kidney spheroids incubated with 7.5 uM for 24 h. **d.** Relative mRNA expression of kidney injury markers such as Hacvr1, Lcn2, and clusterin after 3uM or 7.5uM doxorubicin treatment compared to untreated control. n=4 of each group All data are shown as the means ± s.e.m. *P<0.05 compared to untreated control by unpaired Student's *t* test.

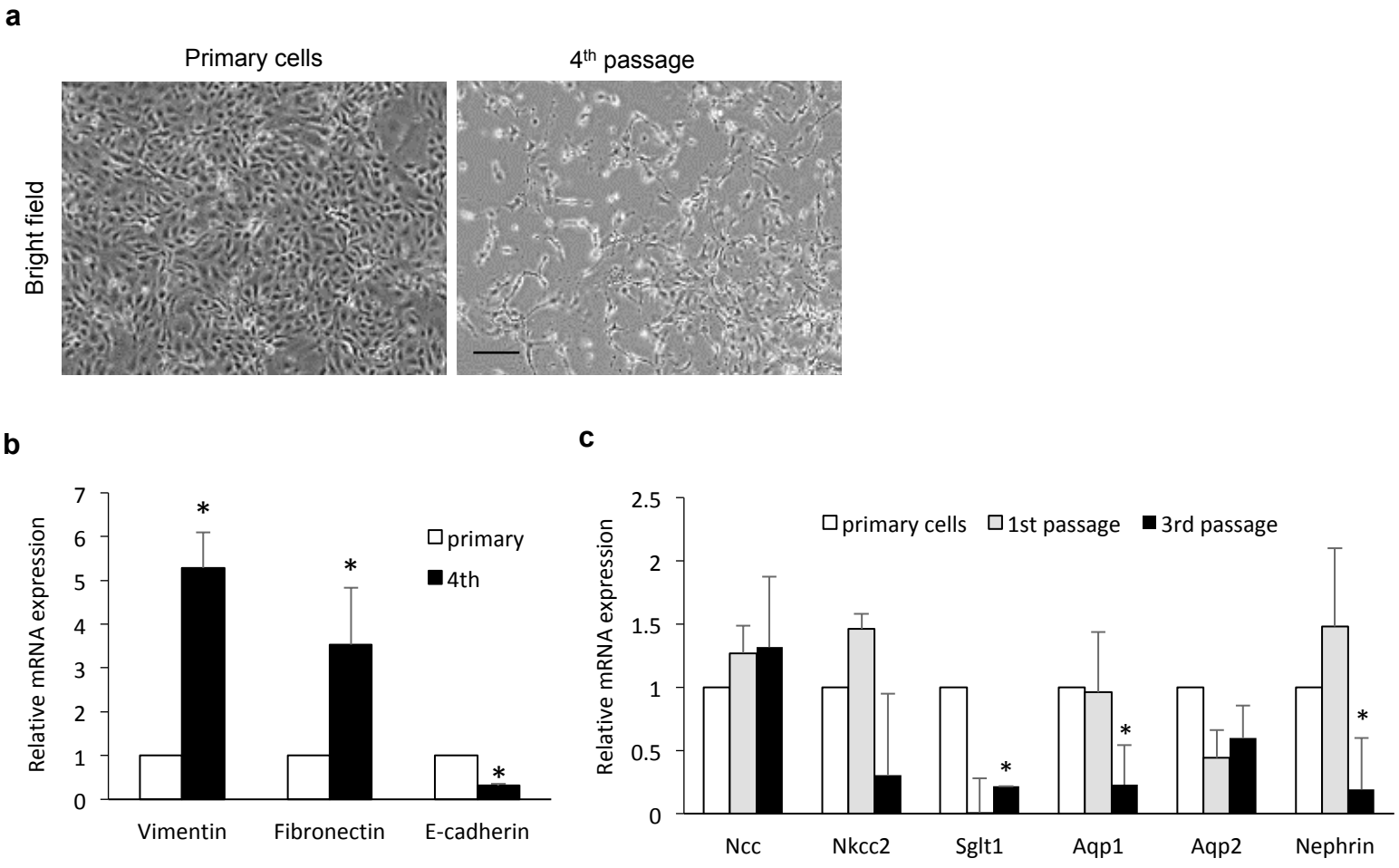
**Supplemental figure 12. Assessment of spheroid-to-spheroid variation response to nephrotoxicants in kidney spheroids.**

Apoptosis profile by MUSE analyzer in there different single a mouse kidney spheroid incubated with 50 μM cyclosporin A or cisplatin for 24 h. Cell viability assay was performed by the Muse Count & Viability reagent (Millipore) following the manufacturer's protocols. The results were obtained with Muse Count & Viability software module and the statistics were shown the percentage of viable cells and annexin V positive apoptotic cells.

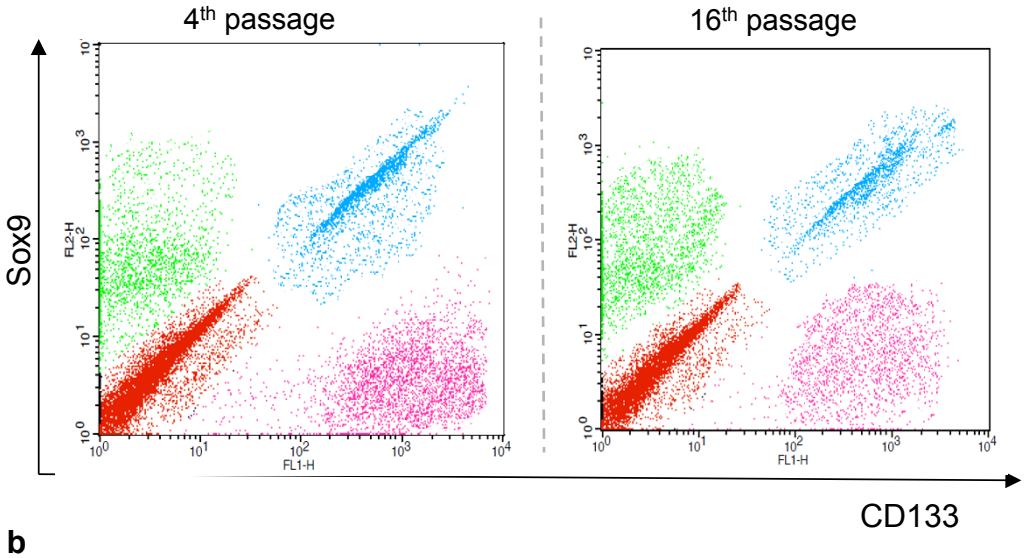
**Supplemental Table I. Sequences of oligonucleotide primers used for qPCR.**

**Supplemental Table II. The list of differentially expressed genes when 2D cells and mouse kidney spheroids (mKidS) were compared.**


a
Whole Kidney
Glomeruli & tubule fraction & single cells
Attached heterogeneous cells (after 2-6hs)
Proliferating cells
Enzyme-mediate dissociation & cell filtration
Cultured in DMEM/F12 + 10% FBS + 20ng/ml EGF
hTERT & SV40 treatment with 4ug/ml polybrene
b
Primary cells
2nd
5th
10th
15th
2nd
5th
10th
Immortalized cells
hTERT – 496 bp
c
Primary cells
2nd
5th
10th
13th
2nd
5th
10th
15th
SV40-227bp
Immortalized cells
d
No. of cumulative doubling
180
160
140
120
100
80
60
40
20
0
Immortalized cell 1
Immortalized cell 2
Immortalized cell3
Primary cell 1
Primary cell 2
Primary cell 3
P 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
No. of Passages
e
Relative mRNA expression
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Kit ligand
CD90
CD105
mKidney
Immortalized cells-5th
Immortalized cells-15th

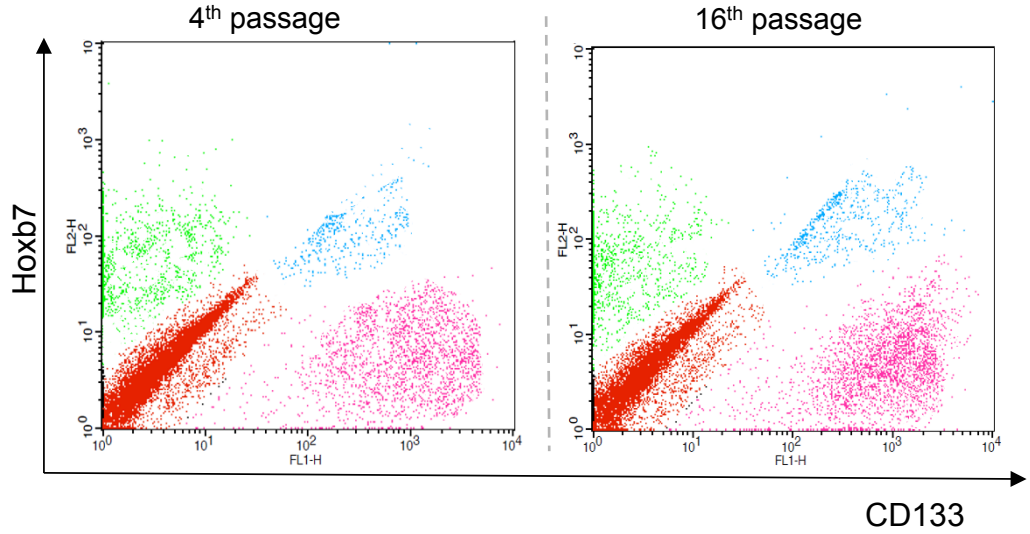

a
Primary cells
4th passage
Bright field
b
Relative mRNA expression
primary
4th
Vimentin
Fibronectin
E-cadherin
c
Relative mRNA expression
primary cells
1st passage
3rd passage
Ncc
Nkcc2
Sglt1
Aqp1
Aqp2
Nephrin

**a**

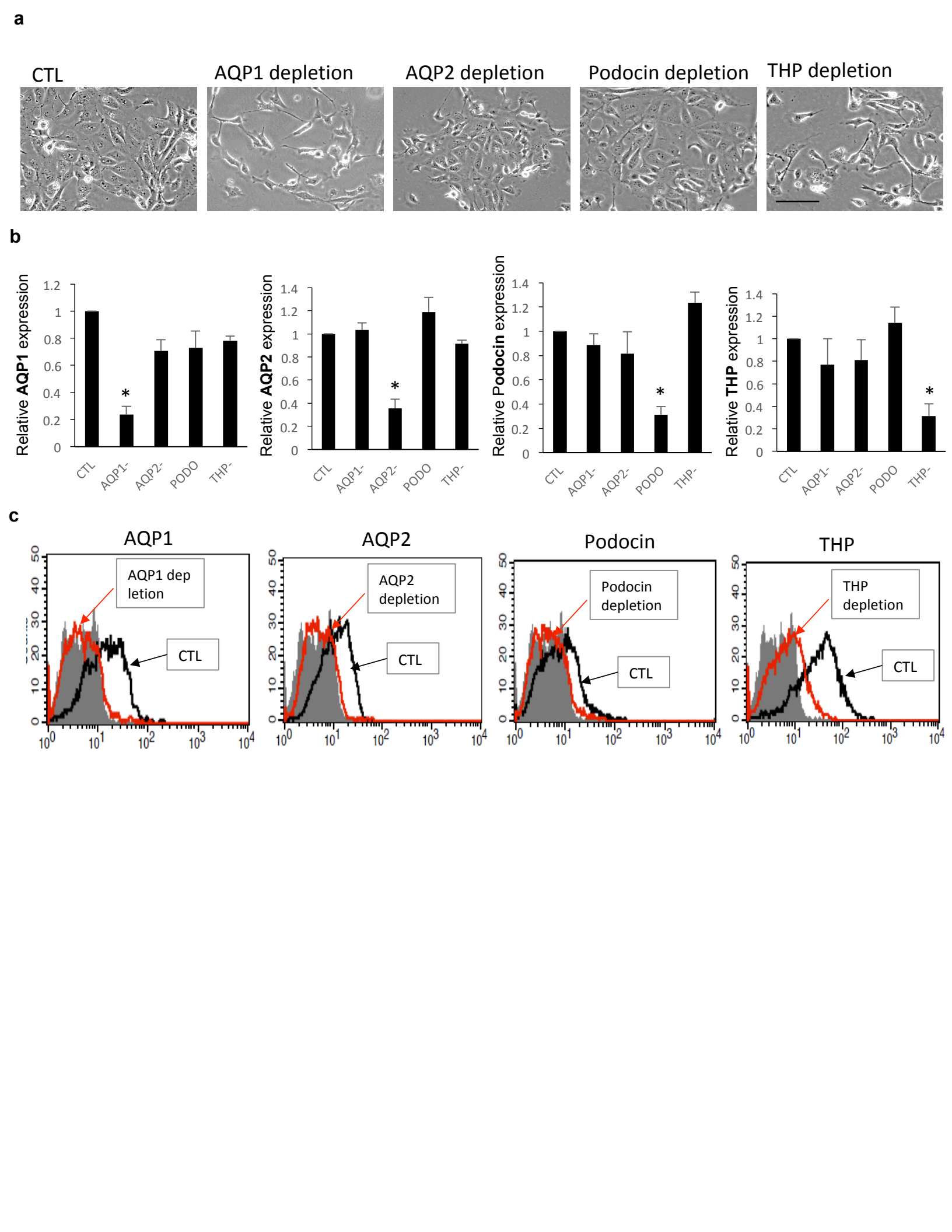


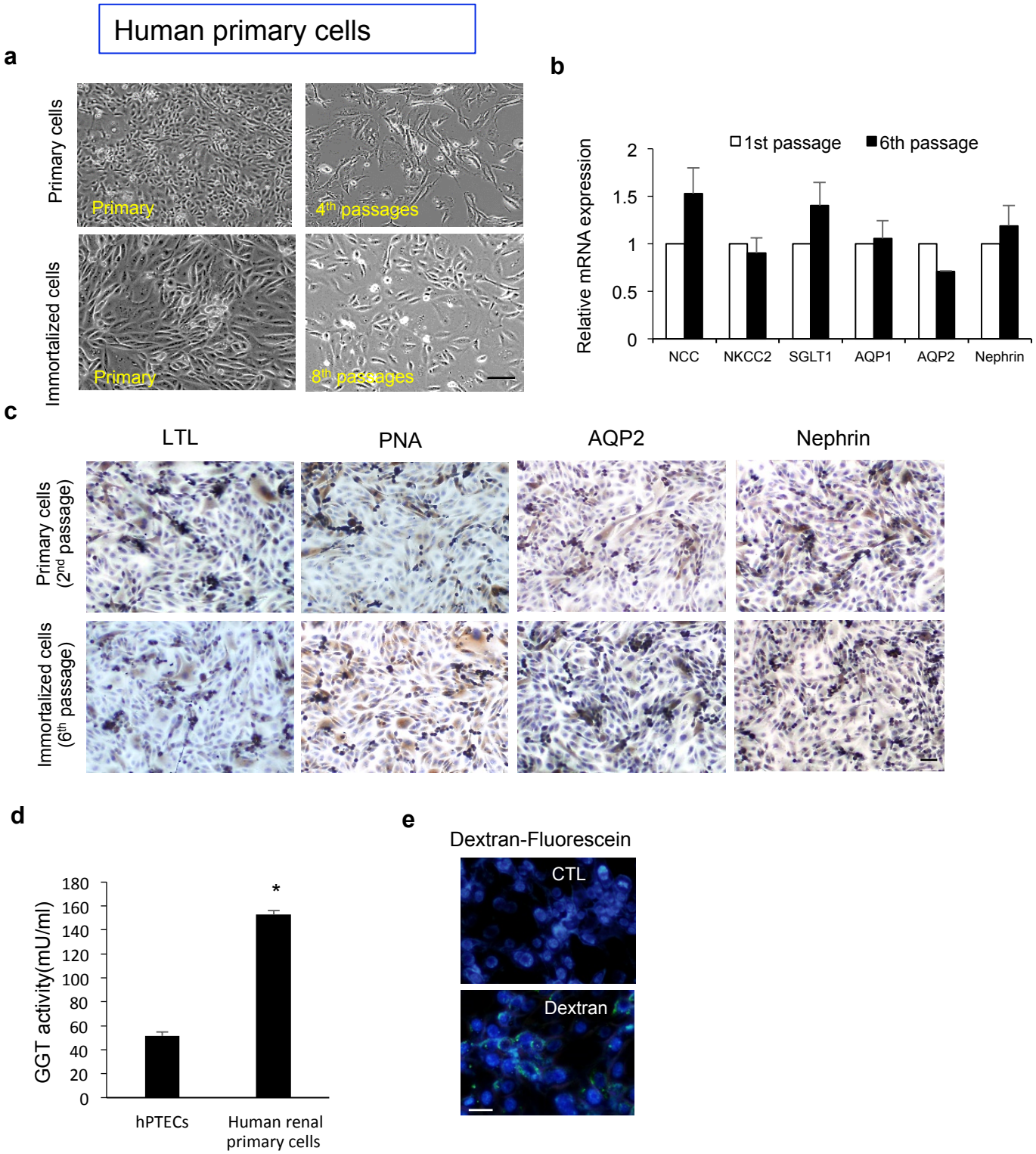

| | 4th | 16th |
|---|---|---|
| CD133+ only | 21.3% | 15.7% |
| Sox9+ only | 18.4% | 19.2% |
| CD133+ Sox9+ | 16.3% | 14.3% |

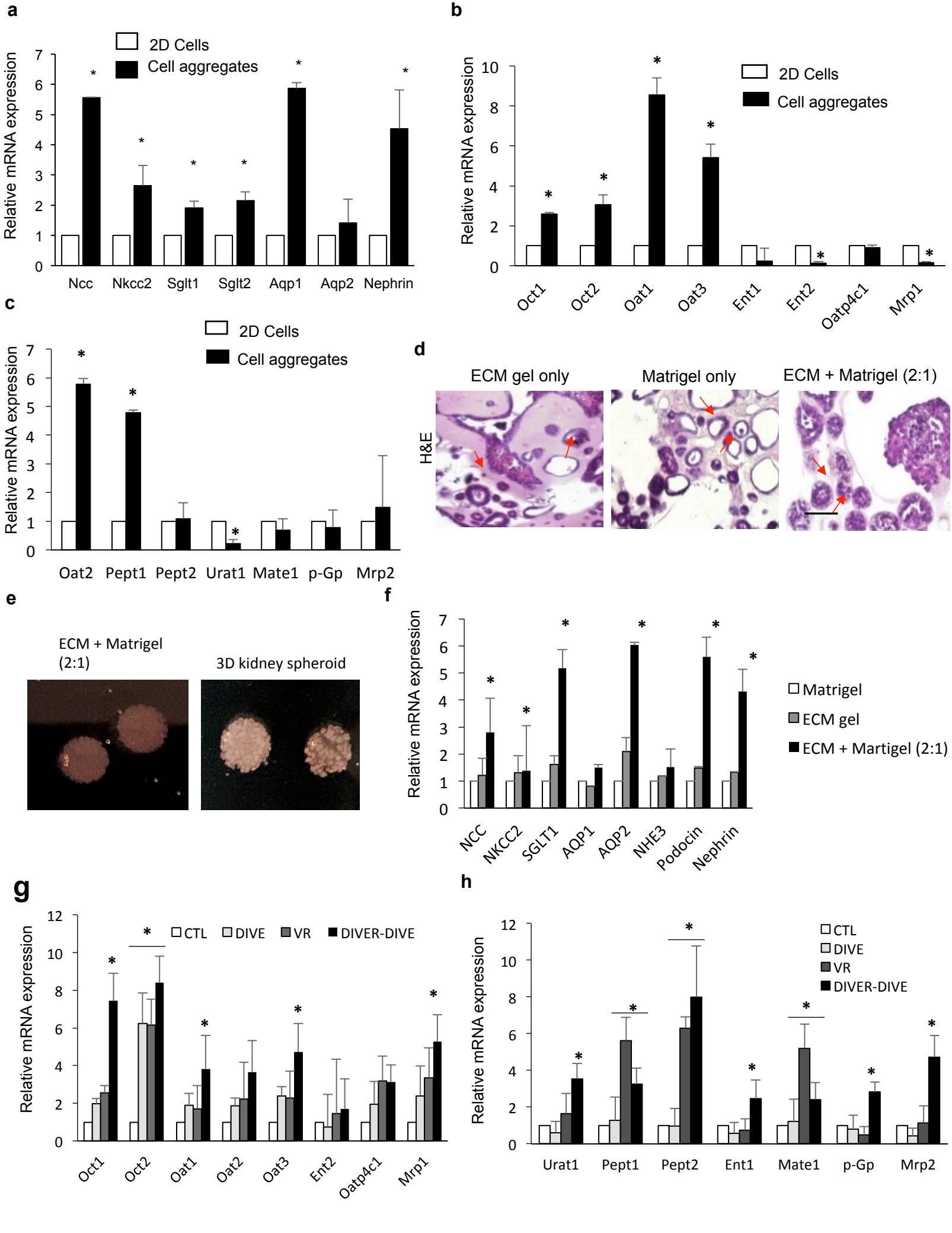
**b**



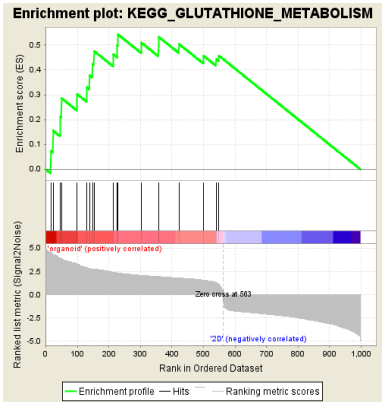

| | 4th | 16th |
|---|---|---|
| CD133+ only | 19.2% | 16.9% |
| Hoxb7+ only | 8.1% | 9.4% |
| CD133+ Hoxb7+ | 4.5% | 5.9% |


a
CTL
AQP1 depletion
AQP2 depletion
Podocin depletion
THP depletion
b
Relative AQP1 expression
Relative AQP2 expression
Relative Podocin expression
Relative THP expression
CTL
AQP1-
AQP2-
PODO
THP-
c
AQP1
AQP2
Podocin
THP
AQP1 depletion
AQP2 depletion
Podocin depletion
THP depletion
CTL


Human primary cells
a
Primary cells
Immortalized cells
Primary
4th passages
Primary
8th passages
b
Relative mRNA expression
1st passage
6th passage
2
1.5
1
0.5
0
NCC
NKCC2
SGLT1
AQP1
AQP2
Nephrin
c
LTL
PNA
AQP2
Nephrin
Primary cells (2nd passage)
Immortalized cells (6th passage)
d
GGT activity(mU/ml)
180
160
140
120
100
80
60
40
20
0
*
hPTECs
Human renal primary cells
e
Dextran-Fluorescein
CTL
Dextran


a
2D Cells
Cell aggregates
Relative mRNA expression
Ncc
Nkcc2
Sglt1
Sglt2
Aqp1
Aqp2
Nephrin
b
2D Cells
Cell aggregates
Relative mRNA expression
Oct1
Oct2
Oat1
Oat3
Ent1
Ent2
Oatp4c1
Mrp1
c
2D Cells
Cell aggregates
Relative mRNA expression
Oat2
Pept1
Pept2
Urat1
Mate1
p-Gp
Mrp2
d
ECM gel only
Matrigel only
ECM + Matrigel (2:1)
H&E
e
ECM + Matrigel (2:1)
3D kidney spheroid
f
Relative mRNA expression
NCC
NKCC2
SGLT1
AQP1
AQP2
NHE3
Podocin
Nephrin
Matrigel
ECM gel
ECM + Martigel (2:1)
g
CTL
DIVE
VR
DIVER-DIVE
Relative mRNA expression
Oct1
Oct2
Oat1
Oat2
Oat3
Ent2
Oatp4c1
Mrp1
h
CTL
DIVE
VR
DIVER-DIVE
Relative mRNA expression
Urat1
Pept1
Pept2
Ent1
Mate1
p-Gp
Mrp2

**a**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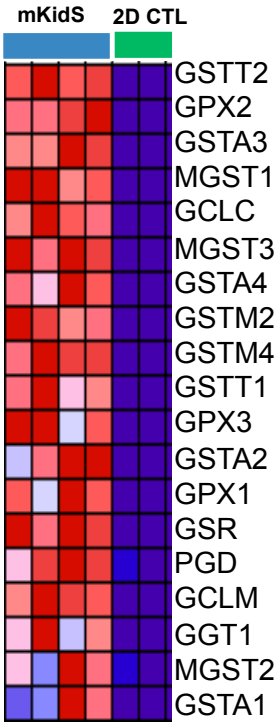
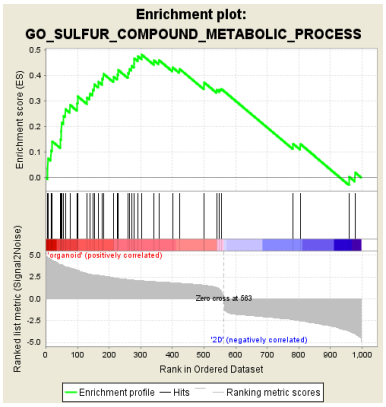
Enrichment score (ES)
'organoid' (positively correlated)
Zero cross at 563
'2D' (negatively correlated)
Ranked list metric (Signal2Noise)
Rank in Ordered Dataset
Enrichment profile
Hits
Ranking metric scores


mKidS
2D CTL
GSTT2
GPX2
GSTA3
MGST1
GCLC
MGST3
GSTA4
GSTM2
GSTM4
GSTT1
GPX3
GSTA2
GPX1
GSR
PGD
GCLM
GGT1
MGST2
GSTA1

**b**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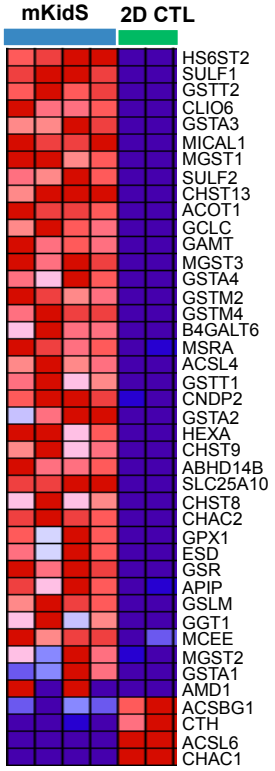
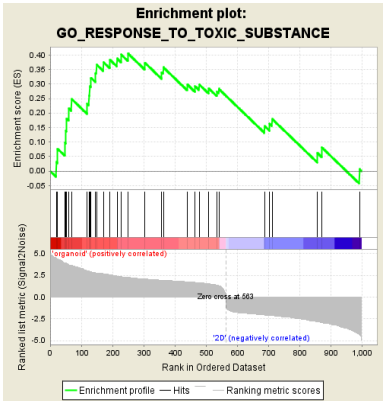
'2D' (negatively correlated)
Ranked list metric (Signal2Noise)
Rank in Ordered Dataset
Enrichment profile
Hits
Ranking metric scores


mKidS
2D CTL
HS6ST2
SULF1
GSTT2
CLIO6
GSTA3
MICAL1
MGST1
SULF2
CHST13
ACOT1
GCLC
GAMT
MGST3
GSTA4
GSTM2
GSTM4
B4GALT6
MSRA
ACSL4
GSTT1
CNDP2
GSTA2
HEXA
CHST9
ABHD14B
SLC25A10
CHST8
CHAC2
GPX1
ESD
GSR
APIP
GSLM
GGT1
MCEE
MGST2
GSTA1
AMD1
ACSBG1
CTH
ACSL6
CHAC1

**c**


Enrichment plot:
GO_RESPONSE_TO_TOXIC_SUBSTANCE
Enrichment score (ES)
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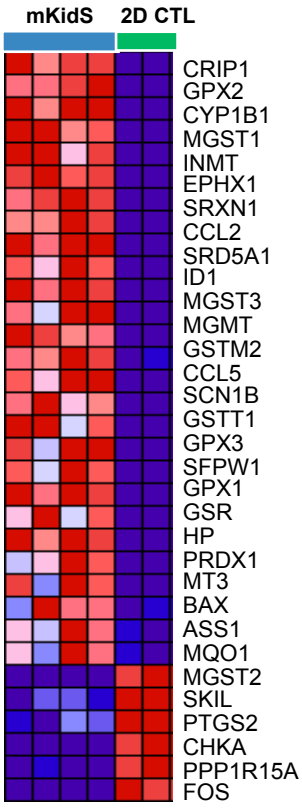
'2D' (negatively correlated)
Ranked list metric (Signal2Noise)
Rank in Ordered Dataset
Enrichment profile
Hits
Ranking metric scores


mKidS
2D CTL
CRIP1
GPX2
CYP1B1
MGST1
INMT
EPHX1
SRXN1
CCL2
SRD5A1
ID1
MGST3
MGMT
GSTM2
CCL5
SCN1B
GSTT1
GPX3
SFPW1
GPX1
GSR
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MT3
BAX
ASS1
MQO1
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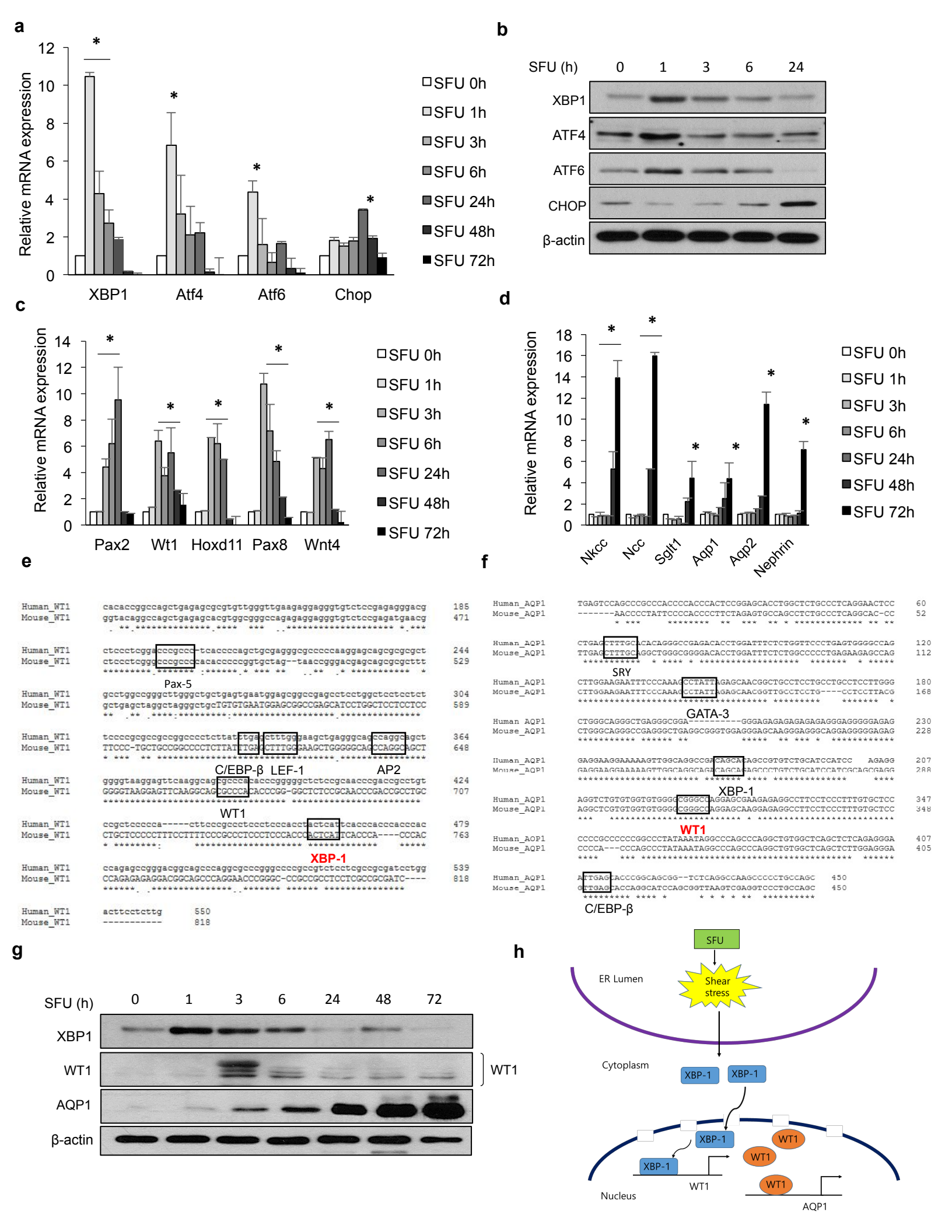
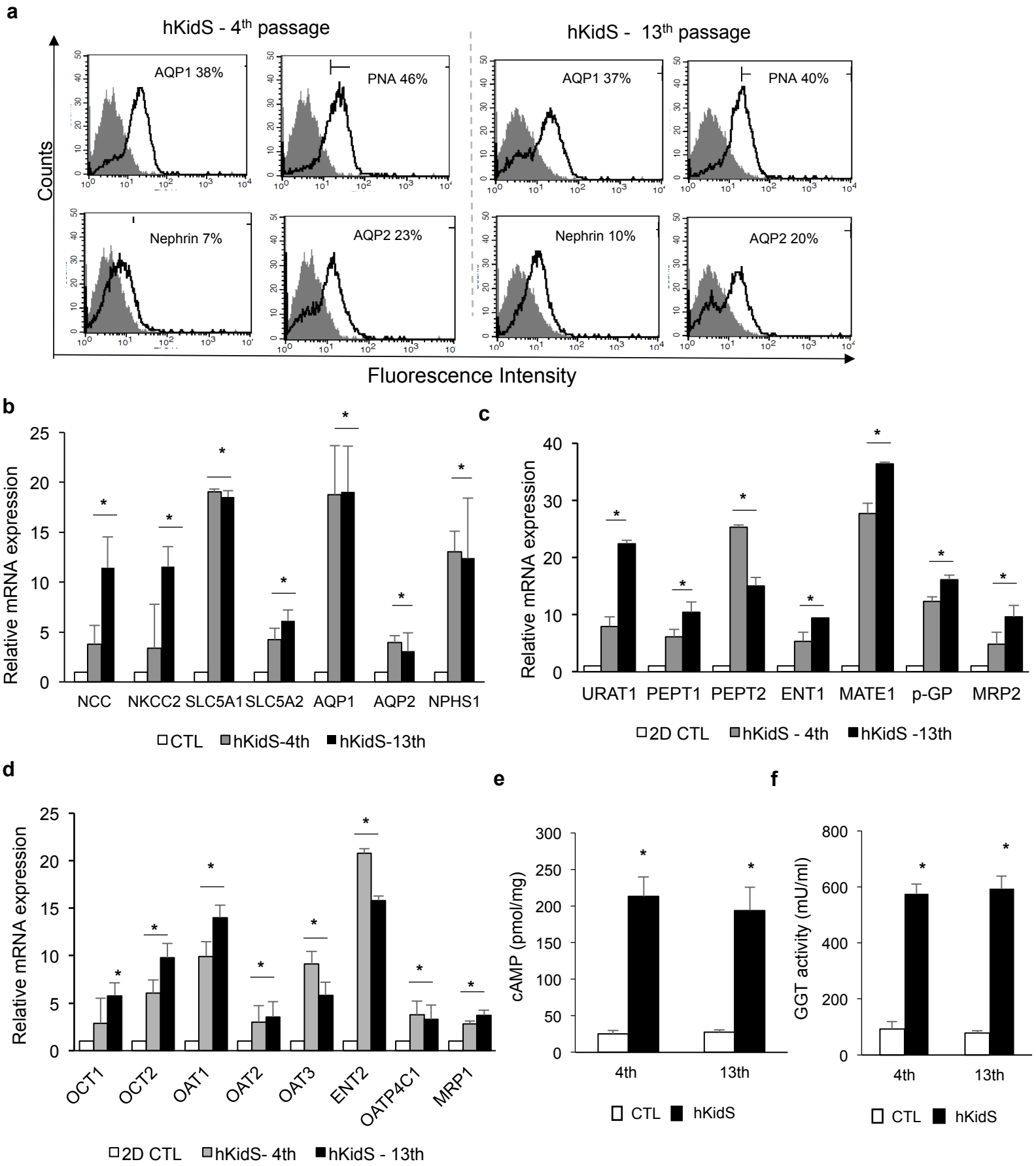
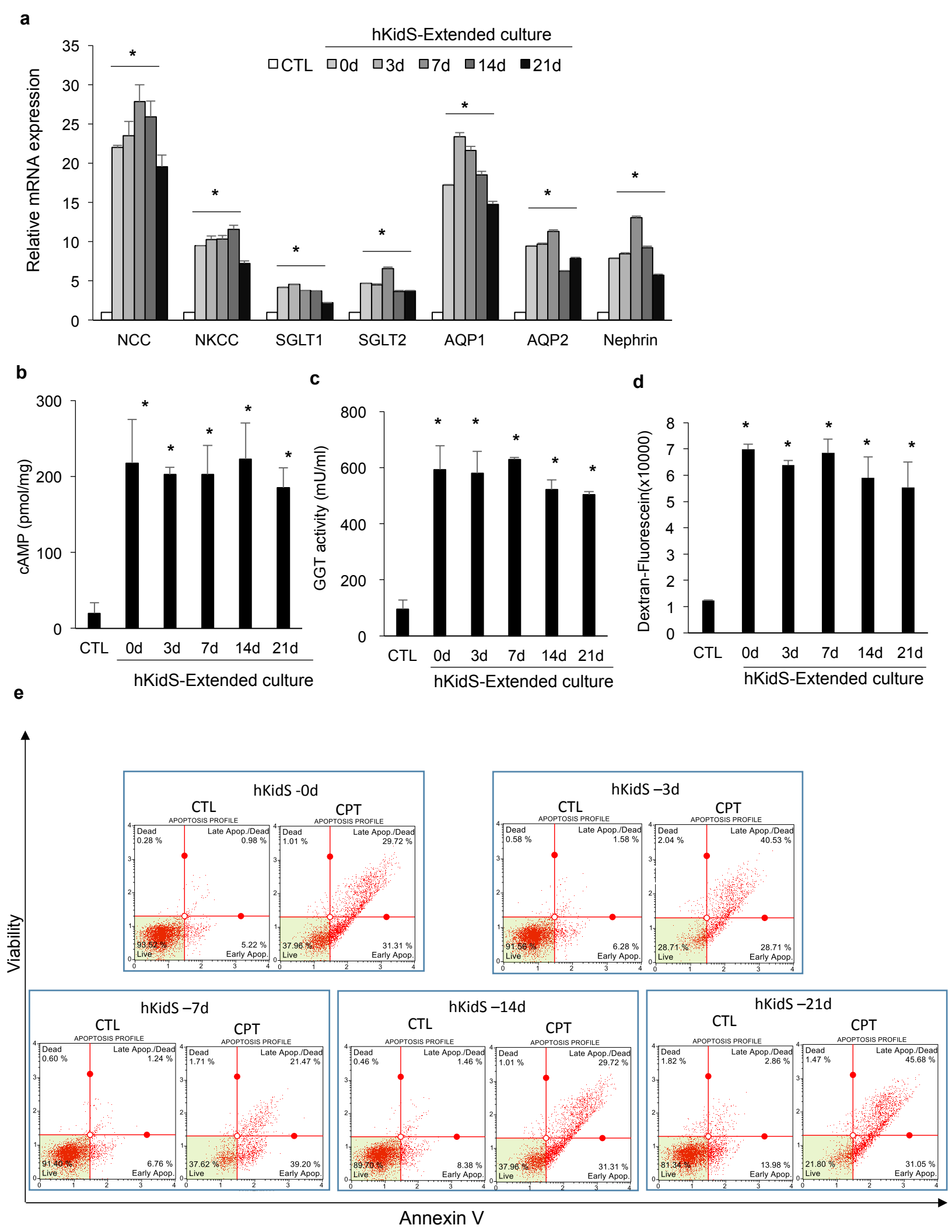
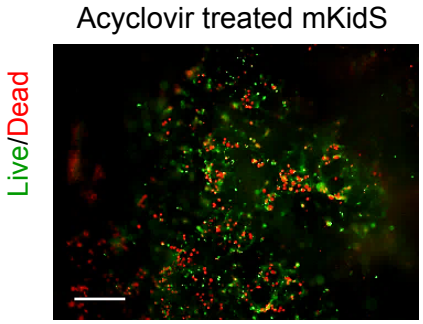
SKIL
PTGS2
CHKA
PPP1R15A
FOS


a
Relative mRNA expression
XBP1
Atf4
Atf6
Chop
SFU 0h
SFU 1h
SFU 3h
SFU 6h
SFU 24h
SFU 48h
SFU 72h
b
SFU (h)
0
1
3
6
24
XBP1
ATF4
ATF6
CHOP
β-actin
c
Relative mRNA expression
Pax2
Wt1
Hoxd11
Pax8
Wnt4
d
Relative mRNA expression
Nkcc
Ncc
Sglt1
Aqp1
Aqp2
Nephrin
e
Human_WT1
Mouse_WT1
Pax-5
C/EBP-β
LEF-1
AP2
WT1
XBP-1
f
Human_AQP1
Mouse_AQP1
SRY
GATA-3
XBP-1
WT1
C/EBP-β
g
SFU (h)
0
1
3
6
24
48
72
XBP1
WT1
AQP1
β-actin
WT1
h
SFU
ER Lumen
Shear stress
Cytoplasm
XBP-1
XBP-1
XBP-1
WT1
WT1
XBP-1
WT1
WT1
Nucleus
AQP1

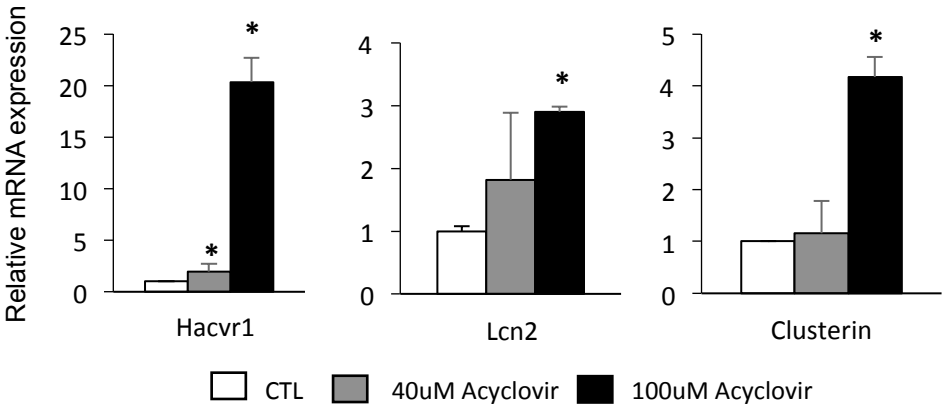

a
hKidS - 4th passage
hKidS - 13th passage
AQP1 38%
PNA 46%
AQP1 37%
PNA 40%
Nephrin 7%
AQP2 23%
Nephrin 10%
AQP2 20%
Counts
Fluorescence Intensity
b
Relative mRNA expression
NCC
NKCC2
SLC5A1
SLC5A2
AQP1
AQP2
NPHS1
CTL
hKidS-4th
hKidS-13th
c
Relative mRNA expression
URAT1
PEPT1
PEPT2
ENT1
MATE1
p-GP
MRP2
2D CTL
hKidS - 4th
hKidS -13th
d
Relative mRNA expression
OCT1
OCT2
OAT1
OAT2
OAT3
ENT2
OATP4C1
MRP1
2D CTL
hKidS- 4th
hKidS - 13th
e
cAMP (pmol/mg)
4th
13th
CTL
hKidS
f
GGT activity (mU/ml)
4th
13th
CTL
hKidS


a
hKidS-Extended culture
CTL 0d 3d 7d 14d 21d
Relative mRNA expression
NCC
NKCC
SGLT1
SGLT2
AQP1
AQP2
Nephrin
b
cAMP (pmol/mg)
c
GGT activity (mU/ml)
d
Dextran-Fluorescein(x10000)
hKidS-Extended culture
e
Viability
Annexin V
hKidS -0d
hKidS –3d
hKidS –7d
hKidS –14d
hKidS –21d
CTL
CPT
APOPTOSIS PROFILE
Dead
Late Apop./Dead
Live
Early Apop.

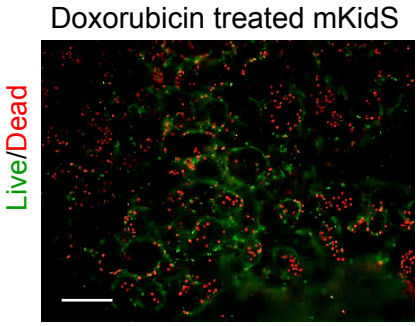
a


Acyclovir treated mKidS
Live/Dead

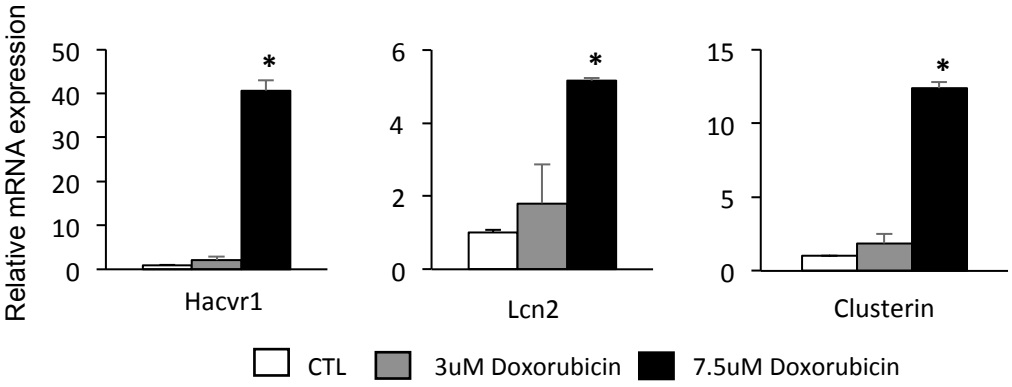
b


Relative mRNA expression
25
20
15
10
5
0
*
*
Hacvr1
4
3
2
1
0
*
Lcn2
5
4
3
2
1
0
*
Clusterin
CTL
40uM Acyclovir
100uM Acyclovir

c

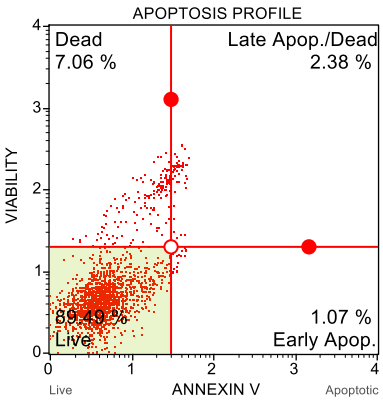

Doxorubicin treated mKidS
Live/Dead

d

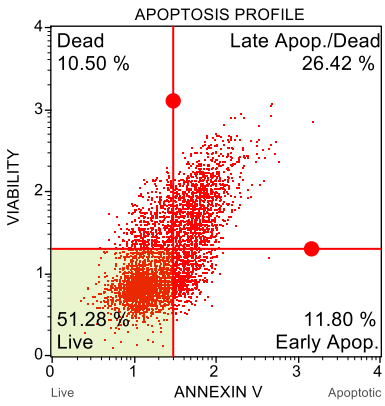

Relative mRNA expression
50
40
30
20
10
0
*
Hacvr1
6
4
2
0
*
Lcn2
15
10
5
0
*
Clusterin
CTL
3uM Doxorubicin
7.5uM Doxorubicin

Cyclosporin A- treated spheroid

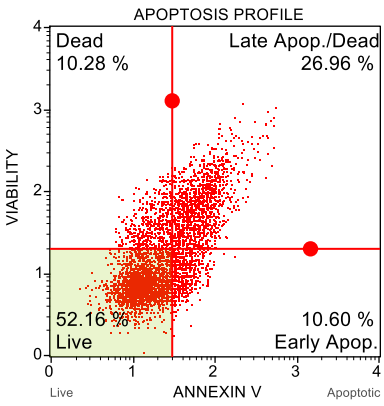
Apoptosis profile – CTL



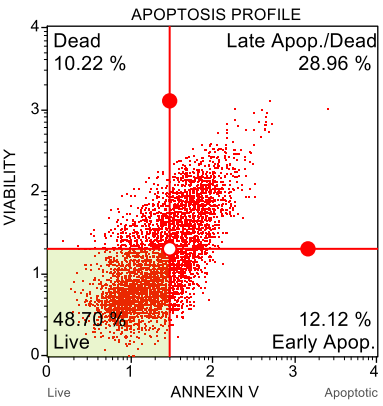

Apoptosis profile – Spheroid 1



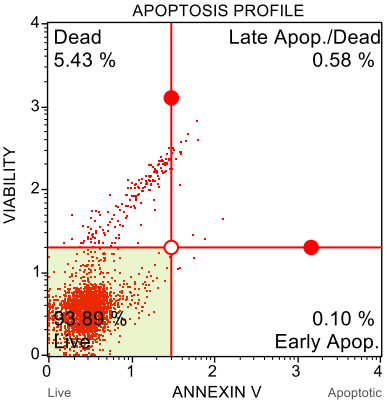

Apoptosis profile – Spheroid 2

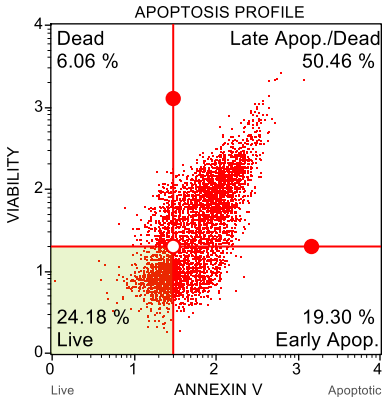


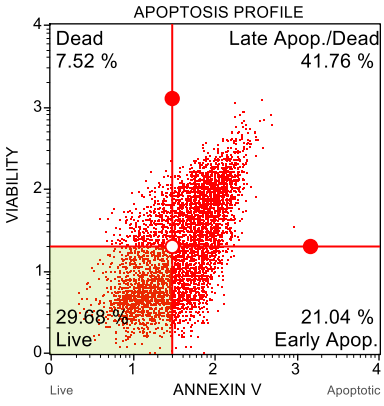

Apoptosis profile – Spheroid 3




Cisplatin-treated spheroid



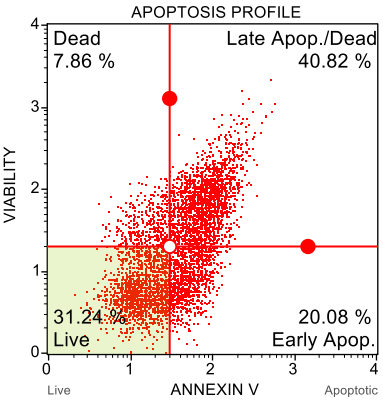



Fig. 1j

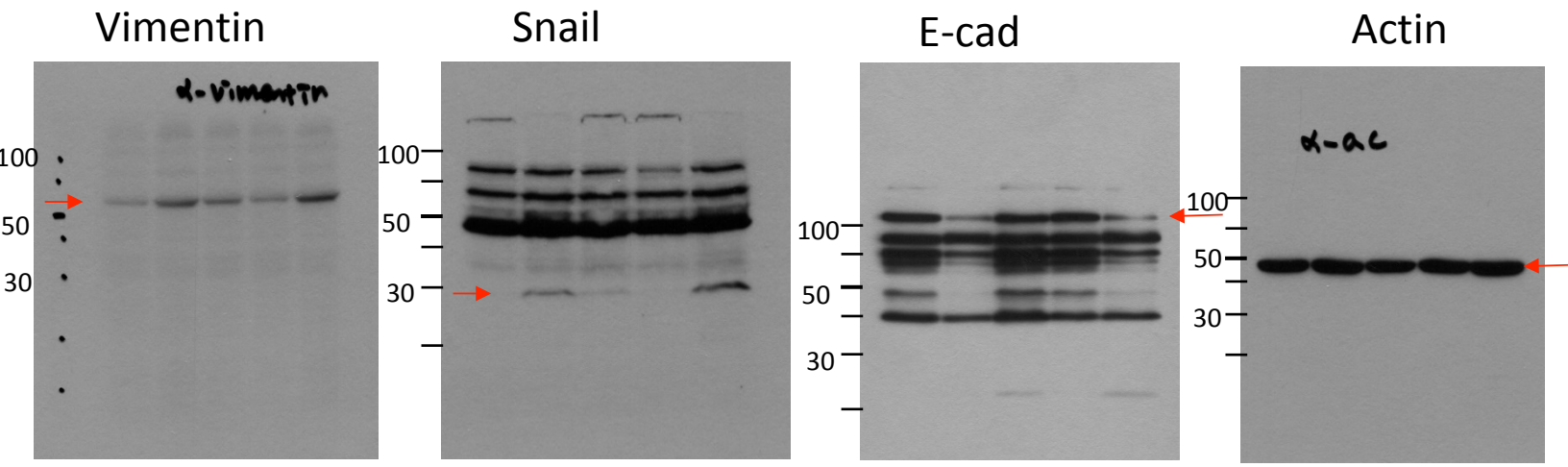



Fig. 2c

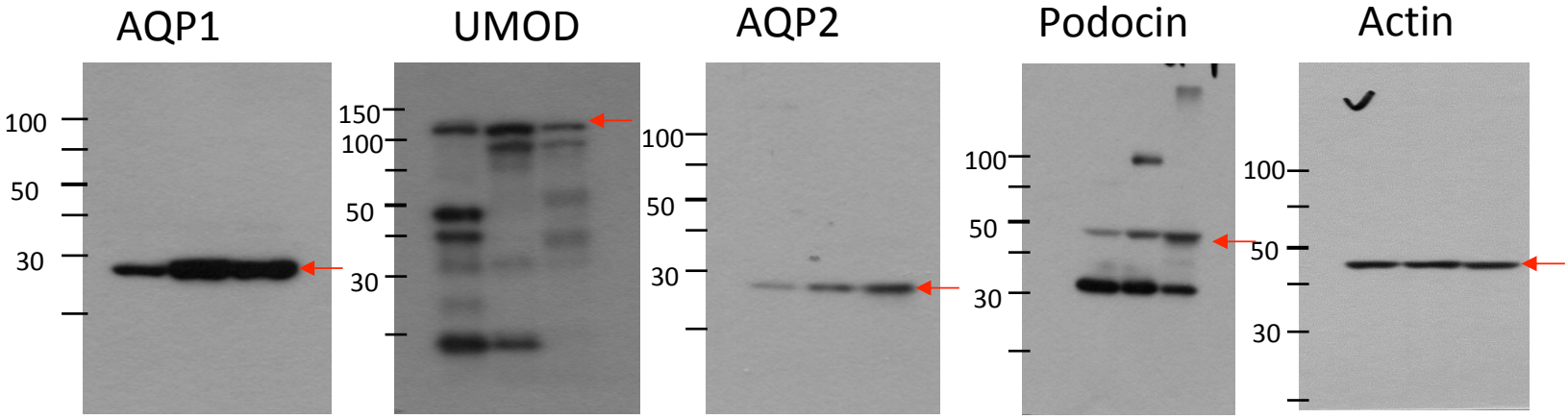



Fig. 3b

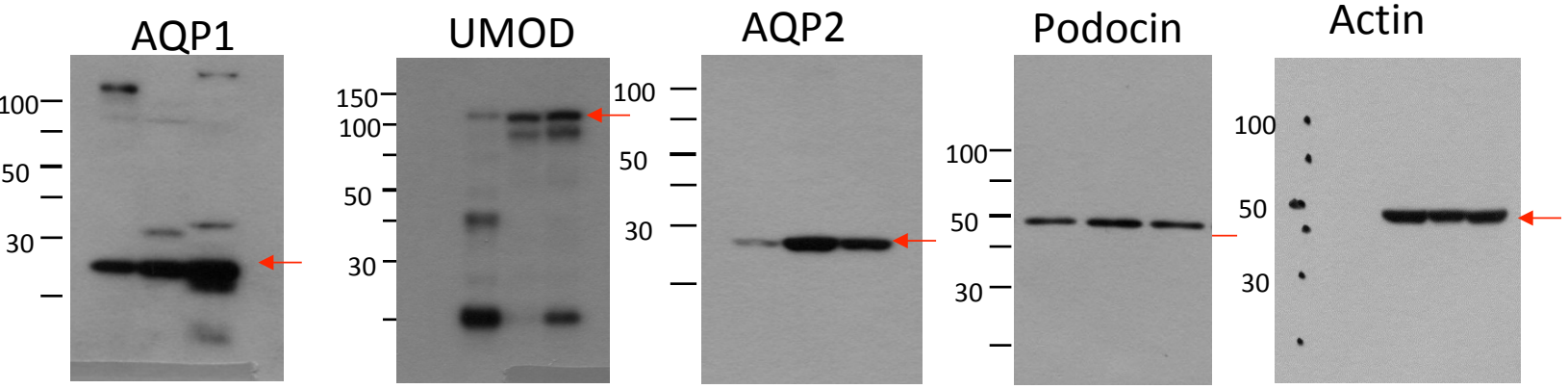



Fig. 5c

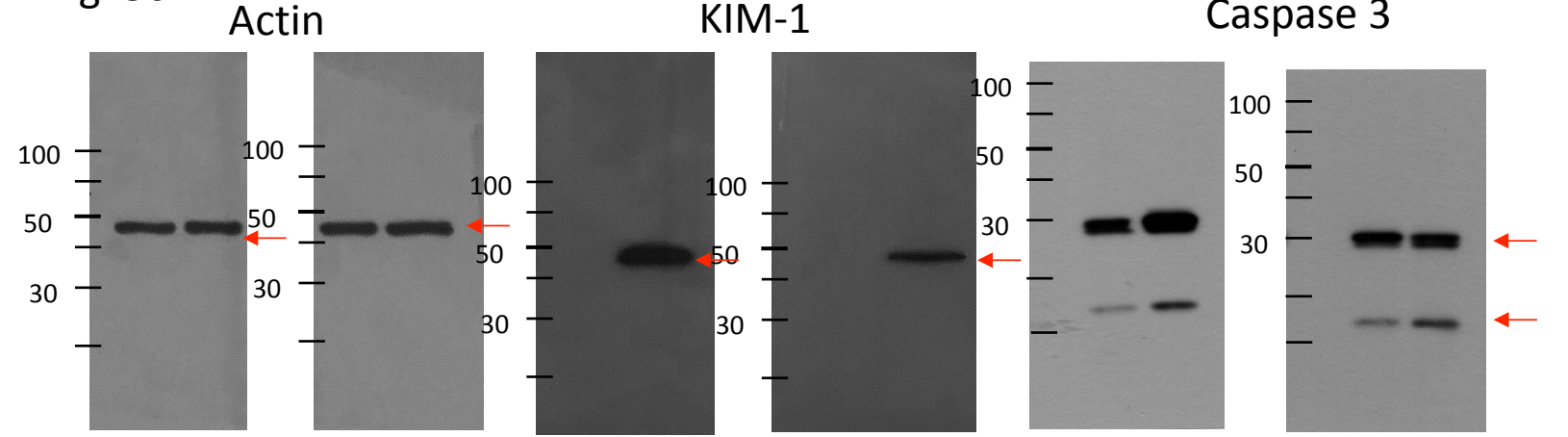
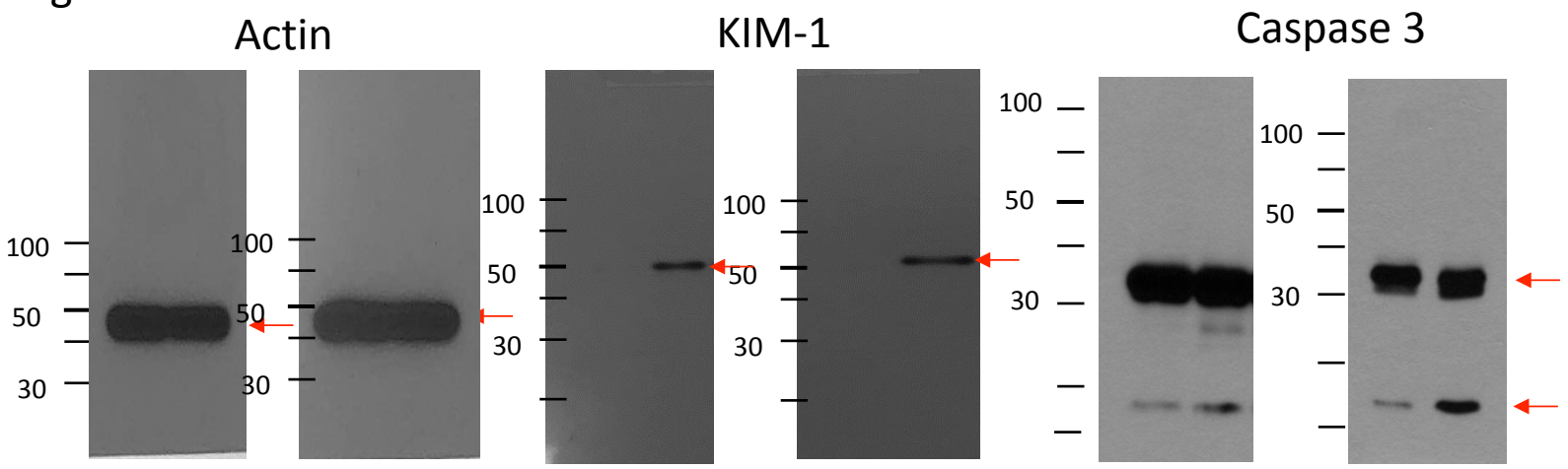
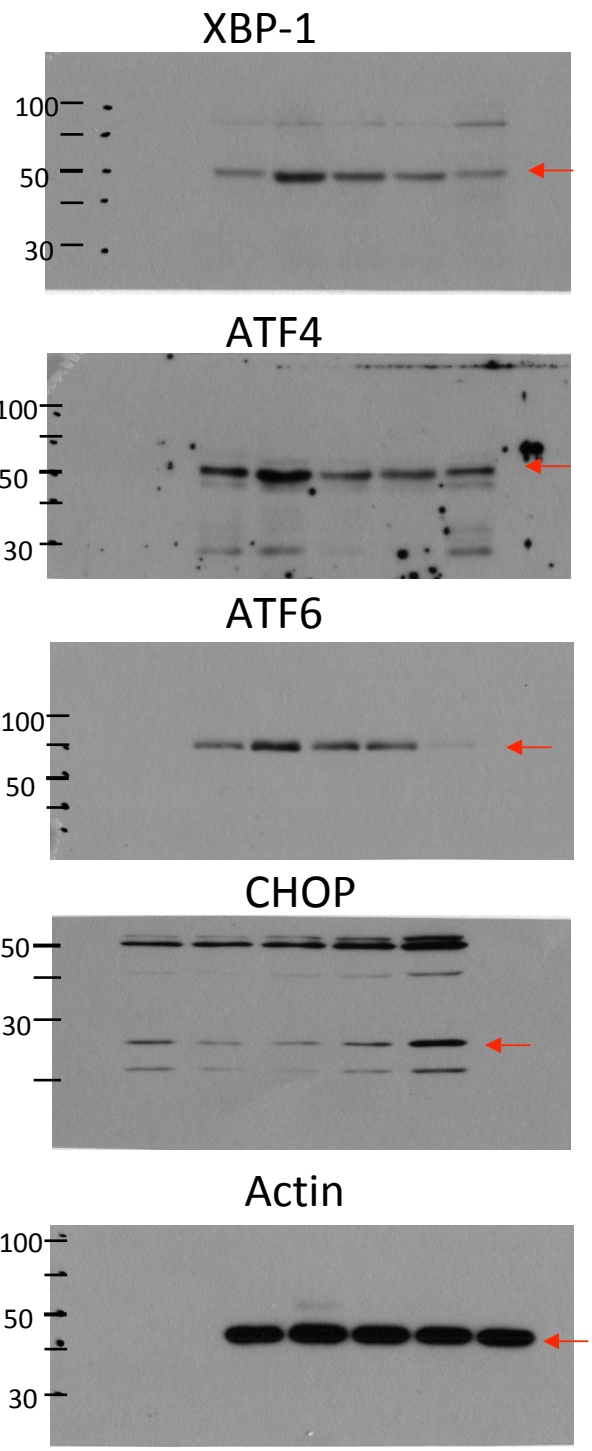


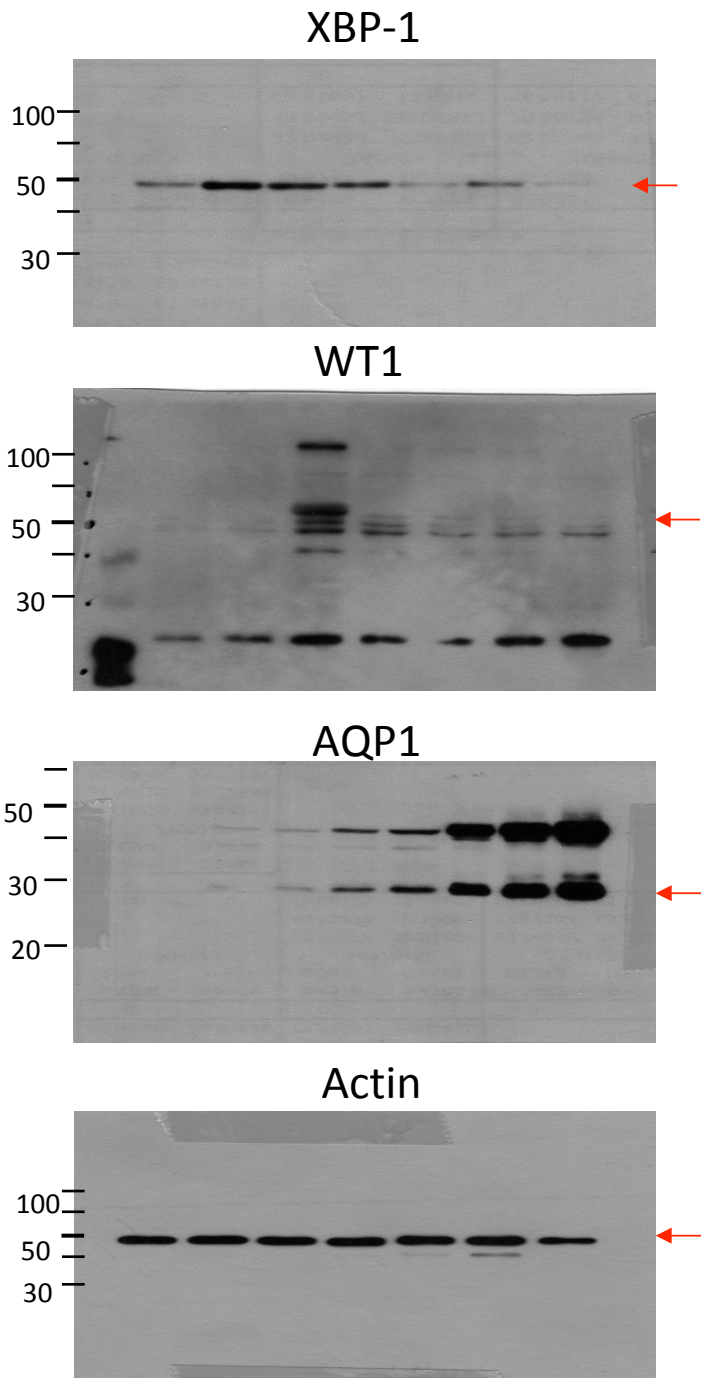
Fig. 7c




Supplemental Fig. 7b




Supplemental Fig. 7g




**Full-length blots**

Supplemental table I. Sequences of oligonucleotide primers used for qPCR

| Gene name | Forward | Reverse |
|---|---|---|
| mNcc | CCTCAAGCAGGAAGGTAGCC | TCACTGTTGGTGCCTGTCTC |
| mNkcc2 | GAGAAGCGGGAATTGGTCTTG | CTCCACCTCCACGAACAAAC |
| mAqp1 | GGCCTTTGGTTTGAGCATCG | CCGGAGGATGCTGATCTGAC |
| mAqp2 | TTCGAGCTGCCTTCTACGTG | GGCTGTTGCATTGTTGTGGA |
| mSglt1 | CTGCAGACATCTTCTCCGGG | GGCAGTGATTGCTAGCAGGA |
| mPodocin | CCGCTGCATTGAGAATGGAC | CGGCCTTTGCCTTCTTGTCA |
| mNephrin | CGAACTGATGCATGCAAGAAGG | TACACTAGTGCGTGGTCTCT |
| mMate 1 | CATGGAACGCACGGAGGAGT | CATCATCAGCTGGGCCAAGAA |
| mUrat1 | CGATGTTCTTCTGGCCGTCT | TGGTCGTAAACCCAGCCATC |
| mOatp4c1 | AATCAGAATGGGGGTTCGCA | GAGACACTGGGGGTGAAAGC |
| mEnt1 | CGGGTTTGAAAGCGCTCG | GGTGACTGGTTGTCATGGCT |
| mEnt2 | TCTCAGGCTCCAACTCAGGA | CCGTCAGCCAGATCTTCCG |
| mOat1 | CTGATGGCTTCCCACAACAC | GTCCTTGCTTGTCCAGGGG |
| mOat2 | CAACTGCGGAATCTGGTGCT | ATCAGGCAGGGCACAATGATG |
| mOat3 | ATGACCTTCTCCGAGATTCTGG | GTGGTTGGCTATTCCGAGGAT |
| mOct1 | GACGCCTGGAAAGTGGACC | GCAACATGGATGTATAGTCTGG |
| mOct2 | CCAGTGCATGAGGTATGAGGT | CTGAAACAGGTCCAGCATCCA |
| mPept1 | CCGGCACACCCTTCTAGTG | TGGCGTTGTGACTGGTGAC |
| mPept2 | AAAGCGACAACATTGGCTAGA | AAATCCCAAATCGCCATCCAT |
| mp-Gp | GGACTTTGCAGAGGAAACCG | TGTCCAGCCAACCTGCATAA |
| mMrp2 | CTGGAAATCACGATGGACGA | GAAAGCCCAAGGGAATCCACA |
| mMrp1 | GCACCTATGCCAACGCTGAG | AGACGAGTTGCTGAGATGCC |
| mHavcr1 | GCTGCTACTGCTCCTTGTGA | TCTTCAGCTCGGGAATGCAC |
| mLcn2 | GCTGTCGCTACTGGATCAGA | TGGCGAACTGGTTGTAGTCC |
| mClusterin | CCCAAAGGGGGTGTACTTGA | GAATCTTCATGGCGTGGCCT |
| mCd133 | CCCGGAGGAGAGCTGGACCG | AGGGCAATCTTCAGAGCCAGACT |

| | | |
|---|---|---|
| mSox9 | GTGCAAGCTGGCAAAGTTGA | TGCTCAGTTCACCGATGTCC |
| mFoxd1 | CCCCTCCTGGACTAACCGGGC | CGAGGTGTTTGCGCTCCCCG |
| mLgr4 | CCGCTGCCTGCTTGCCTGAA | TCCTGGTGACACGCCGCTTC |
| mPax2 | GCGAGCCGACACCTTCAC | GACGCTCAAAGACTCGATCCA |
| mPax8 | CAGAAGGCGTTTGTGACAATGA | TGCACTTTGGTCCGGATGAT |
| mLgr5 | CACAGCCACTGCGGCGACTT | CAATGGGCGTCTGCCGGGTC |
| mSix2 | GGACGGATCGTTGTGACTCAGGA | TCGCTGTTCTCCCTTTCCTGGC |
| mBmi | CTCCAAGATGGCCGCTTGGCT | TTGGAGCCATTGGCAGCATCAGC |
| mWt1 | CTCATGAACCTTCACAACAACGA | TGGCGCATCTCAGAGAACAC |
| mScf | AAGCAACGGCCAAGGACGGG | GCGGTGTGGCGACTCCGTTT |
| mc-kit | GCCAAGGGCATGGCGTTCCT | TCCGCCCGTGAGTGAGGAGG |
| mCd90 | AGTCTCGGGCGCGAATCCCA | TGCCGCCACACTTGACCAGC |
| mCd105 | CTCAGGGCCCGTCCACACCA | AGGGGCGTGGGTGAAGGTCA |
| mCcnd1 | TCAAGTGTGACCCGGACTGC | CCTTGGGGTCGACGTTCTG |
| mCcnd2 | TAAGGGAAGCACTCCCCGA | CACTCGGTCCCGACTGTAA |
| mCcne1 | GTTCCAAGCCCAAGTCCTGA | CTGGAGCGGACTGAAAGGTC |
| mctnnb1 | GCCGCGCCGCTTATAAATC | CTTCACAGGACACGAGCTGA |
| mc-myc | GTTGGAAACCCCGCAGACAG | ATAGGGCTGTACGGAGTCGT |
| mOct4 | GGCTTCAGACTTCGCCTTCT | TGGAAGCTTAGCCAGGTTCG |
| mSox2 | CAGTAGACTGCACATGGCCC | CTTCTCCAGTTCGCAGTCCA |
| mRB1 | AGCCCAGAGAGGATTGGGTA | GGTGGTGTCTCATACGCACA |
| mNanog | AAGGATGAAGTGCAAGCGGT | GGTGCTGAGCCCTTCTGAAT |
| mPCNA | TACAGCTTACTCTGCGCTCC | TTGGACATGCTGGTGAGGTT |
| mVim | GATCGATGTGGACGTTTCCAA | ATACTGCTGGCGCACATCAC |
| mFn | ACAAGGTTCGGGAAGAGGTT | CCGTGTAAGGGTCAAAGCAT |
| mHoxd11 | ATGCGCTGTTGTTCCTCTCC | CTAGCCCCATGGCCTAACTT |
| mEya1 | GAATGCAACAAGCCACAGCC | CCGTCTTGATGCCATAGGAG |
| mLhx1 | CAACCTGACCGAGAAGTGCT | CGAACCAGATCGCTTGGAGA |
| mXBP1 | AACACGCTTGGGAATGGACA | ACATAGTCTGAGTGCTGCGG |

| | | |
|---|---|---|
| mATF4 | TGGGGCCTTTAGGACGATCT | GTGGTCACGTGATCCTACCG |
| mATF6 | TGGTTAGTAATGGGAATGGAAGC | CTTGGTCCATCGTGGGAGG |
| mChop | CAGAGCCAGAATAACAGCCG | TGGACCAGGTTCTGCTTTCA |
| mGapdh | TAACATCAAATGGGGTGAGG | GGTTCACACCATCACAAAC |
| hNCC | CTTCTGCATGCGCACCTTTG | GTGTCTGCCTTCCTGCTTGA |
| hNKCC | CTGCGATAGCAACTAACGGGT | ACATAGCAACAGCCACTGCAT |
| hSGLT1 | CCCATTCGCAGGACAGCTCTTA | GGGAGCAGGGCAGTAGCG |
| hAQP1 | TACGACTTCATCCTGGCCCC | ATTTGGGCTTCATCTCCACCC |
| hAQP2 | CTCCCCTAGACATGGCCTCT | ATACACACACGTGAAGGCGT |
| hPodocin | AAGAAGTCAAAGGCCGGGAG | TCCACATTCACTACCGTGGC |
| hNephrin | GTGCAATGGGCCAAAGATGG | GCACTCATACTCCGCGTCAT |
| hMRP1 | CCCGCTCTGGGACTGGAA | TCGGTCATGTCGGGAGAGAT |
| hMRP2 | GGGAACTGGTGAGTCTCCCT | CCATTCTGATGTTCTCCGTAAAGG |
| hSLC22A1 | CCCCTCATTTTGTTTGCGGT | AAGGTTCTCGGCGTCCTTC |
| hSLC22A2 | TGCAGCTGGAGTTCTCATGG | CTCCGATATCTCCGCCCAAC |
| hSLC15A1 | GAGCGGCTCATCTCCCAAAT | CCCGGACATAGTTGTTGCCT |
| hSLC15A2 | TGATCAAGTCCTTGGGTGCC | CACCAAAAGCTGCCACACAG |
| hSLC29A1 | CAGCCCGGAGAAGGGACG | TTTTAGGCCCGGGAGCCA |
| hSLC22A6 | AGTATGGAGGTACTCCGGGC | GCATGGAGAGGCAGAGGAAG |
| hSLC22A7 | CACCACGTTGGGGGAAGAAA | ACCAGATCCCACTCAGTTGC |
| hSLC22A8 | GGACACCAGAGTCCATACGC | CCTTTCTCCCTCTTCTTGCCA |
| hSLC22A12 | GAACACGGGCACTCTCCTGA | CAGTCCCGCACACCGTAGG |
| hSLC29A2 | TTCTCCAGCGTCCCCGATA | CCGGGAGTGCTCTCATAATCT |
| hSLCO4C1 | GGTTGGTCCTTGAGGCGAC | CCGCCTGAACCTTCCTACTC |
| hP-gp | GAGAGCGGAGGACAAGAAGG | AATGTTCTGGCTTCCGTTGC |
| hHAVCR1 | GCTCTGAAGCCGTTATATGTGG | GGTTGGTACCCTCCACCAGA |
| hLCN2-F | CACCCTCTACGGGAGAACCA | ACACTGGTCGATTGGGACAG |
| hClusterin-F | CACTCGACTCTGCTGCTCAT | CAAAATGAAGGCATGCCGGG |
| hTUBB | GTGGTACGGAAGGAGGTCGAT | GGCGGAACATGGCAGTGAAC |

Supplemental Table II. The list of differentially expressed genes when 2D cells and mouse kidney spheroids (mKidS) were compared.

| tracking_id | 2D cells-1 | 2D cells-1 | mKidS-1 | mKidS-2 | mKidS-3 | mKidS-4 | mkidney-1 | mkidney-2 |
|---|---|---|---|---|---|---|---|---|
| 0610040J01Rik | 0.455924 | 0.451682 | 12.2687 | 18.9776 | 8.03338 | 12.0805 | 33.2355 | 42.6219 |
| 1110008P14Rik | 31.8528 | 28.3732 | 108.661 | 70.8353 | 109.519 | 99.4178 | 97.9958 | 91.2505 |
| 1110032A03Rik | 1.72103 | 2.31066 | 4.622 | 5.69935 | 4.70756 | 4.58296 | 44.2251 | 39.6742 |
| 1110054M08Rik | 1.91527 | 1.94416 | 6.2986 | 4.44433 | 4.51838 | 5.42653 | 27.282 | 26.523 |
| 1190007I07Rik | 6.46972 | 7.23491 | 17.4532 | 11.8152 | 19.8546 | 15.7638 | 12.2972 | 13.4246 |
| 1300002E11Rik | 4.32375 | 4.69464 | 15.5261 | 11.3389 | 15.5066 | 12.7375 | 18.3929 | 21.6805 |
| 1600002K03Rik | 5.20493 | 6.51885 | 18.1339 | 14.2029 | 20.058 | 17.3657 | 19.1382 | 7.41541 |
| 1700001F09Rik | 0 | 0 | 0.955719 | 0.856908 | 1.71111 | 0.80774 | 0 | 0 |
| 1700007K13Rik | 0.904437 | 1.09599 | 5.3813 | 2.59328 | 5.13707 | 5.76206 | 2.29335 | 0.703986 |
| 1700009P17Rik | 0.567888 | 0.802369 | 3.93599 | 3.22047 | 2.70238 | 4.04619 | 15.1499 | 10.8579 |
| 1700010I14Rik | 0.262717 | 0.247258 | 1.45368 | 1.26663 | 1.5399 | 1.50644 | 0.425922 | 1.04747 |
| 1700011H14Rik | 3.8526 | 4.09125 | 43.6534 | 38.798 | 39.1638 | 39.1417 | 356.706 | 311.511 |
| 1700020I14Rik | 5.8683 | 7.17784 | 16.7302 | 15.4849 | 16.7928 | 15.8457 | 15.8707 | 15.0287 |
| 1700037C18Rik | 1.85193 | 2.3256 | 5.23055 | 3.45187 | 5.91066 | 5.93682 | 20.3971 | 17.3515 |
| 1810043G02Rik | 4.46548 | 4.98337 | 13.8818 | 10.1779 | 12.0701 | 12.5599 | 25.5828 | 19.6347 |
| 1810043H04Rik | 18.8214 | 19.0992 | 54.6824 | 29.2369 | 55.6395 | 51.1168 | 88.8974 | 59.4932 |
| 1810058I24Rik | 33.9916 | 39.5783 | 81.8699 | 56.6068 | 80.4997 | 81.4546 | 133.967 | 123.554 |
| 2010111I01Rik | 3.35395 | 3.70341 | 8.60896 | 8.39636 | 11.1739 | 10.046 | 45.3929 | 33.7263 |
| 2010320M18Rik | 6.55763 | 6.78683 | 18.9317 | 10.4527 | 14.529 | 12.7249 | 32.8692 | 39.0564 |
| 2200002D01Rik | 84.9367 | 81.7148 | 203.284 | 83.5675 | 227.833 | 187.137 | 78.2952 | 55.4541 |
| 2210016F16Rik | 2.44364 | 2.53053 | 17.1992 | 15.2755 | 19.5051 | 17.1449 | 24.2342 | 23.5095 |
| 2310007B03Rik | 16.4774 | 16.6449 | 1.39626 | 1.08957 | 2.09504 | 1.54701 | 5.59699 | 5.75977 |
| 2310009A05Rik | 7.67822 | 8.09887 | 24.5848 | 17.8937 | 23.2899 | 19.2154 | 51.113 | 46.5066 |
| 2310022B05Rik | 32.2403 | 28.694 | 13.5857 | 12.6667 | 12.1856 | 12.6229 | 14.4577 | 12.3638 |
| 2310069B03Rik | 3.16834 | 3.583 | 0.897005 | 0.799861 | 0.669998 | 0.688575 | 0 | 0 |
| 2410004I01Rik | 1.72188 | 1.4747 | 0.0578877 | 0.0973209 | 0.194367 | 0.366882 | 0 | 0.189887 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2410006H16Rik | 461.896 | 474.542 | 316.77 | 122.805 | 216.82 | 229.17 | 31.5944 | 26.9819 |
| 2410018L13Rik | 0.0660142 | 0.0310749 | 1.20638 | 1.07567 | 1.80158 | 1.89115 | 0.196003 | 0 |
| 2510002D24Rik | 8.61661 | 8.3673 | 19.522 | 16.1967 | 18.5197 | 18.2731 | 16.2079 | 15.7113 |
| 2610528A11Rik | 1.18883 | 0.593307 | 40.64 | 6.79245 | 2.86805 | 14.0427 | 0.826996 | 1.01526 |
| 2610528J11Rik | 6.20647 | 5.17491 | 13.8355 | 15.7286 | 12.2094 | 12.7484 | 89.7903 | 73.1263 |
| 2700094K13Rik | 102.597 | 93.4989 | 267.415 | 131.815 | 264.362 | 239.027 | 20.9119 | 14.0185 |
| 2810008D09Rik | 10.8917 | 11.5387 | 32.1343 | 13.5023 | 37.2139 | 32.8591 | 53.5104 | 30.7438 |
| 3300005D01Rik | 11.4695 | 10.1129 | 0.844558 | 0.316177 | 1.94179 | 0.949749 | 0.562409 | 0 |
| 3830406C13Rik | 2.04623 | 2.22419 | 7.19854 | 6.95726 | 6.9581 | 6.60282 | 20.3309 | 17.1444 |
| 4930426D05Rik | 0.0281254 | 0.0794232 | 2.0679 | 1.52406 | 1.26851 | 1.15039 | 7.965 | 7.35224 |
| 4930461G14Rik | 34.521 | 30.8299 | 11.9375 | 8.65409 | 9.51407 | 10.565 | 23.4376 | 36.3355 |
| 4930503L19Rik | 6.09396 | 7.12735 | 2.3392 | 3.16467 | 2.57369 | 2.80531 | 1.14337 | 1.12495 |
| 4933412E12Rik | 10.5959 | 9.88703 | 3.10827 | 4.4524 | 3.0045 | 3.166 | 7.4137 | 5.33462 |
| 5430416N02Rik | 48.2648 | 53.3455 | 22.4528 | 9.94007 | 21.0605 | 18.4423 | 3.71844 | 1.95501 |
| 5830416P10Rik | 8.31736 | 7.47952 | 1.88927 | 1.1083 | 3.97998 | 2.6051 | 0 | 0.0582638 |
| 8430408G22Rik | 3.56237 | 2.41545 | 16.2238 | 15.7555 | 16.7043 | 16.3774 | 4.65272 | 2.98777 |
| 9030617O03Rik | 1.03906 | 1.11542 | 10.737 | 9.60976 | 11.4734 | 10.1794 | 33.1412 | 30.6244 |
| 9030625G05Rik | 1.58505 | 1.71253 | 0.465256 | 0.130369 | 0.347222 | 0.545974 | 0.276399 | 0.339598 |
| 9130008F23Rik | 11.6453 | 11.9427 | 4.46839 | 2.30753 | 4.90545 | 4.52437 | 2.56038 | 1.19953 |
| 9330182L06Rik | 3.79272 | 3.32699 | 0.727248 | 0.993673 | 0.702045 | 0.89517 | 0 | 0.0334764 |
| 9930111J21Rik1 | 1.4983 | 1.51816 | 0.0487784 | 0.166497 | 0.0303652 | 0.0514667 | 0.259869 | 0.121194 |
| A230050P20Rik | 1.97612 | 2.19391 | 11.6236 | 11.6563 | 11.0768 | 11.117 | 13.3459 | 11.4495 |
| A330074K22Rik | 1.75796 | 1.81957 | 0.544425 | 0.621225 | 0.196114 | 0.451419 | 0 | 0 |
| AA467197 | 2.18352 | 4.20165 | 1.36081 | 0.408444 | 0.760504 | 0.513868 | 0.515407 | 0.948521 |
| AI506816 | 4.52073 | 4.41047 | 0.978829 | 0.822299 | 1.0917 | 1.55498 | 0 | 0 |
| AW112010 | 0.0677202 | 0.0638337 | 20.7646 | 18.9074 | 13.6329 | 16.2188 | 7.61001 | 10.0807 |
| Aars | 127.365 | 129.3 | 51.9246 | 63.3788 | 58.9452 | 56.543 | 39.0665 | 40.9052 |
| Aatk | 3.92613 | 4.0296 | 0.628878 | 0.332318 | 0.161149 | 0.341336 | 1.01668 | 0.47652 |
| Abcb1b | 16.6006 | 15.8731 | 6.76329 | 6.08582 | 9.12958 | 7.44307 | 2.49869 | 2.21619 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Abcc3 | 0.505753 | 0.44402 | 2.26367 | 3.19579 | 1.93203 | 2.24084 | 39.0534 | 44.7753 |
| Abcd4 | 11.0693 | 9.86218 | 4.97361 | 3.86007 | 4.54489 | 4.90544 | 14.6107 | 8.22584 |
| Abcg2 | 19.1804 | 17.7668 | 6.97428 | 8.11794 | 8.8828 | 8.65154 | 142.521 | 90.1515 |
| Abhd14b | 6.72559 | 6.30204 | 18.7407 | 15.1148 | 15.249 | 16.3103 | 431.601 | 434.192 |
| Acaa1a | 19.7063 | 20.5793 | 46.7798 | 36.7237 | 41.0673 | 43.7045 | 85.3581 | 67.8726 |
| Acot1 | 0.852766 | 0.664339 | 4.68833 | 4.05107 | 4.12121 | 3.98686 | 22.3603 | 23.5168 |
| Acp5 | 2.89004 | 3.63117 | 8.81739 | 10.7347 | 7.9498 | 10.6609 | 82.793 | 56.9319 |
| Acsbg1 | 17.2425 | 20.4778 | 5.77912 | 2.89507 | 7.29155 | 6.22621 | 0.279298 | 0.17177 |
| Acsl4 | 16.6405 | 16.6252 | 46.4361 | 68.3865 | 47.4687 | 50.9924 | 7.56044 | 8.27783 |
| Acsl6 | 26.3059 | 24.867 | 3.96889 | 2.80965 | 4.28521 | 3.816 | 0.101342 | 0.18708 |
| Actn1 | 195.822 | 182.512 | 70.3015 | 105.192 | 99.0042 | 90.9135 | 13.1158 | 16.7203 |
| Acyp2 | 0.0818928 | 0.231694 | 3.18827 | 1.99053 | 3.25882 | 3.56315 | 36.2669 | 42.7239 |
| Adamts5 | 11.3774 | 11.2029 | 4.41683 | 4.34798 | 3.90965 | 4.23483 | 6.63433 | 4.32622 |
| Adamts9 | 0.326291 | 0.306909 | 1.38851 | 3.10908 | 1.23849 | 1.78051 | 2.35694 | 2.5184 |
| Adck4 | 4.56226 | 4.10328 | 11.1664 | 9.46347 | 9.50972 | 10.5356 | 12.1253 | 12.2543 |
| Adm | 0.674363 | 0.666646 | 17.3289 | 9.19944 | 5.52136 | 9.30537 | 8.00834 | 4.6759 |
| Adora1 | 0.973268 | 0.797235 | 4.1136 | 6.80007 | 3.61708 | 4.2561 | 4.04112 | 10.0839 |
| Adssl1 | 11.9298 | 13.5972 | 6.60184 | 5.64414 | 4.08835 | 6.05691 | 7.18035 | 12.3237 |
| Aebp1 | 0.188968 | 0.177697 | 1.17188 | 1.56126 | 0.988241 | 1.11417 | 38.3701 | 34.3318 |
| Aff1 | 15.1425 | 16.0085 | 4.97843 | 9.66463 | 6.11493 | 6.46664 | 8.4607 | 12.0994 |
| Ak1 | 0.850962 | 1.26982 | 7.54744 | 4.39795 | 9.77536 | 8.34583 | 27.8778 | 40.6357 |
| Akr1e1 | 8.14476 | 8.06444 | 24.2657 | 21.4839 | 19.3805 | 20.6085 | 38.5016 | 40.9628 |
| Akr7a5 | 10.4367 | 11.2012 | 29.6481 | 22.639 | 28.4199 | 27.4568 | 198.181 | 172.257 |
| Akt3 | 13.0539 | 13.0515 | 5.3251 | 7.60347 | 5.40593 | 5.61826 | 3.34736 | 3.03969 |
| Alcam | 5.58776 | 6.19215 | 24.7672 | 36.1099 | 26.6278 | 28.1137 | 4.50765 | 4.79813 |
| Aldh18a1 | 88.6711 | 86.498 | 16.843 | 22.986 | 18.4457 | 19.3714 | 2.17087 | 1.86977 |
| Aldh1a1 | 1.22661 | 1.46355 | 0.0727068 | 0.101882 | 0.217249 | 0.179052 | 10.4189 | 5.28514 |
| Aldh1a3 | 5.61375 | 10.4559 | 14.5325 | 14.8341 | 21.7454 | 17.4238 | 2.6281 | 4.01809 |
| Aldh1l1 | 0.0139851 | 0.0526304 | 1.57724 | 1.57318 | 1.0399 | 1.10954 | 206.326 | 184.897 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Aldh4a1 | 3.94044 | 3.03311 | 18.1896 | 26.5087 | 14.2212 | 17.2975 | 77.4438 | 73.0658 |
| Aldh6a1 | 2.37578 | 2.89962 | 5.90633 | 11.7348 | 4.456 | 6.0374 | 106.783 | 96.1907 |
| Alg10b | 28.4978 | 27.1541 | 9.44575 | 14.5642 | 10.4888 | 10.3806 | 1.90923 | 3.10368 |
| Alkbh6 | 9.97679 | 10.1452 | 24.5394 | 18.8062 | 20.7785 | 20.663 | 32.8382 | 40.9143 |
| Alox15 | 0 | 0.0170958 | 1.32633 | 1.85858 | 1.35124 | 1.56936 | 0 | 0.132918 |
| Amd1 | 0.0151179 | 0.0141796 | 5.30819 | 0.0139964 | 5.9433 | 0.0175018 | 0.0900749 | 0.0556068 |
| Amotl2 | 69.3266 | 61.4704 | 13.2808 | 16.3171 | 19.1684 | 17.4741 | 21.0516 | 24.2663 |
| Ampd3 | 4.56818 | 4.48861 | 12.3104 | 15.8553 | 6.77394 | 10.3062 | 12.6749 | 15.4755 |
| Anapc11 | 17.9832 | 18.3377 | 46.7493 | 32.5935 | 46.3342 | 42.8421 | 15.068 | 16.8858 |
| Anapc13 | 80.1083 | 83.0056 | 207.134 | 139.934 | 184.553 | 186.706 | 616.38 | 595.661 |
| Ank | 4.0427 | 3.95309 | 6.82582 | 11.5012 | 9.27551 | 9.0171 | 4.81283 | 6.6382 |
| Ankrd1 | 757.773 | 714.166 | 90.5139 | 49.4869 | 136.489 | 101.159 | 1.82434 | 3.7386 |
| Ankrd11 | 34.261 | 33.732 | 7.65075 | 16.1663 | 8.47148 | 9.76815 | 7.74603 | 7.5146 |
| Ankrd37 | 6.52301 | 5.20052 | 46.7756 | 19.8154 | 24.2338 | 28.302 | 1.32079 | 2.83898 |
| Antxr2 | 37.124 | 44.5142 | 14.74 | 16.1477 | 22.1339 | 18.7241 | 3.25104 | 4.79098 |
| Anxa2 | 669.818 | 620.569 | 1379.47 | 1027.71 | 1540.42 | 1368.8 | 124.045 | 169.557 |
| Anxa8 | 0.763819 | 0.965986 | 13.234 | 8.77237 | 16.9881 | 13.9417 | 1.27703 | 0.872392 |
| Aoc1 | 0 | 0 | 0.91851 | 2.66511 | 0.423869 | 0.836234 | 2.71298 | 6.07795 |
| Ap2s1 | 118.512 | 111.393 | 286.736 | 212.33 | 280.808 | 279.182 | 214.546 | 187.148 |
| Ap4s1 | 2.47051 | 3.10231 | 8.07197 | 6.38177 | 7.90767 | 7.25587 | 27.5062 | 18.1633 |
| Apbb1 | 8.58337 | 8.62899 | 3.19233 | 2.73981 | 1.77627 | 2.20043 | 13.8394 | 14.805 |
| Apcdd1 | 0.728664 | 0.568891 | 3.4803 | 3.40192 | 2.93989 | 3.5821 | 0.922497 | 1.36163 |
| Apip | 11.0159 | 12.5772 | 27.5782 | 20.6512 | 30.055 | 25.8251 | 23.7871 | 23.2956 |
| Apln | 13.2052 | 11.0075 | 1.78534 | 0.814168 | 1.78064 | 1.30913 | 9.44717 | 9.61734 |
| Apobec1 | 2.55626 | 3.24945 | 0.464601 | 0.647722 | 0.471042 | 0.653769 | 2.02188 | 3.35401 |
| Apobec3 | 10.387 | 10.9129 | 30.3478 | 29.0309 | 30.1596 | 29.5665 | 5.42607 | 7.83106 |
| Apol9a | 0.125119 | 0.117787 | 16.0599 | 25.4608 | 19.7343 | 20.0287 | 3.53005 | 2.92468 |
| Apol9b | 0.307608 | 0.307158 | 17.8483 | 22.462 | 19.2775 | 19.3228 | 2.74069 | 5.61551 |
| Apoo-ps | 0.000942551 | 0.67456 | 2.62498 | 3.58955 | 2.32611 | 4.2468 | 7.69E-60 | 6.38E-05 |

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|---|---|---|---|---|---|---|---|---|
| App | 36.6696 | 33.3615 | 138.787 | 220.804 | 119.75 | 146.415 | 311.348 | 365.2 |
| Aqp1 | 9.96172 | 7.28508 | 0.487292 | 0.263386 | 0.604655 | 0.661132 | 366.595 | 679.539 |
| Arg2 | 2.29496 | 2.60125 | 32.1742 | 58.8927 | 25.0275 | 32.5964 | 30.6155 | 45.7759 |
| Arhgef10 | 5.38483 | 5.29406 | 1.70757 | 2.37371 | 1.21537 | 1.44685 | 3.28588 | 3.75966 |
| Arhgef18 | 17.0454 | 15.4659 | 6.22925 | 8.97799 | 7.06228 | 7.62723 | 21.655 | 22.3384 |
| Arhgef5 | 56.2499 | 53.627 | 21.3906 | 27.1778 | 22.9309 | 23.6465 | 14.4042 | 14.1038 |
| Arl4c | 55.4209 | 61.9895 | 24.0345 | 18.6826 | 31.2508 | 26.0724 | 2.87525 | 2.63326 |
| Arl4d | 5.08722 | 5.89969 | 17.9116 | 13.8348 | 10.741 | 13.3949 | 24.8054 | 37.6223 |
| Arnt2 | 3.82195 | 4.41253 | 1.19684 | 1.61529 | 1.67515 | 1.5361 | 5.75271 | 4.67661 |
| Arrdc3 | 1.55885 | 1.16337 | 10.2235 | 14.8646 | 8.21547 | 10.3383 | 16.0872 | 21.9986 |
| Asap1 | 29.081 | 26.6786 | 10.6676 | 14.9899 | 12.0508 | 12.1179 | 3.5381 | 4.00167 |
| Asns | 131.772 | 142.478 | 36.3518 | 41.0817 | 37.6791 | 37.3647 | 7.17683 | 8.99491 |
| Aspa | 1.0152 | 0.871341 | 4.95913 | 10.7844 | 7.0364 | 7.46879 | 48.4226 | 33.363 |
| Ass1 | 0.524362 | 0.975488 | 1.71689 | 5.76062 | 3.8373 | 3.60847 | 61.4844 | 17.0723 |
| Atf3 | 42.3909 | 50.6283 | 8.54668 | 6.78649 | 8.93233 | 8.41392 | 1.07418 | 0.82558 |
| Atf4 | 375.067 | 428.052 | 201.117 | 142.947 | 212.703 | 193.888 | 98.2434 | 110.827 |
| Atf6 | 8.70424 | 9.06902 | 3.39897 | 4.54897 | 3.66568 | 3.92417 | 5.85373 | 6.13871 |
| Atl1 | 3.75567 | 3.69293 | 1.25955 | 1.43112 | 0.724918 | 1.22136 | 1.28223 | 1.07023 |
| Atox1 | 108.637 | 96.4371 | 299.128 | 174.33 | 281.401 | 283.066 | 472.882 | 340.248 |
| Atp1b1 | 18.9726 | 16.7291 | 59.074 | 122.723 | 53.3173 | 69.2629 | 824.336 | 1212.64 |
| Atp5e | 145.555 | 133.175 | 463.836 | 228.143 | 432.871 | 390.314 | 1912.96 | 1412.69 |
| Atp5j | 102.012 | 100.039 | 243.378 | 144.038 | 227.266 | 215.478 | 902.897 | 763.161 |
| Atp6v0d2 | 0 | 0 | 0.966335 | 2.32369 | 0.974668 | 1.20333 | 33.4721 | 25.6344 |
| Atxn2 | 25.9063 | 25.2603 | 10.0676 | 14.5719 | 10.5939 | 12.4107 | 14.3206 | 13.8381 |
| Atxn2l | 54.0055 | 51.2701 | 21.1356 | 32.6178 | 22.8523 | 24.1089 | 34.385 | 25.1447 |
| Aven | 8.17188 | 7.93084 | 21.4003 | 13.6866 | 26.49 | 23.0486 | 14.8376 | 12.0601 |
| B2m | 232.058 | 265.832 | 628.059 | 1005.37 | 673.766 | 709.127 | 1051.48 | 891.375 |
| B3galnt2 | 5.41838 | 6.14136 | 12.3585 | 12.4583 | 14.6945 | 13.1851 | 6.6079 | 4.67991 |
| B3galt4 | 1.91449 | 2.4575 | 6.19835 | 5.69711 | 5.54034 | 5.83123 | 3.61897 | 2.22463 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| B4galnt1 | 26.4841 | 24.8625 | 54.8944 | 61.2144 | 59.97 | 61.0063 | 22.0043 | 31.7071 |
| B4galnt3 | 26.2403 | 22.0917 | 3.95589 | 6.01416 | 4.66909 | 4.82176 | 6.69103 | 4.06173 |
| B4galt6 | 5.75698 | 5.02779 | 17.5684 | 30.2289 | 20.9224 | 21.9283 | 5.16263 | 7.27835 |
| B930041F14Rik | 0.785816 | 0.564351 | 2.49375 | 2.17361 | 2.61494 | 2.24555 | 2.82839 | 3.10025 |
| B9d1 | 25.1793 | 22.5403 | 64.9678 | 61.1375 | 64.7272 | 65.9946 | 23.2472 | 27.0913 |
| B9d2 | 4.51674 | 5.61242 | 12.6827 | 8.64559 | 13.4812 | 12.1571 | 28.4837 | 23.4465 |
| BC002163 | 0.000934154 | 0.0051502 | 64.0268 | 38.2327 | 16.5688 | 57.8542 | 74.7741 | 97.8633 |
| BC005624 | 24.3341 | 25.8998 | 54.3819 | 49.4954 | 55.2602 | 51.7661 | 18.2149 | 34.9986 |
| BC026585 | 0 | 0 | 1.33447 | 0.509939 | 0.9963 | 0.640453 | 123.712 | 135.411 |
| BC030500 | 0.824757 | 0.428331 | 3.21155 | 5.50596 | 4.02093 | 4.3208 | 0 | 0 |
| BC031181 | 34.7313 | 36.1828 | 89.8978 | 67.7052 | 103.125 | 86.7553 | 70.2052 | 77.9378 |
| Bag1 | 84.4091 | 84.4291 | 199.662 | 157.436 | 202.946 | 198.569 | 381.667 | 460.795 |
| Basp1 | 435.007 | 432.019 | 205.931 | 153.494 | 232.108 | 204.52 | 3.02213 | 3.00829 |
| Bax | 67.4613 | 66.1627 | 170.248 | 98.135 | 195.371 | 167.64 | 78.0111 | 58.3365 |
| Baz1a | 26.5254 | 25.3002 | 9.07612 | 14.0416 | 13.3493 | 12.3561 | 1.37244 | 1.51483 |
| Bcap29 | 18.1112 | 19.1895 | 10.2878 | 6.11558 | 9.68346 | 8.98505 | 10.4713 | 11.0361 |
| Bcl2l12 | 7.40794 | 6.50927 | 17.2282 | 13.3039 | 17.4371 | 17.1898 | 9.64272 | 6.41777 |
| Bcl2l15 | 2.44999 | 3.06074 | 6.33386 | 4.53977 | 14.6745 | 9.43876 | 0.536794 | 0.577587 |
| Bcl3 | 10.5602 | 10.8845 | 27.957 | 28.3151 | 27.1303 | 28.6786 | 7.71887 | 6.626 |
| Bdkrb2 | 2.91854 | 3.61194 | 0.29914 | 0.955689 | 0.469172 | 0.726258 | 0 | 0.0987188 |
| Bex1 | 88.5151 | 79.1416 | 27.2251 | 27.659 | 35.7961 | 32.488 | 6.26776 | 4.91791 |
| Bex4 | 1.60657 | 2.27149 | 8.03116 | 7.81292 | 9.48266 | 9.58695 | 50.2857 | 34.2726 |
| Blnk | 6.49713 | 7.2893 | 19.1299 | 22.9347 | 25.5288 | 24.2179 | 16.3598 | 17.4878 |
| Bloc1s1 | 47.302 | 44.753 | 117.067 | 82.3479 | 113.897 | 111.594 | 472.816 | 347.649 |
| Bmf | 0.784903 | 0.798432 | 3.69186 | 4.92775 | 1.48136 | 2.67125 | 3.31516 | 4.44638 |
| Bmp8b | 5.89998 | 5.24648 | 1.36662 | 1.10801 | 1.787 | 1.68243 | 0 | 0.0538487 |
| Bmyc | 0.732224 | 1.03506 | 11.5173 | 13.4963 | 14.402 | 12.6698 | 13.0021 | 17.0758 |
| Bnip3 | 27.4488 | 31.8644 | 208.341 | 93.29 | 49.7643 | 92.1784 | 80.879 | 73.4098 |
| Bola2 | 85.1987 | 86.3605 | 205.913 | 110.55 | 241.403 | 212.177 | 319.711 | 236.45 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Brcc3 | 15.6203 | 13.9088 | 32.9658 | 29.0538 | 29.8721 | 31.1815 | 19.4756 | 17.339 |
| Brsk1 | 11.3747 | 11.2576 | 3.92746 | 3.04223 | 4.19509 | 3.91589 | 1.94948 | 1.27862 |
| Bscl2 | 3.89026 | 3.54805 | 11.0544 | 7.78976 | 10.4209 | 9.59934 | 70.389 | 67.7803 |
| Bst2 | 94.1873 | 95.4602 | 519.493 | 439.722 | 524.073 | 510.893 | 54.4801 | 53.1585 |
| Btn1a1 | 1.67808 | 1.81258 | 0.261099 | 0.219535 | 0.261861 | 0.261 | 0 | 0 |
| C1ql1 | 5.04929 | 4.64729 | 0.925452 | 0.353639 | 0.80081 | 0.710674 | 0.225312 | 0.276916 |
| C230052I12Rik | 4.56394 | 4.74651 | 9.71191 | 9.54956 | 11.1623 | 10.5752 | 4.79577 | 4.42263 |
| C3 | 1.55104 | 1.45897 | 56.1841 | 189.744 | 44.7163 | 78.6041 | 3.46994 | 2.79603 |
| Cacna1g | 1.32042 | 0.972233 | 0.062534 | 0.0902332 | 0.152987 | 0.0834088 | 1.12708 | 0.773311 |
| Cacnb1 | 2.65063 | 2.34928 | 0.945983 | 0.590769 | 0.605891 | 0.613223 | 3.93325 | 5.32595 |
| Cad | 31.3554 | 26.1235 | 10.3065 | 13.8029 | 15.3639 | 13.6593 | 2.57638 | 2.48467 |
| Calcb | 0.516483 | 0.486567 | 12.6054 | 11.6558 | 17.8921 | 14.5859 | 0.306038 | 0 |
| Cald1 | 175.655 | 157.042 | 22.2298 | 22.649 | 29.8562 | 25.5198 | 22.3404 | 27.7928 |
| Caly | 0 | 0.0474488 | 0.949833 | 1.31508 | 0.687917 | 1.36844 | 0 | 0 |
| Camk1 | 35.0452 | 43.8486 | 19.388 | 9.68355 | 15.3453 | 17.4095 | 50.8318 | 47.3954 |
| Camk2b | 0.608542 | 0.613108 | 3.52635 | 3.20604 | 3.70758 | 3.37887 | 1.53503 | 1.25897 |
| Cand2 | 5.88202 | 6.07662 | 1.89977 | 2.66471 | 1.41353 | 2.05821 | 2.66292 | 3.50231 |
| Capsl | 1.79244 | 3.17869 | 8.07168 | 8.75171 | 8.05185 | 8.64984 | 1.87405 | 1.91839 |
| Car2 | 19.0894 | 14.53 | 47.9697 | 45.1577 | 52.7131 | 48.044 | 345.767 | 339.754 |
| Casp12 | 0.117185 | 0.26778 | 2.62907 | 3.54924 | 2.03347 | 2.26641 | 2.19114 | 1.16376 |
| Casp4 | 0.355862 | 0.548218 | 7.16566 | 10.5725 | 5.4978 | 6.77067 | 1.92122 | 1.77128 |
| Cav1 | 49.2852 | 43.1696 | 16.3632 | 12.5144 | 17.1628 | 15.3975 | 36.1305 | 21.4898 |
| Cbl | 5.72019 | 4.74122 | 0.989465 | 3.80552 | 1.30442 | 1.68187 | 0.543066 | 0.728896 |
| Cbr2 | 0.528554 | 0.543137 | 19.2906 | 27.8182 | 10.3197 | 15.4778 | 21.9324 | 10.6734 |
| Cbr3 | 0.491822 | 0.501757 | 13.7183 | 14.0528 | 10.325 | 12.7594 | 3.89045 | 2.53989 |
| Ccdc125 | 2.04765 | 2.5568 | 5.59959 | 5.36565 | 5.5788 | 5.16954 | 2.33481 | 2.64841 |
| Ccdc23 | 14.1299 | 12.3977 | 32.9805 | 20.798 | 31.5325 | 31.0454 | 30.5596 | 32.2259 |
| Ccdc28b | 3.36107 | 3.80092 | 13.2309 | 11.1213 | 8.04691 | 12.3305 | 24.2345 | 18.4337 |
| Ccdc88c | 7.21728 | 6.50694 | 2.04334 | 4.2088 | 2.38154 | 2.84583 | 3.13006 | 1.8525 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ccl2 | 0.837177 | 1.39599 | 9.58399 | 10.3401 | 17.0425 | 14.5104 | 1.5241 | 0.935706 |
| Ccl5 | 4.33202 | 8.93348 | 28.9955 | 25.6462 | 37.4886 | 33.7758 | 14.7548 | 4.93252 |
| Ccng1 | 27.2825 | 35.1891 | 85.9486 | 68.4986 | 108.64 | 92.8379 | 48.0395 | 42.4108 |
| Ccnjl | 2.10306 | 1.93346 | 4.98885 | 5.16486 | 5.253 | 5.80783 | 0.573113 | 0.704926 |
| Ccrn4l | 34.3285 | 34.1623 | 15.0615 | 10.6381 | 15.2788 | 14.4988 | 6.94378 | 7.15215 |
| Cd14 | 7.65964 | 9.06402 | 91.2552 | 101.52 | 66.7715 | 84.4339 | 8.0395 | 9.09717 |
| Cd200 | 0.0374569 | 0 | 1.13941 | 1.09733 | 0.742903 | 0.918239 | 13.5905 | 13.906 |
| Cd24a | 219.324 | 207.102 | 594.591 | 596.139 | 554.854 | 553.186 | 151.444 | 282.496 |
| Cd47 | 9.05161 | 10.9182 | 29.6874 | 25.8955 | 25.52 | 25.2148 | 9.59406 | 8.54894 |
| Cd82 | 32.0756 | 34.9188 | 137.432 | 131.178 | 146.761 | 138.307 | 124.172 | 209.725 |
| Cd83 | 0.868975 | 1.26557 | 4.12613 | 3.11928 | 4.00364 | 3.98809 | 1.10732 | 1.06271 |
| Cdc42ep1 | 38.6173 | 40.3145 | 17.7724 | 16.3172 | 17.8513 | 17.5916 | 32.0017 | 22.3838 |
| Cdc42ep2 | 3.5537 | 3.17088 | 8.99954 | 8.63047 | 7.97249 | 7.83898 | 16.3355 | 18.2769 |
| Cdc42ep3 | 11.2581 | 9.42034 | 1.80835 | 2.11165 | 3.12373 | 2.88944 | 7.15208 | 9.20978 |
| Cdh10 | 2.17905 | 2.74915 | 0.111401 | 0.0234169 | 0.0624348 | 0.117546 | 0 | 0 |
| Cdh3 | 34.7592 | 31.0418 | 12.9626 | 19.1827 | 15.1558 | 15.3726 | 2.3207 | 2.39204 |
| Cdh6 | 7.40091 | 7.24405 | 9.11882 | 27.5736 | 12.1693 | 13.8352 | 1.67459 | 2.24144 |
| Cdk14 | 6.81278 | 7.60449 | 2.76294 | 3.49672 | 2.12883 | 2.46424 | 1.33017 | 1.29035 |
| Cdkl1 | 1.12824 | 0.834403 | 8.74234 | 14.5 | 4.46393 | 7.56457 | 66.0872 | 97.7422 |
| Cdkn2d | 6.49831 | 7.37751 | 19.7892 | 10.9987 | 13.8219 | 15.9426 | 12.7831 | 8.66834 |
| Ceacam1 | 0.461313 | 0.222527 | 12.5426 | 19.1995 | 9.29357 | 11.4119 | 12.9747 | 13.5766 |
| Cebpa | 0.165199 | 0.279789 | 1.80967 | 2.62824 | 0.962743 | 1.85182 | 13.5709 | 11.4909 |
| Cebpb | 20.5305 | 22.3769 | 46.5389 | 72.1916 | 58.0272 | 57.554 | 8.45393 | 9.72962 |
| Cebpd | 1.92333 | 2.4458 | 5.03997 | 10.0386 | 6.94637 | 7.38011 | 18.6662 | 22.2972 |
| Cenpm | 11.7371 | 11.1025 | 38.7775 | 24.1069 | 27.7815 | 31.0531 | 0.771997 | 0.576281 |
| Cep170 | 12.7522 | 13.1501 | 4.89857 | 6.10566 | 5.79812 | 5.66637 | 1.57881 | 1.19206 |
| Cers3 | 1.40196 | 1.67982 | 0.0584917 | 0.0368852 | 0.213076 | 0.0925785 | 0.0787191 | 0.145251 |
| Cetn2 | 18.3383 | 17.8751 | 47.7334 | 41.4392 | 44.8648 | 44.3333 | 53.687 | 47.504 |
| Cetn4 | 1.4256 | 1.86253 | 4.84417 | 4.2865 | 3.48211 | 4.09284 | 13.0882 | 17.0863 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cfh | 0.00971041 | 0.00913448 | 1.55624 | 3.73606 | 0.842208 | 1.47209 | 50.591 | 57.5104 |
| Cfi | 0.0857231 | 0 | 1.92062 | 2.61157 | 0.717367 | 1.20121 | 7.64586 | 5.01469 |
| Chac1 | 58.6849 | 59.4407 | 6.48773 | 7.00115 | 4.66424 | 4.32728 | 1.03916 | 1.70342 |
| Chac2 | 4.34164 | 4.99856 | 11.6869 | 12.5118 | 11.649 | 11.2649 | 16.9295 | 20.004 |
| Chd1 | 24.3262 | 23.1665 | 8.4421 | 12.5176 | 10.2661 | 9.81248 | 4.38296 | 3.77517 |
| Chdh | 0.516799 | 0.326394 | 5.00977 | 7.0379 | 1.98539 | 3.94789 | 32.5978 | 41.4648 |
| Chil1 | 0 | 0 | 6.21479 | 4.975 | 5.06356 | 4.95935 | 0 | 0.294404 |
| Chka | 55.4289 | 54.029 | 21.2166 | 15.4385 | 26.488 | 22.8471 | 49.1323 | 36.8264 |
| Chst13 | 0.0275541 | 0.129681 | 0.854078 | 1.38481 | 1.29851 | 1.35233 | 0.32745 | 0.503245 |
| Chst8 | 0.0183072 | 0.0344531 | 0.830241 | 1.992 | 0.907722 | 1.0685 | 5.98933 | 10.1118 |
| Chst9 | 0.10217 | 0 | 1.35803 | 2.66394 | 1.05623 | 1.71256 | 1.21327 | 3.47982 |
| Ciart | 12.4327 | 14.9058 | 5.1315 | 2.88638 | 2.64628 | 3.46883 | 2.37506 | 1.82469 |
| Cib1 | 26.715 | 26.3927 | 96.5158 | 71.1274 | 105.775 | 94.8245 | 210.386 | 165.527 |
| Cisd1 | 33.2383 | 28.0167 | 74.2026 | 49.9481 | 76.535 | 70.8426 | 220.736 | 220.6 |
| Cited1 | 0.407676 | 0.19214 | 7.42148 | 3.80841 | 1.77545 | 3.35163 | 10.4482 | 10.3741 |
| Cited2 | 78.5828 | 78.1379 | 16.1817 | 23.2655 | 18.0469 | 17.8734 | 46.6391 | 67.3805 |
| Cited4 | 0.600709 | 0.424225 | 2.49592 | 5.66533 | 1.86336 | 2.6354 | 8.69031 | 8.48989 |
| Ckb | 37.3582 | 30.9675 | 17.315 | 7.61261 | 20.7883 | 17.6591 | 317.537 | 517.286 |
| Ckmt1 | 1.35179 | 1.43491 | 3.78929 | 3.53377 | 4.53018 | 3.86561 | 75.0142 | 86.343 |
| Clca4 | 39.4097 | 45.5387 | 8.50729 | 7.33425 | 7.84438 | 7.33901 | 0 | 0 |
| Clcn5 | 6.42999 | 5.98155 | 1.34805 | 3.60203 | 2.26741 | 2.44076 | 2.27927 | 1.69063 |
| Cldn12 | 43.0192 | 43.1351 | 17.788 | 20.3188 | 21.0969 | 18.5907 | 18.3259 | 17.546 |
| Cldn19 | 0.0200376 | 0.00942468 | 1.4419 | 3.21517 | 1.35779 | 1.86322 | 63.7151 | 106.705 |
| Cldn2 | 0.0562885 | 0.0529581 | 2.6918 | 5.16759 | 1.77885 | 2.61053 | 67.1648 | 72.0076 |
| Cldn23 | 3.3247 | 3.58591 | 1.128 | 0.858043 | 0.872633 | 1.02051 | 0.144253 | 0.266068 |
| Cldn4 | 350.886 | 400.635 | 189.742 | 141.088 | 204.784 | 185.957 | 16.6978 | 22.3487 |
| Cldn9 | 0.192424 | 0.27173 | 1.74033 | 1.52282 | 1.59126 | 1.19987 | 0.190463 | 0.234134 |
| Clec2d | 0.430461 | 0.184249 | 8.28269 | 12.2126 | 4.80733 | 6.41061 | 42.9595 | 35.3879 |
| Clec2f | 0 | 0 | 1.59381 | 1.33949 | 1.99125 | 1.09033 | 0 | 0.305186 |

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|---|---|---|---|---|---|---|---|---|
| Clic6 | 0.0570138 | 0.0536355 | 1.2479 | 0.837284 | 0.847777 | 0.98419 | 0.135763 | 0.0835078 |
| Clip2 | 12.4702 | 11.1708 | 4.77558 | 5.88217 | 5.35306 | 5.1484 | 8.62929 | 8.02433 |
| Clip3 | 6.50936 | 6.58943 | 2.25977 | 2.10577 | 2.19414 | 1.88325 | 2.16964 | 1.90638 |
| Cluap1 | 5.61345 | 6.25456 | 14.9344 | 13.5688 | 15.6643 | 15.5308 | 20.9292 | 24.5806 |
| Cmpk2 | 0.809882 | 0.660356 | 4.93984 | 11.6322 | 5.63724 | 6.69271 | 6.10549 | 8.94331 |
| Cndp2 | 21.8575 | 17.5241 | 48.1255 | 56.3114 | 53.5111 | 52.0674 | 233.706 | 191.125 |
| Cnnm4 | 9.40779 | 9.79629 | 3.52033 | 4.08394 | 4.18666 | 4.54312 | 4.56292 | 5.51228 |
| Cnpy2 | 36.5467 | 49.2511 | 106.282 | 90.9636 | 95.7162 | 96.8726 | 134.791 | 114.269 |
| Cntn2 | 7.47753 | 7.31892 | 0.451463 | 0.218076 | 0.403885 | 0.273594 | 0.0777049 | 0.0159361 |
| Coa3 | 62.6216 | 60.5943 | 197.695 | 153.087 | 189.359 | 184.87 | 187.908 | 226.574 |
| Coa4 | 5.4266 | 4.99785 | 19.4458 | 17.266 | 17.1599 | 17.5799 | 11.6792 | 17.0311 |
| Col4a2 | 46.3592 | 38.0577 | 14.4498 | 21.2398 | 16.6279 | 17.9456 | 40.5172 | 37.0438 |
| Col4a3 | 4.24088 | 4.17471 | 0.655624 | 0.900877 | 0.770963 | 0.719755 | 38.2002 | 29.2322 |
| Col6a1 | 0.203375 | 0.201389 | 2.14156 | 1.59175 | 1.76401 | 2.03486 | 13.4463 | 13.0533 |
| Col7a1 | 5.67778 | 6.03142 | 1.59431 | 0.775025 | 2.19541 | 1.68188 | 0.967264 | 0.562049 |
| Col8a1 | 25.4516 | 23.84 | 1.7312 | 1.17984 | 1.72631 | 1.62459 | 0.392799 | 0.302047 |
| Commd3 | 40.3539 | 44.0453 | 106.898 | 71.4867 | 111.538 | 95.7198 | 65.7879 | 60.2854 |
| Coro6 | 3.60974 | 3.65439 | 0.683146 | 0.675663 | 0.495035 | 0.721298 | 0.215294 | 0.529284 |
| Cotl1 | 40.7252 | 46.0741 | 22.9112 | 16.3405 | 21.0843 | 19.1532 | 141.953 | 90.6128 |
| Cox14 | 55.6014 | 53.7503 | 141.906 | 73.6257 | 118.511 | 110.008 | 125.747 | 123.964 |
| Cox16 | 3.41561 | 3.48758 | 8.84326 | 5.17131 | 8.74628 | 8.49924 | 11.4148 | 8.73229 |
| Cox17 | 90.6765 | 97.6149 | 240.418 | 145.445 | 238.206 | 219.699 | 382.771 | 347.232 |
| Cox20 | 11.1364 | 15.1576 | 43.5305 | 27.2171 | 45.9517 | 35.723 | 257.561 | 204.547 |
| Cox6b2 | 2.91444 | 3.36101 | 25.8905 | 8.43611 | 21.3086 | 15.0775 | 33.2105 | 18.2724 |
| Cox7a1 | 3.17167 | 4.60419 | 10.9399 | 4.99272 | 8.20533 | 10.5985 | 230.119 | 181.951 |
| Cp | 0.839405 | 1.47817 | 32.0286 | 66.9634 | 29.5261 | 36.3037 | 22.8285 | 33.0822 |
| Cpm | 9.28856 | 7.30384 | 15.4691 | 28.7328 | 10.7849 | 14.7705 | 6.51637 | 10.0663 |
| Cpn1 | 1.10741 | 1.01861 | 6.07258 | 4.70736 | 4.08835 | 5.67467 | 83.9203 | 49.5706 |
| Cpne8 | 31.2882 | 30.3516 | 11.2542 | 11.8033 | 14.9278 | 11.5237 | 6.89867 | 9.48433 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cpped1 | 7.29238 | 7.75377 | 16.9252 | 15.1124 | 17.8744 | 17.0973 | 21.5964 | 27.64 |
| Cr1l | 6.09914 | 6.04989 | 17.4697 | 13.5673 | 17.8071 | 15.5004 | 24.2153 | 24.5774 |
| Crabp2 | 14.7436 | 16.3744 | 4.35506 | 2.92862 | 4.7343 | 3.48343 | 0.996018 | 0.815569 |
| Creb3l4 | 0.324636 | 0.611188 | 2.7448 | 3.18671 | 2.56223 | 2.27664 | 1.05193 | 1.83209 |
| Creb5 | 4.85525 | 4.92282 | 0.633599 | 0.771055 | 0.859636 | 0.73897 | 0 | 0.110365 |
| Creg1 | 2.62831 | 2.86599 | 6.64652 | 8.20763 | 7.73222 | 7.6967 | 35.1041 | 32.4159 |
| Crim1 | 20.2607 | 18.1563 | 3.61549 | 4.92385 | 4.74636 | 4.38485 | 11.3263 | 15.4985 |
| Crip1 | 1.49028 | 2.67641 | 64.0365 | 41.7471 | 58.581 | 55.1083 | 71.6078 | 50.2505 |
| Crip2 | 31.6573 | 32.9835 | 89.5012 | 81.5646 | 121.239 | 107.955 | 111.963 | 134.581 |
| Crisp1 | 0.0655358 | 0 | 3.22992 | 4.30194 | 5.04032 | 4.17624 | 0 | 0 |
| Crispld2 | 0.348007 | 0.27923 | 5.5097 | 12.3189 | 5.31396 | 7.03078 | 5.66752 | 5.99782 |
| Crmp1 | 2.0829 | 2.26119 | 0.112739 | 0.108333 | 0.19857 | 0.186948 | 0.086662 | 0.106609 |
| Cryl1 | 3.81953 | 3.34793 | 10.1381 | 8.79905 | 8.20993 | 8.85519 | 151.926 | 101.429 |
| Csdc2 | 1.52877 | 1.30622 | 6.04439 | 6.63442 | 6.38183 | 7.01447 | 2.71786 | 2.50707 |
| Csf1 | 48.4895 | 45.4299 | 10.9758 | 18.2735 | 14.9702 | 14.8519 | 6.28757 | 6.12987 |
| Csf1r | 6.99349 | 7.33414 | 1.00887 | 0.531449 | 0.654019 | 0.833619 | 39.4745 | 42.1597 |
| Csf2 | 40.4144 | 46.7702 | 3.20502 | 1.45753 | 3.94066 | 3.38502 | 0 | 0 |
| Csn3 | 3.31757 | 3.74207 | 0.759919 | 1.27777 | 1.45426 | 1.57095 | 0 | 0 |
| Csnk1e | 100.69 | 92.0023 | 31.34 | 34.4666 | 38.7308 | 37.7548 | 9.33671 | 10.0522 |
| Csrnp1 | 10.0693 | 7.82436 | 3.08186 | 2.22901 | 3.15702 | 3.18213 | 4.19072 | 3.07092 |
| Cstb | 167.558 | 198.379 | 489.593 | 357.239 | 489.438 | 443.855 | 124.468 | 116.907 |
| Ctgf | 433.509 | 400.529 | 88.9189 | 70.9392 | 142.147 | 113.817 | 32.27 | 26.5928 |
| Cth | 9.98046 | 14.0079 | 4.26338 | 3.9801 | 4.52844 | 3.8572 | 141.537 | 158.221 |
| Ctla2b | 12.7202 | 18.1036 | 6.79489 | 2.66864 | 10.2701 | 5.94861 | 2.95584 | 1.92633 |
| Ctsh | 17.3294 | 15.9156 | 61.721 | 38.0096 | 49.1138 | 50.2187 | 124.658 | 161.675 |
| Ctsw | 1.38481 | 3.33243 | 0.213123 | 0.286667 | 0.286386 | 0.315053 | 0.913121 | 0.140279 |
| Cttnbp2nl | 45.5659 | 48.1736 | 14.659 | 16.4877 | 16.3784 | 15.7918 | 3.84508 | 5.62566 |
| Cutc | 2.09655 | 2.90445 | 7.23454 | 4.79569 | 6.57425 | 7.02984 | 9.80002 | 11.9839 |
| Cwh43 | 3.55836 | 3.04643 | 0.567229 | 0.566345 | 0.397327 | 0.430223 | 13.2562 | 13.3725 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cxcl1 | 245.612 | 260.087 | 87.8605 | 65.5296 | 117.831 | 92.8083 | 0.622281 | 0.573306 |
| Cxcl17 | 0.0694539 | 0 | 7.09981 | 6.81067 | 3.71156 | 3.67001 | 0 | 0 |
| Cxcl2 | 8.28297 | 9.40373 | 24.0752 | 23.9524 | 37.0117 | 31.8737 | 0 | 0.16312 |
| Cxcl5 | 15.9275 | 19.8517 | 43.0763 | 45.1864 | 56.6007 | 49.0006 | 0 | 0 |
| Cxx1a | 1.18287 | 0.904943 | 4.70975 | 3.82168 | 5.13669 | 4.88636 | 20.185 | 16.7191 |
| Cxx1b | 1.19248 | 1.05044 | 4.94445 | 3.79834 | 5.34588 | 4.81581 | 28.3068 | 21.4628 |
| Cyb5 | 60.3776 | 60.1883 | 158.102 | 130.24 | 184.215 | 164.762 | 1316.99 | 978.422 |
| Cyld | 10.4186 | 11.0453 | 3.87179 | 4.59562 | 4.37985 | 4.34517 | 5.04515 | 5.2342 |
| Cyp1b1 | 0.484675 | 0.517722 | 4.67539 | 3.02285 | 4.4273 | 4.51125 | 6.16413 | 7.3733 |
| Cyp24a1 | 0 | 0 | 4.49651 | 5.768 | 2.55234 | 3.48241 | 4.11207 | 1.62249 |
| Cyp26a1 | 0.278575 | 0.309869 | 2.49464 | 4.52462 | 1.72718 | 2.18936 | 1.05363 | 0.462689 |
| Cyp2j6 | 0.0118961 | 0.0783396 | 0.907415 | 0.884601 | 1.22353 | 0.888067 | 22.0941 | 17.7277 |
| Cyr61 | 691.982 | 623.58 | 35.4605 | 37.9207 | 69.0167 | 52.3451 | 9.78871 | 15.4883 |
| Cys1 | 0.434308 | 0.312585 | 3.42289 | 5.09972 | 1.35419 | 3.22847 | 66.4939 | 61.9335 |
| D10Jhu81e | 11.8431 | 12.1815 | 29.0041 | 25.8817 | 23.9066 | 25.7786 | 136.162 | 172.117 |
| D330041H03Rik | 1.4882 | 1.17386 | 7.71468 | 0.561952 | 9.16759 | 5.18978 | 75.4104 | 71.2048 |
| D630039A03Rik | 0.029902 | 0.0140669 | 1.19035 | 1.69587 | 0.500302 | 0.854835 | 18.5943 | 12.9133 |
| D630045M09Rik | 22.5421 | 19.7352 | 2.15077 | 1.20542 | 2.94393 | 2.69139 | 17.9272 | 21.7723 |
| Daam1 | 9.39833 | 9.66319 | 3.66456 | 4.87977 | 3.79544 | 3.82378 | 4.41167 | 4.67098 |
| Dab2 | 5.28741 | 4.53761 | 1.77837 | 1.73046 | 1.82641 | 1.62034 | 109.19 | 75.3158 |
| Dad1 | 119.794 | 111.946 | 256.161 | 186.269 | 288.646 | 249.268 | 309.904 | 279.317 |
| Dalrd3 | 13.7963 | 13.8935 | 31.6781 | 31.3951 | 32.9365 | 33.9532 | 76.0232 | 51.2264 |
| Dapk1 | 6.61501 | 6.01285 | 13.8267 | 22.0679 | 13.0534 | 15.2323 | 14.2 | 14.4304 |
| Dbi | 264.996 | 258.136 | 830.703 | 515.428 | 727.818 | 688.074 | 946.668 | 948.047 |
| Dbndd1 | 8.37145 | 8.89145 | 4.41298 | 2.86782 | 4.24817 | 3.62185 | 0.357079 | 0.346413 |
| Dcdc2a | 0.988741 | 1.04817 | 4.21576 | 7.03713 | 2.55492 | 3.8483 | 3.32425 | 4.73494 |
| Dclk3 | 6.35423 | 4.78001 | 2.47693 | 1.63879 | 2.50333 | 2.42786 | 15.5959 | 19.4096 |
| Dcxr | 4.86857 | 6.03018 | 40.7314 | 31.1257 | 33.4909 | 38.539 | 277.688 | 158.404 |
| Ddah1 | 56.2438 | 50.2323 | 18.345 | 17.7962 | 18.9125 | 18.1605 | 56.0075 | 42.7499 |

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|---|---|---|---|---|---|---|---|---|
| Ddi2 | 22.9382 | 20.0989 | 6.29015 | 14.3324 | 8.26045 | 8.79259 | 5.858 | 3.66777 |
| Ddit4l | 0.814893 | 1.18768 | 3.76374 | 2.77825 | 4.27765 | 4.21411 | 8.55627 | 10.7581 |
| Ddt | 21.8007 | 20.7447 | 66.3661 | 58.0491 | 69.9701 | 61.6996 | 209.11 | 182.054 |
| Ddx58 | 5.51264 | 5.55471 | 13.1183 | 25.2167 | 15.7427 | 17.5219 | 9.40125 | 11.5353 |
| Ddx60 | 0.0489894 | 0.0724105 | 1.10587 | 2.24338 | 0.745636 | 1.34618 | 0.291787 | 0.4103 |
| Def8 | 20.585 | 18.3298 | 7.82077 | 9.55662 | 8.75577 | 8.57114 | 29.3229 | 25.9949 |
| Derl3 | 0.035024 | 0.032976 | 1.08633 | 1.46776 | 0.477965 | 0.778293 | 1.45552 | 0.894532 |
| Dhh | 16.3493 | 14.4065 | 3.75649 | 4.12487 | 5.52091 | 4.26761 | 1.3246 | 1.28971 |
| Dhrs3 | 4.66512 | 4.79712 | 145.079 | 124.461 | 85.3362 | 108.879 | 251.317 | 211.447 |
| Dhrs4 | 10.215 | 10.281 | 33.1081 | 27.4385 | 31.7392 | 32.773 | 93.2078 | 79.7409 |
| Dhx58 | 0.436427 | 0.410665 | 5.69221 | 11.9394 | 4.62087 | 6.81371 | 1.83887 | 2.39466 |
| Dmpk | 2.04561 | 2.31022 | 7.36348 | 5.58178 | 6.16113 | 6.42168 | 12.263 | 10.251 |
| Dmtf1 | 26.4895 | 28.0713 | 12.3059 | 13.054 | 11.1649 | 10.5574 | 13.8906 | 10.1637 |
| Dnajc15 | 27.3056 | 25.836 | 60.5772 | 36.8578 | 66.751 | 58.4915 | 163.694 | 146.437 |
| Dnajc22 | 2.08544 | 1.81453 | 0.454889 | 0.088253 | 0.391937 | 0.406348 | 16.8897 | 16.8408 |
| Dnajc30 | 6.69363 | 7.39299 | 17.123 | 13.6914 | 15.7511 | 14.8312 | 53.4345 | 50.5301 |
| Dnlz | 5.74679 | 5.77507 | 13.9159 | 12.0725 | 15.8549 | 13.8728 | 18.7515 | 18.4936 |
| Dnm1 | 3.82163 | 3.8603 | 1.62003 | 1.60314 | 0.628607 | 1.28856 | 2.8858 | 3.34372 |
| Dpp4 | 0.255654 | 0.345682 | 2.65745 | 3.67464 | 1.09866 | 1.89695 | 20.4566 | 20.1154 |
| Dpysl5 | 12.5187 | 11.7678 | 3.47962 | 3.86983 | 3.26637 | 3.40681 | 0.100001 | 0.123035 |
| Dsc2 | 12.8843 | 12.4089 | 4.80339 | 6.38365 | 3.82756 | 4.1953 | 0.74261 | 0.456809 |
| Dsg2 | 38.5203 | 35.957 | 13.5196 | 19.3593 | 12.3889 | 13.6056 | 4.75602 | 5.52959 |
| Dtna | 2.29717 | 2.39584 | 0.6874 | 0.512009 | 0.585961 | 0.514296 | 1.97074 | 2.1524 |
| Dtx3l | 2.71449 | 2.84565 | 7.14164 | 15.7645 | 6.76638 | 8.55245 | 2.52919 | 2.59059 |
| Dusp1 | 136.432 | 111.004 | 9.27176 | 7.19565 | 14.3842 | 11.8561 | 27.3696 | 35.2547 |
| Dusp2 | 11.1608 | 10.1077 | 3.21377 | 2.17726 | 5.34785 | 3.98534 | 0.669819 | 0.308818 |
| Dusp4 | 28.1066 | 31.5635 | 7.83204 | 8.92004 | 12.2701 | 10.0786 | 0.859599 | 0.462536 |
| Dusp5 | 55.5919 | 51.3374 | 12.7832 | 19.4052 | 23.9923 | 19.9085 | 0 | 0.453665 |
| Dusp8 | 3.62718 | 3.70039 | 0.716529 | 0.920004 | 1.0638 | 0.817267 | 0.782592 | 0.834457 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dusp9 | 23.9573 | 19.9037 | 8.83736 | 6.77124 | 13.4789 | 11.5067 | 2.30061 | 2.18125 |
| Dynll1 | 78.9704 | 77.9477 | 190.727 | 124.73 | 210.322 | 184.753 | 79.9158 | 64.9259 |
| Ebp | 16.44 | 16.916 | 39.8143 | 31.0325 | 40.7083 | 37.2618 | 108.816 | 88.0587 |
| Echs1 | 32.2614 | 36.4215 | 79.0454 | 76.1495 | 76.3902 | 76.3307 | 112.146 | 123.876 |
| Ecm1 | 15.2011 | 15.1051 | 76.9197 | 40.6489 | 84.9334 | 78.0182 | 121.36 | 138.364 |
| Ecscr | 5.86369 | 4.66341 | 17.6712 | 17.2839 | 26.0918 | 23.2889 | 13.3959 | 11.3959 |
| Eda2r | 0.137014 | 0.266063 | 1.55836 | 1.60955 | 2.04924 | 1.64446 | 0.333797 | 0.19569 |
| Efemp1 | 0.240423 | 0.329105 | 4.71577 | 8.47866 | 3.30592 | 5.13029 | 24.042 | 35.0789 |
| Efhd1 | 0.499047 | 0.469699 | 3.01017 | 2.78619 | 0.928217 | 1.74896 | 124.432 | 163.397 |
| Efna3 | 3.48509 | 2.95356 | 0.77237 | 0.757528 | 0.624645 | 0.951482 | 0.689382 | 1.27088 |
| Egfr | 38.3818 | 33.7993 | 11.9363 | 16.3275 | 15.2779 | 14.6232 | 8.23087 | 7.56058 |
| Egln3 | 3.61098 | 3.09151 | 19.7333 | 11.6307 | 5.96748 | 10.5353 | 7.16145 | 8.03476 |
| Egr1 | 207.864 | 194.971 | 28.5391 | 40.1061 | 37.0348 | 36.5371 | 6.18444 | 4.67751 |
| Ehf | 14.335 | 15.8837 | 46.3683 | 65.578 | 37.9766 | 45.1258 | 12.7687 | 24.448 |
| Eid2 | 3.47065 | 3.95586 | 10.6044 | 5.95464 | 10.4706 | 9.70092 | 7.15614 | 9.86171 |
| Eif4ebp1 | 312.276 | 322.634 | 170.288 | 115.213 | 141.762 | 143.409 | 34.9682 | 47.9148 |
| Elf3 | 19.3996 | 18.6563 | 89.6808 | 85.8374 | 60.3434 | 79.2329 | 19.7891 | 30.8522 |
| Elmod1 | 1.40622 | 1.02386 | 0.0740583 | 0.0778343 | 0.0829989 | 0.039076 | 0.0995974 | 0.306253 |
| Elovl4 | 4.26749 | 4.34738 | 0.234367 | 0.197056 | 0.455323 | 0.461634 | 0 | 0.155165 |
| Emb | 28.7271 | 27.4835 | 66.5015 | 100.898 | 64.6189 | 71.3996 | 19.4847 | 19.5861 |
| Eml5 | 2.33843 | 2.42363 | 0.582037 | 0.609944 | 0.635104 | 0.554751 | 2.7462 | 1.67091 |
| Emp1 | 252.293 | 236.252 | 59.5837 | 53.4255 | 82.721 | 66.4027 | 18.7287 | 22.3346 |
| Eno1b | 65.6508 | 144.842 | 515.801 | 106.109 | 362.688 | 367.995 | 426.772 | 445.349 |
| Eno2 | 2.55079 | 3.63129 | 0.787689 | 0.446655 | 0.410599 | 0.637918 | 1.87236 | 0.787853 |
| Enpp2 | 0.338233 | 0.40567 | 2.90232 | 4.49819 | 1.98488 | 2.45939 | 50.1195 | 77.3211 |
| Entpd3 | 20.3979 | 17.8584 | 6.31363 | 5.10085 | 8.9847 | 7.55974 | 0.369495 | 0.0454536 |
| Epb4.1l3 | 41.4954 | 41.4782 | 18.6396 | 22.5318 | 18.7715 | 18.7348 | 11.7047 | 5.77524 |
| Epb4.1l4b | 0.524742 | 0.479989 | 2.93339 | 5.75945 | 3.01682 | 3.67361 | 26.1091 | 32.6492 |
| Epha2 | 109.289 | 99.7447 | 27.7955 | 29.6214 | 46.9383 | 38.1051 | 2.64335 | 3.33122 |

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|---|---|---|---|---|---|---|---|---|
| Ephx1 | 4.64021 | 4.65031 | 31.9077 | 34.3961 | 28.5016 | 30.5555 | 55.1455 | 73.5844 |
| Ereg | 0 | 0 | 0.885578 | 0.820986 | 2.39274 | 1.65311 | 0 | 0.112856 |
| Esd | 130.9 | 116.409 | 318.1 | 222.867 | 413.84 | 341.705 | 324.953 | 265.476 |
| Eva1a | 1.14892 | 0.744949 | 13.2816 | 11.6891 | 10.0678 | 10.41 | 18.0574 | 17.8183 |
| Eva1c | 1.32145 | 0.974652 | 4.66227 | 3.43758 | 6.64237 | 4.12893 | 12.1744 | 14.6947 |
| Eya2 | 7.90438 | 6.4326 | 21.2037 | 23.8071 | 16.9752 | 19.231 | 0.803378 | 1.13004 |
| F3 | 98.6345 | 95.8013 | 29.4784 | 34.5952 | 39.8176 | 34.8566 | 8.52841 | 13.7204 |
| Faah | 1.22916 | 1.314 | 5.15084 | 6.14845 | 4.44464 | 5.3826 | 29.0704 | 22.0141 |
| Fabp3 | 1.57214 | 1.89486 | 7.09566 | 7.92381 | 3.80252 | 4.11094 | 207.193 | 338.938 |
| Fads3 | 51.3605 | 52.5262 | 16.166 | 16.6484 | 22.3079 | 20.4481 | 70.4358 | 55.0675 |
| Fam102b | 11.6022 | 12.4643 | 5.0926 | 4.54883 | 5.38109 | 4.92643 | 3.33231 | 3.85723 |
| Fam111a | 0.0269068 | 0 | 9.98085 | 11.8813 | 10.2702 | 10.2334 | 2.08183 | 2.56087 |
| Fam129a | 4.48579 | 4.95203 | 14.075 | 27.8584 | 11.8668 | 15.9348 | 2.57409 | 4.43339 |
| Fam131a | 4.34722 | 4.03599 | 2.38302 | 1.29962 | 1.22696 | 1.49536 | 1.84681 | 2.12934 |
| Fam131c | 9.84213 | 8.84843 | 4.17047 | 4.65524 | 3.53293 | 3.10786 | 2.63136 | 3.92791 |
| Fam132a | 2.30633 | 2.27173 | 14.74 | 7.79854 | 11.8415 | 10.7487 | 41.2852 | 32.622 |
| Fam13a | 0.0494008 | 0.0743537 | 0.862714 | 1.92826 | 0.428469 | 0.875666 | 24.5312 | 19.5771 |
| Fam162a | 95.1748 | 102.853 | 495.149 | 211.491 | 216.909 | 278.867 | 202.125 | 205.156 |
| Fam171a1 | 11.3216 | 11.1612 | 22.9783 | 32.3663 | 19.7284 | 22.0456 | 9.39436 | 11.4448 |
| Fam187b | 1.24745 | 1.17467 | 3.54225 | 3.13375 | 4.96585 | 2.73683 | 8.79046 | 8.52898 |
| Fam189b | 0.394976 | 0.39815 | 3.66537 | 5.19326 | 4.02087 | 4.29562 | 2.43454 | 2.47835 |
| Fam198b | 6.60926 | 5.29709 | 0.773488 | 0.462885 | 1.07815 | 0.977744 | 0.488353 | 0.808878 |
| Fam20c | 2.56243 | 2.49212 | 21.2183 | 30.8226 | 10.6689 | 17.9723 | 28.9561 | 39.0955 |
| Fam43a | 0.252512 | 0.316763 | 1.84583 | 3.96473 | 2.71215 | 3.14254 | 8.76616 | 17.4584 |
| Fam65b | 5.52819 | 5.01253 | 1.14797 | 0.663156 | 1.1425 | 1.05305 | 0.687874 | 0.297463 |
| Fam71f1 | 2.3542 | 2.10951 | 0.158877 | 0.0801587 | 0.464376 | 0.302814 | 0 | 0 |
| Fam71f2 | 2.31517 | 1.22398 | 0.675232 | 0.227057 | 0.201617 | 0.19014 | 0.240979 | 0.148072 |
| Fam96a | 24.0643 | 28.3774 | 64.5689 | 45.7793 | 58.6407 | 54.3212 | 48.353 | 52.5497 |
| Fat1 | 25.9273 | 22.9378 | 9.2935 | 14.4365 | 10.7871 | 11.188 | 4.02698 | 5.99823 |

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|---|---|---|---|---|---|---|---|---|
| Fcho1 | 7.39271 | 7.20915 | 3.45383 | 2.43164 | 2.47456 | 2.54318 | 1.07604 | 1.09756 |
| Fdx1l | 21.8103 | 24.9833 | 57.2912 | 29.7745 | 65.4941 | 51.8134 | 75.6265 | 58.0933 |
| Fes | 0.912059 | 1.16885 | 3.5823 | 4.401 | 2.84553 | 3.63341 | 5.42684 | 4.60349 |
| Fetub | 0.697174 | 0.601582 | 4.1483 | 4.38801 | 3.72812 | 4.55715 | 6.84614 | 2.54414 |
| Fez2 | 68.7127 | 61.323 | 27.7897 | 18.0813 | 34.4646 | 29.0245 | 29.4788 | 32.8421 |
| Ffar4 | 0.233703 | 0.125729 | 8.87472 | 11.4091 | 7.24781 | 8.39357 | 0.594735 | 0.121845 |
| Fgd3 | 23.3839 | 21.0482 | 5.13423 | 7.08742 | 7.48967 | 6.75988 | 2.14483 | 3.90677 |
| Fgf1 | 0.326879 | 0.276754 | 6.56413 | 6.27878 | 6.37261 | 6.04901 | 86.5344 | 106.257 |
| Fgf18 | 0.716077 | 0.589828 | 2.94025 | 4.83276 | 6.47613 | 5.23128 | 0.531674 | 0.32682 |
| Fgf21 | 1.63217 | 2.43053 | 0.233658 | 0.196412 | 0.0653773 | 0.0617042 | 0 | 0 |
| Fgf7 | 0.130334 | 0.199277 | 1.62155 | 1.39369 | 3.93758 | 2.66182 | 0.387724 | 0.476894 |
| Fhdc1 | 9.49659 | 8.65199 | 2.37506 | 3.22549 | 2.95181 | 2.78592 | 1.05274 | 0.854888 |
| Fhl1 | 44.6865 | 43.4669 | 7.77483 | 4.48772 | 7.63863 | 6.72143 | 44.323 | 29.451 |
| Filip1l | 22.7605 | 23.9499 | 7.9497 | 8.94499 | 10.4012 | 9.11305 | 7.00145 | 10.8441 |
| Fjx1 | 2.70951 | 2.97448 | 0.319675 | 0.167986 | 0.626937 | 0.421698 | 1.7192 | 2.2466 |
| Fkbp5 | 16.3663 | 15.4685 | 30.726 | 40.4348 | 31.6973 | 32.3682 | 5.42031 | 5.8246 |
| Flnc | 36.4915 | 29.958 | 6.94495 | 6.38203 | 8.15137 | 7.33168 | 0.053928 | 0.0829482 |
| Fmn1 | 4.60625 | 3.72421 | 1.08161 | 1.82929 | 1.052 | 1.22743 | 3.86374 | 4.14504 |
| Fn1 | 158.382 | 168.389 | 32.0826 | 39.1276 | 37.1207 | 36.227 | 9.34217 | 11.3051 |
| Fndc3c1 | 3.25535 | 2.62472 | 0.0484873 | 0.0652314 | 0.0761001 | 0.0818502 | 0 | 0 |
| Fos | 60.5156 | 50.307 | 2.50931 | 3.58854 | 4.28335 | 3.81163 | 4.6635 | 1.86001 |
| Fosb | 7.19701 | 6.26035 | 0.249789 | 0.462059 | 0.700005 | 0.448047 | 0.269042 | 0.165488 |
| Fosl1 | 40.7847 | 40.1526 | 9.86405 | 7.79948 | 27.2659 | 18.7478 | 3.12E-52 | 3.56E-31 |
| Foxa2 | 0.386364 | 0.343398 | 4.66124 | 3.3545 | 4.41746 | 4.13572 | 0 | 0 |
| Foxa3 | 5.23716 | 5.01078 | 1.54525 | 1.13679 | 1.2986 | 1.27413 | 0.259497 | 0.0797783 |
| Foxn1 | 2.00328 | 2.11977 | 0.509895 | 0.587964 | 0.686167 | 0.568772 | 0 | 0 |
| Foxn3 | 6.19553 | 6.47373 | 0.923446 | 2.40691 | 1.05563 | 1.18888 | 1.39094 | 1.4664 |
| Frmd6 | 21.3184 | 20.8895 | 5.87279 | 6.05876 | 7.8083 | 6.70366 | 2.10584 | 2.42475 |
| Frs3 | 4.19214 | 3.84714 | 1.85978 | 1.17756 | 1.31214 | 1.55086 | 16.9074 | 10.6239 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fsd1 | 9.43743 | 10.2212 | 1.45955 | 1.75644 | 1.50694 | 1.8729 | 0.30733 | 0.0944705 |
| Fst | 29.1633 | 25.7958 | 4.80767 | 3.25475 | 8.5596 | 6.45746 | 7.0504 | 17.2046 |
| Fth1 | 748.374 | 672.607 | 1355.85 | 1754.95 | 1573.44 | 1563.52 | 6839.91 | 6204.69 |
| Ftl1 | 1417.86 | 1207.11 | 2696.98 | 2154.67 | 3246.22 | 2903.92 | 5582.4 | 3497.92 |
| Fuca1 | 14.12 | 14.0034 | 33.3034 | 26.5671 | 31.2672 | 29.0582 | 101.109 | 98.751 |
| Fuom | 0.633564 | 0.77499 | 18.2949 | 19.0521 | 16.4036 | 18.3052 | 21.484 | 19.6525 |
| Fut2 | 0 | 0 | 1.19829 | 2.52986 | 0.58036 | 1.04669 | 0.0870598 | 0 |
| Fuz | 3.22579 | 2.86478 | 7.91708 | 7.11088 | 6.09372 | 7.5625 | 32.2608 | 25.272 |
| Fxyd3 | 1.16279 | 1.97626 | 13.3603 | 8.82995 | 11.7328 | 9.33556 | 6.15512 | 1.25735 |
| Fzd8 | 0.166789 | 0.229336 | 1.10639 | 1.76511 | 1.41503 | 1.37696 | 4.88736 | 6.66969 |
| Gabarap | 144.161 | 161.565 | 372.864 | 274.042 | 324.326 | 320.836 | 598.656 | 497.361 |
| Gabrp | 4.03559 | 2.94613 | 181.541 | 226.429 | 144.804 | 162.53 | 0.0779852 | 0 |
| Gadd45a | 59.5078 | 70.8234 | 26.607 | 19.4928 | 19.46 | 21.2665 | 31.3895 | 40.5704 |
| Gamt | 0.792837 | 0.995927 | 5.51245 | 4.1408 | 4.26613 | 4.08844 | 50.4169 | 32.6966 |
| Gars | 225.357 | 230.546 | 101.61 | 87.7032 | 111.98 | 106.267 | 42.9314 | 55.2194 |
| Gas1 | 0.0275256 | 0.0776902 | 0.791288 | 0.870032 | 1.26215 | 1.05976 | 10.0748 | 15.9194 |
| Gas2 | 2.88175 | 3.82395 | 11.4226 | 9.35302 | 12.6968 | 11.8616 | 30.6982 | 21.3778 |
| Gas6 | 4.42466 | 4.13161 | 1.48852 | 1.07945 | 1.45969 | 1.47263 | 224.403 | 220.239 |
| Gata6 | 2.19654 | 2.24403 | 0.670466 | 0.363294 | 0.701401 | 0.4402 | 0.721823 | 0.789262 |
| Gatad2b | 14.0278 | 13.5782 | 3.40632 | 9.94704 | 4.19531 | 5.24197 | 1.25716 | 1.54589 |
| Gatm | 17.1885 | 16.1917 | 4.08304 | 3.29423 | 4.57564 | 4.67893 | 199.931 | 87.4189 |
| Gatsl2 | 7.54987 | 6.90089 | 2.29265 | 4.16158 | 2.45988 | 2.6784 | 15.958 | 7.50108 |
| Gbp2 | 0.8564 | 1.09124 | 9.0974 | 16.4925 | 6.03753 | 8.41351 | 7.21708 | 10.247 |
| Gbp3 | 0.318467 | 0.267139 | 7.07499 | 13.1575 | 6.72079 | 7.6596 | 35.0347 | 47.135 |
| Gbp7 | 0.629553 | 0.472304 | 2.65026 | 5.67556 | 2.17272 | 3.04944 | 5.35628 | 5.62927 |
| Gc | 1.83858 | 3.13353 | 76.6918 | 53.4738 | 42.3304 | 53.1437 | 22.4471 | 13.8913 |
| Gclc | 10.146 | 9.65108 | 38.6158 | 63.0998 | 49.0052 | 47.7361 | 172.464 | 172.583 |
| Gclm | 35.8297 | 33.2948 | 60.7806 | 81.8192 | 75.0709 | 72.4113 | 105.951 | 111.714 |
| Gdf15 | 214.628 | 208.255 | 84.6412 | 61.6491 | 133.728 | 114.786 | 6.89566 | 9.45061 |

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|---|---|---|---|---|---|---|---|---|
| Gdnf | 1.59857 | 1.27429 | 0.0944331 | 0.147458 | 0.257068 | 0.241985 | 0.0726378 | 0.0893564 |
| Gemin7 | 37.9359 | 32.9596 | 80.1544 | 49.0438 | 90.5113 | 77.2425 | 89.897 | 85.0308 |
| Gfra4 | 0.13001 | 0.244807 | 3.92127 | 2.31687 | 0.9274 | 2.01435 | 2.70246 | 2.00511 |
| Ggt1 | 0 | 0.0829002 | 2.09556 | 5.34707 | 1.22865 | 2.88038 | 838.401 | 665.414 |
| Gimap9 | 0.302961 | 0.38031 | 2.31166 | 2.06879 | 2.12972 | 2.28311 | 10.9933 | 8.35363 |
| Gjb1 | 0.0923546 | 0.173883 | 1.73854 | 2.09212 | 0.763681 | 1.79936 | 35.2908 | 29.2228 |
| Gjb2 | 0.492742 | 0.326277 | 8.05426 | 11.1167 | 10.3381 | 9.45845 | 44.8335 | 47.1967 |
| Glipr2 | 32.8444 | 32.1761 | 15.2054 | 12.0043 | 15.178 | 14.1163 | 4.19684 | 3.06433 |
| Glod5 | 0.163457 | 0.0770759 | 2.45455 | 0.38202 | 1.42286 | 2.01823 | 138.023 | 101.86 |
| Glrp1 | 2.53358 | 4.16736 | 0.479886 | 0.233586 | 0.282998 | 0.319893 | 0 | 0 |
| Gltscr1l | 4.9242 | 4.58976 | 1.41816 | 2.65646 | 1.4798 | 1.83683 | 4.2767 | 4.30751 |
| Gm10052 | 997.604 | 940.979 | 421.928 | 534.834 | 439.232 | 448.108 | 24.2766 | 54.0801 |
| Gm1045 | 17.4627 | 26.2992 | 4.40636 | 3.3787 | 7.00354 | 5.63705 | 0 | 0.505051 |
| Gm10451 | 0 | 0 | 1.75907 | 3.32693 | 2.39026 | 2.5884 | 2.68174 | 2.88205 |
| Gm11538 | 0.482575 | 1.38412 | 3.78887 | 1.73172 | 3.58996 | 3.11331 | 0 | 0 |
| Gm12238 | 0 | 0 | 0 | 0 | 38.8447 | 0 | 0 | 0 |
| Gm12942 | 4.80788 | 3.77324 | 10.565 | 9.62823 | 7.85117 | 9.47837 | 16.7617 | 16.4473 |
| Gm13363 | 11.4461 | 12.2354 | 0.000516945 | 6.9341 | 3.19721 | 3.48323 | 2.26E-06 | 2.59E-06 |
| Gm14446 | 0.458608 | 0.356508 | 1.01878 | 3.21201 | 0.992516 | 1.46626 | 1.54158 | 2.18757 |
| Gm16617 | 1.51022 | 1.77992 | 0.0839469 | 0.423332 | 0.187743 | 0.177461 | 0.446203 | 0 |
| Gm16973 | 0.751274 | 0.910257 | 2.87608 | 2.26128 | 2.86842 | 2.89858 | 6.46202 | 4.55897 |
| Gm17296 | 3.56488 | 3.34545 | 0.902077 | 1.66405 | 0.980343 | 1.07797 | 0.744028 | 0.549242 |
| Gm4532 | 0.377554 | 0.284787 | 2.26657 | 1.34055 | 2.53453 | 2.0408 | 2.67722 | 1.64301 |
| Gm5424 | 1.69014 | 1.49846 | 17.8698 | 15.1868 | 13.1584 | 13.9616 | 444.328 | 309.595 |
| Gm5617 | 1.50744 | 1.42198 | 5.62561 | 4.23013 | 4.1917 | 4.27865 | 70.107 | 50.0653 |
| Gm6548 | 10.4033 | 10.2214 | 22.8043 | 22.6221 | 22.9025 | 22.0816 | 10.504 | 10.6846 |
| Gm8439 | 0.49801 | 0.470961 | 2.7904 | 3.75016 | 2.28069 | 3.15407 | 0 | 0 |
| Gnai1 | 0.768368 | 0.748257 | 2.78708 | 2.782 | 3.17405 | 2.8937 | 17.8911 | 18.7512 |
| Golm1 | 24.8242 | 25.5767 | 55.377 | 68.4513 | 56.143 | 57.6175 | 6.94602 | 8.98462 |

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|---|---|---|---|---|---|---|---|---|
| Got1 | 45.1277 | 42.9977 | 18.7241 | 18.1752 | 23.553 | 21.1751 | 49.6053 | 77.5169 |
| Gpc6 | 1.59047 | 1.68804 | 4.54724 | 5.45068 | 2.89794 | 3.7792 | 1.54826 | 2.06373 |
| Gpd1 | 0.748158 | 0.762591 | 17.5984 | 29.2889 | 18.5647 | 19.8802 | 120.01 | 82.5909 |
| Gpnmb | 1.23527 | 2.19736 | 0.186203 | 0.219188 | 0.236556 | 0.301248 | 0.133705 | 0.0822426 |
| Gpr123 | 1.43822 | 1.77879 | 6.21086 | 9.94956 | 4.30083 | 5.85919 | 0.211465 | 0.487815 |
| Gpr124 | 20.6947 | 17.5529 | 2.51669 | 2.26475 | 2.61388 | 2.48642 | 8.11997 | 5.1069 |
| Gprc5a | 309.229 | 272.616 | 100.832 | 80.1861 | 131.204 | 115.088 | 7.6539 | 15.5305 |
| Gpt2 | 29.7553 | 31.7518 | 5.45604 | 5.51608 | 4.17056 | 4.79971 | 25.1317 | 19.2466 |
| Gpx1 | 176.687 | 150.747 | 470.322 | 309.454 | 590.509 | 503.497 | 1174.42 | 731.155 |
| Gpx2 | 0.1823 | 0.0858521 | 2.4761 | 2.37885 | 2.9417 | 3.41556 | 0 | 0 |
| Gpx3 | 2.81822 | 3.22353 | 18.1866 | 17.2926 | 8.60721 | 14.5232 | 22982.6 | 14189.8 |
| Grasp | 18.1146 | 16.7146 | 7.43984 | 8.18928 | 8.03467 | 8.29136 | 5.9178 | 5.17496 |
| Grb10 | 0.221656 | 0.451736 | 2.31207 | 7.39654 | 3.50474 | 3.79686 | 8.7638 | 5.00118 |
| Grcc10 | 63.6907 | 70.1785 | 257.619 | 161.296 | 207.576 | 217.082 | 381.855 | 348.929 |
| Grem1 | 0.138899 | 0.261488 | 0.891844 | 0.723946 | 2.85948 | 1.68808 | 0 | 0 |
| Gsap | 0.831935 | 0.975619 | 2.93533 | 3.63326 | 2.24535 | 2.79141 | 1.89962 | 1.12673 |
| Gsdma | 3.12561 | 3.21095 | 0.705419 | 0.607939 | 1.34403 | 1.06076 | 0 | 0 |
| Gsr | 104.202 | 94.9632 | 232.945 | 198.676 | 237.062 | 221.501 | 20.7432 | 28.1368 |
| Gsta1 | 0 | 0 | 0.394595 | 0.497523 | 2.7227 | 1.73706 | 3.15654 | 1.50755 |
| Gsta2 | 0 | 0 | 0.663484 | 1.28271 | 1.78169 | 1.75247 | 853.708 | 525.081 |
| Gsta3 | 1.1762 | 0.704744 | 13.7848 | 13.9437 | 21.7847 | 18.1019 | 38.405 | 27.2265 |
| Gsta4 | 5.60648 | 5.03726 | 50.1617 | 35.8726 | 75.9955 | 59.6165 | 488.452 | 283.01 |
| Gstm2 | 20.4192 | 17.3888 | 76.0435 | 69.8346 | 51.9676 | 58.583 | 311.778 | 346.221 |
| Gstm4 | 0.992345 | 1.0702 | 3.04141 | 4.09665 | 3.59965 | 3.6898 | 9.74863 | 14.0472 |
| Gstt1 | 0.707392 | 0.488629 | 7.37383 | 10.9465 | 4.50778 | 6.5728 | 346.684 | 277.896 |
| Gstt2 | 0.476396 | 0.384449 | 8.44285 | 10.1715 | 8.10507 | 8.59542 | 180.02 | 124.3 |
| Gstt3 | 1.55699 | 1.9388 | 12.3265 | 15.5787 | 8.31619 | 9.68088 | 44.5682 | 47.0117 |
| Gtf3c6 | 24.1017 | 26.328 | 61.1415 | 39.3326 | 67.9038 | 59.3363 | 59.886 | 63.5901 |
| H1f0 | 303.216 | 347.996 | 188.973 | 140.809 | 111.775 | 138.354 | 120.053 | 165.312 |

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|---|---|---|---|---|---|---|---|---|
| H1fx | 6.96642 | 8.54729 | 22.4109 | 15.1655 | 12.9141 | 16.7988 | 3.26105 | 2.00341 |
| H2-Q5 | 0.444568 | 0.190296 | 1.38853 | 2.78642 | 1.15353 | 1.56083 | 1.91831 | 1.91543 |
| H2-Q7 | 0.94918 | 0.867978 | 5.46642 | 8.93547 | 3.24988 | 5.11139 | 17.4085 | 17.189 |
| H2-Q8 | 0.000370546 | 0.000339647 | 2.04729 | 5.03143 | 1.50888 | 0.000409078 | 5.18144 | 0.00133302 |
| H2-T23 | 10.1122 | 10.8621 | 43.0341 | 39.2954 | 30.1715 | 35.4412 | 121.962 | 125.746 |
| H2afx | 28.4026 | 30.8801 | 85.9375 | 76.4049 | 84.0625 | 80.8913 | 14.6816 | 14.0361 |
| H6pd | 22.0861 | 20.5571 | 48.1324 | 83.7576 | 45.5975 | 55.6434 | 32.0841 | 35.7445 |
| Hapln4 | 1.57905 | 1.86815 | 0.145469 | 0.16679 | 0.177884 | 0.15349 | 0 | 0.0437999 |
| Havcr1 | 0.553062 | 0.565584 | 3.05738 | 4.09997 | 5.7496 | 5.02301 | 1.28527 | 1.05362 |
| Hbegf | 83.9454 | 80.8352 | 24.0726 | 22.2689 | 37.8411 | 31.297 | 2.74958 | 6.6957 |
| Hddc3 | 1.77986 | 1.95675 | 6.19105 | 6.20047 | 6.04292 | 6.47133 | 11.5907 | 13.1562 |
| Heg1 | 2.1647 | 2.08611 | 0.478479 | 0.607585 | 0.678714 | 0.700565 | 1.57842 | 1.5212 |
| Herc3 | 5.84311 | 5.63928 | 2.23159 | 1.79336 | 2.28034 | 2.47946 | 7.44836 | 6.80738 |
| Hexa | 7.65329 | 8.99243 | 24.903 | 24.7888 | 16.9201 | 21.7869 | 39.3421 | 42.3077 |
| Hfe | 0.97274 | 0.940325 | 3.20105 | 2.91144 | 2.54294 | 2.39593 | 9.84301 | 14.8879 |
| Hgfac | 11.8568 | 10.7808 | 32.9588 | 21.4502 | 18.3089 | 22.344 | 25.2162 | 16.8936 |
| Hif3a | 0.0180257 | 0.0226956 | 2.08755 | 3.71251 | 0.807574 | 1.67459 | 0.107775 | 0.0663055 |
| Higd1a | 15.0429 | 16.1416 | 55.5885 | 27.48 | 37.7199 | 41.4935 | 37.7335 | 37.6444 |
| Hilpda | 75.6767 | 73.4028 | 28.7231 | 9.35853 | 20.0002 | 21.2253 | 4.20588 | 4.38444 |
| Hint3 | 3.19678 | 3.74962 | 14.3922 | 7.65116 | 9.20939 | 8.52316 | 41.4545 | 19.7854 |
| Hip1 | 16.4162 | 15.2358 | 4.88853 | 5.89257 | 4.79839 | 4.97186 | 4.5773 | 4.64172 |
| Hist1h2af | 0.415209 | 0.392332 | 2.78513 | 1.94989 | 3.10712 | 2.12986 | 0 | 0 |
| Hist1h2bc | 2.64478 | 3.46319 | 27.4322 | 10.9102 | 28.9485 | 26.8385 | 259.691 | 270.766 |
| Hist3h2a | 2.6806 | 3.10688 | 9.52138 | 9.82866 | 15.0318 | 12.6682 | 37.2416 | 45.1984 |
| Hkdc1 | 0.0983898 | 0.0809924 | 1.15571 | 1.25754 | 0.929673 | 1.04729 | 0.878493 | 0.6304 |
| Hmgn2 | 82.0744 | 89.1338 | 262.044 | 233.106 | 239.348 | 246.048 | 44.73 | 39.0324 |
| Hmox2 | 44.9626 | 44.2984 | 117.523 | 109.673 | 95.9295 | 107.97 | 71.1526 | 74.2473 |
| Hoxb13 | 9.07574 | 8.34341 | 22.3251 | 15.0747 | 17.1559 | 19.0996 | 0 | 0 |
| Hoxb2 | 12.3351 | 13.1643 | 28.2402 | 28.949 | 31.4973 | 30.2027 | 20.4417 | 30.2407 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Hoxb6 | 21.1998 | 22.6975 | 77.7984 | 52.0329 | 71.603 | 69.2041 | 69.661 | 86.1407 |
| Hoxb7 | 23.0436 | 22.8177 | 56.0041 | 47.0469 | 51.0033 | 54.2197 | 20.5158 | 33.6203 |
| Hoxb8 | 6.48908 | 6.8185 | 18.9612 | 21.3944 | 19.7399 | 20.605 | 42.4289 | 52.7891 |
| Hoxd9 | 6.46588 | 8.07334 | 15.7336 | 18.3584 | 14.8271 | 16.3833 | 45.1079 | 39.2479 |
| Hp | 0.0347548 | 0.0327222 | 0.731472 | 1.65064 | 0.517401 | 1.13811 | 0.206339 | 0.38044 |
| Hpcal4 | 5.0166 | 4.17184 | 1.15509 | 1.05569 | 1.48633 | 1.01733 | 0.270582 | 0.366188 |
| Hras | 26.0487 | 24.6571 | 57.2131 | 40.293 | 73.178 | 64.4544 | 52.9537 | 52.6375 |
| Hs3st1 | 21.7358 | 18.4816 | 50.3869 | 54.82 | 68.1719 | 59.324 | 1.76058 | 3.64056 |
| Hs3st6 | 0.116725 | 0.219829 | 7.41583 | 8.77148 | 5.26249 | 6.28262 | 1.8471 | 2.27007 |
| Hs6st2 | 0.0294938 | 0.00924601 | 1.40704 | 1.53508 | 1.63245 | 1.70847 | 1.58066 | 2.26877 |
| Hsh2d | 0.0387232 | 0.218782 | 1.41601 | 1.87578 | 0.528546 | 1.35926 | 0 | 0 |
| Hspb2 | 12.0395 | 11.533 | 5.68018 | 2.86607 | 4.39703 | 3.67426 | 7.48932 | 9.27226 |
| Hspb8 | 0.0496914 | 0.0701536 | 1.4024 | 1.52584 | 1.07829 | 1.01585 | 7.97462 | 5.35679 |
| Htra1 | 51.6296 | 50.5801 | 13.7382 | 8.668 | 18.9108 | 14.6525 | 31.3991 | 24.1728 |
| Hypk | 138.099 | 140.656 | 308.315 | 198.333 | 331.677 | 292.728 | 354.384 | 307.699 |
| I830012O16Rik | 1.72614 | 1.6453 | 5.87676 | 11.7348 | 5.81665 | 6.56434 | 6.05259 | 16.9895 |
| Iapp | 0.07812 | 0.147327 | 1.30301 | 0.876107 | 1.16553 | 1.28554 | 0 | 0 |
| Iars | 62.0084 | 62.8642 | 21.8722 | 33.485 | 27.3737 | 26.5051 | 8.43695 | 11.5802 |
| Icam1 | 5.36888 | 4.92225 | 10.5628 | 17.282 | 8.57438 | 11.2472 | 14.6391 | 17.2498 |
| Ict1 | 41.0636 | 42.2767 | 96.3685 | 55.5368 | 102.082 | 89.302 | 103.536 | 106.526 |
| Id1 | 19.9211 | 17.4062 | 78.67 | 58.7373 | 100.679 | 81.5334 | 45.6831 | 28.4472 |
| Ier2 | 115.149 | 118.856 | 39.5474 | 29.2011 | 45.6097 | 39.6314 | 17.2165 | 14.2206 |
| Ier3 | 314.791 | 287.652 | 130.585 | 77.8902 | 154.248 | 134.214 | 28.4568 | 22.6634 |
| Ifi204 | 1.4007 | 1.15556 | 7.8109 | 10.2613 | 9.34769 | 9.34082 | 2.16832 | 2.03513 |
| Ifi205 | 0.593917 | 0.692165 | 4.50869 | 4.42234 | 4.98064 | 4.62721 | 0.336069 | 0.413183 |
| Ifi27 | 1.99236 | 2.72768 | 138.664 | 157.222 | 115.554 | 129.741 | 75.1901 | 83.1773 |
| Ifi27l2a | 0 | 0.132586 | 15.6886 | 16.4092 | 14.7922 | 14.6193 | 72.4225 | 87.6862 |
| Ifi35 | 17.638 | 17.6724 | 60.0939 | 56.9437 | 63.8131 | 62.3227 | 26.6899 | 21.4122 |
| Ifi44 | 0.0893123 | 0.0840305 | 18.4845 | 36.8407 | 12.7478 | 19.1405 | 11.8695 | 14.8179 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ifi47 | 0.681339 | 0.369978 | 5.16316 | 7.60872 | 3.34715 | 4.74576 | 6.07369 | 6.04306 |
| Ifih1 | 1.75881 | 1.81194 | 4.47619 | 8.21372 | 4.49012 | 5.05976 | 2.89087 | 2.98489 |
| Ifit1 | 0.660661 | 0.979061 | 7.48916 | 19.9962 | 9.21221 | 9.52226 | 9.5318 | 6.04323 |
| Ifit3 | 4.17234 | 4.30458 | 14.6401 | 27.3368 | 15.2146 | 17.6145 | 35.2868 | 67.6179 |
| Ifitm1 | 0.243214 | 0 | 12.6848 | 20.818 | 6.13344 | 10.6903 | 45.2071 | 92.6063 |
| Ifitm2 | 172.777 | 167.819 | 454.157 | 363.098 | 377.019 | 372.466 | 378.982 | 356.662 |
| Ifitm3 | 29.1947 | 33.5301 | 694.249 | 724.951 | 657.471 | 667.651 | 189.541 | 198.98 |
| Ifne | 0 | 0 | 0.924045 | 1.5532 | 0.723094 | 0.879216 | 0 | 0 |
| Ifngr2 | 20.3485 | 19.6949 | 47.1654 | 49.1794 | 50.9073 | 49.9795 | 7.65792 | 10.2806 |
| Ift22 | 16.5668 | 16.8579 | 42.3458 | 32.762 | 37.9247 | 37.1595 | 26.4936 | 25.3101 |
| Igf2bp1 | 6.72895 | 5.8904 | 2.26259 | 2.23417 | 2.53072 | 2.13838 | 0.324958 | 0.327155 |
| Igfbp3 | 1.34579 | 1.46896 | 7.00611 | 4.17183 | 14.0572 | 9.55098 | 84.6454 | 82.8387 |
| Igfbp4 | 42.0952 | 38.0563 | 219.143 | 259.864 | 161.872 | 200.015 | 294.684 | 133.222 |
| Igtp | 4.18196 | 4.43276 | 17.4373 | 25.3899 | 14.5447 | 19.4577 | 14.3955 | 12.4723 |
| Iigp1 | 0 | 0.0276838 | 1.12258 | 3.29372 | 1.13055 | 1.51075 | 6.12885 | 5.60026 |
| Il10rb | 11.8255 | 13.2095 | 27.3031 | 26.5023 | 28.0012 | 28.2226 | 48.6423 | 49.3406 |
| Il11 | 6.323 | 8.69907 | 0.610635 | 0.317254 | 1.02905 | 0.825501 | 0 | 0.267004 |
| Il13ra1 | 6.12011 | 7.06604 | 33.7123 | 35.4781 | 21.516 | 25.7959 | 15.1113 | 17.0194 |
| Il17re | 3.49046 | 3.30629 | 8.38366 | 10.9731 | 6.03784 | 7.2254 | 19.1015 | 20.5496 |
| Il1f6 | 0.114807 | 0.108179 | 0.764575 | 0.749795 | 2.56667 | 1.27892 | 0 | 0 |
| Il1rl1 | 0.31335 | 0.624819 | 1.21084 | 2.41144 | 2.05763 | 1.82047 | 0.148472 | 0.152225 |
| Il1rn | 3.42991 | 4.39795 | 8.66846 | 12.9239 | 12.7765 | 10.9733 | 0.108274 | 0 |
| Il23a | 23.1136 | 32.8202 | 7.18999 | 3.96576 | 11.8872 | 8.0329 | 0.407822 | 0.626613 |
| Il24 | 53.098 | 49.8448 | 9.53087 | 6.4419 | 21.0734 | 13.8584 | 0 | 0 |
| Il33 | 2.63489 | 2.34808 | 7.31585 | 10.2041 | 10.3175 | 8.67787 | 3.38528 | 4.16377 |
| Ilk | 119.489 | 108.297 | 42.7116 | 70.0404 | 55.2837 | 53.5222 | 75.0761 | 75.3691 |
| Immp1l | 13.132 | 14.4826 | 38.5036 | 21.869 | 32.7411 | 30.1677 | 38.5955 | 31.4811 |
| Inhba | 22.8267 | 20.9792 | 3.02635 | 5.53596 | 6.77999 | 4.49378 | 0 | 0.10967 |
| Inmt | 0 | 0.0451546 | 2.81763 | 3.03891 | 1.66629 | 2.75133 | 39.4995 | 28.8032 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Insl3 | 0.867383 | 0.480374 | 3.91924 | 1.21E-07 | 3.73773 | 2.79388 | 10.7067 | 2.54541 |
| Iqgap3 | 25.0893 | 22.9593 | 9.76747 | 13.9722 | 9.84171 | 11.5034 | 0.176213 | 0.162606 |
| Iqsec1 | 10.1371 | 8.72632 | 3.96479 | 5.46625 | 3.14478 | 3.91325 | 19.1515 | 22.6227 |
| Irf7 | 1.03923 | 1.53392 | 34.1019 | 66.8547 | 29.315 | 42.0795 | 18.702 | 19.0547 |
| Irf8 | 10.5385 | 9.09273 | 3.07033 | 2.35332 | 1.82515 | 2.20172 | 5.93306 | 6.5119 |
| Irf9 | 4.27715 | 4.61096 | 23.8468 | 34.6882 | 23.0999 | 23.975 | 15.0753 | 14.205 |
| Irgm1 | 17.6624 | 19.6614 | 66.0957 | 94.2539 | 70.4785 | 73.0878 | 22.0461 | 23.1258 |
| Irgm2 | 1.4256 | 1.7309 | 7.9609 | 16.0149 | 7.14183 | 8.92579 | 4.93199 | 6.20099 |
| Irs2 | 3.40374 | 2.64336 | 0.175811 | 0.354782 | 0.144526 | 0.210231 | 1.01007 | 1.66978 |
| Irx3 | 0.130978 | 0.264077 | 1.38673 | 2.19264 | 1.55402 | 1.98768 | 28.0278 | 34.9679 |
| Isg15 | 6.78333 | 9.88845 | 157.82 | 191.495 | 176.69 | 173.522 | 19.4344 | 18.5284 |
| Isg20 | 15.7293 | 14.1874 | 62.8984 | 64.3911 | 46.533 | 57.3572 | 16.8363 | 10.3878 |
| Isoc2a | 0.846956 | 1.0496 | 2.86643 | 3.32364 | 3.65172 | 3.28815 | 178.965 | 124.568 |
| Isoc2b | 2.14684 | 3.39878 | 10.4332 | 7.49324 | 4.08229 | 7.54188 | 34.9389 | 34.776 |
| Itga2 | 28.4391 | 29.7821 | 6.24008 | 20.2671 | 7.89295 | 9.98721 | 0.119835 | 0 |
| Itgb6 | 2.14379 | 1.89167 | 6.81335 | 8.76095 | 6.10941 | 6.77672 | 21.9546 | 25.0068 |
| Itm2a | 7.06204 | 6.09567 | 1.11245 | 0.70145 | 0.900046 | 1.23954 | 2.48778 | 5.60753 |
| Itm2b | 95.6055 | 103.936 | 301.159 | 272.962 | 247.874 | 263.196 | 1485.79 | 1505.48 |
| Itprip | 16.1789 | 15.1242 | 4.15805 | 4.92833 | 5.09619 | 5.08762 | 3.43982 | 4.10721 |
| Izumo4 | 1.11869 | 1.2547 | 4.55115 | 2.83199 | 2.64598 | 3.6837 | 22.7227 | 13.762 |
| Jag1 | 29.7398 | 36.9915 | 13.9508 | 14.3679 | 18.4177 | 16.7253 | 7.5642 | 8.2415 |
| Jag2 | 9.0518 | 7.80475 | 3.86071 | 3.61661 | 3.665 | 3.79208 | 3.68438 | 2.38157 |
| Jdp2 | 40.752 | 40.9105 | 5.27054 | 7.4956 | 5.57561 | 6.13043 | 6.8077 | 15.7341 |
| Josd2 | 5.91727 | 7.02939 | 21.2089 | 20.2364 | 26.2106 | 23.1523 | 35.5503 | 26.1098 |
| Jun | 33.5514 | 31.8706 | 10.3791 | 11.2632 | 11.0811 | 11.3143 | 13.3445 | 10.5314 |
| Junb | 331.685 | 375.675 | 99.0555 | 92.077 | 119.22 | 108.89 | 16.5532 | 16.6047 |
| Katnal1 | 4.40087 | 4.47852 | 1.38296 | 2.12347 | 1.34826 | 1.52245 | 4.61863 | 4.56117 |
| Kbtbd11 | 0.0897972 | 0.0675682 | 3.80997 | 3.65966 | 0.978922 | 2.10041 | 5.59869 | 3.72963 |
| Kcnab3 | 9.12793 | 8.88051 | 2.40007 | 1.31327 | 1.79318 | 2.29156 | 1.43441 | 1.00814 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Kcne3 | 0 | 0.0894591 | 2.68758 | 2.2689 | 3.59338 | 2.38561 | 2.84739 | 0.512788 |
| Kcnj16 | 0.0353961 | 0.0110927 | 1.31783 | 2.94355 | 1.63808 | 2.12012 | 104.841 | 129.309 |
| Kctd1 | 4.11437 | 3.49828 | 22.1766 | 28.9919 | 21.4344 | 23.137 | 14.8416 | 19.63 |
| Kctd15 | 0.654641 | 0.752886 | 2.474 | 2.79037 | 2.88522 | 3.26888 | 5.08392 | 6.38575 |
| Keg1 | 0 | 0 | 2.29485 | 3.04635 | 1.15012 | 1.62556 | 964.725 | 792.348 |
| Kif12 | 0.744934 | 0.793232 | 7.65522 | 5.15999 | 7.48488 | 6.56849 | 131.514 | 74.7049 |
| Kif5c | 4.89623 | 4.70287 | 0.404735 | 0.283599 | 0.499156 | 0.384285 | 0.472759 | 0.872548 |
| Kif7 | 2.89071 | 2.37563 | 1.01317 | 0.417225 | 0.706922 | 0.730761 | 0.946804 | 0.342601 |
| Kifc2 | 2.78255 | 2.74685 | 1.10635 | 0.739084 | 0.747432 | 0.991499 | 16.5604 | 11.0384 |
| Kifc3 | 15.1937 | 14.9463 | 3.37477 | 3.58387 | 3.05016 | 3.22669 | 41.5456 | 57.0037 |
| Kirrel | 13.8321 | 14.8387 | 5.19187 | 7.38948 | 6.20161 | 6.10979 | 1.77228 | 1.80365 |
| Kitl | 2.53001 | 2.50314 | 5.46387 | 7.4898 | 6.80408 | 6.46592 | 5.88013 | 4.91733 |
| Klc1 | 66.7008 | 61.5298 | 26.8316 | 24.8096 | 29.8532 | 28.2124 | 30.1674 | 23.3011 |
| Klf11 | 7.73744 | 8.07302 | 3.42582 | 2.8507 | 2.39686 | 3.00385 | 2.54505 | 3.91375 |
| Klf2 | 7.28684 | 7.97801 | 1.28925 | 0.530434 | 1.19859 | 1.04233 | 28.2853 | 20.7412 |
| Klf3 | 26.1297 | 24.6238 | 8.1832 | 15.8122 | 9.14674 | 9.52411 | 6.56045 | 6.53824 |
| Klf5 | 31.5398 | 29.2912 | 7.89998 | 18.9731 | 10.0219 | 11.8031 | 0.311874 | 2.87598 |
| Klf6 | 110.211 | 108.742 | 23.776 | 23.8551 | 33.9743 | 27.1165 | 7.91107 | 10.9124 |
| Klf7 | 4.51809 | 4.45176 | 0.96994 | 2.96813 | 1.26009 | 1.7614 | 0.415862 | 0.638951 |
| Klhdc7a | 1.05323 | 1.33438 | 6.20717 | 11.0043 | 3.47952 | 5.78011 | 20.142 | 18.4556 |
| Klhl14 | 0.042348 | 0.0597563 | 2.89736 | 5.26205 | 2.14658 | 2.98803 | 3.99217 | 5.44467 |
| Klhl5 | 14.6729 | 13.7804 | 5.74575 | 5.46276 | 5.31763 | 5.47549 | 13.8571 | 12.7156 |
| Klra33 | 9.63273 | 6.46659 | 0.862634 | 1.58147 | 2.6723 | 1.59931 | 0 | 0 |
| Kng1 | 0 | 0 | 0.501878 | 5.82837 | 0.529988 | 1.26604 | 0.627594 | 1.40841 |
| Kng2 | 0 | 0 | 0.689307 | 3.68864 | 0.807284 | 0.918396 | 464.406 | 530.966 |
| Krt15 | 0.131621 | 0.0743323 | 1.63174 | 1.56785 | 1.6322 | 1.7839 | 5.63183 | 2.01967 |
| Krt80 | 20.8574 | 17.3568 | 2.33666 | 3.52669 | 3.75336 | 2.85272 | 6.19819 | 8.17883 |
| L3hypdh | 4.70505 | 5.00409 | 1.94201 | 1.3606 | 1.68118 | 1.55296 | 26.0647 | 26.0263 |
| LOC106740 | 6.05579 | 8.05213 | 3.94935 | 1.78449 | 3.64772 | 2.76318 | 7.65783 | 4.86699 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lage3 | 29.6568 | 30.8372 | 82.4967 | 51.5665 | 78.4607 | 78.0489 | 37.3735 | 44.1174 |
| Lamb1 | 99.4384 | 102.337 | 41.1589 | 40.0398 | 42.6716 | 42.5847 | 35.8127 | 47.4159 |
| Lamp2 | 40.4995 | 45.603 | 81.7336 | 130.738 | 65.8097 | 81.1694 | 200.159 | 173.27 |
| Lamtor1 | 53.8487 | 58.0941 | 125.64 | 87.4119 | 131.301 | 122.128 | 73.253 | 80.7862 |
| Lamtor4 | 25.7627 | 25.585 | 77.1134 | 47.6962 | 78.3783 | 74.3397 | 187.853 | 148.827 |
| Lars2 | 38.0616 | 49.4898 | 102.252 | 124.607 | 143.243 | 122.689 | 19.4112 | 20.8649 |
| Lats2 | 14.8816 | 14.7874 | 3.34685 | 4.3192 | 4.62606 | 4.6534 | 11.4188 | 12.8221 |
| Layn | 6.21063 | 6.46327 | 2.01186 | 2.02035 | 2.47315 | 2.12356 | 1.20043 | 1.66054 |
| Lbp | 0.380829 | 0.407202 | 6.87326 | 10.4472 | 3.9909 | 6.36432 | 2.67747 | 2.59651 |
| Lca5 | 6.5567 | 6.69908 | 2.02645 | 3.80314 | 1.96187 | 2.25553 | 0.895005 | 0.917574 |
| Lcn2 | 6.47354 | 10.3932 | 827.685 | 960.514 | 482.104 | 675.225 | 6.38695 | 8.93304 |
| Ldhb | 80.8489 | 79.1812 | 596.617 | 747.85 | 601.632 | 621.192 | 1130.6 | 1352.37 |
| Ldhd | 0.417507 | 0.411593 | 3.56302 | 6.00987 | 2.80967 | 3.55139 | 59.5922 | 75.8328 |
| Ldlrad3 | 4.07422 | 3.85302 | 0.46979 | 0.465908 | 0.796363 | 0.571938 | 7.00392 | 7.18232 |
| Lef1 | 1.54418 | 1.58497 | 0.105736 | 0.053085 | 0.268746 | 0.0848206 | 0.681526 | 0.978236 |
| Lgals3 | 78.174 | 83.2495 | 181.23 | 119.03 | 183.657 | 169.54 | 104.631 | 83.8074 |
| Lgals3bp | 0.653111 | 0.653019 | 52.8814 | 125.315 | 55.6391 | 68.2972 | 42.7236 | 50.1534 |
| Lgals9 | 13.3289 | 11.9158 | 48.4425 | 90.5682 | 52.295 | 58.5349 | 25.1077 | 24.1071 |
| Lgr4 | 2.77361 | 2.46012 | 6.71035 | 10.9208 | 4.79852 | 6.73975 | 32.142 | 26.3941 |
| Lhfp | 83.4342 | 78.6775 | 23.9361 | 19.5118 | 24.9242 | 23.7734 | 18.9553 | 25.3309 |
| Lhx9 | 2.49479 | 2.48315 | 0.109601 | 0.0608382 | 0.158577 | 0.207448 | 0 | 0 |
| Lipg | 9.56304 | 7.9579 | 2.15409 | 2.51264 | 2.624 | 3.23187 | 0.201168 | 0.659941 |
| Lmbrd2 | 8.99803 | 8.31903 | 2.3032 | 5.54613 | 2.12491 | 3.20739 | 2.36121 | 1.55597 |
| Lmo7 | 14.1922 | 11.7031 | 3.63241 | 6.24884 | 4.91415 | 4.81621 | 18.9665 | 25.2476 |
| Loxl4 | 12.9421 | 11.2133 | 1.31669 | 2.7026 | 2.11777 | 2.14684 | 3.31668 | 3.51395 |
| Lpar6 | 3.05137 | 2.95467 | 9.98762 | 10.7566 | 9.9615 | 9.54604 | 8.65374 | 6.03559 |
| Lpcat1 | 34.6682 | 30.9737 | 13.5389 | 16.1738 | 15.0608 | 15.7875 | 1.52074 | 1.97354 |
| Lpcat2 | 11.5922 | 10.3528 | 5.08993 | 3.31416 | 5.87755 | 4.39454 | 1.01436 | 0.623842 |
| Lrch2 | 3.57069 | 4.18227 | 0.562037 | 0.318709 | 0.395585 | 0.455112 | 0.0703828 | 0.129875 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lrfn1 | 2.80417 | 2.64626 | 0.883105 | 0.718897 | 0.690714 | 0.682195 | 0.904172 | 0.679615 |
| Lrg1 | 0.0690379 | 0.0324999 | 2.17948 | 3.40739 | 0.513884 | 1.61479 | 3.27911 | 1.25957 |
| Lrp1 | 2.87584 | 2.88926 | 0.534532 | 0.426352 | 0.339077 | 0.383427 | 5.04232 | 4.80582 |
| Lrp12 | 10.0329 | 10.8946 | 3.01818 | 3.899 | 3.90187 | 3.46509 | 1.05887 | 2.14557 |
| Lrrc26 | 0.118194 | 0.0371 | 1.39711 | 0.734068 | 0.635551 | 1.47526 | 2.10402 | 1.86751 |
| Lrrc8b | 20.7985 | 17.7885 | 4.10038 | 9.47732 | 5.23867 | 6.48139 | 1.18039 | 1.11686 |
| Lrrc8c | 40.9573 | 38.6655 | 10.3228 | 11.5867 | 15.1032 | 11.8767 | 2.09781 | 1.85113 |
| Lrrk2 | 4.86978 | 4.88904 | 0.686482 | 0.680473 | 1.00749 | 0.818402 | 7.16262 | 8.18392 |
| Lsm7 | 71.0007 | 64.2117 | 201.458 | 95.2844 | 205.415 | 184.643 | 56.0266 | 57.6795 |
| Lsp1 | 4.53115 | 4.35944 | 1.392 | 0.486854 | 0.746981 | 1.16964 | 13.3019 | 10.762 |
| Ltb | 1.32568 | 1.12371 | 10.8758 | 11.8608 | 12.1761 | 11.4857 | 1.04826 | 0.322017 |
| Ltbp2 | 3.83069 | 4.81742 | 1.049 | 0.839137 | 1.17165 | 0.994288 | 0.0754115 | 0.115985 |
| Ltf | 0 | 0.0149109 | 1.80512 | 2.53447 | 2.18024 | 2.31172 | 0.471468 | 0.405935 |
| Lurap1l | 5.09718 | 4.84796 | 13.4704 | 13.7838 | 17.7716 | 16.0274 | 9.19807 | 9.84687 |
| Ly6c1 | 45.8723 | 44.2489 | 7.16272 | 5.70868 | 6.68072 | 5.4338 | 152.409 | 168.953 |
| Ly6g6d | 0.472167 | 0.356389 | 2.73417 | 1.94423 | 1.52761 | 1.0009 | 6.12486 | 11.269 |
| Ly75 | 9.04632 | 9.505 | 2.78952 | 4.9256 | 2.79439 | 3.31328 | 0.193965 | 0.0298305 |
| Ly96 | 2.66823 | 3.10486 | 8.66369 | 7.81347 | 10.8614 | 8.93886 | 14.5437 | 12.693 |
| Lypd6b | 0.732583 | 0.598659 | 4.43581 | 4.41087 | 3.68033 | 3.62353 | 4.24248 | 5.64068 |
| Lyrm2 | 9.68159 | 10.8723 | 27.0657 | 18.754 | 23.9351 | 20.2587 | 37.412 | 37.6359 |
| Lysmd2 | 1.90401 | 1.79297 | 6.98944 | 5.46929 | 8.90933 | 8.40162 | 1.64758 | 2.60332 |
| Mab21l3 | 1.50327 | 1.36897 | 7.61797 | 12.9783 | 4.32174 | 7.12622 | 1.21699 | 0.704519 |
| Mafb | 3.11395 | 2.69139 | 0.643749 | 0.423603 | 0.894127 | 0.679258 | 7.83589 | 6.07089 |
| Maff | 54.9889 | 60.9426 | 25.9008 | 20.5882 | 28.0254 | 24.9703 | 1.33888 | 2.28652 |
| Mageh1 | 0.432247 | 0.594769 | 3.46169 | 3.59137 | 3.25848 | 2.41055 | 5.72571 | 8.37311 |
| Mal2 | 29.9944 | 32.0931 | 62.8091 | 73.9188 | 54.2018 | 58.8112 | 33.7951 | 49.5843 |
| Mansc1 | 1.25676 | 1.18259 | 4.53839 | 5.74087 | 3.59682 | 4.14226 | 7.80526 | 9.19397 |
| Maoa | 10.9116 | 10.7063 | 3.65547 | 2.70363 | 5.91902 | 4.42823 | 4.0718 | 4.18691 |
| Map1b | 10.7089 | 10.0355 | 2.93723 | 4.62238 | 4.54958 | 4.05279 | 0.747526 | 1.21371 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Map3k5 | 1.71549 | 1.87769 | 7.22116 | 10.6365 | 6.83012 | 7.11845 | 10.7276 | 11.2847 |
| Mapk15 | 0 | 0 | 1.43619 | 1.33686 | 1.55171 | 1.40757 | 23.8361 | 20.8394 |
| Mapk8ip3 | 14.4565 | 12.4194 | 5.59037 | 4.39478 | 4.78643 | 4.84379 | 26.9274 | 18.4488 |
| Matk | 0.219326 | 0.33932 | 2.4532 | 1.65468 | 1.48011 | 2.3058 | 1.30253 | 0.622943 |
| Mcam | 19.1355 | 20.7228 | 7.63275 | 4.31553 | 6.55062 | 5.32875 | 8.82077 | 6.57571 |
| Mcee | 8.96658 | 13.381 | 25.4898 | 20.0387 | 23.3628 | 23.2783 | 169.963 | 159.979 |
| Mecom | 2.3624 | 2.05133 | 4.80984 | 7.76851 | 4.9772 | 5.3424 | 11.9594 | 13.8376 |
| Med9os | 0.229285 | 0.324722 | 1.79055 | 1.50453 | 1.28526 | 1.48866 | 6.06961 | 5.78646 |
| Mef2b | 1.10864 | 1.54893 | 0.158474 | 0.0999075 | 0.133092 | 0.0836463 | 0 | 0.130416 |
| Mef2d | 15.6732 | 14.6975 | 4.27478 | 7.96679 | 5.58542 | 5.59224 | 7.31042 | 7.0366 |
| Mest | 17.1979 | 14.8669 | 4.36217 | 2.39648 | 7.19353 | 5.3092 | 2.26323 | 1.15907 |
| Mettl7b | 9.58512 | 7.86117 | 5.18215 | 2.12424 | 3.64482 | 3.663 | 423.398 | 353.059 |
| Mfap3l | 17.6506 | 15.4751 | 5.18932 | 7.52147 | 7.20406 | 6.24968 | 11.0932 | 15.3692 |
| Mgat3 | 4.63055 | 3.90404 | 1.97298 | 1.39789 | 1.61675 | 1.29968 | 17.483 | 16.6632 |
| Mgmt | 0 | 0.0594691 | 2.94305 | 1.70807 | 4.15488 | 3.77605 | 15.6828 | 13.2969 |
| Mgst1 | 6.93311 | 7.97779 | 68.9956 | 69.7451 | 48.6973 | 59.2359 | 92.8118 | 69.7144 |
| Mgst2 | 0.490367 | 0.277631 | 1.42025 | 0.734468 | 2.92947 | 1.73322 | 0.578027 | 0.354456 |
| Mgst3 | 27.9874 | 27.0665 | 112.905 | 86.7104 | 109.607 | 103.9 | 563.136 | 563.38 |
| Mical1 | 0.55239 | 0.386492 | 3.83183 | 3.68882 | 3.51667 | 3.98516 | 3.36113 | 3.33638 |
| Mien1 | 54.3382 | 49.4761 | 166.322 | 108.446 | 134.097 | 138.041 | 239.349 | 238.372 |
| Mif | 685.142 | 588.585 | 1959.09 | 1124.98 | 1414.58 | 1543.52 | 1159.67 | 834.996 |
| Minos1 | 16.5671 | 16.0721 | 35.9903 | 23.0376 | 39.3933 | 34.4958 | 93.9329 | 78.8772 |
| Misp | 1.24637 | 1.20679 | 18.2415 | 21.9893 | 18.3827 | 20.8319 | 21.0602 | 37.4654 |
| Mitd1 | 14.0804 | 13.8762 | 33.2138 | 33.0248 | 33.5069 | 32.498 | 10.9885 | 7.17448 |
| Mks1 | 4.21643 | 4.14237 | 1.47931 | 1.91749 | 1.08217 | 1.56116 | 6.62904 | 5.57118 |
| Mllt4 | 57.3494 | 53.1704 | 20.6577 | 25.6511 | 20.0214 | 20.5757 | 17.7223 | 15.1859 |
| Mmp11 | 14.6847 | 13.8739 | 7.79662 | 6.2813 | 5.35409 | 6.18837 | 4.08656 | 4.59502 |
| Mmp15 | 0.465951 | 0.522252 | 5.96099 | 8.96475 | 5.1346 | 5.80375 | 2.36113 | 1.99706 |
| Mmp7 | 0.635926 | 0.217899 | 173.065 | 205.292 | 78.9129 | 130.366 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mmp9 | 8.41062 | 9.99318 | 1.79984 | 1.76554 | 2.52171 | 2.12074 | 0.161473 | 0.198628 |
| Mnda | 1.92879 | 2.17863 | 6.13106 | 8.97563 | 7.21012 | 6.40749 | 1.63725 | 1.00649 |
| Mndal | 0.0234701 | 0.0883551 | 0.960978 | 1.70324 | 1.36772 | 1.56255 | 12.2781 | 9.60783 |
| Mocs3 | 1.83516 | 1.67656 | 3.97327 | 4.49582 | 5.38831 | 5.20318 | 4.81109 | 3.84495 |
| Morn2 | 6.36758 | 7.38577 | 16.4692 | 16.2552 | 19.2651 | 14.6794 | 96.4923 | 89.7278 |
| Moxd1 | 10.0308 | 9.84527 | 2.36668 | 2.06795 | 2.18455 | 2.36673 | 0 | 0.0512072 |
| Mpc2 | 13.8258 | 13.5928 | 37.0107 | 22.7319 | 35.6863 | 30.9593 | 333.762 | 315.247 |
| Mppe1 | 1.51124 | 1.1487 | 4.23205 | 4.68481 | 4.66894 | 4.0473 | 3.92987 | 4.59889 |
| Mras | 6.42408 | 6.29132 | 2.40194 | 2.08823 | 2.61412 | 2.12831 | 7.28512 | 8.15117 |
| Mrpl52 | 114.137 | 129.285 | 317.019 | 147.378 | 325.738 | 293.353 | 373.547 | 257.227 |
| Mrpl54 | 75.8822 | 73.0927 | 206.393 | 122.701 | 209.986 | 188.221 | 317.694 | 246.81 |
| Mrps12 | 39.5035 | 35.2955 | 97.0089 | 65.9412 | 104.689 | 97.3889 | 30.6374 | 39.0448 |
| Mrps16 | 55.7546 | 56.6392 | 132.612 | 78.4728 | 122.151 | 116.778 | 159.609 | 115.102 |
| Mrps6 | 49.0117 | 48.9867 | 119.132 | 80.4964 | 140.091 | 123.463 | 292.322 | 476.637 |
| Msra | 1.51779 | 2.10713 | 6.98152 | 6.25819 | 5.6821 | 6.02639 | 289.305 | 263.601 |
| Mt1 | 49.657 | 86.4469 | 735.33 | 577.365 | 390.479 | 539.455 | 1050.54 | 865.754 |
| Mt2 | 22.5871 | 47.467 | 305.013 | 360.704 | 210.799 | 272.539 | 276.655 | 200.367 |
| Mt3 | 0 | 0 | 0.872931 | 1.25744 | 3.20291 | 2.375 | 14.4749 | 8.46876 |
| Mthfd2 | 112.389 | 118.109 | 27.2875 | 31.3885 | 30.7892 | 28.7996 | 4.33949 | 5.17956 |
| Mthfs | 1.16481 | 1.74387 | 5.78558 | 2.5594 | 3.74654 | 4.18332 | 11.3459 | 10.6958 |
| Mtmr10 | 13.8243 | 12.9351 | 2.48515 | 2.8187 | 4.31942 | 3.46129 | 5.49179 | 5.48249 |
| Mtmr7 | 22.0836 | 20.745 | 9.28712 | 8.79884 | 10.4241 | 9.27344 | 0.80948 | 0.959223 |
| Muc1 | 1.33755 | 1.44376 | 6.65846 | 12.3308 | 4.21841 | 6.08554 | 31.2348 | 53.4481 |
| Muc20 | 0.652044 | 0.70764 | 3.53147 | 7.20008 | 2.05503 | 3.22769 | 16.3989 | 40.2665 |
| Mum1l1 | 3.30712 | 3.16196 | 0.953981 | 0.97358 | 0.780028 | 1.11316 | 0.604527 | 0.818297 |
| Mx2 | 0.0181238 | 0.102209 | 1.26153 | 2.13817 | 1.54839 | 1.5215 | 0.538442 | 0.596009 |
| Mxd3 | 2.31557 | 3.03189 | 10.4618 | 6.23317 | 7.10686 | 8.33619 | 0.214862 | 0.396056 |
| Mxra7 | 6.21874 | 6.12498 | 1.65551 | 0.879064 | 1.04124 | 1.16498 | 10.7597 | 11.2163 |
| Myc | 112.33 | 114.841 | 38.5337 | 37.0612 | 60.7409 | 52.0107 | 3.15518 | 2.54242 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Myeov2 | 59.6341 | 60.281 | 177.765 | 98.1896 | 147.805 | 139.538 | 256.295 | 219.671 |
| Myh10 | 47.1462 | 44.4388 | 13.7093 | 17.8179 | 15.6956 | 15.3229 | 8.12479 | 13.5453 |
| Myh14 | 14.4425 | 11.7688 | 3.39352 | 3.49848 | 2.27259 | 2.99991 | 5.49674 | 5.15582 |
| Myh9 | 175.406 | 163.081 | 64.2538 | 105.056 | 77.6996 | 82.4577 | 27.9124 | 38.0423 |
| Myl6 | 482.768 | 479.893 | 1135.59 | 720.638 | 1143 | 1056.34 | 1640.98 | 1467.21 |
| Myof | 73.3118 | 74.7845 | 29.8316 | 41.3711 | 35.5959 | 34.4944 | 8.12746 | 10.1081 |
| Myzap | 5.49958 | 4.86645 | 2.15597 | 2.046 | 2.24857 | 2.00497 | 5.3942 | 4.16394 |
| N6amt2 | 22.563 | 23.6969 | 49.0812 | 36.7224 | 59.7248 | 47.9632 | 24.016 | 24.5765 |
| Naprt1 | 0.260879 | 0.0446413 | 2.38833 | 2.16246 | 1.64674 | 2.13301 | 39.8984 | 27.2178 |
| Nbea | 5.80188 | 5.24063 | 1.90075 | 2.88176 | 1.99135 | 2.14989 | 1.59276 | 1.89094 |
| Nckap5l | 3.7218 | 3.09194 | 0.855322 | 1.09897 | 0.969645 | 1.06463 | 1.24279 | 2.00685 |
| Ncoa1 | 2.15567 | 2.51435 | 0.666138 | 0.649952 | 0.465032 | 0.523747 | 5.86164 | 6.67049 |
| Ndn | 0.991948 | 1.08932 | 7.96123 | 6.2573 | 9.67045 | 8.30719 | 3.11078 | 2.71752 |
| Ndrg4 | 5.66175 | 5.02824 | 0.866347 | 1.18197 | 0.787799 | 1.12117 | 3.15345 | 6.86134 |
| Ndufa2 | 112.973 | 101.119 | 340.692 | 159.841 | 307.437 | 277.759 | 796.705 | 544.306 |
| Ndufa3 | 136.226 | 116.074 | 373.726 | 218.914 | 298.716 | 315.042 | 1435.65 | 1099.31 |
| Ndufa8 | 55.8996 | 49.3039 | 136.9 | 90.571 | 138.959 | 132.334 | 551.034 | 515.419 |
| Ndufab1 | 70.4118 | 68.0803 | 149.478 | 105.248 | 156.15 | 147.573 | 221.558 | 229.771 |
| Ndufaf3 | 8.93271 | 8.92861 | 21.6785 | 15.6325 | 18.4422 | 19.0524 | 38.9146 | 36.3589 |
| Ndufs3 | 47.0217 | 46.7531 | 116.722 | 74.8757 | 101.67 | 99.7591 | 258.115 | 240.502 |
| Nedd9 | 2.31998 | 2.94621 | 6.38914 | 8.65115 | 5.64127 | 6.51555 | 8.0005 | 9.20552 |
| Nek1 | 7.393 | 7.1137 | 2.98044 | 4.38324 | 1.97261 | 3.21423 | 1.83658 | 1.82216 |
| Nenf | 45.3259 | 50.6011 | 130.234 | 77.4501 | 112.011 | 118.499 | 132.048 | 140.099 |
| Nes | 94.1235 | 85.085 | 26.0052 | 23.6832 | 33.6789 | 29.157 | 10.0184 | 8.69378 |
| Neurl3 | 6.9095 | 7.97963 | 20.216 | 22.04 | 25.0644 | 22.7926 | 6.93486 | 5.25373 |
| Nfat5 | 13.377 | 13.6217 | 5.49353 | 7.21495 | 5.93254 | 5.62399 | 14.998 | 14.6724 |
| Nfe2l2 | 29.9153 | 31.5361 | 59.1542 | 69.2774 | 60.9079 | 62.2395 | 37.1316 | 47.3555 |
| Nfix | 4.55543 | 5.03964 | 1.50127 | 1.64984 | 1.31185 | 1.41933 | 8.68896 | 9.94169 |
| Nfkbiz | 24.9397 | 27.8436 | 9.39806 | 10.8242 | 7.69194 | 9.0214 | 4.1004 | 4.07237 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nipal4 | 10.4317 | 8.82043 | 2.1769 | 1.61217 | 4.50842 | 3.81819 | 0 | 0.143207 |
| Nmb | 1.17859 | 0.893528 | 5.77097 | 4.41756 | 5.77231 | 4.80583 | 6.996 | 2.84806 |
| Nmi | 8.14728 | 10.4903 | 33.044 | 31.1389 | 30.2416 | 29.8565 | 14.8951 | 16.9126 |
| Nppb | 10.3267 | 10.681 | 1.34074 | 0.563462 | 2.24961 | 1.88909 | 0 | 0 |
| Npr1 | 0.334691 | 0.393561 | 3.4914 | 5.00616 | 2.20315 | 3.01288 | 14.7582 | 15.3599 |
| Npr2 | 1.35577 | 1.64928 | 0.245486 | 0.162954 | 0.188277 | 0.25902 | 21.1509 | 14.85 |
| Npr3 | 6.37493 | 5.66465 | 0.788718 | 0.900014 | 1.16376 | 0.94657 | 2.47226 | 1.93048 |
| Nqo1 | 7.20624 | 5.08767 | 13.6686 | 10.9142 | 29.1208 | 19.9524 | 23.51 | 28.6876 |
| Nr4a1 | 48.7761 | 38.8927 | 4.55602 | 4.88282 | 6.63981 | 6.19054 | 4.31186 | 3.94511 |
| Nradd | 1.06884 | 1.00656 | 13.2133 | 7.3925 | 14.7948 | 13.6162 | 4.87773 | 3.44668 |
| Nrep | 1.54315 | 1.48847 | 5.98762 | 3.652 | 5.32839 | 5.29472 | 11.1999 | 12.9997 |
| Nrg1 | 14.4729 | 12.3294 | 2.40421 | 4.08201 | 4.89108 | 4.23724 | 1.50545 | 1.07996 |
| Nrk | 2.5261 | 2.40577 | 0.125919 | 0.452922 | 0.125489 | 0.214022 | 0.0754232 | 0.0232006 |
| Nt5c | 104.075 | 95.2295 | 220.777 | 133.584 | 236.064 | 217.366 | 61.9205 | 49.5137 |
| Nuak1 | 4.67116 | 4.59938 | 1.38343 | 2.08445 | 1.89442 | 1.72405 | 2.60164 | 2.95466 |
| Nudt12 | 7.43984 | 7.18279 | 2.69347 | 4.31352 | 2.65901 | 2.81999 | 3.67787 | 5.15931 |
| Nudt16l1 | 19.1312 | 17.8781 | 52.3358 | 35.2015 | 43.299 | 42.3472 | 57.7003 | 52.5234 |
| Nudt19 | 6.23961 | 6.46395 | 22.2343 | 19.1484 | 22.5741 | 21.428 | 151.42 | 190.112 |
| Nyap1 | 6.03047 | 5.58124 | 1.52809 | 1.59183 | 1.30359 | 1.65516 | 1.38343 | 1.25399 |
| Oas1a | 0.166208 | 0.290508 | 26.3812 | 37.6884 | 26.0842 | 29.3979 | 1.83492 | 3.2977 |
| Oas1b | 0.244944 | 0.230536 | 3.55423 | 4.35692 | 4.37734 | 3.98061 | 2.76782 | 1.88087 |
| Oas1g | 0.0447467 | 0 | 6.5109 | 8.86679 | 8.93197 | 7.6296 | 1.06417 | 0.736101 |
| Oas2 | 0.0110288 | 0.0103752 | 3.15755 | 10.8965 | 2.58288 | 4.75938 | 1.96975 | 2.30206 |
| Oas3 | 0.0626923 | 0.0758218 | 5.43412 | 15.5552 | 4.24994 | 6.88203 | 0.159994 | 0.0984207 |
| Oasl1 | 3.56881 | 3.63343 | 14.362 | 22.5777 | 16.6367 | 16.7903 | 1.86159 | 2.67091 |
| Oasl2 | 1.75866 | 2.09409 | 34.4236 | 62.2044 | 32.4199 | 38.0066 | 8.3406 | 9.00242 |
| Ogfod1 | 8.34997 | 7.0867 | 2.5564 | 4.19597 | 3.38617 | 3.36209 | 2.80687 | 2.26645 |
| Ogfr | 17.2875 | 18.4415 | 36.1813 | 36.5797 | 37.2283 | 35.1724 | 18.4344 | 17.9542 |
| Oit1 | 0.982497 | 0.426986 | 15.8687 | 16.8252 | 12.9409 | 15.0314 | 3.58833 | 2.61856 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Olfm2 | 1.38571 | 1.64475 | 0.233487 | 0.0560848 | 0.149453 | 0.035212 | 2.32625 | 3.18981 |
| Oma1 | 4.4257 | 4.59542 | 11.8718 | 10.2946 | 11.0049 | 11.7158 | 9.57952 | 13.098 |
| Omp | 0.765062 | 0.659979 | 2.35129 | 2.21411 | 3.50414 | 2.75454 | 0.505475 | 0.543914 |
| Orai3 | 3.68552 | 4.54054 | 9.98503 | 11.0133 | 9.36034 | 10.1212 | 9.29618 | 10.0435 |
| Osgin1 | 46.0718 | 46.8527 | 11.4662 | 14.1321 | 12.2828 | 12.8734 | 53.6171 | 54.7776 |
| Otub2 | 4.82685 | 5.52813 | 1.97818 | 2.29413 | 1.81573 | 2.15943 | 1.65169 | 2.20093 |
| Otud4 | 28.549 | 29.8547 | 11.744 | 14.009 | 15.5926 | 13.4837 | 6.47333 | 7.46469 |
| Oxld1 | 5.31143 | 5.54876 | 19.2599 | 11.2903 | 13.9932 | 12.9916 | 40.5151 | 29.7561 |
| Padi1 | 4.39199 | 3.80608 | 9.32277 | 11.0941 | 8.32951 | 8.58824 | 9.25E-07 | 0.0899005 |
| Padi3 | 1.50468 | 0.820284 | 0.186585 | 0.117661 | 0.139421 | 0.131256 | 0 | 0 |
| Padi4 | 27.1477 | 24.0374 | 2.79246 | 3.19189 | 2.98643 | 2.79272 | 0.196373 | 0.0603834 |
| Palld | 7.81055 | 6.81741 | 0.742756 | 0.825258 | 0.743369 | 0.97964 | 1.4998 | 1.58144 |
| Palm3 | 38.3355 | 31.3086 | 6.70751 | 4.27542 | 9.13564 | 6.64002 | 16.3876 | 15.5746 |
| Paox | 11.8993 | 12.5724 | 35.8239 | 29.9005 | 40.2637 | 36.7795 | 7.11819 | 5.32743 |
| Pard3 | 20.2837 | 19.7811 | 7.7166 | 12.5052 | 8.43383 | 8.62412 | 9.17848 | 12.2544 |
| Parp12 | 4.72906 | 5.4267 | 15.7299 | 28.9283 | 15.5511 | 18.4006 | 6.58067 | 8.72892 |
| Parp14 | 2.07017 | 2.34195 | 8.75529 | 18.4901 | 8.63383 | 10.7379 | 3.97364 | 5.20548 |
| Parp9 | 5.49855 | 6.18667 | 16.9198 | 27.503 | 14.8324 | 19.0094 | 7.5569 | 5.97783 |
| Pbdc1 | 16.5521 | 16.495 | 41.0293 | 32.1999 | 46.3192 | 39.6304 | 10.6724 | 13.7699 |
| Pbp2 | 6.62001 | 5.48972 | 1.2086 | 0.700721 | 4.01364 | 1.71619 | 0 | 0 |
| Pcbd1 | 44.7821 | 44.8092 | 130.426 | 80.7264 | 111.349 | 112.164 | 567.933 | 520.991 |
| Pcbd2 | 10.9406 | 10.6376 | 39.4052 | 29.7289 | 31.3366 | 34.204 | 59.8903 | 54.0803 |
| Pcdh1 | 25.9047 | 23.5272 | 7.79522 | 11.8506 | 9.99619 | 9.80356 | 8.18874 | 7.99521 |
| Pcdh7 | 0.39624 | 0.280756 | 1.54045 | 1.6255 | 2.04843 | 1.8211 | 0.362454 | 0.412546 |
| Pcdhgb7 | 0.0383491 | 0.0583302 | 0.514749 | 1.71662 | 0.825416 | 0.745228 | 2.75841 | 2.01205 |
| Pcolce2 | 13.229 | 12.0205 | 4.20572 | 3.15551 | 7.84363 | 5.6191 | 2.00169 | 2.9888 |
| Pctp | 13.7695 | 12.5964 | 31.1997 | 30.6349 | 38.2436 | 34.5695 | 18.5811 | 17.3025 |
| Pde4b | 6.85272 | 6.07763 | 2.85657 | 3.38464 | 2.37829 | 2.36839 | 4.05809 | 3.60304 |
| Pdgfb | 82.0402 | 82.7349 | 23.4921 | 23.0874 | 30.4664 | 26.8993 | 7.52431 | 7.80244 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pdk4 | 6.46626 | 6.38691 | 1.05652 | 2.74577 | 0.984325 | 1.53465 | 5.17136 | 6.22525 |
| Pdlim2 | 13.2413 | 11.8324 | 5.01374 | 4.82568 | 5.3571 | 4.43517 | 13.8971 | 15.1985 |
| Pdrg1 | 11.2643 | 9.62618 | 25.6905 | 22.3879 | 24.6037 | 26.5852 | 43.9539 | 45.8604 |
| Pdxk | 1.81148 | 1.78176 | 16.509 | 21.5907 | 14.2038 | 15.7105 | 23.8908 | 22.2726 |
| Pdzk1ip1 | 15.8482 | 14.9394 | 30.1794 | 37.571 | 28.8272 | 31.7997 | 1896.03 | 1318.55 |
| Pepd | 8.7745 | 10.1518 | 19.5823 | 26.6578 | 20.3472 | 21.8015 | 94.6618 | 89.3813 |
| Pex7 | 6.53048 | 7.72724 | 16.7269 | 13.649 | 16.6344 | 15.5318 | 29.3973 | 32.257 |
| Pgd | 84.7489 | 67.9255 | 134.801 | 170.892 | 188.858 | 173.044 | 46.0457 | 48.134 |
| Pglyrp1 | 0.561942 | 0.454222 | 8.30338 | 5.55285 | 5.58998 | 7.45634 | 0.948217 | 1.16365 |
| Pgp | 21.5352 | 21.3124 | 53.1814 | 31.5725 | 45.7533 | 46.5014 | 33.1821 | 28.1577 |
| Phf19 | 4.00237 | 3.63648 | 1.80252 | 1.28242 | 1.32818 | 1.35659 | 0.543053 | 0.417539 |
| Phlda1 | 108.96 | 92.6417 | 24.6306 | 25.4119 | 41.5525 | 33.7446 | 8.43225 | 10.62 |
| Phlda3 | 19.7351 | 21.2456 | 59.6033 | 40.7027 | 75.2337 | 68.0014 | 11.0295 | 6.31974 |
| Phldb2 | 37.4849 | 36.5731 | 16.1259 | 17.0775 | 17.177 | 15.8981 | 39.0054 | 33.2386 |
| Phyhd1 | 1.40396 | 1.68558 | 6.72847 | 3.32218 | 4.12558 | 4.60863 | 48.8936 | 28.4812 |
| Pigr | 0.0221477 | 0.0104176 | 2.50943 | 5.43447 | 0.740979 | 1.98903 | 7.25187 | 4.13626 |
| Pigyl | 17.7917 | 20.3404 | 46.4861 | 32.8156 | 39.7402 | 39.8854 | 40.9218 | 37.9516 |
| Pih1d1 | 17.476 | 21.2883 | 62.7146 | 51.0913 | 57.0847 | 58.1722 | 52.819 | 45.5513 |
| Pih1d2 | 1.23782 | 1.0949 | 3.32482 | 3.52882 | 3.67674 | 3.07178 | 1.78099 | 2.59936 |
| Pik3cb | 15.0959 | 13.5129 | 4.58414 | 5.6484 | 6.24882 | 5.61721 | 5.07473 | 4.77822 |
| Pim1 | 25.2328 | 23.8952 | 4.99237 | 5.54042 | 4.89001 | 4.63728 | 3.36996 | 5.83869 |
| Pim3 | 89.6237 | 82.9855 | 39.1195 | 33.7171 | 36.0651 | 37.1361 | 74.2962 | 55.9669 |
| Pinlyp | 0.292807 | 0.069014 | 1.62726 | 1.77801 | 2.72971 | 2.49383 | 0 | 0 |
| Pip5k1a | 34.2329 | 34.871 | 8.06422 | 16.2695 | 10.2982 | 11.0651 | 3.17888 | 3.78371 |
| Pir | 1.25486 | 1.20806 | 3.69419 | 2.44217 | 4.49203 | 4.19963 | 0.677772 | 1.35409 |
| Pkia | 7.88871 | 8.58909 | 2.57772 | 2.43696 | 3.50761 | 3.40993 | 7.45852 | 6.45676 |
| Plac8 | 12.8651 | 11.3224 | 200.017 | 206.727 | 164.315 | 186.318 | 42.8363 | 35.0485 |
| Plau | 470.012 | 423.473 | 64.1737 | 41.5837 | 104.664 | 78.8736 | 294.63 | 529.811 |
| Plcg1 | 16.0741 | 14.2851 | 6.51317 | 8.5564 | 5.96423 | 6.54886 | 8.01859 | 7.13647 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Plcl2 | 2.0154 | 1.95517 | 0.104424 | 0.00975582 | 0.0780391 | 0.0856939 | 3.24976 | 2.57562 |
| Plet1 | 3.99183 | 4.46717 | 26.6872 | 68.9364 | 36.3018 | 40.3713 | 34.724 | 76.6566 |
| Plk2 | 121.811 | 112.467 | 23.4699 | 22.3405 | 36.9223 | 30.0993 | 4.79334 | 6.17936 |
| Pmaip1 | 61.242 | 72.1063 | 30.5253 | 24.4905 | 39.9059 | 33.8977 | 4.3935 | 2.762 |
| Pmp22 | 0.0500274 | 0.0235428 | 0.747476 | 0.581886 | 1.61287 | 1.08118 | 16.0568 | 17.7325 |
| Pnp | 15.7227 | 16.1904 | 33.9904 | 29.3039 | 36.438 | 33.1558 | 15.2291 | 16.3103 |
| Pnrc1 | 21.3131 | 25.2427 | 51.3365 | 49.3242 | 42.7077 | 44.9813 | 53.7494 | 53.6061 |
| Podxl | 31.3825 | 27.5667 | 9.44647 | 10.2825 | 12.1844 | 10.8129 | 46.6777 | 33.3997 |
| Pof1b | 0.219033 | 0.154539 | 1.91273 | 2.56508 | 1.75058 | 2.00537 | 0.325998 | 0.842203 |
| Polr2l | 14.1367 | 11.1825 | 31.7795 | 17.5085 | 37.2877 | 31.5445 | 38.9322 | 34.2619 |
| Pop1 | 28.412 | 25.384 | 9.70625 | 10.954 | 14.2643 | 13.5494 | 5.18663 | 5.47559 |
| Pou3f3 | 0.0985731 | 0.0794922 | 7.25576 | 10.9053 | 7.03306 | 8.51063 | 75.3402 | 93.4477 |
| Ppdpf | 26.1314 | 22.6593 | 65.2329 | 39.9486 | 56.9825 | 53.6725 | 131.019 | 90.1637 |
| Ppm1h | 0.183406 | 0.289567 | 1.37516 | 3.1196 | 1.49308 | 1.92746 | 10.6689 | 12.2314 |
| Ppp1r12b | 4.01313 | 4.07803 | 0.487095 | 1.1032 | 0.443832 | 0.514778 | 0.735687 | 0.554284 |
| Ppp1r15a | 34.2125 | 39.342 | 10.1753 | 11.0095 | 8.78577 | 9.26407 | 12.5572 | 15.3748 |
| Ppp1r1b | 0.736481 | 1.00133 | 10.8401 | 11.7792 | 5.34469 | 8.82901 | 118.646 | 211.638 |
| Ppp1r26 | 0.430648 | 0.687185 | 2.05656 | 2.72962 | 1.23856 | 2.06212 | 2.56479 | 2.90204 |
| Prap1 | 0 | 0 | 2.32617 | 3.14484 | 2.93875 | 3.4223 | 3.21539 | 3.28704 |
| Prdx1 | 362.514 | 353.989 | 782.641 | 619.955 | 809.01 | 748.704 | 404.612 | 406.79 |
| Prickle1 | 6.31621 | 6.67589 | 1.08116 | 1.03479 | 1.35381 | 1.3349 | 2.66397 | 2.85813 |
| Prkcdbp | 5.49336 | 6.07437 | 18.0114 | 12.1127 | 13.817 | 14.4912 | 38.5117 | 42.6189 |
| Prkch | 6.57446 | 5.68307 | 2.13023 | 2.35992 | 1.9844 | 2.27813 | 5.73404 | 6.10041 |
| Prkci | 64.6342 | 64.8417 | 18.669 | 27.4727 | 21.3516 | 21.7542 | 7.3414 | 9.37938 |
| Prl6a1 | 0 | 0.0552613 | 0.846287 | 0.98496 | 1.23832 | 1.10043 | 0 | 0 |
| Procr | 37.3316 | 34.9416 | 6.5395 | 5.18451 | 9.07101 | 8.01247 | 4.90746 | 3.57512 |
| Prr15 | 1.28129 | 1.07933 | 5.93814 | 5.02358 | 3.01165 | 3.94295 | 7.60792 | 7.6291 |
| Prr15l | 2.43228 | 2.3545 | 31.7228 | 29.9869 | 18.1044 | 23.5168 | 64.6805 | 76.5048 |
| Prr5l | 1.86809 | 1.70114 | 0.364635 | 0.211037 | 0.421154 | 0.32156 | 1.52899 | 1.38385 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prrg3 | 0.853169 | 1.20374 | 3.9832 | 6.50029 | 2.1844 | 3.63037 | 0.381114 | 0.755479 |
| Prss22 | 437.237 | 379.055 | 84.0528 | 40.4397 | 82.8498 | 79.1001 | 0.420183 | 0.38735 |
| Prss27 | 6.13605 | 4.28482 | 0.601467 | 0.272261 | 0.82885 | 0.244289 | 0 | 0 |
| Prss46 | 1.27769 | 1.27385 | 0.0416373 | 0 | 0 | 0 | 0 | 0 |
| Prss52 | 1.96542 | 0.993401 | 0.106326 | 0.13407 | 0.357062 | 0.168449 | 0 | 0 |
| Psmb10 | 19.0122 | 19.65 | 44.8445 | 32.3389 | 40.6363 | 42.2674 | 33.2803 | 34.1316 |
| Psmb8 | 1.39669 | 2.15546 | 23.7313 | 37.5875 | 16.7051 | 24.6951 | 29.6997 | 24.7583 |
| Psmb9 | 0.70838 | 0.364172 | 11.0144 | 12.9853 | 5.44081 | 7.70863 | 15.241 | 9.59099 |
| Psmd10 | 17.8301 | 20.3513 | 44.3356 | 36.7754 | 41.7845 | 42.9442 | 11.9616 | 17.9479 |
| Psme1 | 102.533 | 118.554 | 252.268 | 218.25 | 208.922 | 226.97 | 160.089 | 156.816 |
| Psme2 | 46.8913 | 56.3287 | 178.708 | 128.475 | 147.74 | 145.306 | 89.2689 | 77.0622 |
| Psme2b | 3.41151 | 3.75597 | 0.203965 | 0.547039 | 0.386952 | 0.161559 | 0.0117726 | 0.167513 |
| Psmg4 | 21.3782 | 21.8595 | 69.3884 | 34.6204 | 60.3621 | 53.7449 | 89.7264 | 37.6576 |
| Psors1c2 | 12.3921 | 9.27372 | 6.00248 | 2.21091 | 4.98033 | 5.34434 | 1.07869 | 0.220779 |
| Psph | 45.8034 | 50.0599 | 21.1259 | 16.9827 | 22.7016 | 19.0908 | 12.416 | 10.2488 |
| Psrc1 | 5.32477 | 5.9425 | 16.9082 | 11.1742 | 13.951 | 13.694 | 0.308798 | 0.189843 |
| Ptbp2 | 16.2403 | 19.5995 | 8.80111 | 6.81897 | 8.90072 | 7.94718 | 9.33997 | 7.286 |
| Ptges | 0.374974 | 0.451973 | 2.87575 | 2.13479 | 1.72793 | 1.96819 | 9.62625 | 8.15215 |
| Ptges2 | 8.94971 | 7.86271 | 17.9578 | 17.0998 | 19.6102 | 17.8576 | 14.8328 | 17.4867 |
| Ptgs2 | 40.4811 | 38.6208 | 11.4977 | 18.3255 | 18.0191 | 16.0274 | 0.488142 | 0.788204 |
| Ptpn21 | 17.6063 | 16.7819 | 5.6181 | 7.4735 | 6.55011 | 6.59557 | 6.38777 | 6.80773 |
| Ptprs | 50.6523 | 46.43 | 25.4268 | 22.4471 | 21.3438 | 21.9213 | 8.12076 | 4.58227 |
| Pts | 4.57977 | 4.80302 | 21.8855 | 17.4292 | 18.2279 | 17.1977 | 88.1706 | 86.1473 |
| Pycr1 | 4.20334 | 4.30411 | 1.33033 | 1.86423 | 1.12288 | 1.16116 | 0.0883845 | 0.163076 |
| Qk | 51.5868 | 52.682 | 14.8702 | 17.0937 | 19.1708 | 16.9092 | 11.26 | 14.1137 |
| Rab11a | 49.6506 | 51.6518 | 110.573 | 91.8806 | 117.206 | 110.487 | 74.7827 | 65.636 |
| Rab11fip5 | 35.1102 | 36.8052 | 15.2218 | 16.5851 | 15.9689 | 15.7915 | 21.5898 | 19.0349 |
| Rab15 | 4.08069 | 4.26723 | 1.57002 | 1.35853 | 0.905504 | 1.30282 | 2.54346 | 3.1287 |
| Rab17 | 0.504228 | 0.442185 | 6.60671 | 3.9385 | 2.91466 | 3.0249 | 34.039 | 28.8653 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rab19 | 2.62567 | 2.93989 | 8.05786 | 8.09594 | 5.23845 | 7.38712 | 4.8447 | 4.66029 |
| Rab20 | 12.4032 | 11.1339 | 25.4282 | 31.1558 | 21.3268 | 27.3126 | 13.607 | 31.7877 |
| Rab26os | 13.9045 | 12.2403 | 34.1628 | 12.6049 | 30.8319 | 30.7828 | 13.3333 | 12.7625 |
| Rab32 | 4.50265 | 4.19663 | 12.1194 | 19.2112 | 14.1973 | 14.2573 | 5.53477 | 7.43952 |
| Rab3b | 7.90387 | 7.21687 | 2.38841 | 1.03416 | 2.00384 | 1.59963 | 4.7737 | 3.315 |
| Rab6b | 5.39047 | 5.9605 | 1.73597 | 1.65041 | 1.80237 | 1.74829 | 9.88484 | 10.1018 |
| Rac3 | 6.43792 | 6.91166 | 25.6564 | 19.8894 | 23.079 | 23.88 | 2.13575 | 2.46024 |
| Ramp1 | 1.97058 | 1.85419 | 11.7358 | 7.65414 | 7.49308 | 8.70372 | 0.917472 | 0.442427 |
| Ramp2 | 0.349851 | 0.879102 | 2.07117 | 2.50262 | 2.31755 | 2.66681 | 52.4758 | 43.884 |
| Rap1gap | 2.30998 | 1.84778 | 6.60388 | 6.71047 | 5.74272 | 6.21196 | 60.5167 | 77.9964 |
| Rap1gap2 | 1.46835 | 1.30131 | 4.47081 | 8.00357 | 5.41672 | 5.43934 | 7.89098 | 9.68526 |
| Rapgef2 | 5.61017 | 5.57732 | 1.73684 | 2.60618 | 1.98686 | 1.9664 | 1.86497 | 2.13079 |
| Rapgef3 | 10.9521 | 9.21093 | 2.93737 | 3.93874 | 4.90604 | 4.56327 | 40.0808 | 31.4112 |
| Rapgef5 | 3.23394 | 2.79123 | 0.460108 | 0.912614 | 0.674472 | 0.70952 | 1.52503 | 2.81421 |
| Rasa3 | 20.1521 | 18.1614 | 3.98049 | 3.80721 | 5.67674 | 4.83758 | 2.82601 | 2.75868 |
| Rassf10 | 0.0122469 | 0.0230431 | 2.03088 | 2.16295 | 1.32034 | 1.6143 | 1.82249 | 3.58714 |
| Rassf3 | 5.98552 | 5.4308 | 11.1718 | 16.1329 | 9.71389 | 11.6127 | 17.8138 | 23.2432 |
| Rassf8 | 10.703 | 8.2803 | 1.82036 | 4.05691 | 2.62209 | 3.14147 | 2.79251 | 6.29481 |
| Rbbp9 | 9.89761 | 10.3747 | 19.9276 | 28.3816 | 16.2332 | 19.4761 | 34.6087 | 44.51 |
| Rbm43 | 6.65325 | 7.32249 | 18.601 | 20.7802 | 15.4318 | 17.1564 | 5.99291 | 7.78559 |
| Rbmx | 6.21449 | 5.54873 | 19.2129 | 16.277 | 23.4284 | 21.6041 | 37.4199 | 29.8458 |
| Rbp1 | 2.43882 | 2.18545 | 26.2013 | 18.6359 | 15.7311 | 19.6141 | 10.6602 | 8.31626 |
| Rbpj | 39.0134 | 40.0979 | 16.0414 | 15.2856 | 15.4864 | 14.7743 | 5.06002 | 5.08358 |
| Rcbtb2 | 2.4241 | 2.64466 | 7.4753 | 8.27839 | 7.0088 | 7.12698 | 8.9037 | 8.47472 |
| Rcn3 | 3.24563 | 3.08546 | 0.916197 | 0.651755 | 0.513109 | 0.558024 | 43.0872 | 47.5078 |
| Rdh10 | 9.5938 | 13.5056 | 22.1592 | 26.5187 | 28.2096 | 26.4545 | 12.7817 | 14.2459 |
| Rdm1 | 9.91033 | 10.4953 | 42.8732 | 29.3501 | 25.8037 | 27.8469 | 16.718 | 13.3206 |
| Rem2 | 12.9955 | 10.8669 | 3.41789 | 1.96731 | 4.2419 | 3.96826 | 0.42369 | 0.43416 |
| Renbp | 8.59696 | 10.4229 | 2.97108 | 2.01043 | 1.8262 | 2.91862 | 61.8096 | 40.3198 |

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|---|---|---|---|---|---|---|---|---|
| Rfc1 | 44.9575 | 42.8373 | 21.252 | 24.3832 | 19.022 | 20.0003 | 5.97048 | 6.88642 |
| Rftn1 | 9.6012 | 8.61104 | 2.89408 | 2.18856 | 4.3952 | 3.41537 | 3.68578 | 4.36358 |
| Rgl1 | 2.45516 | 1.75285 | 4.89474 | 6.84575 | 6.96722 | 6.66015 | 32.6914 | 28.0559 |
| Rgs16 | 34.0302 | 30.9766 | 8.74933 | 11.1395 | 18.1622 | 13.8283 | 0.336043 | 0.275527 |
| Rhob | 108.849 | 107.914 | 22.7848 | 16.4096 | 23.3945 | 20.7599 | 36.0755 | 37.2622 |
| Rhof | 11.2645 | 9.45293 | 3.81876 | 4.17198 | 4.86848 | 4.63362 | 4.67063 | 8.84258 |
| Rimklb | 4.24649 | 4.13422 | 0.409691 | 0.137791 | 0.288676 | 0.308761 | 0.126095 | 0.193908 |
| Rin1 | 17.6229 | 17.5058 | 6.76647 | 6.6912 | 10.4076 | 8.95367 | 1.51364 | 0.782108 |
| Ripk3 | 0.85679 | 0.71677 | 3.37737 | 3.58524 | 4.7215 | 4.03085 | 1.57169 | 0.790596 |
| Rn45s | 140.801 | 140.339 | 713.026 | 600.677 | 1094.53 | 813.068 | 348.181 | 354.96 |
| Rnf122 | 8.15619 | 7.86604 | 3.2412 | 3.35329 | 3.05004 | 3.53252 | 0.933668 | 2.03209 |
| Rnf130 | 26.9803 | 30.6119 | 12.3555 | 5.95817 | 10.3918 | 10.132 | 38.0238 | 48.9496 |
| Rnf135 | 5.12989 | 4.89223 | 12.135 | 12.0056 | 12.3249 | 11.9559 | 5.69302 | 4.33376 |
| Rnf24 | 7.28959 | 7.17619 | 2.1059 | 3.25598 | 2.20618 | 2.27987 | 67.7563 | 42.3571 |
| Rnf39 | 11.3582 | 10.3315 | 2.33857 | 2.41288 | 2.89719 | 2.84294 | 0.38003 | 0.817545 |
| Rogdi | 11.227 | 11.6395 | 23.9815 | 30.5841 | 23.0463 | 24.4591 | 172.019 | 140.48 |
| Rpl41 | 3241.51 | 2564.89 | 7559.05 | 3272.14 | 8146.18 | 7013.56 | 1473.96 | 1355.09 |
| Rpp25l | 19.0951 | 14.3615 | 41.8594 | 29.0733 | 38.0144 | 33.8166 | 27.8931 | 30.0273 |
| Rps27l | 195.731 | 212.536 | 512.233 | 297.611 | 590.141 | 487.919 | 425.482 | 323.028 |
| Rps4l | 2.22863 | 2.24962 | 9.71413 | 10.8381 | 11.9261 | 11.3807 | 44.0112 | 46.146 |
| Rps6ka2 | 6.47033 | 6.59822 | 1.21176 | 1.27904 | 1.63792 | 1.26937 | 1.25052 | 1.02573 |
| Rsad2 | 1.03685 | 1.12384 | 3.17686 | 8.03444 | 4.27335 | 4.75848 | 7.84989 | 9.82204 |
| Rsrp1 | 16.266 | 22.9705 | 52.3016 | 51.4817 | 68.3434 | 60.0868 | 195.523 | 131.186 |
| Rtp4 | 0.610899 | 0.657209 | 34.4302 | 43.2434 | 31.858 | 32.7077 | 9.67809 | 12.6421 |
| Rundc3b | 1.85988 | 1.59659 | 0.334103 | 0.442988 | 0.489744 | 0.271171 | 0.138397 | 0.0425635 |
| Rusc2 | 10.7952 | 10.9159 | 3.82479 | 4.841 | 4.09446 | 3.89635 | 7.00219 | 8.45837 |
| Rxra | 4.22188 | 3.81375 | 8.14941 | 10.8602 | 8.09556 | 8.57713 | 16.374 | 15.1092 |
| Rybp | 14.2272 | 13.9847 | 5.33086 | 8.11859 | 6.25202 | 6.38115 | 1.67234 | 3.33448 |
| S100a1 | 33.7789 | 36.918 | 97.8241 | 78.5831 | 78.6596 | 89.7554 | 1343.37 | 1137.43 |

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|---|---|---|---|---|---|---|---|---|
| S100a14 | 58.3343 | 51.1368 | 29.4221 | 10.5084 | 19.2672 | 20.5294 | 0.955466 | 0.65597 |
| S100a3 | 6.73296 | 5.13572 | 1.68208 | 0.494811 | 2.16307 | 1.86684 | 0 | 0.548676 |
| S100g | 0 | 0 | 0.445798 | 2.74663 | 0.165811 | 0.629282 | 2796.33 | 1609.43 |
| Samd9l | 5.46406 | 6.87021 | 29.1445 | 39.3779 | 21.8739 | 26.633 | 57.6996 | 45.0419 |
| Sars | 123.805 | 135.363 | 53.2759 | 53.1991 | 50.6078 | 55.1507 | 48.7132 | 48.205 |
| Scand1 | 23.3358 | 28.6095 | 59.8046 | 50.7221 | 68.2732 | 67.2828 | 160.988 | 154.285 |
| Scarf2 | 8.09247 | 9.03325 | 1.02128 | 0.580531 | 0.628798 | 0.880312 | 10.9961 | 11.7167 |
| Scn1b | 0.69802 | 0.94279 | 3.02442 | 2.23191 | 3.80186 | 3.7604 | 15.6837 | 21.8296 |
| Scp2 | 14.9058 | 15.3168 | 41.0308 | 34.3463 | 33.5669 | 35.1728 | 184.273 | 177.794 |
| Scrn1 | 3.4528 | 2.91526 | 0.112399 | 0.118123 | 0.18889 | 0.08898 | 1.35804 | 3.71072 |
| Sdhaf1 | 13.9598 | 15.3751 | 43.327 | 34.363 | 47.2832 | 42.2173 | 53.2209 | 46.3258 |
| Sdpr | 0.381398 | 0.239222 | 1.71809 | 4.55698 | 1.80315 | 2.57107 | 22.1934 | 16.752 |
| Sec23b | 30.5973 | 29.406 | 58.4255 | 79.9785 | 62.7574 | 62.107 | 35.5544 | 42.4011 |
| Sec61b | 122.421 | 107.731 | 293.866 | 166.944 | 309.841 | 269.235 | 150.232 | 127.455 |
| Sel1l3 | 10.7792 | 10.3427 | 2.84101 | 3.94937 | 2.44096 | 2.65832 | 13.3508 | 11.9582 |
| Selenbp1 | 1.75071 | 1.9014 | 51.0429 | 37.0981 | 12.9597 | 27.6006 | 213.83 | 171.008 |
| Selk | 38.3841 | 43.7419 | 101.824 | 63.4774 | 95.8419 | 86.703 | 180.081 | 137.137 |
| Sema3a | 5.34755 | 4.27581 | 0.899657 | 1.13771 | 1.0974 | 1.04779 | 0.0775799 | 0.167069 |
| Sema3e | 13.2063 | 11.6086 | 2.62251 | 2.83274 | 3.61128 | 3.10718 | 0.471276 | 0.111514 |
| Sema4g | 3.91292 | 3.30072 | 1.77571 | 1.42895 | 0.683889 | 0.954 | 34.5657 | 18.9522 |
| Sema7a | 7.38863 | 6.32156 | 1.85723 | 3.62334 | 3.39907 | 2.37307 | 3.04632 | 4.13169 |
| Sepp1 | 3.46452 | 3.54933 | 45.4666 | 126.746 | 42.9907 | 60.1351 | 444.924 | 432.415 |
| Sept4 | 3.32129 | 2.35705 | 8.70164 | 9.92772 | 6.64869 | 7.20005 | 49.7089 | 78.2199 |
| Sepw1 | 79.408 | 70.3933 | 289.494 | 164.738 | 328.565 | 305.009 | 306.591 | 237.06 |
| Serf1 | 29.9124 | 36.4622 | 93.8455 | 51.9636 | 80.8046 | 69.5598 | 45.0861 | 38.9902 |
| Serpina3g | 0 | 0 | 0.56105 | 1.43564 | 0.76532 | 0.926842 | 2.22837 | 0.402984 |
| Serpinb9 | 11.5031 | 12.0336 | 20.5209 | 33.2172 | 27.1953 | 25.9244 | 17.9628 | 28.0141 |
| Serpinb9b | 12.5222 | 12.3962 | 0.564541 | 0.798259 | 1.26508 | 1.21879 | 0 | 0 |
| Serpine1 | 108.729 | 90.3987 | 42.471 | 29.7979 | 41.8294 | 39.0637 | 0.51023 | 0.523016 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Serpine2 | 2.87757 | 3.4614 | 12.2806 | 8.23185 | 17.4891 | 14.3507 | 41.939 | 25.629 |
| Setd7 | 16.8689 | 15.509 | 6.62381 | 8.53867 | 6.23326 | 6.34057 | 4.48942 | 4.38183 |
| Sfta2 | 2.45158 | 2.08377 | 8.21084 | 4.94421 | 7.48504 | 6.80731 | 0.720436 | 1.32424 |
| Sgms2 | 31.5004 | 29.4114 | 10.602 | 20.8726 | 12.0568 | 13.4155 | 13.7248 | 11.0189 |
| Sgtb | 3.97159 | 3.19222 | 0.551242 | 0.956863 | 0.956602 | 0.675526 | 0.287009 | 0.294182 |
| Sh3bgrl3 | 76.8191 | 73.5845 | 288.909 | 234.329 | 309.575 | 304.303 | 506.677 | 394.003 |
| Sh3bp2 | 9.22511 | 9.74226 | 4.64457 | 3.86227 | 4.44889 | 4.11292 | 5.15642 | 5.26766 |
| Sh3bp5 | 29.4384 | 25.1017 | 9.43722 | 9.54794 | 12.2218 | 9.81451 | 27.9056 | 26.2918 |
| Sh3kbp1 | 5.61415 | 6.50378 | 13.4086 | 10.5749 | 16.7143 | 14.7246 | 4.3763 | 4.25255 |
| Shisa5 | 31.7971 | 32.1676 | 56.0246 | 84.7943 | 58.3695 | 66.0051 | 83.7912 | 97.4181 |
| Shmt2 | 110.727 | 113.739 | 49.5438 | 55.4454 | 60.1131 | 55.0627 | 108.823 | 70.5643 |
| Siglecg | 1.62083 | 0.911755 | 0 | 0 | 0 | 0 | 0.314412 | 0.322252 |
| Sim2 | 0 | 0.0657071 | 6.55008 | 11.664 | 6.99605 | 7.68513 | 6.23674 | 17.0923 |
| Skil | 22.7105 | 24.3056 | 10.1277 | 9.89099 | 10.3539 | 9.26 | 2.72784 | 2.78124 |
| Slamf9 | 3.98181 | 3.82883 | 0.557496 | 0.156221 | 0.156051 | 0.29436 | 12.6804 | 8.86063 |
| Slc12a4 | 20.7159 | 18.7223 | 6.68883 | 6.42325 | 8.11928 | 7.41176 | 10.4818 | 12.6908 |
| Slc16a12 | 0.0220219 | 0.0725084 | 2.00829 | 3.34652 | 1.30981 | 1.84929 | 18.0268 | 15.1206 |
| Slc1a4 | 20.9773 | 21.7134 | 3.81271 | 5.22203 | 4.36802 | 4.38967 | 9.55707 | 10.6452 |
| Slc22a18 | 0.152989 | 0.0576026 | 1.89747 | 0.911561 | 1.66998 | 1.25195 | 778.909 | 482.797 |
| Slc23a2 | 4.03674 | 4.47713 | 1.11148 | 1.74089 | 1.59637 | 1.48682 | 4.42513 | 3.99923 |
| Slc25a10 | 9.47739 | 9.08568 | 21.9278 | 22.3917 | 24.2248 | 23.533 | 86.1886 | 64.4294 |
| Slc25a11 | 33.4359 | 36.5092 | 77.236 | 68.6622 | 75.9471 | 71.6874 | 92.6368 | 95.8359 |
| Slc25a38 | 3.61563 | 4.38368 | 8.80667 | 7.29629 | 11.085 | 10.5474 | 23.3707 | 17.0072 |
| Slc25a48 | 2.36686 | 1.82301 | 5.44598 | 14.3365 | 4.91829 | 7.33026 | 1.09547 | 1.57117 |
| Slc27a3 | 0.856368 | 0.695963 | 3.05731 | 2.28087 | 2.46096 | 2.65849 | 5.55629 | 2.27779 |
| Slc27a6 | 0.0839455 | 0.126378 | 2.0982 | 2.90381 | 3.30874 | 2.5081 | 0 | 0 |
| Slc35a1 | 5.80451 | 5.75007 | 14.2452 | 11.9769 | 13.7705 | 12.3081 | 19.9812 | 21.3806 |
| Slc36a4 | 2.79317 | 2.97634 | 0.689695 | 1.24564 | 1.08761 | 0.754907 | 0.548941 | 0.590646 |
| Slc37a4 | 3.66295 | 4.84999 | 15.6453 | 11.7277 | 8.81832 | 10.7926 | 54.0722 | 34.1045 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Slc38a2 | 107.269 | 117.785 | 36.0008 | 41.7674 | 41.3661 | 38.0788 | 20.675 | 30.189 |
| Slc39a4 | 3.01459 | 2.79947 | 6.01163 | 11.6768 | 6.22028 | 7.59484 | 0.471804 | 0.217589 |
| Slc3a2 | 140.954 | 149.979 | 47.5144 | 49.5267 | 58.6947 | 52.9349 | 188.232 | 106.147 |
| Slc40a1 | 9.38076 | 9.3866 | 22.5384 | 29.7474 | 14.944 | 18.7025 | 14.6579 | 12.594 |
| Slc52a3 | 2.45976 | 2.51726 | 0.529941 | 0.247029 | 0.360442 | 0.34054 | 11.4651 | 10.0987 |
| Slc6a9 | 8.76197 | 10.8263 | 2.61426 | 3.57801 | 2.40933 | 3.1876 | 9.61692 | 12.2147 |
| Slc7a1 | 27.4386 | 29.2557 | 4.07604 | 6.65495 | 4.82909 | 4.67252 | 1.93801 | 4.06663 |
| Slc7a5 | 78.5531 | 79.026 | 16.0613 | 20.0416 | 20.2991 | 18.8379 | 2.39418 | 2.40974 |
| Slc7a6 | 26.9173 | 24.6549 | 9.14679 | 12.4882 | 12.0541 | 11.6666 | 2.24827 | 2.89153 |
| Slc9a5 | 5.95771 | 5.27795 | 1.79076 | 1.4458 | 1.69798 | 1.61671 | 0.816195 | 0.443031 |
| Slfn2 | 6.20021 | 6.11889 | 16.2972 | 19.8533 | 17.9186 | 17.7137 | 12.6595 | 11.3743 |
| Slfn9 | 1.71318 | 1.94438 | 4.26402 | 14.3924 | 3.5335 | 5.38851 | 0.0658009 | 0.121424 |
| Slk | 40.3432 | 40.8887 | 15.6645 | 20.201 | 17.9269 | 17.3747 | 17.706 | 15.2112 |
| Slpi | 0 | 0 | 1.28706 | 0.595027 | 2.01626 | 1.01981 | 0.686563 | 0.421605 |
| Smagp | 32.0494 | 33.963 | 72.3541 | 65.471 | 62.0264 | 65.1987 | 103.032 | 141.43 |
| Smim1 | 3.00078 | 2.85372 | 7.57505 | 8.30352 | 5.57211 | 6.44636 | 37.9061 | 26.6421 |
| Smim22 | 4.88991 | 5.11132 | 51.0054 | 21.7697 | 42.1808 | 43.5733 | 136.913 | 113.3 |
| Smim24 | 0 | 0.287356 | 1.13098 | 2.376 | 1.26344 | 1.79444 | 208.691 | 165.355 |
| Smim4 | 6.03651 | 6.04634 | 19.5169 | 8.69796 | 19.3035 | 13.2997 | 109.93 | 86.8961 |
| Smim6 | 0.25405 | 0.335059 | 5.01632 | 2.98489 | 4.35293 | 4.46508 | 24.3891 | 18.4946 |
| Smpdl3a | 0.302021 | 0.379016 | 3.00844 | 3.93451 | 1.52923 | 1.94056 | 87.9592 | 74.6778 |
| Smtn | 86.7325 | 83.4718 | 30.6545 | 32.4148 | 38.9669 | 37.119 | 51.8467 | 56.0341 |
| Smtnl2 | 4.15273 | 4.5013 | 15.1191 | 8.8042 | 5.97071 | 9.32476 | 18.8759 | 17.4429 |
| Smurf1 | 35.3584 | 34.7921 | 12.7341 | 15.9591 | 15.6746 | 15.0169 | 4.88673 | 5.7522 |
| Snhg1 | 185.001 | 201.903 | 100.593 | 53.643 | 106.861 | 97.8925 | 26.8882 | 13.0773 |
| Snora16a | 0 | 0 | 0 | 12.0109 | 0 | 0 | 0 | 0 |
| Snora21 | 0 | 0 | 49.3428 | 0 | 0 | 0 | 0 | 0 |
| Snora33 | 0 | 167.903 | 0 | 0 | 0 | 0 | 0 | 0 |
| Snora34 | 50.2525 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Snora52 | 0 | 10.8134 | 0 | 0 | 0 | 0 | 0 | 0 |
| Snora64 | 55.898 | 43.9456 | 0 | 0 | 0 | 0 | 0 | 0 |
| Snora78 | 0 | 0 | 0 | 3.73342 | 0 | 0 | 0 | 0 |
| Snora7a | 0 | 0 | 0 | 0 | 0 | 27.3531 | 0 | 0 |
| Snora81 | 0 | 0 | 0 | 2.81472 | 3.61868 | 0 | 0 | 0 |
| Snrpe | 175.959 | 178.538 | 442.669 | 201.034 | 424.641 | 380.222 | 96.9645 | 76.897 |
| Snx9 | 70.428 | 67.8004 | 23.6387 | 34.0793 | 30.3602 | 30.459 | 17.7945 | 24.039 |
| Sorbs2 | 14.3023 | 12.532 | 3.7765 | 3.76539 | 5.47473 | 4.34793 | 4.98773 | 4.60819 |
| Sorbs3 | 11.8075 | 12.7505 | 28.6699 | 28.5454 | 25.7247 | 26.219 | 65.4954 | 58.9346 |
| Sort1 | 5.21555 | 5.39598 | 2.0298 | 2.59757 | 2.14456 | 2.02716 | 15.8827 | 24.301 |
| Sox11 | 18.9935 | 17.4755 | 6.75749 | 5.84648 | 9.28812 | 7.9138 | 0.0878758 | 0.144173 |
| Sox17 | 2.35559 | 2.05885 | 13.4003 | 13.0345 | 13.39 | 13.3331 | 8.58708 | 6.72273 |
| Sp100 | 0.102563 | 0.11582 | 3.13172 | 6.907 | 3.28043 | 4.09554 | 10.9786 | 13.7265 |
| Spa17 | 0.867647 | 1.19007 | 5.87693 | 3.68605 | 3.43255 | 4.63612 | 64.296 | 62.6115 |
| Spaca7 | 1.80272 | 2.41832 | 8.32027 | 6.02198 | 9.39229 | 6.83892 | 0 | 0.251674 |
| Sparc | 88.6251 | 77.0813 | 17.9935 | 11.5227 | 21.1262 | 16.5617 | 85.4915 | 72.453 |
| Spc25 | 18.9515 | 20.907 | 61.6621 | 42.548 | 48.7297 | 47.6112 | 12.2964 | 6.11388 |
| Specc1 | 28.3749 | 26.1833 | 9.95379 | 15.7494 | 11.7522 | 12.0429 | 4.59287 | 6.46654 |
| Spg20 | 27.3292 | 25.4861 | 10.7884 | 11.8277 | 12.3464 | 10.9593 | 6.5584 | 9.71214 |
| Spint2 | 272.398 | 288.419 | 613.444 | 503.662 | 597.654 | 583.989 | 525.951 | 556.379 |
| Spn | 2.02886 | 1.7337 | 0.402459 | 0.381857 | 0.521627 | 0.511435 | 1.57693 | 1.3748 |
| Spp1 | 786.743 | 868.529 | 3101.5 | 3473.41 | 2931.69 | 3061.76 | 2101.16 | 1705.21 |
| Sprr2e | 0.344193 | 0.649298 | 3.44704 | 1.20707 | 2.56868 | 3.03712 | 0 | 0 |
| Sprr2g | 0.767941 | 0.885275 | 7.50043 | 6.06416 | 8.2779 | 7.62886 | 0 | 0 |
| Sprtn | 7.18799 | 7.1982 | 2.10987 | 3.95717 | 1.92254 | 2.66721 | 2.74155 | 2.83513 |
| Spry1 | 34.529 | 32.953 | 14.868 | 12.174 | 14.3101 | 13.7418 | 12.3349 | 15.8781 |
| Spsb4 | 3.89567 | 4.31722 | 9.47238 | 10.7782 | 9.19288 | 10.7125 | 17.5236 | 13.9576 |
| Sptbn2 | 4.62948 | 4.30671 | 1.07092 | 1.60867 | 0.731697 | 1.10033 | 15.6096 | 24.8326 |
| Srcin1 | 2.54088 | 2.48569 | 0.423766 | 0.189296 | 0.155898 | 0.244486 | 7.96047 | 4.7437 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Srd5a1 | 27.2183 | 27.0549 | 114.099 | 92.5763 | 114.268 | 107.363 | 4.37413 | 4.00519 |
| Srd5a2 | 0.418964 | 0.169204 | 2.39207 | 2.34579 | 1.41258 | 1.75506 | 1.06294 | 1.30537 |
| Srxn1 | 5.61546 | 5.10929 | 28.4386 | 32.5604 | 38.1066 | 34.4561 | 28.4567 | 26.3083 |
| Ssh1 | 13.6062 | 10.1846 | 3.59969 | 4.38863 | 2.77389 | 3.40268 | 1.61473 | 1.48971 |
| St5 | 4.03882 | 5.07459 | 11.9914 | 12.5171 | 9.85366 | 10.7564 | 14.378 | 17.3719 |
| St6galnac2 | 1.11649 | 1.13313 | 10.0039 | 16.4145 | 8.35958 | 10.5584 | 122.747 | 84.1968 |
| Stambpl1 | 20.6193 | 20.0845 | 8.28756 | 6.33821 | 7.16031 | 6.82377 | 2.14599 | 1.56687 |
| Stard13 | 7.42692 | 8.22254 | 2.23005 | 2.49964 | 3.12376 | 2.76413 | 3.32743 | 4.5777 |
| Stat1 | 2.27489 | 2.24756 | 14.0992 | 30.7962 | 14.2418 | 17.8061 | 7.57071 | 7.49996 |
| Stat2 | 4.69647 | 4.59935 | 9.01738 | 18.1216 | 8.639 | 10.6836 | 10.3933 | 9.81954 |
| Stbd1 | 11.8878 | 14.5927 | 7.2857 | 5.18473 | 4.73649 | 5.51134 | 3.60739 | 6.57193 |
| Stc1 | 0.33068 | 0.278904 | 3.11344 | 1.99252 | 2.00641 | 2.31418 | 1.8328 | 1.92068 |
| Stc2 | 0.125686 | 0.0236592 | 3.95064 | 8.02301 | 5.42361 | 5.69701 | 1.64347 | 1.28596 |
| Stmn2 | 0.964499 | 1.21769 | 19.0038 | 11.4688 | 24.7635 | 20.4152 | 2.51723 | 1.37571 |
| Ston1 | 14.8646 | 13.1675 | 3.28407 | 6.29027 | 3.32175 | 3.27945 | 2.06921 | 3.34065 |
| Stra13 | 32.3317 | 34.653 | 74.125 | 50.1824 | 76.931 | 71.2231 | 194.934 | 158.8 |
| Sulf1 | 0.0280228 | 0.0263605 | 0.993887 | 1.08966 | 1.03461 | 0.930974 | 0.500649 | 0.444853 |
| Sulf2 | 0.540087 | 0.539754 | 4.1312 | 3.33989 | 5.53637 | 4.56798 | 9.78142 | 7.58264 |
| Sult1d1 | 0.0183319 | 0.0172499 | 24.6571 | 42.0932 | 14.8386 | 21.934 | 221.359 | 161.203 |
| Supt20 | 25.8837 | 26.2598 | 10.3671 | 15.8707 | 11.6442 | 11.0479 | 11.5988 | 7.46324 |
| Sv2a | 2.73991 | 2.49569 | 0.384592 | 0.434532 | 0.633203 | 0.570637 | 7.70286 | 5.85296 |
| Syde2 | 5.41494 | 5.2301 | 1.66501 | 2.16041 | 1.97089 | 1.89037 | 2.36862 | 2.80218 |
| Syne3 | 4.29111 | 3.76329 | 1.16069 | 1.0599 | 1.19812 | 1.22574 | 0.738434 | 0.907977 |
| Syngap1 | 2.32611 | 1.76052 | 0.338929 | 0.933551 | 0.340631 | 0.64122 | 2.26618 | 0.813148 |
| Syngr3 | 24.8743 | 23.2166 | 3.55726 | 3.05442 | 2.742 | 3.56812 | 0.406644 | 0.50005 |
| Synpo | 2.58894 | 2.67627 | 7.27735 | 8.1211 | 5.08655 | 6.23907 | 19.6597 | 12.2126 |
| Syt11 | 5.16925 | 4.63602 | 1.69963 | 2.22113 | 1.82501 | 1.56636 | 5.18527 | 4.75062 |
| Sytl1 | 0.139453 | 0.131245 | 2.03186 | 0.778462 | 1.90196 | 1.76451 | 5.94145 | 6.37157 |
| Sytl2 | 2.95327 | 2.46583 | 8.85238 | 11.1047 | 7.04937 | 8.32041 | 6.13339 | 10.7041 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tacc1 | 5.1265 | 4.91995 | 1.56208 | 1.8053 | 1.83327 | 1.73698 | 10.963 | 14.4458 |
| Tada1 | 2.16913 | 2.43007 | 7.65649 | 6.68714 | 7.37584 | 7.67053 | 6.511 | 6.26977 |
| Taf10 | 112.675 | 110.034 | 240.394 | 180.146 | 280.238 | 253.725 | 225.386 | 214.109 |
| Tal1 | 0.141037 | 0.09476 | 1.5305 | 1.63871 | 1.44818 | 1.44527 | 0.899726 | 0.885572 |
| Tap1 | 1.48068 | 1.71034 | 10.2127 | 14.5345 | 8.06492 | 10.7766 | 7.15371 | 5.17353 |
| Tars | 117.974 | 120.46 | 51.3699 | 49.9697 | 63.9643 | 58.0289 | 9.34284 | 12.3987 |
| Tbc1d16 | 2.95038 | 2.67953 | 0.613706 | 0.732433 | 0.584494 | 0.633516 | 9.67688 | 10.8562 |
| Tbc1d9 | 4.78717 | 5.04264 | 1.13928 | 1.26621 | 1.63221 | 1.7559 | 1.70503 | 2.54667 |
| Tbkbp1 | 1.58357 | 1.55038 | 0.384315 | 0.394944 | 0.319092 | 0.255325 | 5.0576 | 4.28908 |
| Tceal8 | 3.28093 | 3.45236 | 20.9922 | 13.2354 | 21.4646 | 18.9639 | 32.784 | 23.019 |
| Tdrkh | 11.5713 | 12.2794 | 4.48986 | 2.17026 | 3.52441 | 3.1267 | 0.977907 | 1.32308 |
| Tecpr1 | 10.9544 | 10.0746 | 3.44979 | 4.8534 | 4.01887 | 4.34163 | 8.80549 | 6.2383 |
| Ten1 | 23.033 | 20.8593 | 57.4521 | 35.1835 | 52.281 | 53.0246 | 12.2507 | 21.757 |
| Tesc | 0.582928 | 0.79882 | 3.70418 | 2.91602 | 2.10573 | 2.11169 | 61.536 | 80.603 |
| Tgfb3 | 0.697075 | 0.631952 | 1.8636 | 3.00427 | 1.97896 | 1.96639 | 1.05614 | 0.649604 |
| Tgm2 | 13.469 | 11.3667 | 36.0987 | 60.4131 | 20.7848 | 35.2761 | 82.3295 | 69.2708 |
| Tgtp1 | 0.216225 | 0.159847 | 6.11435 | 13.2975 | 4.49837 | 5.62307 | 1.1947 | 0.621716 |
| Tgtp2 | 0.0154037 | 0.0289861 | 0.732457 | 1.77593 | 0.553646 | 1.04254 | 2.01646 | 1.80385 |
| Thbd | 14.0095 | 12.3692 | 3.402 | 2.16669 | 4.88067 | 3.95118 | 10.6641 | 7.94706 |
| Thbs1 | 68.5862 | 54.3444 | 10.2998 | 14.4251 | 19.144 | 15.1234 | 10.8531 | 20.6395 |
| Thbs3 | 7.77684 | 6.87122 | 1.64492 | 1.7854 | 3.017 | 2.44575 | 2.09288 | 0.89116 |
| Tiam2 | 4.64885 | 5.93713 | 1.98868 | 1.37347 | 2.82976 | 2.19725 | 1.52748 | 1.70694 |
| Tigit | 23.986 | 19.4866 | 1.54506 | 1.29878 | 2.94621 | 1.81336 | 0 | 0 |
| Timm10b | 14.341 | 14.9534 | 34.3908 | 21.3939 | 34.6269 | 31.0524 | 34.5853 | 28.2661 |
| Timp3 | 5.47192 | 4.93491 | 0.42912 | 0.352426 | 0.469878 | 0.494862 | 233.41 | 214.332 |
| Tinag | 2.89179 | 2.4472 | 8.5457 | 10.4684 | 7.00764 | 7.40859 | 54.708 | 47.7836 |
| Tjap1 | 38.082 | 36.3831 | 17.4817 | 15.9576 | 19.2681 | 18.4451 | 8.12836 | 8.00164 |
| Tkt | 168.434 | 145.857 | 338.752 | 339.747 | 335.289 | 338.189 | 137.718 | 114.207 |
| Tma7 | 126.586 | 127.698 | 283.625 | 192.482 | 289.67 | 270.719 | 177.918 | 164.825 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tmbim4 | 30.1717 | 31.4617 | 75.9296 | 59.5069 | 81.9919 | 74.0539 | 563.67 | 442.372 |
| Tmc4 | 15.5518 | 16.8556 | 36.0841 | 43.7393 | 34.3983 | 36.5497 | 43.3534 | 49.8241 |
| Tmco4 | 1.65475 | 2.33517 | 5.20256 | 6.97013 | 3.95707 | 4.9014 | 8.69493 | 11.1219 |
| Tmem100 | 0.0767874 | 0.0481823 | 2.63469 | 2.57237 | 4.09439 | 3.76781 | 1.9776 | 4.30208 |
| Tmem116 | 0.649884 | 0.611788 | 3.29577 | 2.99471 | 3.13371 | 3.23961 | 37.8013 | 37.5046 |
| Tmem120b | 6.3001 | 7.58787 | 2.5912 | 2.96463 | 2.66377 | 2.45303 | 7.46124 | 7.67493 |
| Tmem121 | 11.3017 | 10.531 | 3.12805 | 2.09856 | 2.61924 | 2.83508 | 0 | 0 |
| Tmem123 | 29.2394 | 28.4052 | 72.9618 | 108.307 | 61.9627 | 71.4958 | 25.061 | 30.9365 |
| Tmem130 | 2.32098 | 2.13893 | 0.210963 | 0.192158 | 0.216736 | 0.0556549 | 0 | 0 |
| Tmem144 | 8.28157 | 7.52177 | 2.10428 | 2.18026 | 2.38192 | 2.22075 | 2.85709 | 2.74077 |
| Tmem147 | 45.0977 | 46.0326 | 99.992 | 68.1264 | 116.984 | 98.9695 | 152.079 | 158.842 |
| Tmem158 | 6.36956 | 6.70778 | 2.42715 | 2.16207 | 3.23714 | 2.74497 | 0.620557 | 2.00289 |
| Tmem173 | 13.3212 | 13.5179 | 43.1981 | 53.7184 | 36.9358 | 44.1306 | 2.85025 | 3.06711 |
| Tmem176a | 40.9729 | 48.5564 | 103.974 | 128.153 | 90.1707 | 102.118 | 962.869 | 680.285 |
| Tmem176b | 122.379 | 128.569 | 284.705 | 312.245 | 278.011 | 283.206 | 999.165 | 955.411 |
| Tmem178 | 0.0267394 | 0.0503371 | 19.7128 | 18.6884 | 14.2917 | 16.3403 | 19.0679 | 13.7736 |
| Tmem200b | 0.0340283 | 0 | 3.20376 | 3.644 | 1.56191 | 2.42741 | 4.64698 | 4.84286 |
| Tmem205 | 9.34013 | 9.5123 | 30.7975 | 17.0132 | 22.5189 | 21.8925 | 354.782 | 188.448 |
| Tmem213 | 0 | 0 | 3.44341 | 11.6807 | 2.70566 | 4.45327 | 724.99 | 565.096 |
| Tmem238 | 13.922 | 17.5279 | 34.4771 | 27.2955 | 51.442 | 41.5755 | 55.0289 | 47.3284 |
| Tmem256 | 72.8085 | 77.5185 | 202.425 | 94.5493 | 152.95 | 158.497 | 356.709 | 214.329 |
| Tmem260 | 1.0408 | 1.10803 | 2.98697 | 3.50117 | 2.48901 | 3.01023 | 4.61276 | 5.67529 |
| Tmem30b | 1.59748 | 1.70002 | 4.45889 | 5.55057 | 3.16424 | 4.15497 | 18.1589 | 35.6157 |
| Tmem42 | 0.60748 | 0.572158 | 3.9897 | 2.6134 | 4.11825 | 4.18421 | 8.90552 | 11.0621 |
| Tmem45b | 1.77198 | 1.64067 | 6.85046 | 4.56962 | 2.59399 | 4.65129 | 60.2294 | 50.8148 |
| Tmem63b | 71.1625 | 66.7752 | 23.7975 | 30.6313 | 31.9758 | 29.8382 | 20.8767 | 18.8715 |
| Tmem71 | 4.25123 | 4.16645 | 1.64857 | 0.850881 | 1.07936 | 1.13677 | 1.40545 | 0.594265 |
| Tmem80 | 1.30974 | 2.02834 | 10.3155 | 9.41882 | 13.6494 | 10.3321 | 24.5065 | 26.4767 |
| Tmprss11e | 3.61159 | 3.56348 | 0.62605 | 0.280741 | 1.6218 | 1.23309 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tmprss2 | 4.34624 | 3.34556 | 9.59581 | 19.4042 | 8.7969 | 10.8884 | 49.3011 | 45.1847 |
| Tmprss4 | 0.0972215 | 0.0731892 | 3.01136 | 5.02758 | 2.36219 | 2.79215 | 0.462583 | 0.0711131 |
| Tmsb15b1 | 0.718096 | 2.55245 | 4.37261 | 3.56419 | 6.21231 | 4.78473 | 3.59643 | 2.75159 |
| Tmsb15b2 | 0.109274 | 5.06E-07 | 2.69979 | 1.03187 | 2.58121 | 1.21065 | 0.000141692 | 1.43631 |
| Tnfrsf1b | 2.94552 | 3.03728 | 7.07051 | 11.994 | 5.4475 | 7.41963 | 0.920501 | 1.60439 |
| Tnfsf10 | 0.0170634 | 0 | 0.76374 | 1.90275 | 0.369966 | 0.815725 | 7.67184 | 10.9078 |
| Tnip3 | 0.328288 | 0.564422 | 7.18291 | 9.87998 | 6.98563 | 6.86585 | 0.134783 | 0.0829049 |
| Tnk2 | 45.5227 | 40.8536 | 19.3202 | 19.0906 | 22.9284 | 22.0078 | 12.0531 | 9.27159 |
| Tnks | 12.0985 | 11.7887 | 2.56753 | 6.84452 | 2.81428 | 3.56367 | 1.31448 | 1.83142 |
| Tnnc2 | 20.9788 | 18.8933 | 5.50458 | 2.71708 | 9.67157 | 5.81875 | 0 | 0 |
| Tnpo2 | 44.681 | 43.0771 | 17.2485 | 21.2991 | 20.5947 | 20.6023 | 11.7788 | 8.73954 |
| Tns1 | 2.60545 | 2.60384 | 8.19607 | 13.189 | 4.93167 | 7.48619 | 102.086 | 118.919 |
| Toporsos | 4.282 | 2.78958 | 11.4856 | 8.37369 | 11.4206 | 10.9222 | 78.9846 | 46.2949 |
| Tor3a | 6.30047 | 7.18972 | 13.3645 | 19.6006 | 14.2791 | 14.9766 | 6.96756 | 9.43768 |
| Tor4a | 6.55346 | 6.45953 | 15.1816 | 17.1477 | 13.0806 | 14.137 | 8.70987 | 9.56975 |
| Tpgs1 | 7.02454 | 7.77363 | 21.8537 | 16.2845 | 19.181 | 19.1724 | 46.8681 | 44.7924 |
| Tprn | 9.40937 | 8.88216 | 17.0686 | 20.3129 | 19.5514 | 19.9046 | 19.2144 | 22.3902 |
| Traf5 | 1.15617 | 0.811073 | 4.13981 | 6.17906 | 4.4564 | 5.27735 | 3.75004 | 5.38033 |
| Trappc2l | 32.9527 | 33.7317 | 78.9978 | 61.6711 | 69.5766 | 72.8785 | 57.8013 | 66.8496 |
| Trex1 | 2.92341 | 3.41799 | 8.96429 | 9.24171 | 11.9281 | 11.0857 | 21.2444 | 17.6273 |
| Trib3 | 32.2628 | 36.8507 | 10.5795 | 8.12841 | 4.94609 | 7.72239 | 0.644604 | 1.82321 |
| Trim12a | 0.933845 | 1.58803 | 6.6377 | 6.67409 | 5.19348 | 5.0001 | 13.7785 | 13.6392 |
| Trim12c | 0.548409 | 0.730879 | 4.71801 | 6.1805 | 3.27041 | 3.95842 | 11.3269 | 8.44231 |
| Trim14 | 1.74606 | 2.05971 | 4.64806 | 6.26797 | 2.76305 | 4.74785 | 1.27901 | 1.62249 |
| Trim21 | 1.21344 | 1.40531 | 2.99341 | 6.37887 | 3.00905 | 3.84861 | 4.16556 | 3.24457 |
| Trim30a | 0.0226343 | 0.0106465 | 2.23934 | 5.80642 | 2.48215 | 3.32637 | 2.96439 | 2.81798 |
| Trim30d | 0.011355 | 0 | 0.612851 | 1.70024 | 0.471064 | 0.82674 | 0.946996 | 0.527284 |
| Trim34a | 0.997967 | 1.30507 | 4.24654 | 6.90496 | 2.9771 | 3.79035 | 4.12584 | 4.70329 |
| Trim54 | 3.38647 | 2.68008 | 0.0995487 | 0.11159 | 0.223021 | 0.140119 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Trim65 | 0.636769 | 0.732228 | 1.84625 | 3.02573 | 2.17456 | 2.37743 | 1.93687 | 1.65739 |
| Trmt1l | 6.33895 | 6.67149 | 14.8157 | 18.2904 | 17.9208 | 16.054 | 19.149 | 16.2599 |
| Trp53inp1 | 2.74333 | 3.85665 | 9.68507 | 6.85665 | 9.55358 | 8.76797 | 6.4612 | 5.00248 |
| Trpv6 | 0 | 0 | 1.5033 | 3.65454 | 1.04391 | 1.7415 | 0.967296 | 1.51432 |
| Tshz1 | 2.33065 | 2.55873 | 10.6845 | 17.6259 | 7.2319 | 10.5571 | 6.3175 | 5.81649 |
| Tspan2 | 2.70994 | 2.31132 | 0.288947 | 0.249862 | 0.427557 | 0.280477 | 1.74312 | 1.11146 |
| Tspan33 | 4.6283 | 5.53594 | 30.88 | 32.9835 | 18.5438 | 24.1248 | 57.3369 | 75.6742 |
| Tspan7 | 26.555 | 24.7783 | 8.69913 | 5.63323 | 8.61065 | 7.48838 | 38.8521 | 28.9047 |
| Tspan8 | 136.61 | 113.764 | 704.323 | 541.365 | 506.862 | 541.621 | 47.4485 | 85.0022 |
| Ttc30b | 0.934407 | 0.973403 | 3.24786 | 3.47552 | 2.3577 | 3.07686 | 5.06284 | 6.41027 |
| Tub | 2.64627 | 2.15058 | 0.592632 | 0.262268 | 0.48083 | 0.419559 | 0.084061 | 0.051714 |
| Tubb3 | 5.25466 | 5.71249 | 0.668877 | 1.00245 | 1.59645 | 1.53486 | 0.156138 | 0.0959892 |
| Tusc2 | 13.1097 | 14.1431 | 30.3274 | 27.4077 | 33.5677 | 31.4695 | 38.5427 | 45.8885 |
| Twist2 | 1.50203 | 1.27955 | 15.7285 | 13.023 | 15.7511 | 15.6445 | 0.212298 | 0.130471 |
| Uba7 | 0.31326 | 0.730396 | 5.33089 | 8.73658 | 4.18599 | 5.48208 | 4.70149 | 4.28763 |
| Ube2l6 | 6.40831 | 5.84375 | 10.9255 | 18.7138 | 11.1961 | 12.9471 | 26.895 | 19.5911 |
| Uchl1 | 129.038 | 128.928 | 29.1154 | 13.4463 | 53.8824 | 41.2232 | 10.4213 | 9.45236 |
| Ucp2 | 9.08704 | 8.25816 | 31.9391 | 32.9216 | 29.7408 | 29.8025 | 76.1358 | 68.5554 |
| Ufc1 | 38.3291 | 38.0501 | 98.8722 | 65.3369 | 94.7986 | 88.5603 | 120.275 | 95.8133 |
| Ugt1a6a | 6.57E-11 | 8.08E-47 | 1.47451 | 3.82999 | 1.50673 | 2.06849 | 1.48436 | 1.3617 |
| Ugt1a6b | 5.48E-07 | 0.00147718 | 1.80855 | 0.462364 | 1.50065 | 1.40487 | 348.708 | 211.528 |
| Ugt1a7c | 0.600013 | 0.710748 | 12.8929 | 23.0622 | 18.1232 | 16.1915 | 15.4644 | 5.64381 |
| Ugt2b34 | 0.283205 | 0.146547 | 2.20765 | 2.05367 | 1.63206 | 2.06518 | 16.4327 | 7.67076 |
| Unc5b | 28.3436 | 26.3173 | 8.92611 | 10.4943 | 9.66195 | 9.55873 | 1.40502 | 1.57156 |
| Upk1a | 0.502444 | 0.473078 | 2.94214 | 3.84383 | 2.58252 | 2.93849 | 5.11305 | 4.05879 |
| Upk3a | 0.131003 | 0.0411269 | 2.66253 | 1.18017 | 0.975575 | 1.78932 | 9.84156 | 1.43208 |
| Uqcr11 | 133.375 | 129.321 | 388.528 | 198.453 | 374.849 | 351.739 | 1808.39 | 1489.09 |
| Uqcrb | 150.661 | 160.166 | 412.252 | 250.182 | 409.594 | 359.152 | 1311.34 | 1221.18 |
| Uqcrh | 239.49 | 235.99 | 670.986 | 363.821 | 620.465 | 546.619 | 1749.06 | 1694.25 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Urah | 0.324956 | 0.842743 | 4.87948 | 3.49339 | 5.05108 | 3.72548 | 7.19601 | 6.77013 |
| Usp18 | 2.49739 | 2.68637 | 20.0823 | 35.9735 | 26.1965 | 25.6335 | 3.33209 | 4.74887 |
| Usp44 | 1.91387 | 1.906 | 0.601807 | 0.54545 | 0.444004 | 0.478574 | 0 | 0 |
| Usp53 | 10.7994 | 11.0664 | 2.79979 | 5.41745 | 2.66578 | 3.20126 | 2.33458 | 5.12317 |
| Vash1 | 2.65218 | 2.3228 | 0.553231 | 0.490325 | 0.603489 | 0.615202 | 1.12837 | 0.892511 |
| Vcam1 | 11.5879 | 11.0086 | 46.9461 | 73.6301 | 51.6206 | 52.6867 | 4.2827 | 3.14252 |
| Vegfa | 57.4523 | 63.571 | 31.7522 | 18.1486 | 17.1288 | 20.6139 | 104.847 | 62.1129 |
| Vim | 32.9991 | 24.4819 | 60.5874 | 29.7009 | 88.0669 | 66.098 | 93.8478 | 67.3749 |
| Vkorc1 | 16.0957 | 14.171 | 41.4464 | 36.359 | 35.8675 | 36.7243 | 79.2316 | 98.0366 |
| Vtcn1 | 1.09722 | 1.29831 | 5.46058 | 6.63174 | 6.07862 | 5.78181 | 0.593442 | 0.425784 |
| Wfs1 | 52.2211 | 43.3003 | 17.2793 | 17.0505 | 22.6564 | 19.1703 | 8.64677 | 15.4281 |
| Wipi1 | 33.2167 | 33.1981 | 13.4055 | 11.6394 | 11.3029 | 11.3139 | 14.2813 | 14.1208 |
| Wnk2 | 0.0361568 | 0.0509994 | 0.760395 | 2.08006 | 0.6175 | 1.05486 | 0.843563 | 0.484368 |
| Wnk4 | 0.839734 | 0.645442 | 5.56907 | 7.24281 | 5.34202 | 5.72061 | 130.418 | 119.117 |
| Wnt16 | 0.981975 | 0.949979 | 4.71048 | 9.36753 | 2.97679 | 5.16354 | 0 | 0.199283 |
| Wnt4 | 0.947984 | 0.681968 | 5.49847 | 4.71651 | 2.86067 | 4.05847 | 4.91325 | 3.02216 |
| Wnt7a | 34.3792 | 35.5841 | 4.67647 | 3.51612 | 8.66891 | 6.24726 | 0.161365 | 0 |
| Wscd1 | 0 | 0.0298684 | 1.8957 | 1.29873 | 1.96725 | 1.9634 | 6.51639 | 7.55053 |
| Wwc2 | 31.513 | 30.8957 | 12.7508 | 17.8455 | 13.1216 | 13.0618 | 10.6282 | 17.435 |
| Wwtr1 | 40.0957 | 41.3676 | 17.9484 | 20.1504 | 19.1578 | 18.5417 | 15.2559 | 17.5416 |
| Xaf1 | 0.352571 | 0.576095 | 15.2282 | 16.6286 | 12.9902 | 14.0604 | 4.40018 | 2.55925 |
| Xpo5 | 36.4138 | 33.2166 | 11.7465 | 20.2241 | 16.9903 | 15.6973 | 5.07149 | 5.90167 |
| Yipf2 | 7.14322 | 8.01968 | 24.4233 | 19.0844 | 20.8474 | 20.671 | 34.8567 | 29.1202 |
| Zbed6 | 8.95099 | 8.05537 | 2.24272 | 6.83096 | 1.83614 | 2.73924 | 3.30959 | 1.88171 |
| Zbp1 | 0 | 0.140117 | 9.27997 | 17.0473 | 8.52388 | 9.5222 | 3.57713 | 3.43344 |
| Zbtb32 | 3.40627 | 2.48825 | 0.562698 | 0.804244 | 0.630422 | 0.593944 | 1.96405 | 1.76478 |
| Zbtb45 | 3.47767 | 3.54539 | 8.42786 | 8.18341 | 8.28906 | 8.91886 | 5.90873 | 6.96372 |
| Zbtb46 | 1.42511 | 1.3447 | 0.142991 | 0.2282 | 0.252111 | 0.257175 | 1.49703 | 1.76749 |
| Zbtb8os | 19.9317 | 22.9846 | 50.9644 | 39.465 | 44.4734 | 44.0307 | 54.3839 | 53.3852 |

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|---|---|---|---|---|---|---|---|---|
| Zc3h18 | 53.199 | 46.9245 | 17.4303 | 29.4661 | 19.7711 | 20.6984 | 16.269 | 18.6202 |
| Zc3h6 | 3.43284 | 3.71347 | 1.53651 | 0.869271 | 0.435949 | 0.700466 | 2.2998 | 2.29504 |
| Zcchc18 | 0.445109 | 0.53432 | 1.79137 | 2.85423 | 1.60715 | 1.79425 | 0.828627 | 0.452986 |
| Zfhx3 | 3.88819 | 3.31311 | 1.0198 | 1.31068 | 1.05986 | 0.979551 | 0.641144 | 0.798161 |
| Zfp105 | 0.244627 | 0.334865 | 2.43611 | 2.52402 | 2.26091 | 2.33742 | 1.45446 | 2.03248 |
| Zfp467 | 0.983475 | 0.846023 | 3.13796 | 3.95845 | 2.2 | 3.03772 | 51.0873 | 47.8709 |
| Zfp518b | 6.02172 | 5.10121 | 2.09869 | 2.23145 | 2.05 | 2.01408 | 0.802906 | 0.763406 |
| Zfp647 | 4.89002 | 5.63467 | 2.09763 | 1.74507 | 2.15264 | 1.74772 | 1.18699 | 1.53279 |
| Zfp771 | 5.81952 | 6.96783 | 17.979 | 19.5304 | 20.3242 | 18.7588 | 18.983 | 20.8005 |
| Zfp9 | 6.92936 | 6.7332 | 1.24859 | 1.10031 | 1.0901 | 1.17806 | 0.840591 | 0.556831 |
| Zfp951 | 1.93865 | 2.56763 | 0.758546 | 0.429811 | 0.68384 | 0.730833 | 0.354961 | 0.818658 |
| Zfpm1 | 7.94418 | 8.42738 | 2.45133 | 2.65 | 2.27666 | 2.45353 | 3.31828 | 5.28799 |
| Zfpm2 | 4.27311 | 5.03234 | 1.34927 | 1.42601 | 1.4391 | 1.12696 | 0.353428 | 0.621189 |
| Znfx1 | 3.61377 | 3.35272 | 7.24168 | 13.0469 | 8.20644 | 8.7767 | 22.6699 | 21.7827 |
| Znhit2 | 9.35157 | 9.26337 | 23.9139 | 17.8741 | 25.9909 | 21.6617 | 38.8522 | 35.3362 |
| Zswim4 | 19.2172 | 18.5268 | 5.94858 | 6.64178 | 5.73827 | 6.03743 | 2.78657 | 3.74963 |
| Zswim7 | 3.94326 | 4.77939 | 12.2847 | 7.76046 | 13.1272 | 10.7502 | 25.8129 | 16.6109 |