

Supplementary Information

Supplementary contents

Supplementary Figure 1. Expression pattern of Dock family in wounds.

Supplementary Figure 2. Immunofluorescence staining of Dock5 with different keratin markers.

Supplementary Figure 3. The effect of Dock5 on inflammation and macrophage signaling at day 5 and day 1 after injury.

Supplementary Figure 4. Dock5 deficiency in keratinocytes delays wound healing.

Supplementary Figure 5. KEGG pathway analysis among all significantly upregulated genes.

Supplementary Figure 6. Dock5 regulates keratinocyte migration, proliferation and adhesion via LAMA3.

Supplementary Figure 7. Dock5 regulates keratinocyte migration, proliferation and adhesion via ITGA3.

Supplementary Figure 8. Dock5 has no effect on mRNA expression of Zeb1.

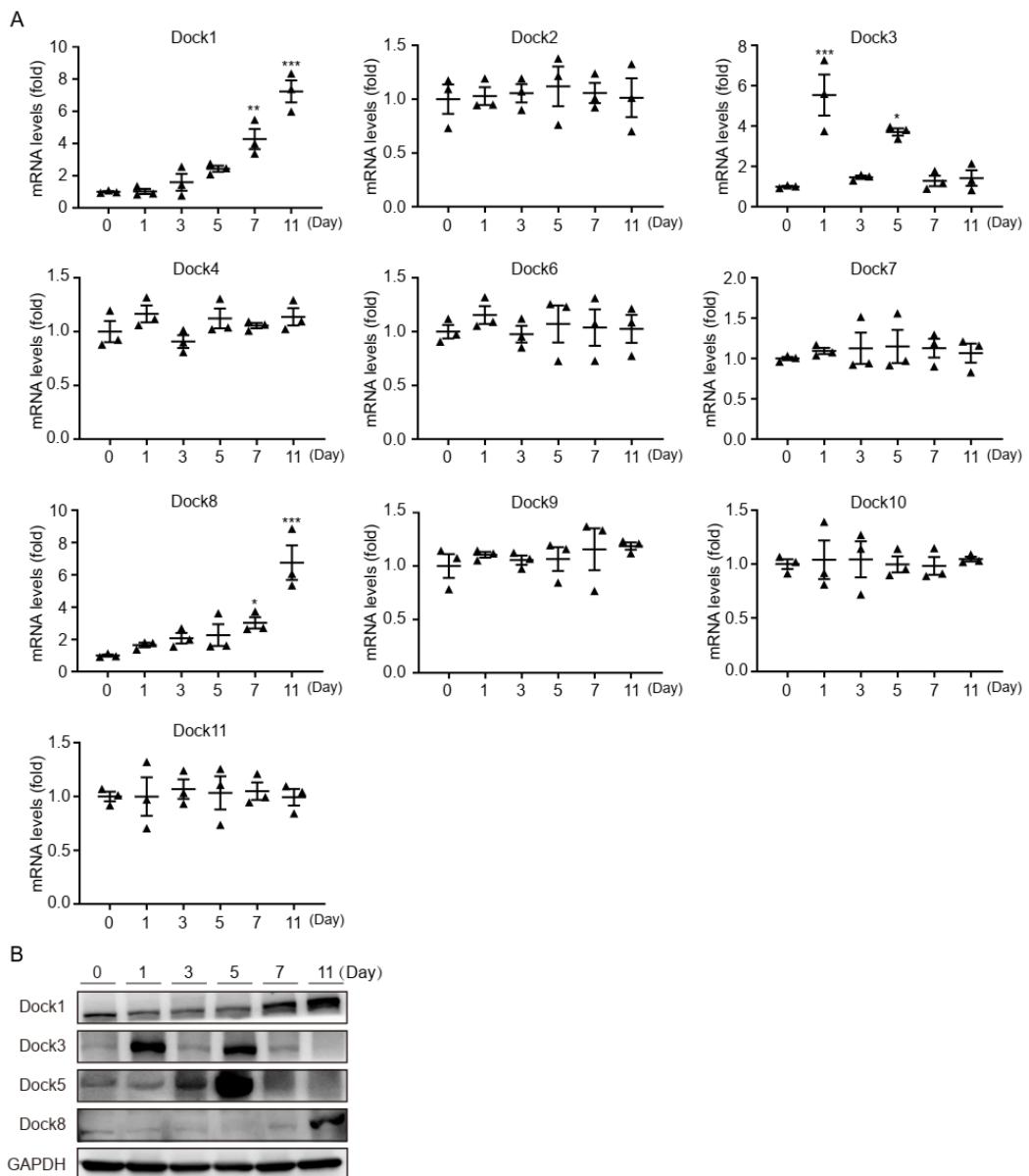
Supplementary Table 1. List of primers.

Supplementary Table 2. Differential expressed genes in wound tissue from Dock5 KO mice.

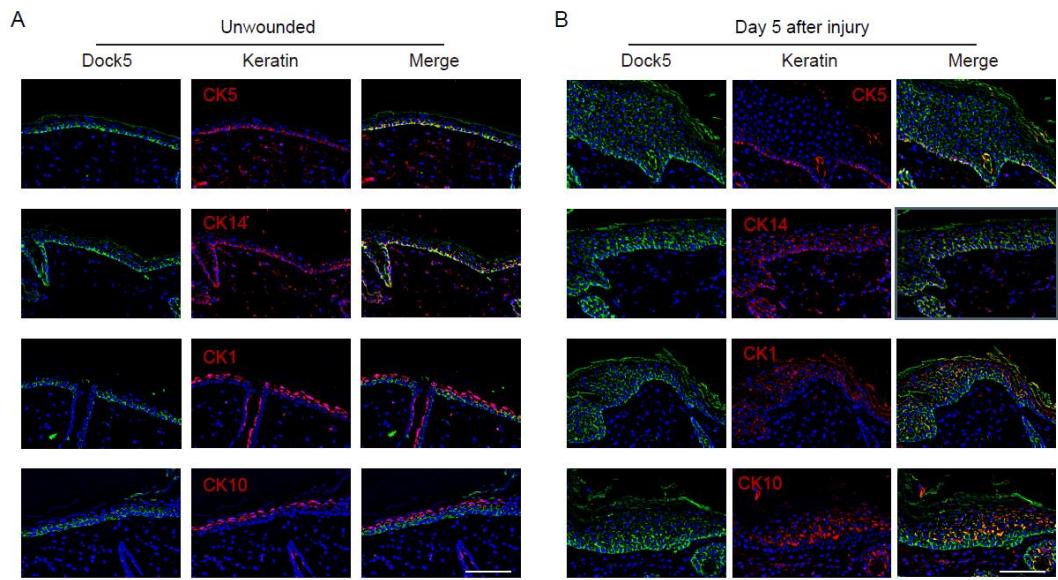
Supplementary Table 3. Top 10 terms of GO_BP analysis in wound tissue from Dock5 KO mice.

Supplementary Table 4. Top 10 terms of KEGG analysis for differentially expressed genes in wound tissue from Dock5 KO mice.

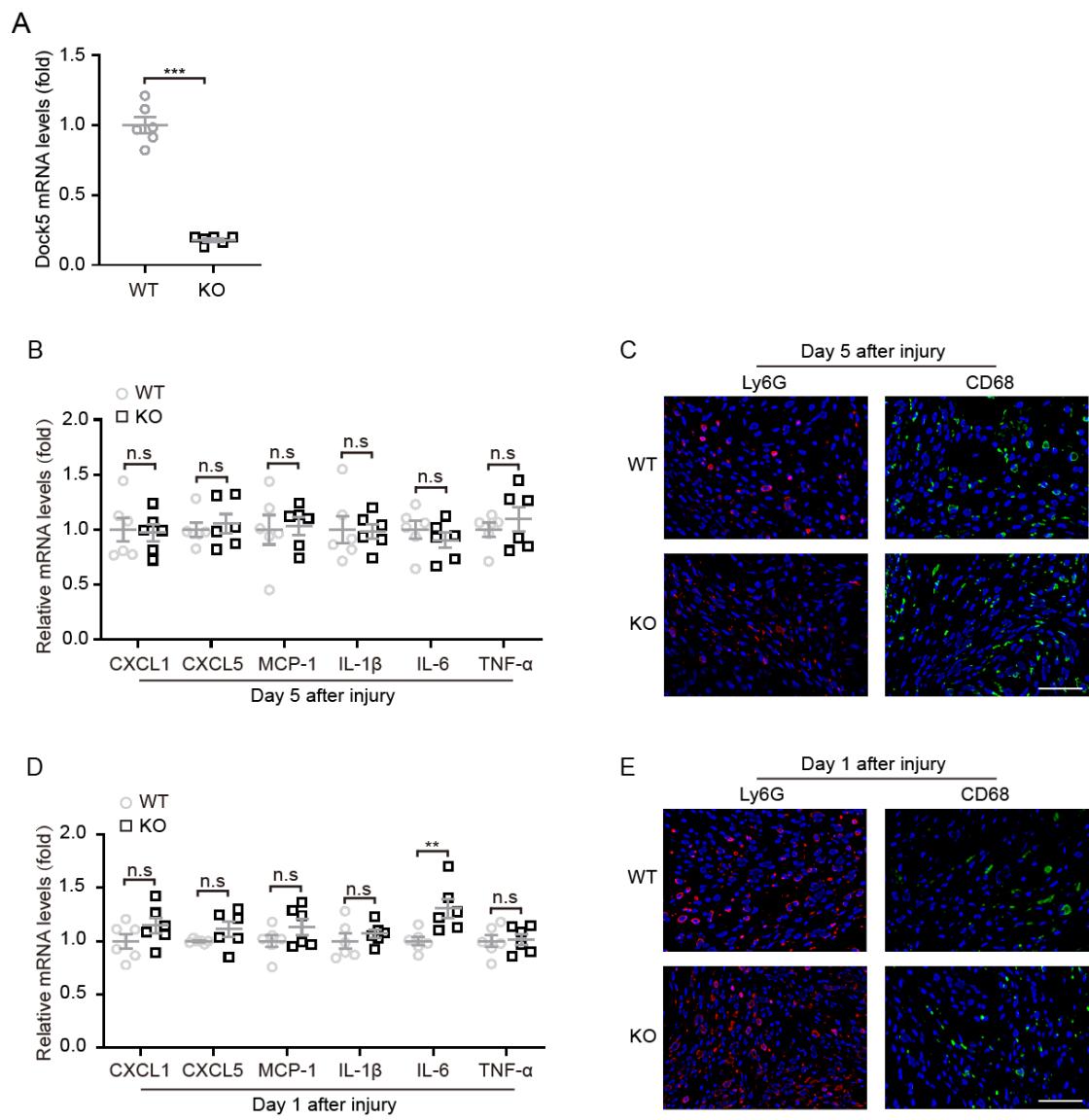
Supplementary Table 5. Clinical characteristics of DFU patients and healthy subjects.



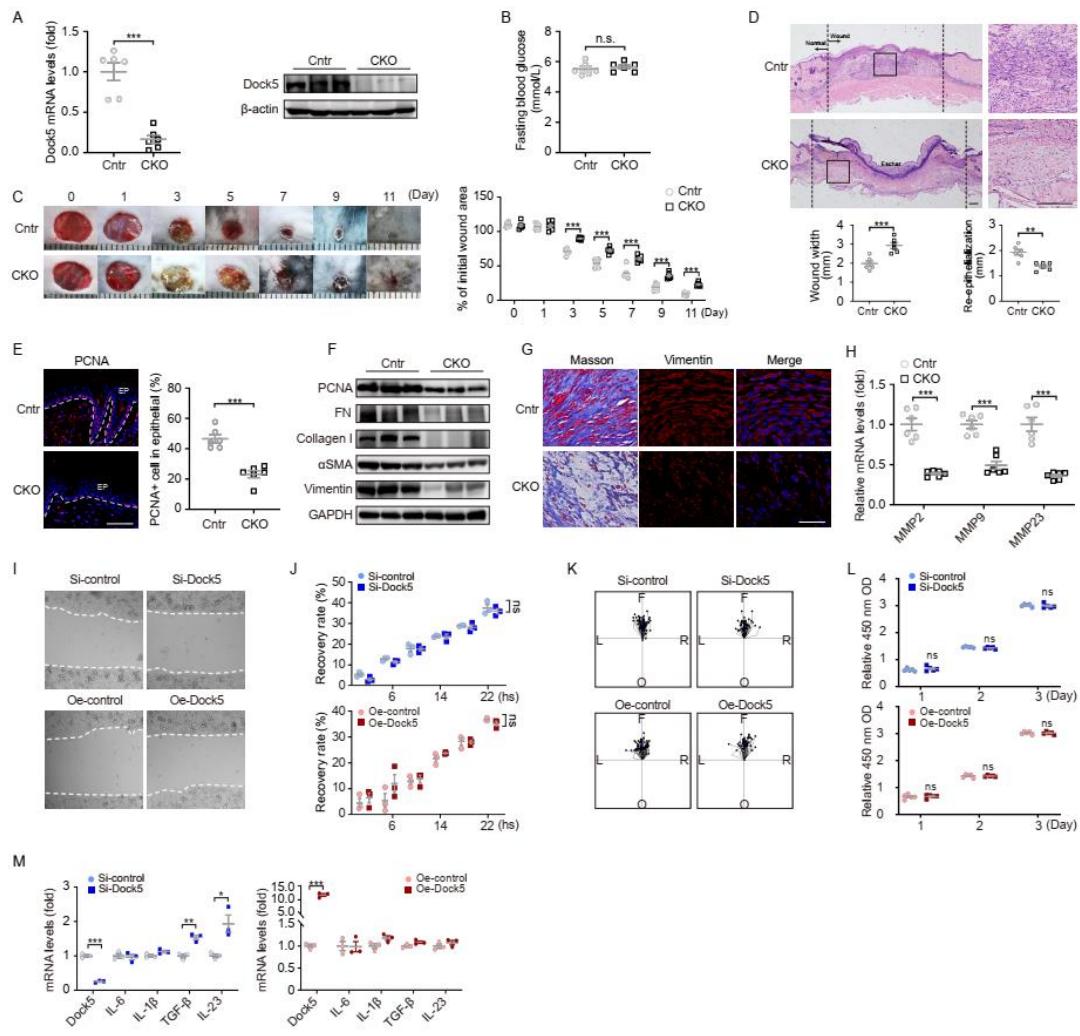
Supplementary Figure 1. Expression pattern of Dock family in wounds.
 Full-thickness wounds were made on the dorsum of C57BL/6 mice, and (A) mRNA expression of 10 Dock members in wound biopsies at the indicated time points after injury was analyzed by qRT-PCR. (B) The protein expression of Dock1, Dock3, Dock5 and Dock8 was examined by western blot. n = 3 mice per group. Data are presented as the mean \pm S.E.M. *P < 0.05, **P < 0.01, ***P < 0.001.



Supplementary Figure 2. Immunofluorescence staining of Dock5 with different keratin markers. (A) Co-immunofluorescence staining of Dock5 with indicated keratin in unwounded skin of C57BL/6 mice. (B) Full-thickness wounds were made on the dorsum of C57BL/6 mice, co-immunofluorescence staining of dock5 with indicated keratin in wound edge were shown at day 5 after injury. Scale bars: 100 μ m. n = 3 mice per group.

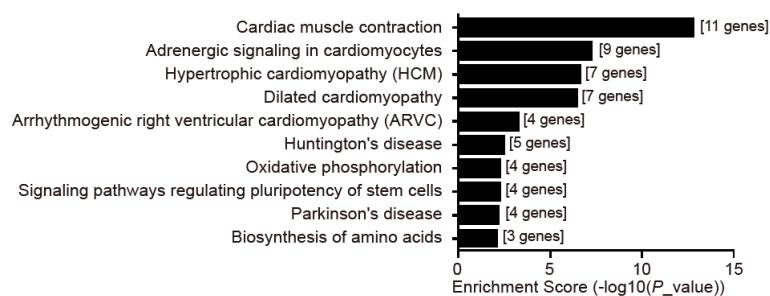


Supplementary Figure 3. The effect of Dock5 on inflammation and macrophage signaling at day 5 and day 1 after injury. Full-thickness wounds were made on the dorsum of WT and Dock5 KO mice. The mRNA expression of Dock5 (A) and indicated inflammatory genes (B and D), and immunofluorescence staining of neutrophils and macrophages antibodies (C and E) in wound tissue were assessed at day 5 and day 1 after wounding, respectively. $n = 6$ mice per group. Data are presented as the mean \pm S.E.M. ** $P < 0.01$, *** $P < 0.001$, n.s. not significant.

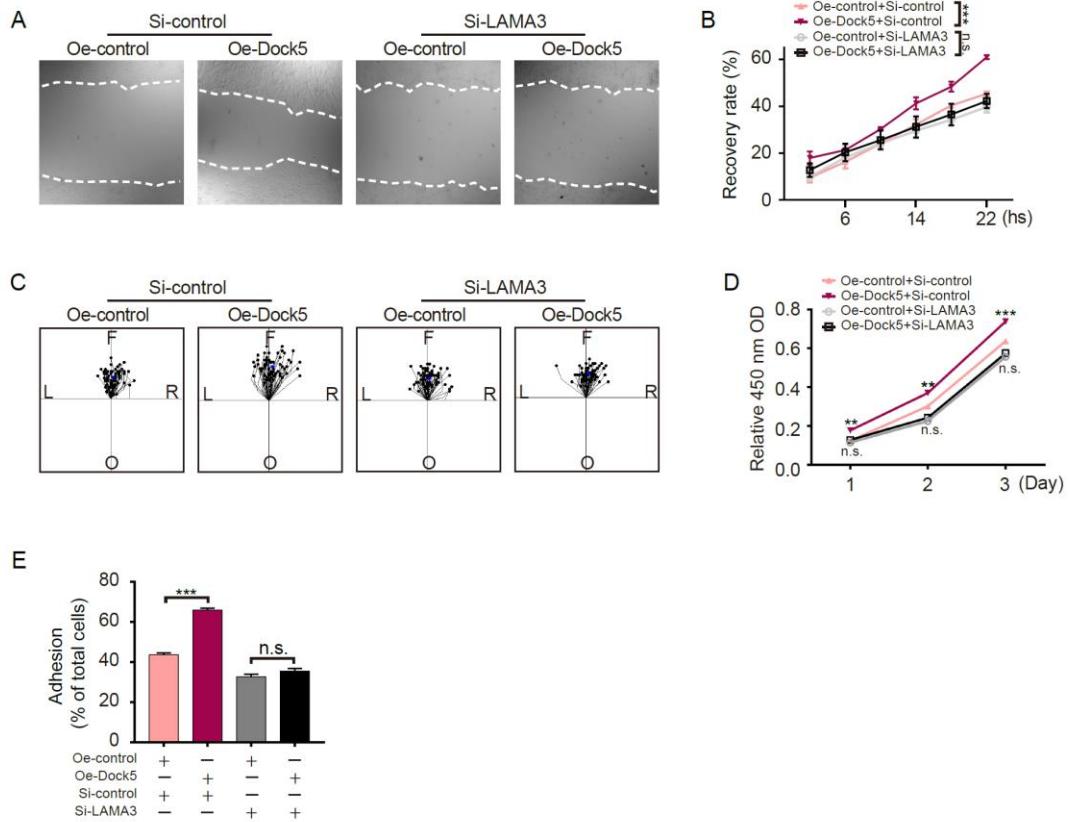


Supplementary Figure 4. Dock5 deficiency in keratinocytes delays wound healing. (A-H) Full-thickness wounds were made on the dorsum of keratinocyte-specific Dock5 conditional knockout (CKO) and WT control mice (Cntr). (A) The mRNA and protein expression of Dock5 was assessed in isolated keratinocytes. (B) Fasting blood glucose was assessed. (C) Representative wound images (left) are shown at the indicated times and were quantified as the percentage of the initial wound area (right). (D) Representative H&E-stained sections are shown on day 7 after injury, and the wound width and re-epithelialization were quantified. (E) Representative image and quantification of PCNA-positive cell numbers in epithelial cells are shown. (F) Expression of the indicated proteins in wound tissue using western blot analysis. (G) Masson's trichrome staining and vimentin immunostaining of wound sections. (H) mRNA expression of genes related to ECM deposition was analyzed using qRT-PCR. (I-M) Melanocytes and Langerhans cells were transfected with Dock5-specific knockdown siRNA (Si-Dock5) or overexpression plasmid (Oe-Dock5), respectively. In melanocyte, (I) live-cell images were acquired 16 h after scratching in a wound-healing assay using a live-cell imaging system. (J) Wound recovery rate was quantified. (K) The cell migration trajectory was tracked for 2 h at 8-10 h after scratching. The center indicates the start point, and magenta dots indicate

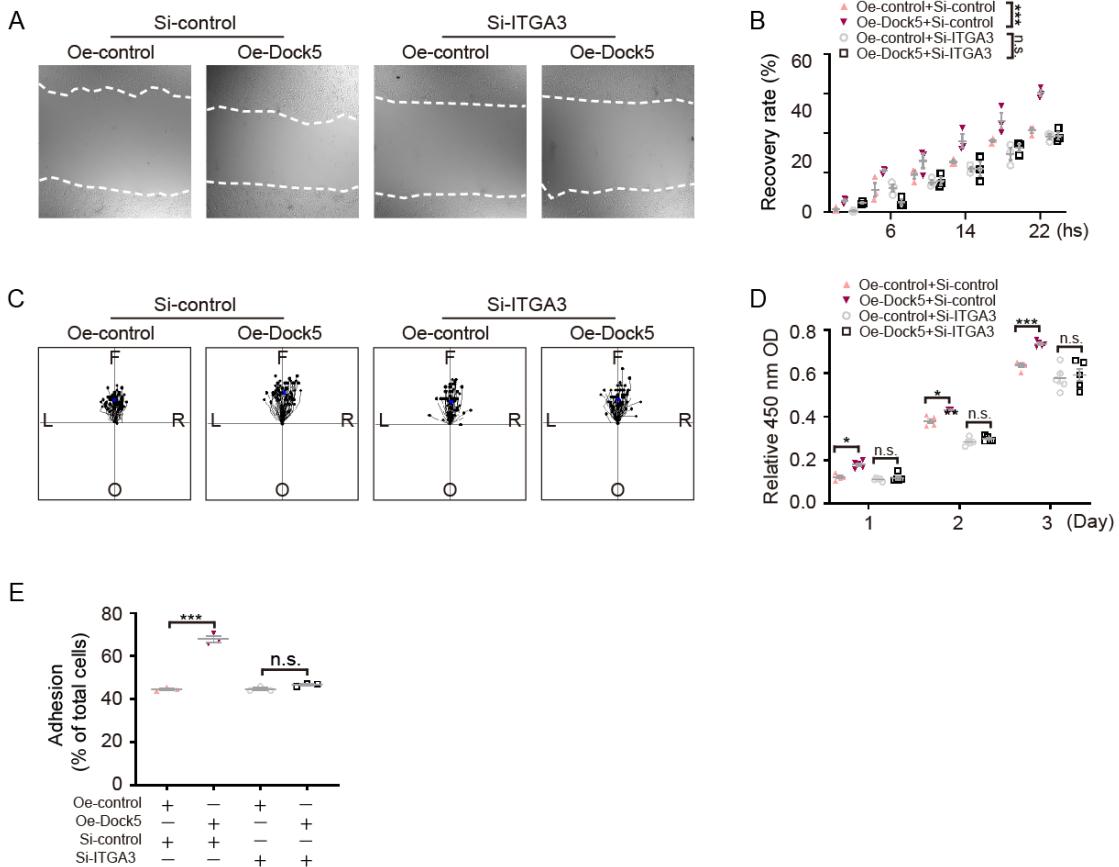
end points. Each line shows the trajectory of a randomly chosen cell (L/R/F/O, left/right/forward/opposite to the direction of migration). (L) Cell proliferation was assessed using the CCK8 assay. In Langerhans cells, (M) the mRNA levels of the cytokines IL-1 β , TGF- β and IL-23 were detected under LPS treatment. Each grid scale represents 1 mm for C. Scale bars: 200 μ m for D, 50 μ m for G. n = 6 mice per group for A-H. n = 3 for I, J and M, n = 57-70 for K, n = 5 for L. Data are presented as the means \pm S.E.M. *P < 0.05, **P < 0.01, ***P < 0.001, n.s. not significant.



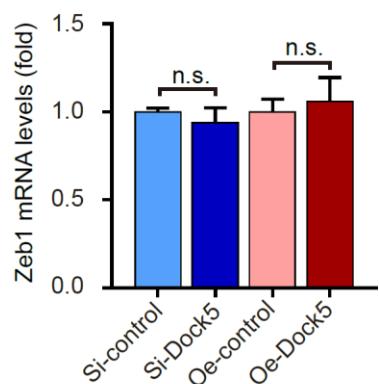
Supplementary Figure 5. KEGG pathway analysis among all significantly upregulated genes. The 10 highest-ranking terms from KEGG pathway analysis of all significantly upregulated (change-fold over 1.5) genes are shown.



Supplementary Figure 6. Dock5 regulates keratinocyte migration, proliferation and adhesion via LAMA3. Keratinocytes were transfected with Dock5 overexpression plasmid (Oe-Dock5) with or without LAMA3-specific knockdown siRNA. (A) Live-cell images were acquired 16 h after scratching in a wound-healing assay via a live-cell imaging system. (B) Wound recovery rate was quantified. (C) Cell migration trajectory was tracked for 2 h at 8-10 h after scratching. The center indicates the start point, and magenta dots indicate end points. Each line shows the trajectory of a randomly chosen cell (L/R/F/O, left/right/forward/opposite to the direction of migration). (D) Cell proliferation was assessed by CCK8 assay. (E) Cell adhesion was quantified by CyQUANT Assay Kit. n = 3 for A, B and E, n = 65-73 for C, n = 5 for D. Data are presented as the mean \pm S.E.M. **P < 0.01 and ***P < 0.001 compared with Oe-control+Si-control, n.s. not significant compared with Oe-control+Si-LAMA3.



Supplementary Figure 7. Dock5 regulates keratinocyte migration, proliferation and adhesion via ITGA3. Keratinocytes were transfected with Dock5 overexpression plasmid (Oe-Dock5) with or without ITGA3-specific knockdown siRNA. (A) Live-cell images were acquired 16 h after scratching in a wound-healing assay via a live-cell imaging system. (B) Wound recovery rate was quantified. (C) Cell migration trajectory was tracked for 2 h at 8-10 h after scratching. The center indicates the start point, and magenta dots indicate end points. Each line shows the trajectory of a randomly chosen cell (L/R/F/O, left/right/forward/opposite to the direction of migration). (D) Cell proliferation was assessed by CCK8 assay. (E) Cell adhesion was quantified by CyQUANT Assay Kit. $n = 3$ for A, B and E, $n = 58-70$ for C, $n = 5$ for D. Data are presented as the mean \pm S.E.M. * $P < 0.05$ and *** $P < 0.001$ compared with Oe-control+Si-control, n.s. not significant compared with Oe-control+Si-ITGA3.



Supplementary Figure 8. Dock5 has no effect on mRNA expression of Zeb1.

Keratinocytes were transfected with Dock5-specific knockdown siRNA (Si-Dock5) or overexpression plasmid (Oe-Dock5), the mRNA levels of Zeb1 were detected by qRT-PCR. n = 3. Data are presented as the mean \pm S.E.M. n.s., not significant.

Supplementary Table 1. List of primers.

| Primers | | |
|---------------------------------|---------|-----------------------|
| m-Dock5 | Forward | GAGGGCCTAGGCAGTCTCTT |
| | Reverse | ACTGGGTCAGCAACCTCAAG |
| m-GAPDH | Forward | TGAACCGGAAGCTCACTG |
| | Reverse | TCCACCACCCCTGTTGCTG |
| m-Dock1 | Forward | ACTTGCGGAGCAGTACGAAA |
| | Reverse | CCTGGCAGTTATAGGCCGT |
| m-Dock2 | Forward | CCTACAGGCAGATGTCCGTC |
| | Reverse | CCACAGGAGATGCAAGGCTA |
| m-Dock3 | Forward | GGACCTTCGCTCCTTCCA |
| | Reverse | GTCCTGAACCCTGAGTGGTG |
| m-Dock4 | Forward | CAGGCTGGTTGGTTGGAGTA |
| | Reverse | CAAGCGAGCAGAGACACTCA |
| m-Dock6 | Forward | ACCGGCTGGAGGAGTTCTAT |
| | Reverse | TCTTGCCTTGTGCTGTTCG |
| m-Dock7 | Forward | AGCTGCGCTTGTTCAAG |
| | Reverse | TCACACGTAACAGCCTGCAT |
| m-Dock8 | Forward | TGACTCCGATTGAGGTTGCC |
| | Reverse | CCCTGATTTACCCACCCCAC |
| m-Dock9 | Forward | ATGTCGTTCACCAAGTCGCTT |
| | Reverse | CAGGTGCTATGGCTGTAGGG |
| m-Dock10 | Forward | AAGCCACTTGTCCCCTACG |
| | Reverse | GTTCCCTCTCAAACCTCCGCA |
| m-Dock11 | Forward | AGAACAGTGCAAGCGTCGTA |
| | Reverse | AATCTCTCATACTTCCCGTG |
| m-IL-1β | Forward | CCAGGATGAGGACATGAGCA |
| | Reverse | CGGAGCCTGTAGTGCAGTTG |
| m-IL-6 | Forward | TCCATCCAGTTGCCTTCTG |
| | Reverse | AAGCCTCCGACTTGTGAAGTG |
| m-TNFα | Forward | ACTGGCAGAAGAGGGACTCC |
| | Reverse | GCCACAAGCAGGAATGAGAA |
| m-CXCL1 | Forward | GTTCCAGCACTCCAGACTCC |
| | Reverse | CTCCGTTACTTGGGGACACC |

| | | |
|----------------|---------|-------------------------|
| m-CXCL5 | Forward | TCCTCAGTCATAGCCGCAAC |
| | Reverse | GCAGGAAGCTTCAGGGACAA |
| m-MCP-1 | Forward | TTAAAAACCTGGATCGGAACCAA |
| | Reverse | GCATTAGCTTCAGATTACGGGT |
| h-Dock5 | Forward | CTCCTTGCAGATCGGTGACA |
| | Reverse | TTTAGATCCTGGGGAACCCCT |
| h-GAPDH | Forward | GGGTGTGAACCACGAGAAAT |
| | Reverse | CCTTCCACAATGCCAAAGTT |
| m-MMP2 | Forward | ACCTGAACACTTCTATGGCTG |
| | Reverse | CTTCCGCATGGTCTCGATG |
| m-MMP9 | Forward | GGACCCGAAGCGGACATTG |
| | Reverse | CGTCGTCGAAATGGGCATCT |
| m-MMP23 | Forward | CCACTTCAACCTCACATACAGAG |
| | Reverse | GGGGAAACATCACTCCACATT |
| m-LAMA3 | Forward | ACACCTGGGACGTGGATTG |
| | Reverse | CTTGCAGGGTGAATGCTTCAT |
| h-LAMA3 | Forward | CACCGGGATATTCGGGAATC |
| | Reverse | AGCTGTCGCAATCATCACATT |
| m-LAMB3 | Forward | GAGGGGCCTTTATCCACCT |
| | Reverse | CTGCCACTGTCCATATTGGGT |
| m-LAMC2 | Forward | CGAGACCAGGGCAACTAGA |
| | Reverse | GGTCGGCACCTATCACAGC |
| m-ITGA3 | Forward | ACTGTGAACGGATGGACATTTC |
| | Reverse | ACAGACCAGGACTCTACCTGC |
| h-ITGA3 | Forward | CTACCACAAACGAGATGTCAA |
| | Reverse | CCGAAGTACACAGTGTCTGG |
| m-ITGB1 | Forward | ATGCCAAATCTGCGGAGAAT |
| | Reverse | TTTGCTGCGATTGGTGACATT |
| m-ITGA6 | Forward | ATAAAACACGGCCTCCCAGG |
| | Reverse | CTCGAGAACCTGTGTTGGCT |
| m-ITGB4 | Forward | AGAGCTGTACCGAGTGCATC |
| | Reverse | TGGTGTGCGATCTGGGTGTTCT |
| h-ITGB4 | Forward | GCAGCTTCCAATCACAGAGG |
| | Reverse | CCAGATCATCGGACATGGAGTT |

| | | |
|---------------|---------|------------------------|
| h-Zeb1 | Forward | TTACACCTTGCATACAGAACCC |
| | Reverse | TTTACGATTACACCCAGACTGC |

Supplementary Table 2. Differential expressed genes in wound tissue from Dock5 KO mice.**Up-regulated:**

| No. | Track_id | Gene_Name | Locus | log2(fold_change) | Fold_Change |
|-----|----------------------|---------------|---------------------------|-------------------|-------------|
| 1 | ENSMUSG00000107928.1 | Gm45140 | chr6:87788861-87835795 | 2.693621809 | 6.469354677 |
| 2 | ENSMUSG0000052557.11 | Gan | chr8:117158135-117215997 | 2.221748912 | 4.66458558 |
| 3 | ENSMUSG0000021214.14 | Akr1c18 | chr13:4132615-4150654 | 2.04187649 | 4.117807791 |
| 4 | ENSMUSG0000028069.16 | Gpatch4 | chr3:88043108-88055993 | 1.79453302 | 3.46903169 |
| 5 | ENSMUSG0000048489.12 | 8430408G22Rik | chr6:116650609-116652794 | 1.682221162 | 3.209216594 |
| 6 | ENSMUSG0000022529.11 | Zfp263 | chr16:3744093-3750790 | 1.652224211 | 3.143178513 |
| 7 | ENSMUSG0000020913.3 | Krt24 | chr11:99279959-99285262 | 1.632876648 | 3.101307648 |
| 8 | ENSMUSG0000050071.8 | Bex1 | chrX:136213972-136215513 | 1.619343806 | 3.072352618 |
| 9 | ENSMUSG0000091898.8 | Tnncl | chr14:31208312-31211729 | 1.517467364 | 2.862880327 |
| 10 | ENSMUSG0000020722.5 | Caeng1 | chr11:107703218-107716522 | 1.471739544 | 2.77356117 |
| 11 | ENSMUSG0000002265.16 | Peg3 | chr7:6703892-6730431 | 1.459975764 | 2.75103742 |
| 12 | ENSMUSG0000031425.15 | Plp1 | chrX:136822671-136839733 | 1.455111206 | 2.741776943 |
| 13 | ENSMUSG0000007097.14 | Atp1a2 | chr1:172271709-172298064 | 1.440172054 | 2.713532249 |
| 14 | ENSMUSG0000019787.9 | Trdn | chr10:33080554-33476709 | 1.426404172 | 2.687759723 |
| 15 | ENSMUSG0000053907.10 | Mat2a | chr6:72432799-72439558 | 1.410406255 | 2.658120036 |
| 16 | ENSMUSG0000000435.1 | Myf5 | chr10:107482908-107486134 | 1.363388739 | 2.572888147 |
| 17 | ENSMUSG0000015090.13 | Ptgds | chr2:25466709-25470046 | 1.360342117 | 2.567460564 |
| 18 | ENSMUSG0000002007.5 | Srk3 | chrX:73774405-73778925 | 1.355760933 | 2.559320691 |
| 19 | ENSMUSG0000030672.12 | Mylpf | chr7:127208890-127214298 | 1.345905446 | 2.541896778 |
| 20 | ENSMUSG0000020872.4 | Tac4 | chr11:95261529-95269265 | 1.344644486 | 2.539676053 |
| 21 | ENSMUSG00000078815.8 | Cacng6 | chr7:3424195-3435667 | 1.327676725 | 2.50998149 |
| 22 | ENSMUSG0000048616.4 | Nog | chr11:89300638-89302332 | 1.313309841 | 2.485110223 |
| 23 | ENSMUSG0000025141.2 | Myadml2 | chr11:120646031-120648158 | 1.29659765 | 2.45648878 |
| 24 | ENSMUSG0000026414.13 | Tnnt2 | chr1:135836354-135852260 | 1.262583488 | 2.399249992 |
| 25 | ENSMUSG0000031097.15 | Tnni2 | chr7:142441808-142444410 | 1.233962083 | 2.352120681 |
| 26 | ENSMUSG0000026418.16 | Tnni1 | chr1:135779434-135810989 | 1.230625058 | 2.346686397 |
| 27 | ENSMUSG0000026208.9 | Des | chr1:75360329-75368579 | 1.216293012 | 2.323489318 |
| 28 | ENSMUSG0000031204.3 | Asb12 | chrX:95470201-95557987 | 1.215591439 | 2.322359695 |
| 29 | ENSMUSG0000061086.12 | Myl4 | chr11:104550663-104595753 | 1.202663218 | 2.301641625 |
| 30 | ENSMUSG0000026426.10 | Arl8a | chr1:135146824-135156269 | 1.175787374 | 2.259161447 |
| 31 | ENSMUSG0000025453.17 | Nnt | chr13:119335448-119408997 | 1.172635918 | 2.254231869 |
| 32 | ENSMUSG0000036278.6 | Macrod1 | chr19:7056768-7198061 | 1.135373064 | 2.196753609 |
| 33 | ENSMUSG0000052852.8 | Reep1 | chr6:71707561-71810710 | 1.124860493 | 2.180804574 |
| 34 | ENSMUSG0000074221.12 | Zfp568 | chr7:29983955-30028282 | 1.122500055 | 2.17723941 |
| 35 | ENSMUSG0000030137.8 | Tuba8 | chr6:121210696-121226854 | 1.091132583 | 2.130412182 |
| 36 | ENSMUSG0000017300.9 | Tnncl | chr2:164777161-164779967 | 1.066240658 | 2.093969833 |
| 37 | ENSMUSG0000038086.4 | Hspb2 | chr9:50751078-50752354 | 1.050160142 | 2.070759693 |
| 38 | ENSMUSG0000041189.9 | Chrnb1 | chr11:69784036-69795943 | 1.043141123 | 2.060709474 |
| 39 | ENSMUSG0000028464.16 | Tpm2 | chr4:43514711-43523765 | 1.007349542 | 2.010214624 |
| 40 | ENSMUSG0000062929.8 | Cfl2 | chr12:54858809-54862877 | 1.001598845 | 2.002217699 |

| | | | | | |
|----|-----------------------|---------|---------------------------|-------------|-------------|
| 41 | ENSMUSG00000026207.16 | Speg | chr1:75375297-75432320 | 0.992241344 | 1.989273089 |
| 42 | ENSMUSG0000001948.10 | Spa17 | chr9:37603290-37613722 | 0.982025978 | 1.97523729 |
| 43 | ENSMUSG00000032366.15 | Tpm1 | chr9:67022590-67049406 | 0.971713829 | 1.961168955 |
| 44 | ENSMUSG00000054034.10 | Tceal5 | chrX:136200948-136203876 | 0.967940722 | 1.956046575 |
| 45 | ENSMUSG00000027367.16 | Stard7 | chr2:127270218-127298932 | 0.966628847 | 1.954268706 |
| 46 | ENSMUSG00000079110.11 | Capn3 | chr2:120456019-120504913 | 0.95488497 | 1.938425072 |
| 47 | ENSMUSG00000057604.9 | Lmcd1 | chr6:112273758-112330425 | 0.953820808 | 1.936995777 |
| 48 | ENSMUSG00000025229.15 | Pitx3 | chr19:46135685-46148326 | 0.943339916 | 1.922974879 |
| 49 | ENSMUSG00000031508.14 | Ankrd10 | chr8:11611583-11635757 | 0.921325154 | 1.893854051 |
| 50 | ENSMUSG00000039376.13 | Synpo2l | chr14:20658946-20668354 | 0.920649943 | 1.892967895 |
| 51 | ENSMUSG00000098754.7 | Prn | chr2:131909957-131956130 | 0.915720291 | 1.88651071 |
| 52 | ENSMUSG00000026489.13 | Coq8a | chr1:180165238-180199602 | 0.900401362 | 1.8665852 |
| 53 | ENSMUSG00000038393.14 | Txnip | chr3:96557957-96561883 | 0.885036746 | 1.84681166 |
| 54 | ENSMUSG00000020098.7 | Pcbd1 | chr10:61089331-61094324 | 0.8795973 | 1.839861668 |
| 55 | ENSMUSG00000042258.13 | Isl1 | chr13:116298281-116309689 | 0.87883464 | 1.838889308 |
| 56 | ENSMUSG00000009210.10 | Prr29 | chr11:106365472-106377558 | 0.878577531 | 1.838561621 |
| 57 | ENSMUSG00000068284.14 | Usf3 | chr16:44173246-44227465 | 0.872999712 | 1.831467007 |
| 58 | ENSMUSG00000022860.14 | Chodl | chr16:78930948-78951733 | 0.85570912 | 1.809648023 |
| 59 | ENSMUSG00000020022.16 | Ndufa12 | chr10:94198955-94221443 | 0.854631636 | 1.808296983 |
| 60 | ENSMUSG00000018599.5 | Mief2 | chr11:60728398-60732951 | 0.836912087 | 1.786222855 |
| 61 | ENSMUSG00000020475.3 | Pgam2 | chr11:5801640-5803733 | 0.820791783 | 1.766375152 |
| 62 | ENSMUSG00000040666.18 | Sh3bgr | chr16:96200470-96228933 | 0.817491738 | 1.762339334 |
| 63 | ENSMUSG00000096968.1 | Gm26620 | chr1:170885065-170885881 | 0.816262912 | 1.760838888 |
| 64 | ENSMUSG00000028773.8 | Fabp3 | chr4:130308595-130315463 | 0.814781525 | 1.759031752 |
| 65 | ENSMUSG00000027257.13 | Pacsin3 | chr2:91255954-91264679 | 0.807225647 | 1.749843195 |
| 66 | ENSMUSG00000031700.11 | Gpt2 | chr8:85492576-85527560 | 0.805243202 | 1.747440341 |
| 67 | ENSMUSG00000039873.4 | Neurl2 | chr2:164830732-164833456 | 0.803572219 | 1.745417562 |
| 68 | ENSMUSG00000043639.14 | Rbm20 | chr19:53677306-53867080 | 0.770518177 | 1.705882381 |
| 69 | ENSMUSG00000026162.7 | Nhej1 | chr1:74967139-75125200 | 0.763994653 | 1.698186199 |
| 70 | ENSMUSG00000052374.15 | Actn2 | chr13:12269426-12340760 | 0.758926694 | 1.692231205 |
| 71 | ENSMUSG00000037904.14 | Ankrd9 | chr12:110975353-110979040 | 0.758214144 | 1.691395615 |
| 72 | ENSMUSG00000071317.4 | Bves | chr10:45335772-45372479 | 0.747089782 | 1.678403721 |
| 73 | ENSMUSG0000006958.13 | Chrd | chr16:20733127-20742384 | 0.742327063 | 1.672872002 |
| 74 | ENSMUSG00000037266.18 | Rsrp1 | chr4:134923592-134927671 | 0.741663151 | 1.672102342 |
| 75 | ENSMUSG00000044033.16 | Ccdc141 | chr2:77009902-77170636 | 0.741591267 | 1.67201903 |
| 76 | ENSMUSG00000018334.18 | Ksr1 | chr11:79013440-79146407 | 0.732177826 | 1.661144787 |
| 77 | ENSMUSG00000020839.16 | Tmigd1 | chr11:76902159-76916587 | 0.727847387 | 1.656166119 |
| 78 | ENSMUSG00000075289.4 | Carns1 | chr19:4164324-4175479 | 0.724840591 | 1.652718011 |
| 79 | ENSMUSG00000026668.10 | Ucma | chr2:4976122-4985748 | 0.719323923 | 1.646410312 |
| 80 | ENSMUSG00000038489.8 | Polr2l | chr7:141471860-141475132 | 0.710226337 | 1.63606077 |
| 81 | ENSMUSG00000035642.16 | Aamdc | chr7:97550331-97579497 | 0.705094132 | 1.63025103 |
| 82 | ENSMUSG00000022610.9 | Mapk12 | chr15:89130585-89140703 | 0.703442932 | 1.628386236 |
| 83 | ENSMUSG00000038462.3 | Uqcrfs1 | chr13:30540308-30545362 | 0.700298229 | 1.624840639 |
| 84 | ENSMUSG00000045620.7 | Odf3l1 | chr9:56848659-56864679 | 0.690287112 | 1.613604612 |

| | | | | | |
|-----|-----------------------|----------|---------------------------|-------------|-------------|
| 85 | ENSMUSG00000025894.11 | Aasdhppt | chr9:4294793-4309471 | 0.675409924 | 1.597050491 |
| 86 | ENSMUSG00000044894.14 | Uqcrq | chr11:53427922-53430831 | 0.662000025 | 1.58227463 |
| 87 | ENSMUSG00000027887.11 | Sypl2 | chr3:108211472-108226648 | 0.659050716 | 1.579043282 |
| 88 | ENSMUSG00000005320.9 | Fgfr4 | chr13:55152640-55168759 | 0.658638118 | 1.578591754 |
| 89 | ENSMUSG00000042918.17 | Mamstr | chr7:45639977-45646521 | 0.65564275 | 1.575317633 |
| 90 | ENSMUSG00000024132.5 | Eci1 | chr17:24426683-24439316 | 0.6548306 | 1.574431074 |
| 91 | ENSMUSG00000041571.9 | Selenow | chr7:15917208-15922402 | 0.6526884 | 1.572094999 |
| 92 | ENSMUSG00000036052.14 | Dnajb5 | chr4:42949814-42959425 | 0.64964647 | 1.56878372 |
| 93 | ENSMUSG00000061816.15 | Myl1 | chr1:66924295-66945404 | 0.649295792 | 1.568402441 |
| 94 | ENSMUSG0000006575.14 | Rundc3a | chr11:102393403-102402555 | 0.640170539 | 1.558513378 |
| 95 | ENSMUSG00000038046.4 | Mrm3 | chr11:76243715-76250619 | 0.627530802 | 1.544918574 |
| 96 | ENSMUSG00000020163.12 | Uqcr11 | chr10:80402997-80406830 | 0.624749104 | 1.541942646 |
| 97 | ENSMUSG00000019933.7 | Mrln | chr10:70204664-70219711 | 0.622336113 | 1.539365813 |
| 98 | ENSMUSG00000037058.14 | Paip2 | chr18:35598617-35617186 | 0.618761438 | 1.535556331 |
| 99 | ENSMUSG00000026817.14 | Ak1 | chr2:32621758-32635058 | 0.616384717 | 1.533028712 |
| 100 | ENSMUSG00000058183.14 | Mmel1 | chr4:154869585-154895528 | 0.607333214 | 1.523440562 |
| 101 | ENSMUSG00000047067.7 | Dusp28 | chr1:92906981-92908435 | 0.601807298 | 1.51761653 |
| 102 | ENSMUSG00000031448.12 | Adprhl1 | chr8:13221663-13254162 | 0.596467453 | 1.512009761 |
| 103 | ENSMUSG00000066705.7 | Fxyd6 | chr9:45370185-45396159 | 0.59588339 | 1.51139776 |
| 104 | ENSMUSG0000000216.8 | Scnn1g | chr7:121734479-121768475 | 0.59521075 | 1.510693253 |
| 105 | ENSMUSG00000027076.10 | Timm10 | chr2:84826997-84830213 | 0.592466067 | 1.507821938 |

Down-regulated:

| No. | Track_id | Gene_Name | Locus | log2(fold_change) | Fold_Change |
|-----|-----------------------|-----------|---------------------------|-------------------|-------------|
| 1 | ENSMUSG00000090223.1 | Pcp4 | chr16:96467606-96525793 | -4.58341853 | 0.041711282 |
| 2 | ENSMUSG00000031471.3 | Defb8 | chr8:19445769-19447606 | -4.26531417 | 0.052001096 |
| 3 | ENSMUSG00000029819.6 | Npy | chr6:49822710-49829507 | -3.548175608 | 0.08548555 |
| 4 | ENSMUSG00000020953.17 | Coch | chr12:51593341-51605771 | -2.675567829 | 0.156521438 |
| 5 | ENSMUSG00000052336.7 | Cx3cr1 | chr9:119901616-120069879 | -2.330225051 | 0.198853099 |
| 6 | ENSMUSG00000056481.6 | Cd248 | chr19:5068078-5070637 | -2.159656684 | 0.223809521 |
| 7 | ENSMUSG00000026725.17 | Tnn | chr1:160085029-160153580 | -2.135820549 | 0.227538007 |
| 8 | ENSMUSG00000041984.2 | Rptn | chr3:93393699-93399442 | -2.098173969 | 0.233553672 |
| 9 | ENSMUSG00000054555.11 | Adam12 | chr7:133883199-134232146 | -2.058730444 | 0.240027158 |
| 10 | ENSMUSG00000053654.7 | Krt42 | chr11:100262882-100269871 | -1.995589198 | 0.250765503 |
| 11 | ENSMUSG00000020241.13 | Col6a2 | chr10:76595762-76623630 | -1.959666793 | 0.257087827 |
| 12 | ENSMUSG00000001510.8 | Dlx3 | chr11:95120119-95125296 | -1.954985581 | 0.257923373 |
| 13 | ENSMUSG00000048126.16 | Col6a3 | chr1:90765923-90843971 | -1.945962428 | 0.259541577 |
| 14 | ENSMUSG00000079017.3 | Ifi27l2a | chr12:103442167-103443680 | -1.92735657 | 0.262910457 |
| 15 | ENSMUSG0000000901.16 | Mmp11 | chr10:75923222-75936496 | -1.862650502 | 0.274970642 |
| 16 | ENSMUSG0000001119.7 | Col6a1 | chr10:76708792-76726168 | -1.857430718 | 0.275967309 |
| 17 | ENSMUSG00000054196.7 | Cthrc1 | chr15:39076932-39087121 | -1.83641785 | 0.28001619 |
| 18 | ENSMUSG00000060594.6 | Layn | chr9:51054640-51077094 | -1.805039814 | 0.286173143 |
| 19 | ENSMUSG00000026043.18 | Col3a1 | chr1:45311538-45349706 | -1.782918281 | 0.290594987 |
| 20 | ENSMUSG0000004473.10 | Clec11a | chr7:44302687-44306902 | -1.776724618 | 0.291845228 |

| | | | | | |
|----|-----------------------|----------|---------------------------|--------------|-------------|
| 21 | ENSMUSG00000032925.16 | Itgb11 | chr14:123659971-123975618 | -1.769128572 | 0.293385897 |
| 22 | ENSMUSG00000066756.5 | Igfl3 | chr7:18176494-18181862 | -1.767429191 | 0.293731686 |
| 23 | ENSMUSG00000028111.4 | Ctsk | chr3:95499256-95509362 | -1.760236003 | 0.295199871 |
| 24 | ENSMUSG00000006205.13 | Htra1 | chr7:130936111-130985660 | -1.75975582 | 0.295298141 |
| 25 | ENSMUSG00000039883.5 | Lrrc17 | chr5:21543559-21575904 | -1.751707048 | 0.296950209 |
| 26 | ENSMUSG00000031925.17 | Maml2 | chr9:13297957-13709388 | -1.734367106 | 0.300540827 |
| 27 | ENSMUSG00000032332.17 | Col12a1 | chr9:79598991-79718831 | -1.726447947 | 0.302195075 |
| 28 | ENSMUSG00000052316.9 | Lrrc15 | chr16:30269302-30283256 | -1.714055254 | 0.3048021 |
| 29 | ENSMUSG00000018412.16 | Kansl1 | chr11:104333229-104468861 | -1.711954949 | 0.30524616 |
| 30 | ENSMUSG00000032243.8 | Itga11 | chr9:62677826-62783982 | -1.701814502 | 0.307399239 |
| 31 | ENSMUSG0000005355.9 | Casp14 | chr10:78711991-78718294 | -1.694066468 | 0.309054576 |
| 32 | ENSMUSG00000031538.6 | Plat | chr8:22757727-22782844 | -1.663473182 | 0.315678261 |
| 33 | ENSMUSG00000027514.14 | Zbp1 | chr2:173206612-173218923 | -1.661193524 | 0.31617747 |
| 34 | ENSMUSG00000026042.16 | Col5a2 | chr1:45374321-45503282 | -1.660049287 | 0.316428338 |
| 35 | ENSMUSG00000040552.8 | C3ar1 | chr6:122847138-122856161 | -1.657820295 | 0.316917604 |
| 36 | ENSMUSG0000000753.15 | Serpinf1 | chr11:75409769-75422701 | -1.655130727 | 0.317508974 |
| 37 | ENSMUSG00000098112.7 | Bin2 | chr15:100641077-100669553 | -1.640197805 | 0.320812486 |
| 38 | ENSMUSG00000020674.17 | Pxdn | chr12:29937608-30017658 | -1.639337328 | 0.321003887 |
| 39 | ENSMUSG00000100838.1 | Gm29094 | chr9:89199379-89215471 | -1.625382681 | 0.324123902 |
| 40 | ENSMUSG00000053063.11 | Clec12a | chr6:129342691-129365303 | -1.625095954 | 0.324188326 |
| 41 | ENSMUSG00000024084.7 | Qpct | chr17:79051906-79090243 | -1.623986984 | 0.324437619 |
| 42 | ENSMUSG00000037010.7 | Apln | chrX:48025146-48034853 | -1.619906539 | 0.32535654 |
| 43 | ENSMUSG00000044350.14 | Lacc1 | chr4:77024200-77036904 | -1.609139441 | 0.32779382 |
| 44 | ENSMUSG00000032454.9 | Rbp2 | chr9:98486115-98509781 | -1.599781479 | 0.329926947 |
| 45 | ENSMUSG00000087370.3 | Tmem170b | chr13:41605907-41641355 | -1.596370121 | 0.330708007 |
| 46 | ENSMUSG00000031253.15 | SrpX2 | chrX:133908426-133932446 | -1.576916209 | 0.335197615 |
| 47 | ENSMUSG00000034205.16 | Loxl2 | chr14:69609068-69695834 | -1.57254437 | 0.336214915 |
| 48 | ENSMUSG00000039671.18 | Zmynd8 | chr2:165784152-165899016 | -1.567168399 | 0.337470103 |
| 49 | ENSMUSG00000090084.7 | SrpX | chrX:10037977-10117709 | -1.564968304 | 0.337985134 |
| 50 | ENSMUSG0000010830.7 | Kdelr3 | chr15:79516408-79527739 | -1.562003661 | 0.338680385 |
| 51 | ENSMUSG00000028459.11 | Cd72 | chr4:43446462-43454628 | -1.554835774 | 0.340367272 |
| 52 | ENSMUSG00000021388.14 | Aspn | chr13:49544443-49567565 | -1.552397579 | 0.340942989 |
| 53 | ENSMUSG00000036103.8 | Colec12 | chr18:9707648-9877995 | -1.545464183 | 0.342585458 |
| 54 | ENSMUSG00000054435.16 | Gimap4 | chr6:48684549-48692060 | -1.536475952 | 0.344726485 |
| 55 | ENSMUSG00000022014.15 | Epst1 | chr14:77904239-78002657 | -1.517992239 | 0.349171512 |
| 56 | ENSMUSG00000026837.15 | Col5a1 | chr2:27886425-28039514 | -1.51377392 | 0.350193954 |
| 57 | ENSMUSG00000022816.11 | Fstl1 | chr16:37776873-37836514 | -1.501986903 | 0.353066806 |
| 58 | ENSMUSG00000031673.6 | Cdh11 | chr8:102632095-102785642 | -1.500050199 | 0.353541089 |
| 59 | ENSMUSG00000003355.6 | Fkbp11 | chr15:98724373-98728198 | -1.499609921 | 0.353648998 |
| 60 | ENSMUSG00000027230.9 | Creb3l1 | chr2:91982328-92024502 | -1.497121872 | 0.354259422 |
| 61 | ENSMUSG00000048368.9 | Omd | chr13:49582462-49592822 | -1.494205833 | 0.354976191 |
| 62 | ENSMUSG00000029661.16 | Col1a2 | chr6:4504814-4541544 | -1.491423777 | 0.355661378 |
| 63 | ENSMUSG00000029718.14 | Pcolce | chr5:137605103-137613784 | -1.478053317 | 0.358972861 |
| 64 | ENSMUSG00000029664.10 | Tfp12 | chr6:3962595-3988919 | -1.468946874 | 0.361245902 |

| | | | | | |
|-----|-----------------------|-----------|---------------------------|--------------|-------------|
| 65 | ENSMUSG00000015947.10 | Fcgr1 | chr3:96282909-96293969 | -1.460832878 | 0.363283343 |
| 66 | ENSMUSG00000053835.17 | H2-T24 | chr17:36005695-36020560 | -1.451719173 | 0.365585518 |
| 67 | ENSMUSG00000042379.8 | Esm1 | chr13:113209659-113218098 | -1.449800387 | 0.366072071 |
| 68 | ENSMUSG00000000693.10 | Loxl3 | chr6:83034173-83052562 | -1.439115881 | 0.368793241 |
| 69 | ENSMUSG00000018593.13 | Sparc | chr11:55394500-55423183 | -1.43270577 | 0.37043549 |
| 70 | ENSMUSG00000035799.6 | Twist1 | chr12:33957671-33959829 | -1.432252776 | 0.370551822 |
| 71 | ENSMUSG00000023885.8 | Thbs2 | chr17:14665500-14694262 | -1.415723443 | 0.374821745 |
| 72 | ENSMUSG00000029767.16 | Calu | chr6:29348069-29377110 | -1.408323386 | 0.376749268 |
| 73 | ENSMUSG0000001506.10 | Col1a1 | chr11:94936224-94953042 | -1.405217113 | 0.377561322 |
| 74 | ENSMUSG00000035373.2 | Ccl7 | chr11:82045712-82047525 | -1.404939487 | 0.377633986 |
| 75 | ENSMUSG00000032690.16 | Oas2 | chr5:120730333-120749853 | -1.403527524 | 0.378003756 |
| 76 | ENSMUSG00000066861.14 | Oas1g | chr5:120876142-120887613 | -1.4007591 | 0.378729814 |
| 77 | ENSMUSG00000046807.10 | Lrrc75b | chr10:75550123-75560330 | -1.384674953 | 0.382975776 |
| 78 | ENSMUSG00000021624.9 | Cd180 | chr13:102693558-102739629 | -1.383010015 | 0.383418003 |
| 79 | ENSMUSG00000052593.15 | Adam17 | chr12:21323509-21373632 | -1.382131912 | 0.383651444 |
| 80 | ENSMUSG00000046352.7 | Gjb2 | chr14:57098600-57104702 | -1.374349787 | 0.385726512 |
| 81 | ENSMUSG00000029185.14 | Fam114a1 | chr5:64970071-65041886 | -1.36647607 | 0.387837425 |
| 82 | ENSMUSG00000038179.13 | Slamf7 | chr1:171632403-171653035 | -1.356660619 | 0.390485094 |
| 83 | ENSMUSG00000028126.16 | Pip5k1a | chr3:95058530-95106930 | -1.355812973 | 0.390714588 |
| 84 | ENSMUSG00000012519.14 | Mlk1 | chr8:111311797-111338177 | -1.35343886 | 0.391358081 |
| 85 | ENSMUSG00000023992.14 | Trem2 | chr17:48346401-48354147 | -1.350116568 | 0.392260353 |
| 86 | ENSMUSG00000032089.16 | Il10ra | chr9:45253837-45269149 | -1.34791655 | 0.392858982 |
| 87 | ENSMUSG00000002732.14 | Fkbp7 | chr2:76663044-76673116 | -1.341111646 | 0.394716396 |
| 88 | ENSMUSG00000021567.15 | Nkd2 | chr13:73818534-73847631 | -1.340169215 | 0.394974326 |
| 89 | ENSMUSG00000060572.17 | Mfap2 | chr4:141010418-141015984 | -1.339741658 | 0.395091398 |
| 90 | ENSMUSG00000041559.7 | Fmod | chr1:134037254-134048277 | -1.334385362 | 0.396560981 |
| 91 | ENSMUSG0000005124.9 | Wisp1 | chr15:66891320-66923201 | -1.326534169 | 0.398724962 |
| 92 | ENSMUSG00000030713.6 | Klk7 | chr7:43811294-43816359 | -1.322023991 | 0.399973413 |
| 93 | ENSMUSG00000035572.16 | Dcaf10 | chr4:45342101-45379759 | -1.321146759 | 0.400216691 |
| 94 | ENSMUSG00000031520.6 | Vegfc | chr8:54077606-54187096 | -1.32049316 | 0.400398046 |
| 95 | ENSMUSG00000099398.1 | Ms4a14 | chr19:11301249-11314454 | -1.316885746 | 0.401400482 |
| 96 | ENSMUSG00000062960.10 | Kdr | chr5:75932827-75978458 | -1.315220221 | 0.401864148 |
| 97 | ENSMUSG00000054675.5 | Tmem119 | chr5:113793729-113800516 | -1.313368915 | 0.402380162 |
| 98 | ENSMUSG00000033825.9 | Tpsb2 | chr17:25366550-25368094 | -1.294862897 | 0.407574897 |
| 99 | ENSMUSG00000071984.10 | Fndc1 | chr17:7738569-7827302 | -1.288315807 | 0.409428715 |
| 100 | ENSMUSG0000001555.10 | Fkbp10 | chr11:100415697-100424824 | -1.28042165 | 0.411675173 |
| 101 | ENSMUSG00000052776.10 | Oas1a | chr5:120896256-120907521 | -1.276872768 | 0.412689098 |
| 102 | ENSMUSG00000024672.11 | Ms4a7 | chr19:11321039-11336146 | -1.276496711 | 0.412796685 |
| 103 | ENSMUSG00000021665.9 | Hexb | chr13:97176331-97198357 | -1.269124766 | 0.414911409 |
| 104 | ENSMUSG00000061991.2 | Hist1h2af | chr13:23533906-23534304 | -1.262686647 | 0.416767116 |
| 105 | ENSMUSG00000048376.6 | F2r | chr13:95601803-95618487 | -1.259839191 | 0.417590504 |
| 106 | ENSMUSG00000044447.5 | Dock5 | chr14:67752135-6793442 | -1.253346959 | 0.419473926 |
| 107 | ENSMUSG00000037362.8 | Nov | chr15:54745702-54754039 | -1.25229489 | 0.419779934 |
| 108 | ENSMUSG00000038642.10 | Ctss | chr3:95526786-95556403 | -1.248682555 | 0.420832329 |

| | | | | | |
|-----|-----------------------|----------|---------------------------|--------------|-------------|
| 109 | ENSMUSG00000029061.2 | Mmp23 | chr4:155650655-155653384 | -1.247388939 | 0.421209845 |
| 110 | ENSMUSG00000023191.9 | P3h3 | chr6:124841089-124857752 | -1.246947785 | 0.421338664 |
| 111 | ENSMUSG00000025743.14 | Sdc3 | chr4:130792537-130826319 | -1.243987358 | 0.422204143 |
| 112 | ENSMUSG00000021423.6 | Ly86 | chr13:37345208-37419036 | -1.235605148 | 0.424664334 |
| 113 | ENSMUSG0000004730.14 | Adgre1 | chr17:57358686-57483529 | -1.230004083 | 0.426316239 |
| 114 | ENSMUSG00000057596.13 | Trim30d | chr7:104470014-104507849 | -1.223691757 | 0.428185618 |
| 115 | ENSMUSG00000036106.15 | Prr5 | chr15:84669620-84703673 | -1.221367025 | 0.428876144 |
| 116 | ENSMUSG00000033491.13 | Prss35 | chr9:86743649-86758443 | -1.219881726 | 0.429317913 |
| 117 | ENSMUSG00000028972.11 | Car6 | chr4:150187015-150201332 | -1.217287096 | 0.430090719 |
| 118 | ENSMUSG00000052160.7 | Pld4 | chr12:112760655-112768990 | -1.212034196 | 0.431659548 |
| 119 | ENSMUSG00000037035.5 | Inhbb | chr1:119415465-119422248 | -1.203618876 | 0.434184799 |
| 120 | ENSMUSG00000032011.5 | Thy1 | chr9:44043384-44048579 | -1.203552696 | 0.434204717 |
| 121 | ENSMUSG00000041734.15 | Kirrel | chr3:87078593-87174747 | -1.197408896 | 0.436057746 |
| 122 | ENSMUSG00000022844.7 | Pdia5 | chr16:35397313-35490873 | -1.192917358 | 0.437417438 |
| 123 | ENSMUSG00000069920.10 | B3gnt9 | chr8:105252638-105255153 | -1.190776425 | 0.43806704 |
| 124 | ENSMUSG00000032368.14 | Zic1 | chr9:91358058-91365810 | -1.190077075 | 0.438279445 |
| 125 | ENSMUSG0000001123.15 | Lgals9 | chr11:78962974-78984946 | -1.188547169 | 0.438744465 |
| 126 | ENSMUSG00000036334.12 | Igsf10 | chr3:59316735-59344394 | -1.185306357 | 0.439731151 |
| 127 | ENSMUSG00000038295.14 | Atg9b | chr5:24384181-24392143 | -1.184847348 | 0.439871078 |
| 128 | ENSMUSG00000022623.15 | Shank3 | chr15:89499623-89560261 | -1.183772438 | 0.440198936 |
| 129 | ENSMUSG00000063611.4 | Gm10134 | chr2:28506095-28506475 | -1.183564747 | 0.440262311 |
| 130 | ENSMUSG00000015340.10 | Cybb | chrX:9435252-9487771 | -1.180983279 | 0.441050795 |
| 131 | ENSMUSG00000040212.12 | Emp3 | chr7:45918023-45921404 | -1.180807559 | 0.441104518 |
| 132 | ENSMUSG00000019539.11 | Rcn3 | chr7:45082913-45092221 | -1.176652014 | 0.442376909 |
| 133 | ENSMUSG00000071847.12 | Apcdd1 | chr18:62922327-62953195 | -1.175339746 | 0.442779475 |
| 134 | ENSMUSG00000020256.14 | Aldh1l2 | chr10:83487450-83534140 | -1.174031773 | 0.443181089 |
| 135 | ENSMUSG00000024620.11 | Pdgfrb | chr18:61045150-61085061 | -1.173689018 | 0.443286392 |
| 136 | ENSMUSG00000053687.15 | Dpep2 | chr8:105984944-105991759 | -1.172966153 | 0.443508557 |
| 137 | ENSMUSG00000036599.10 | Chst12 | chr5:140505550-140525724 | -1.171997491 | 0.443806441 |
| 138 | ENSMUSG00000025289.15 | Prdx4 | chrX:155323918-155340754 | -1.170974193 | 0.444121342 |
| 139 | ENSMUSG00000056671.6 | Prelid2 | chr18:41875696-41951194 | -1.168997241 | 0.444730347 |
| 140 | ENSMUSG00000039285.12 | Azi2 | chr9:118040499-118069794 | -1.167910105 | 0.445065598 |
| 141 | ENSMUSG00000021208.9 | Ifi27l2b | chr12:103450898-103457223 | -1.166261162 | 0.445574581 |
| 142 | ENSMUSG00000052504.6 | Epha3 | chr16:63543538-63864158 | -1.159811226 | 0.447571096 |
| 143 | ENSMUSG00000026825.17 | Dnm1 | chr2:32308471-32353338 | -1.149635633 | 0.450739055 |
| 144 | ENSMUSG00000032122.15 | Slc37a2 | chr9:37227585-37255738 | -1.148417458 | 0.451119809 |
| 145 | ENSMUSG00000032035.15 | Ets1 | chr9:32636221-32757820 | -1.146629443 | 0.451679254 |
| 146 | ENSMUSG00000022098.10 | Bmp1 | chr14:70474558-70520234 | -1.145254361 | 0.45210997 |
| 147 | ENSMUSG00000030782.16 | Tgfb1l1 | chr7:128246812-128255699 | -1.144953362 | 0.452204307 |
| 148 | ENSMUSG00000042988.10 | Notum | chr11:120653788-120661175 | -1.143199641 | 0.452754335 |
| 149 | ENSMUSG00000027860.15 | Vangl1 | chr3:102153583-102204693 | -1.141630898 | 0.453246914 |
| 150 | ENSMUSG00000036594.14 | H2-Aa | chr17:34282744-34287827 | -1.139826925 | 0.453814017 |
| 151 | ENSMUSG00000037544.14 | Dlgap5 | chr14:47387779-47418407 | -1.135922253 | 0.455043934 |
| 152 | ENSMUSG00000024781.15 | Lipa | chr19:34492318-34527474 | -1.129381594 | 0.457111622 |

| | | | | | |
|-----|-----------------------|----------------|---------------------------|--------------|-------------|
| 153 | ENSMUSG00000017897.18 | Eya2 | chr2:165595032-165771727 | -1.12656704 | 0.458004272 |
| 154 | ENSMUSG00000061144.5 | Spink12 | chr18:44104407-44108543 | -1.125355144 | 0.458389167 |
| 155 | ENSMUSG00000025888.5 | Casp1 | chr9:5298517-5307265 | -1.124164063 | 0.458767767 |
| 156 | ENSMUSG00000069892.9 | 9930111J21Rik2 | chr11:49015874-49051242 | -1.121771663 | 0.459529166 |
| 157 | ENSMUSG00000073489.6 | Ifi204 | chr1:173747293-173766943 | -1.118595772 | 0.460541869 |
| 158 | ENSMUSG00000038702.6 | Dsel | chr1:111858702-111864918 | -1.118352162 | 0.460619642 |
| 159 | ENSMUSG00000050762.5 | Prss27 | chr17:24038144-24045954 | -1.117152942 | 0.461002685 |
| 160 | ENSMUSG00000024538.7 | Ppic | chr18:53406341-53418007 | -1.115009297 | 0.46168818 |
| 161 | ENSMUSG00000030110.13 | Ret | chr6:118151745-118197718 | -1.114762379 | 0.461767205 |
| 162 | ENSMUSG00000078606.8 | Gm4070 | chr7:105895139-105953967 | -1.112573584 | 0.46246831 |
| 163 | ENSMUSG00000024900.4 | Cpt1a | chr19:3323301-3385732 | -1.103681571 | 0.465327524 |
| 164 | ENSMUSG00000040229.11 | Gpr34 | chrX:13632089-13640858 | -1.103675934 | 0.465329342 |
| 165 | ENSMUSG0000000278.10 | Scpep1 | chr11:88924020-88955465 | -1.099738549 | 0.466601048 |
| 166 | ENSMUSG00000023982.7 | Guca1a | chr17:47394560-47400584 | -1.09561938 | 0.467935186 |
| 167 | ENSMUSG00000094786.1 | Gm14403 | chr2:177498215-177509763 | -1.093781743 | 0.4685316 |
| 168 | ENSMUSG00000020019.4 | Ntn4 | chr10:93640681-93747207 | -1.093715463 | 0.468553125 |
| 169 | ENSMUSG00000025647.16 | Shisa5 | chr9:109038565-109057777 | -1.0884879 | 0.470253993 |
| 170 | ENSMUSG00000020866.17 | Cacna1g | chr11:94408391-94474198 | -1.088265579 | 0.470326466 |
| 171 | ENSMUSG0000006369.14 | Fbln1 | chr15:85205949-85286535 | -1.088169974 | 0.470357634 |
| 172 | ENSMUSG00000038400.15 | Pmepal | chr2:173224458-173276533 | -1.086723906 | 0.470829328 |
| 173 | ENSMUSG00000040690.15 | Col16a1 | chr4:130047840-130099283 | -1.085598516 | 0.471196747 |
| 174 | ENSMUSG00000051378.10 | Kif18b | chr11:102905529-102925124 | -1.084709713 | 0.471487127 |
| 175 | ENSMUSG00000022103.10 | Gfra2 | chr14:70890120-70979838 | -1.08013762 | 0.472983703 |
| 176 | ENSMUSG00000035469.17 | Rcbtb1 | chr14:59201209-59237265 | -1.069344335 | 0.476535522 |
| 177 | ENSMUSG00000021760.4 | Gpx8 | chr13:113042759-113046386 | -1.06909277 | 0.476618624 |
| 178 | ENSMUSG00000027715.9 | Ccna2 | chr3:36564865-36572150 | -1.066383805 | 0.477514416 |
| 179 | ENSMUSG00000025140.15 | Pycr1 | chr11:120635712-120643769 | -1.066051658 | 0.477624366 |
| 180 | ENSMUSG00000036596.6 | Cpz | chr5:35502218-35525698 | -1.065844913 | 0.477692817 |
| 181 | ENSMUSG00000081058.5 | Hist2h3c2 | chr3:96238108-96239127 | -1.06071894 | 0.479393104 |
| 182 | ENSMUSG00000050212.4 | Eva1b | chr4:126147744-126149875 | -1.05911931 | 0.479924939 |
| 183 | ENSMUSG00000031309.15 | Rps6ka3 | chrX:159210307-159368244 | -1.05883235 | 0.480020409 |
| 184 | ENSMUSG00000046318.15 | Ccbe1 | chr18:66045302-66302739 | -1.056890157 | 0.480667059 |
| 185 | ENSMUSG00000029581.14 | Fscn1 | chr5:142960343-142973185 | -1.04497614 | 0.484652924 |
| 186 | ENSMUSG00000033420.12 | Antxr1 | chr6:87133853-87335821 | -1.042558147 | 0.485465895 |
| 187 | ENSMUSG00000020745.15 | Pafah1b1 | chr11:74673949-74724670 | -1.036359486 | 0.487556228 |
| 188 | ENSMUSG00000047557.2 | Lxn | chr3:67457998-67463926 | -1.033130121 | 0.488648808 |
| 189 | ENSMUSG00000034708.11 | Grn | chr11:102430315-102437048 | -1.029626999 | 0.489836777 |
| 190 | ENSMUSG00000041891.15 | Lman1 | chr18:65980754-66022580 | -1.026940594 | 0.490749739 |
| 191 | ENSMUSG00000022330.5 | Osr2 | chr15:35296098-35303305 | -1.020599489 | 0.492911488 |
| 192 | ENSMUSG00000035041.8 | Creb3l3 | chr10:81084324-81098874 | -1.020590012 | 0.492914726 |
| 193 | ENSMUSG00000030657.11 | Xylt1 | chr7:117380979-117673580 | -1.019064201 | 0.493436314 |
| 194 | ENSMUSG00000021886.7 | Gpr65 | chr12:98268635-98276644 | -1.017082175 | 0.494114681 |
| 195 | ENSMUSG00000039997.16 | Ifi203 | chr1:173920407-173942672 | -1.014710851 | 0.494927513 |
| 196 | ENSMUSG00000063727.3 | Tnfrsf11b | chr15:54250619-54278484 | -1.012124631 | 0.495815531 |

| | | | | | |
|-----|-----------------------|-----------|---------------------------|--------------|-------------|
| 197 | ENSMUSG00000075602.10 | Ly6a | chr15:74994877-74998031 | -1.010843733 | 0.496255937 |
| 198 | ENSMUSG00000020601.8 | Trib2 | chr12:15791727-15816922 | -1.006113711 | 0.497885632 |
| 199 | ENSMUSG00000024986.11 | Hhex | chr19:37434810-37440731 | -1.005098821 | 0.498236002 |
| 200 | ENSMUSG00000016087.13 | Fli1 | chr9:32422204-32542861 | -1.00331482 | 0.49885249 |
| 201 | ENSMUSG00000032431.6 | Crtap | chr9:114375134-114390675 | -1.00082721 | 0.499713393 |
| 202 | ENSMUSG00000027306.15 | Nusap1 | chr2:119618298-119651244 | -0.999543351 | 0.500158288 |
| 203 | ENSMUSG00000027422.15 | Rrbp1 | chr2:143947395-144011263 | -0.999512956 | 0.500168825 |
| 204 | ENSMUSG00000027661.4 | Slc2a10 | chr2:165503787-165519917 | -0.999466261 | 0.500185014 |
| 205 | ENSMUSG00000073412.6 | Lst1 | chr17:35185095-35188439 | -0.999321701 | 0.500235136 |
| 206 | ENSMUSG00000047586.3 | Nccrp1 | chr7:28543596-28547254 | -0.993600677 | 0.502222763 |
| 207 | ENSMUSG00000029093.14 | Sorcs2 | chr5:36017180-36398139 | -0.98691569 | 0.504555302 |
| 208 | ENSMUSG00000039706.11 | Ldb2 | chr5:44472132-44799680 | -0.985706287 | 0.504978445 |
| 209 | ENSMUSG00000027580.17 | Helz2 | chr2:181227615-181242027 | -0.985557024 | 0.505030693 |
| 210 | ENSMUSG00000026074.14 | Map4k4 | chr1:39900913-40026310 | -0.982767186 | 0.506008251 |
| 211 | ENSMUSG00000061306.15 | Slc38a10 | chr11:120103960-120151346 | -0.978676856 | 0.507444921 |
| 212 | ENSMUSG00000045679.14 | Pqlc3 | chr12:16988648-17000408 | -0.978401993 | 0.507541609 |
| 213 | ENSMUSG00000016206.6 | H2-M3 | chr17:37270220-37274484 | -0.976104563 | 0.508350491 |
| 214 | ENSMUSG00000048402.14 | Gli2 | chr1:118834132-119053619 | -0.971894818 | 0.509836011 |
| 215 | ENSMUSG00000028036.6 | Ptgfr | chr3:151796502-151837630 | -0.969773763 | 0.510586124 |
| 216 | ENSMUSG00000025007.13 | Aldh18a1 | chr19:40550257-40588463 | -0.969629236 | 0.510637277 |
| 217 | ENSMUSG00000028597.11 | Gpx7 | chr4:108400390-108406961 | -0.968762652 | 0.510944093 |
| 218 | ENSMUSG00000045672.15 | Col27a1 | chr4:63214004-63334991 | -0.968484276 | 0.511042692 |
| 219 | ENSMUSG00000030867.7 | Plk1 | chr7:122159439-122169873 | -0.967235012 | 0.511485408 |
| 220 | ENSMUSG00000085795.8 | Zfp703 | chr8:26977325-26981461 | -0.966653856 | 0.51169149 |
| 221 | ENSMUSG00000103243.1 | Lce1d | chr3:92685499-92687210 | -0.966435742 | 0.511768856 |
| 222 | ENSMUSG00000034487.4 | Kdelc2 | chr9:53384025-53401867 | -0.96320887 | 0.512914809 |
| 223 | ENSMUSG00000079111.3 | Kdelr2 | chr5:143403838-143421901 | -0.961967748 | 0.513356249 |
| 224 | ENSMUSG00000026222.16 | Sp100 | chr1:85649988-85709998 | -0.961928799 | 0.513370108 |
| 225 | ENSMUSG00000079057.4 | Cyp4v3 | chr8:45304944-45333216 | -0.961766085 | 0.513428012 |
| 226 | ENSMUSG00000031012.17 | Cask | chrX:13517080-13851367 | -0.958268793 | 0.514674142 |
| 227 | ENSMUSG00000032766.9 | Gng11 | chr6:4003904-4008445 | -0.957301373 | 0.51501938 |
| 228 | ENSMUSG00000055799.13 | Tcf7l1 | chr6:72626378-72789254 | -0.957235688 | 0.515042829 |
| 229 | ENSMUSG00000018417.14 | Myo1b | chr1:51749765-51916071 | -0.954331704 | 0.516080597 |
| 230 | ENSMUSG00000048706.3 | Lurap11 | chr4:80910646-80955628 | -0.953145564 | 0.516505077 |
| 231 | ENSMUSG00000032740.16 | Ccdc88a | chr11:29373658-29510808 | -0.952698046 | 0.51666532 |
| 232 | ENSMUSG00000028370.7 | Pappa | chr4:65124174-65357509 | -0.950957882 | 0.517288892 |
| 233 | ENSMUSG00000035273.14 | Hpse | chr5:100679484-100719716 | -0.949673341 | 0.517749679 |
| 234 | ENSMUSG00000022324.15 | Matn2 | chr15:34306677-34436273 | -0.94924377 | 0.517903865 |
| 235 | ENSMUSG00000041084.8 | Ostc | chr3:130695912-130709444 | -0.948158824 | 0.518293489 |
| 236 | ENSMUSG00000076441.9 | Ass1 | chr2:31470207-31520672 | -0.947915415 | 0.518380942 |
| 237 | ENSMUSG00000024427.6 | Spry4 | chr18:38586268-38601268 | -0.947913279 | 0.51838171 |
| 238 | ENSMUSG00000078252.1 | Krtap17-1 | chr11:99993234-99993994 | -0.94530422 | 0.519320031 |
| 239 | ENSMUSG00000031821.11 | Gins2 | chr8:120578633-120589304 | -0.943886156 | 0.519830736 |
| 240 | ENSMUSG00000031997.9 | Trpc6 | chr9:8544142-8680741 | -0.943470179 | 0.519980642 |

| | | | | | |
|-----|-----------------------|---------------|--------------------------|--------------|-------------|
| 241 | ENSMUSG00000056069.9 | Fam105a | chr15:27655069-27681579 | -0.942738013 | 0.520244599 |
| 242 | ENSMUSG0000003814.8 | Calr | chr8:84841850-84846934 | -0.942390116 | 0.520370068 |
| 243 | ENSMUSG00000024013.14 | Fgd2 | chr17:29360914-29379660 | -0.942379023 | 0.520374069 |
| 244 | ENSMUSG00000042082.7 | Arsb | chr13:93771630-93943016 | -0.940872683 | 0.520917683 |
| 245 | ENSMUSG00000030329.11 | Pianp | chr6:124996694-125003096 | -0.940266738 | 0.521136519 |
| 246 | ENSMUSG00000027469.16 | Tpx2 | chr2:152847964-152895321 | -0.938517166 | 0.521768891 |
| 247 | ENSMUSG00000070034.13 | Sp110 | chr1:85576899-85598817 | -0.937033636 | 0.522305704 |
| 248 | ENSMUSG00000026728.9 | Vim | chr2:13573927-13582826 | -0.936446541 | 0.522518296 |
| 249 | ENSMUSG00000026482.13 | Rgl1 | chr1:152516760-152766351 | -0.936066598 | 0.522655923 |
| 250 | ENSMUSG00000056870.9 | Gulp1 | chr1:44551511-44796838 | -0.934436493 | 0.523246807 |
| 251 | ENSMUSG00000041707.8 | 1810011H11Rik | chr14:32785963-32817984 | -0.933810848 | 0.523473769 |
| 252 | ENSMUSG00000015854.7 | Cd5l | chr3:87357881-87371073 | -0.932645467 | 0.523896792 |
| 253 | ENSMUSG00000035863.14 | Palm | chr10:79793572-79820896 | -0.932116695 | 0.524088844 |
| 254 | ENSMUSG00000053730.15 | Tmem39b | chr4:129676355-129696838 | -0.93113735 | 0.524444732 |
| 255 | ENSMUSG00000020330.16 | Hmmr | chr11:40701395-40733422 | -0.930050122 | 0.524840108 |
| 256 | ENSMUSG00000029287.14 | Tgfbr3 | chr5:107106570-107289629 | -0.929664626 | 0.524980366 |
| 257 | ENSMUSG00000040133.2 | Gpr176 | chr2:118277110-118373419 | -0.926448982 | 0.526151808 |
| 258 | ENSMUSG00000024299.16 | Adamts10 | chr17:33524204-33553782 | -0.926258334 | 0.526221342 |
| 259 | ENSMUSG00000038943.16 | Prc1 | chr7:80294450-80316259 | -0.926176951 | 0.526251027 |
| 260 | ENSMUSG00000029781.7 | Fkbp9 | chr6:56832059-56879358 | -0.92387053 | 0.527093012 |
| 261 | ENSMUSG00000031070.15 | Mrgprf | chr7:145300828-145309557 | -0.91949809 | 0.528692919 |
| 262 | ENSMUSG00000054484.14 | Tmem62 | chr2:120977017-121007852 | -0.915144516 | 0.530290748 |
| 263 | ENSMUSG00000003352.13 | Cacnb3 | chr15:98632220-98644530 | -0.914122626 | 0.530666497 |
| 264 | ENSMUSG00000036777.8 | Anln | chr9:22332012-22389188 | -0.908219197 | 0.532842404 |
| 265 | ENSMUSG00000032014.6 | Oaf | chr9:43221235-43239911 | -0.908036131 | 0.532910021 |
| 266 | ENSMUSG00000045930.3 | Clec14a | chr12:58264720-58269290 | -0.907885029 | 0.53296584 |
| 267 | ENSMUSG00000026039.9 | Sgo2a | chr1:57995971-58025899 | -0.907216036 | 0.533213039 |
| 268 | ENSMUSG00000030921.17 | Trim30a | chr7:104409025-104465193 | -0.905351176 | 0.533902727 |
| 269 | ENSMUSG00000040520.7 | Manea | chr4:26324506-26346891 | -0.904752167 | 0.53412445 |
| 270 | ENSMUSG00000070390.12 | Nlrp1b | chr11:71153102-71230733 | -0.904678437 | 0.534151748 |
| 271 | ENSMUSG00000036565.7 | Ttyh3 | chr5:140620578-140649031 | -0.90425331 | 0.534309173 |
| 272 | ENSMUSG0000004665.10 | Cnn2 | chr10:79988584-79996062 | -0.901466734 | 0.535342192 |
| 273 | ENSMUSG00000072980.3 | Oip5 | chr2:119609512-119618469 | -0.9010087 | 0.535512182 |
| 274 | ENSMUSG00000091604.2 | Gm17349 | chr15:99702176-99705490 | -0.898697693 | 0.536370689 |
| 275 | ENSMUSG00000074802.11 | Gas2l3 | chr10:89408823-89443967 | -0.896524393 | 0.537179296 |
| 276 | ENSMUSG00000037725.8 | Ckap2 | chr8:22168160-22185819 | -0.894997833 | 0.537748003 |
| 277 | ENSMUSG00000020649.11 | Rrm2 | chr12:24708241-24714146 | -0.894406049 | 0.537968629 |
| 278 | ENSMUSG00000040055.9 | Gjb6 | chr14:57123303-57133611 | -0.892242739 | 0.538775914 |
| 279 | ENSMUSG00000017754.13 | Pltp | chr2:164839518-164857711 | -0.891394427 | 0.53909281 |
| 280 | ENSMUSG00000046841.5 | Ckap4 | chr10:84526305-84534062 | -0.89087882 | 0.539285512 |
| 281 | ENSMUSG00000076431.4 | Sox4 | chr13:28948919-28953713 | -0.889217863 | 0.539906742 |
| 282 | ENSMUSG00000040522.5 | Tlr8 | chrX:167242696-167264329 | -0.888054058 | 0.540342454 |
| 283 | ENSMUSG00000027303.17 | Ptpa | chr2:130450278-130554026 | -0.887928265 | 0.54038957 |
| 284 | ENSMUSG0000003779.15 | Kif20a | chr18:34624624-34633265 | -0.887010077 | 0.540733605 |

| | | | | | |
|-----|-----------------------|-----------|---------------------------|--------------|-------------|
| 285 | ENSMUSG00000020914.17 | Top2a | chr11:98992943-99024189 | -0.885929464 | 0.541138779 |
| 286 | ENSMUSG00000048644.8 | Ctxn1 | chr8:4257660-4259274 | -0.882108167 | 0.542574005 |
| 287 | ENSMUSG00000031799.9 | Tpm4 | chr8:72134975-72153142 | -0.879929506 | 0.543393982 |
| 288 | ENSMUSG00000026321.7 | Tnfrsf11a | chr1:105780718-105847981 | -0.879636314 | 0.543504425 |
| 289 | ENSMUSG00000028264.16 | Spaca1 | chr4:34024874-34050191 | -0.877149219 | 0.544442193 |
| 290 | ENSMUSG00000010663.4 | Fads1 | chr19:10182888-10196870 | -0.876933618 | 0.544523562 |
| 291 | ENSMUSG00000058665.8 | En1 | chr1:120602418-120607992 | -0.875282211 | 0.545147218 |
| 292 | ENSMUSG00000012017.3 | Scarf2 | chr16:17797282-17808287 | -0.875205231 | 0.545176307 |
| 293 | ENSMUSG00000035365.15 | Parpbp | chr10:88091432-88146941 | -0.874423195 | 0.545471908 |
| 294 | ENSMUSG00000000792.2 | Slc5a5 | chr8:70882889-70892757 | -0.874165468 | 0.545569362 |
| 295 | ENSMUSG00000022033.9 | Pbk | chr14:65805837-65817822 | -0.872565341 | 0.546174801 |
| 296 | ENSMUSG00000038305.14 | Spats2l | chr1:57774162-57948394 | -0.872273945 | 0.546285129 |
| 297 | ENSMUSG00000035000.8 | Dpp4 | chr2:62330073-62412231 | -0.86481391 | 0.549117232 |
| 298 | ENSMUSG00000021540.16 | Smad5 | chr13:56703010-56742377 | -0.861247539 | 0.55047634 |
| 299 | ENSMUSG00000022221.14 | Ripk3 | chr14:55784995-55788865 | -0.860240034 | 0.550860899 |
| 300 | ENSMUSG00000094777.2 | Hist1h2ap | chr13:21833026-21833507 | -0.860109562 | 0.550910719 |
| 301 | ENSMUSG00000044583.13 | Tlr7 | chrX:167304929-167330558 | -0.859943492 | 0.550974138 |
| 302 | ENSMUSG00000031328.15 | Flna | chrX:74223461-74249820 | -0.857896036 | 0.551756629 |
| 303 | ENSMUSG00000044949.4 | Ubtd2 | chr11:32455370-32516687 | -0.855468435 | 0.552685843 |
| 304 | ENSMUSG00000035683.13 | Melk | chr4:44300876-44364675 | -0.852057352 | 0.553994151 |
| 305 | ENSMUSG00000026416.12 | Ii20 | chr1:130906985-130911451 | -0.851039784 | 0.554385034 |
| 306 | ENSMUSG00000079277.9 | Hoxd3 | chr2:74711927-74748442 | -0.849506395 | 0.554974583 |
| 307 | ENSMUSG0000000531.4 | Grasp | chr15:101224207-101232755 | -0.849097793 | 0.555131786 |
| 308 | ENSMUSG00000071266.13 | Zfp946 | chr17:22424222-22456689 | -0.848688692 | 0.555289225 |
| 309 | ENSMUSG00000028184.12 | Adgrl2 | chr3:148815583-148990555 | -0.844650068 | 0.556845858 |
| 310 | ENSMUSG00000040675.17 | Mthfd11 | chr10:3973118-4167081 | -0.842395811 | 0.557716628 |
| 311 | ENSMUSG00000027134.4 | Lpcat4 | chr2:112239468-112247111 | -0.842224384 | 0.557782902 |
| 312 | ENSMUSG00000032725.10 | Folr2 | chr7:101839988-101857194 | -0.839374143 | 0.558885967 |
| 313 | ENSMUSG00000063245.11 | Zfp993 | chr4:146610961-146658160 | -0.837009879 | 0.559802611 |
| 314 | ENSMUSG00000086965.1 | Rtl10 | chr16:18498901-18501658 | -0.83670254 | 0.559921879 |
| 315 | ENSMUSG00000015354.8 | Pcolce2 | chr9:95637601-95698096 | -0.835680727 | 0.560318594 |
| 316 | ENSMUSG00000074364.6 | Ehd2 | chr7:15946958-15967567 | -0.835048027 | 0.560564378 |
| 317 | ENSMUSG00000027864.9 | Ptgfrn | chr3:101040232-101110278 | -0.832158278 | 0.561688325 |
| 318 | ENSMUSG00000028312.19 | Smc2 | chr4:52439243-52488260 | -0.832051026 | 0.561730084 |
| 319 | ENSMUSG00000021822.3 | Plau | chr14:20836660-20843385 | -0.831250644 | 0.562041808 |
| 320 | ENSMUSG00000009876.13 | Cox4i2 | chr2:152754173-152765037 | -0.829425499 | 0.562753294 |
| 321 | ENSMUSG00000036158.12 | Prickle1 | chr15:93499114-93595891 | -0.827354128 | 0.563561855 |
| 322 | ENSMUSG00000042961.13 | Egflam | chr15:7206120-7398395 | -0.826362167 | 0.56394948 |
| 323 | ENSMUSG00000047712.8 | Ust | chr10:8204756-8518825 | -0.824951253 | 0.564501276 |
| 324 | ENSMUSG0000001403.13 | Ube2c | chr2:164769898-164778822 | -0.824262374 | 0.564770886 |
| 325 | ENSMUSG00000031661.12 | Nkd1 | chr8:88521354-88594884 | -0.822913202 | 0.565299293 |
| 326 | ENSMUSG00000022095.9 | Fam160b2 | chr14:70583296-70599835 | -0.822273594 | 0.56554997 |
| 327 | ENSMUSG00000017861.11 | Mybl2 | chr2:163054687-163084688 | -0.822213017 | 0.565573717 |
| 328 | ENSMUSG00000050530.14 | Fam171a1 | chr2:3114224-3227806 | -0.82183531 | 0.565721807 |

| | | | | | |
|-----|-----------------------|----------------|---------------------------|--------------|-------------|
| 329 | ENSMUSG00000069893.10 | 9930111J21Rik1 | chr11:48946150-48979398 | -0.820195745 | 0.566365093 |
| 330 | ENSMUSG00000029428.13 | Stx2 | chr5:128984557-129008574 | -0.81721288 | 0.567537301 |
| 331 | ENSMUSG00000030772.6 | Dkk3 | chr7:112116017-112159057 | -0.817097844 | 0.567582556 |
| 332 | ENSMUSG00000035311.16 | Gnptab | chr10:88379132-88447329 | -0.815278482 | 0.568298778 |
| 333 | ENSMUSG00000044469.7 | Tnfaip8l1 | chr17:56162477-56173955 | -0.814316899 | 0.568677686 |
| 334 | ENSMUSG00000020695.14 | Mrc2 | chr11:105292643-105351139 | -0.812415461 | 0.569427684 |
| 335 | ENSMUSG00000061731.9 | Ext1 | chr15:53064038-53346159 | -0.811011078 | 0.56998226 |
| 336 | ENSMUSG0000003200.9 | Sh3gl1 | chr17:56016753-56036637 | -0.810173403 | 0.570313306 |
| 337 | ENSMUSG00000039062.15 | Anpep | chr7:79821803-79861059 | -0.809991169 | 0.57038535 |
| 338 | ENSMUSG00000115338.1 | Pnp | chr14:50931082-50953412 | -0.809593135 | 0.570542738 |
| 339 | ENSMUSG00000021256.5 | Vash1 | chr12:86678700-86692091 | -0.808143553 | 0.571116292 |
| 340 | ENSMUSG00000070348.5 | Ccnd1 | chr7:144929931-144939925 | -0.806456465 | 0.571784547 |
| 341 | ENSMUSG00000039187.16 | Fanci | chr7:79391929-79450264 | -0.804814089 | 0.572435842 |
| 342 | ENSMUSG00000018381.15 | Abi3 | chr11:95830074-95842476 | -0.804572726 | 0.572531618 |
| 343 | ENSMUSG00000021877.12 | Arf4 | chr14:26638074-26665084 | -0.802796244 | 0.573237047 |
| 344 | ENSMUSG00000028175.15 | Depdc1a | chr3:159495433-159529955 | -0.801782532 | 0.573639975 |
| 345 | ENSMUSG00000040253.15 | Gbp7 | chr3:142530342-142550149 | -0.801752053 | 0.573652094 |
| 346 | ENSMUSG00000038070.15 | Cntln | chr4:84884309-85131921 | -0.800987835 | 0.573956047 |
| 347 | ENSMUSG00000052560.15 | Cpne8 | chr15:90487482-90679432 | -0.800119013 | 0.574301799 |
| 348 | ENSMUSG00000035245.12 | Eogt | chr6:97110024-97149182 | -0.799366295 | 0.574601516 |
| 349 | ENSMUSG00000069607.4 | Cd300ld3 | chr11:115042131-115048409 | -0.796954162 | 0.575563032 |
| 350 | ENSMUSG00000034520.14 | Gjc1 | chr11:102799579-102819700 | -0.796642902 | 0.575687223 |
| 351 | ENSMUSG00000034059.13 | Ypel4 | chr2:84734058-84738655 | -0.793081933 | 0.577109933 |
| 352 | ENSMUSG00000028687.17 | Mutyh | chr4:116807723-116819440 | -0.791446648 | 0.577764454 |
| 353 | ENSMUSG00000015305.6 | Sash1 | chr10:8722219-8886070 | -0.790304778 | 0.578221926 |
| 354 | ENSMUSG00000029516.19 | Cit | chr5:115845278-116008947 | -0.789223863 | 0.578655312 |
| 355 | ENSMUSG00000043099.4 | Hic1 | chr11:75164565-75169519 | -0.787218257 | 0.579460306 |
| 356 | ENSMUSG00000063146.11 | Clip2 | chr5:134489383-134552434 | -0.786448064 | 0.579769738 |
| 357 | ENSMUSG00000039209.12 | Rpl39l | chr16:10170226-10174911 | -0.778761002 | 0.582867149 |
| 358 | ENSMUSG00000037649.9 | H2-DMa | chr17:34135182-34139101 | -0.776805182 | 0.583657861 |
| 359 | ENSMUSG00000031015.8 | Swap70 | chr7:110221711-110283506 | -0.776672146 | 0.583711685 |
| 360 | ENSMUSG00000024063.12 | Lbh | chr17:72918305-72941942 | -0.775505421 | 0.584183931 |
| 361 | ENSMUSG00000029119.9 | Man2b2 | chr5:36806921-36830653 | -0.772675011 | 0.585331161 |
| 362 | ENSMUSG00000020424.3 | Gatsl3 | chr11:4218225-4222409 | -0.770847287 | 0.586073176 |
| 363 | ENSMUSG00000020493.8 | Prr11 | chr11:87089153-87108708 | -0.769932316 | 0.586444987 |
| 364 | ENSMUSG00000024340.14 | Btnl2 | chr17:34354822-34369493 | -0.769829441 | 0.586486806 |
| 365 | ENSMUSG00000024421.16 | Lama3 | chr18:12333819-12583013 | -0.769470203 | 0.586632863 |
| 366 | ENSMUSG00000031756.5 | Cenpn | chr8:116921730-116941507 | -0.766413844 | 0.587876965 |
| 367 | ENSMUSG00000036534.6 | Slc38a7 | chr8:95835920-95853539 | -0.764823211 | 0.588525483 |
| 368 | ENSMUSG00000030082.14 | Sec61a1 | chr6:88503579-88518905 | -0.76106519 | 0.590060509 |
| 369 | ENSMUSG00000073650.8 | Catip | chr1:74362108-74369321 | -0.760272645 | 0.590384747 |
| 370 | ENSMUSG00000024795.11 | Kif20b | chr19:34922361-34975745 | -0.760168198 | 0.590427491 |
| 371 | ENSMUSG00000078495.10 | Zfp984 | chr4:147753974-147809788 | -0.758374466 | 0.591162038 |
| 372 | ENSMUSG00000031903.7 | Pla2g15 | chr8:106150399-106164715 | -0.757698463 | 0.591439104 |

| | | | | | |
|-----|-----------------------|---------------|---------------------------|--------------|-------------|
| 373 | ENSMUSG00000039765.15 | Cc2d2a | chr5:43662346-43740972 | -0.757634114 | 0.591465484 |
| 374 | ENSMUSG00000020875.9 | Hoxb9 | chr11:96271457-96276595 | -0.756479228 | 0.591939146 |
| 375 | ENSMUSG00000022108.8 | Itm2b | chr14:73362226-73385289 | -0.755093461 | 0.592508 |
| 376 | ENSMUSG00000017466.9 | Timp2 | chr11:118301069-118355740 | -0.754874235 | 0.592598042 |
| 377 | ENSMUSG00000027642.15 | Rpn2 | chr2:157279017-157326319 | -0.754850338 | 0.592607858 |
| 378 | ENSMUSG00000104713.4 | Gbp6 | chr5:105270702-105293698 | -0.754583067 | 0.592717654 |
| 379 | ENSMUSG00000061288.13 | Taok3 | chr5:117120129-117275219 | -0.753717329 | 0.593073441 |
| 380 | ENSMUSG00000110723.1 | AC153912.1 | chr10:29198954-29221940 | -0.753689119 | 0.593085038 |
| 381 | ENSMUSG00000029674.13 | Limk1 | chr5:134656039-134688598 | -0.753661819 | 0.59309626 |
| 382 | ENSMUSG00000026586.16 | Prrx1 | chr1:163245119-163313710 | -0.752691428 | 0.593495326 |
| 383 | ENSMUSG00000018906.14 | P4ha2 | chr11:54100095-54131665 | -0.751844703 | 0.593843753 |
| 384 | ENSMUSG00000048612.16 | Myof | chr19:37899036-38043577 | -0.750850598 | 0.594253089 |
| 385 | ENSMUSG00000036908.16 | Unc93b1 | chr19:3935186-3949340 | -0.750124459 | 0.594552264 |
| 386 | ENSMUSG00000025823.9 | Pdia4 | chr6:47796141-47813430 | -0.749675923 | 0.59473714 |
| 387 | ENSMUSG00000073565.4 | Prr16 | chr18:51117898-51304641 | -0.749608785 | 0.594764818 |
| 388 | ENSMUSG00000006800.14 | Sulf2 | chr2:166073089-166155663 | -0.749139393 | 0.594958361 |
| 389 | ENSMUSG00000020571.12 | Pdia6 | chr12:17266545-17284770 | -0.747522569 | 0.595625502 |
| 390 | ENSMUSG00000036223.15 | Ska1 | chr18:74195299-74207818 | -0.747360173 | 0.595692552 |
| 391 | ENSMUSG00000033350.7 | Chst2 | chr9:95399292-95406722 | -0.746330381 | 0.596117908 |
| 392 | ENSMUSG00000021365.15 | Nedd9 | chr13:41309581-41487362 | -0.744536977 | 0.596859399 |
| 393 | ENSMUSG00000046743.6 | Fat4 | chr3:38886940-39011985 | -0.744128816 | 0.597028283 |
| 394 | ENSMUSG00000074165.10 | Zfp788 | chr7:41633203-41651530 | -0.743530731 | 0.597275839 |
| 395 | ENSMUSG00000005871.14 | Apc | chr18:34220924-34322189 | -0.742993362 | 0.597498352 |
| 396 | ENSMUSG00000039497.8 | Dse | chr10:34151393-34207715 | -0.740707752 | 0.598445697 |
| 397 | ENSMUSG00000027365.14 | Trpm7 | chr2:126791565-126876230 | -0.739542387 | 0.598929298 |
| 398 | ENSMUSG00000042190.12 | Cmkrl1 | chr5:113612354-113650426 | -0.739330912 | 0.599017098 |
| 399 | ENSMUSG00000046731.4 | Kctd11 | chr11:69878261-69881406 | -0.73895482 | 0.599173274 |
| 400 | ENSMUSG00000027919.5 | Lce1g | chr3:92750148-92752338 | -0.738637703 | 0.599304992 |
| 401 | ENSMUSG00000019989.8 | Enpp3 | chr10:24772406-24842823 | -0.736966114 | 0.599999784 |
| 402 | ENSMUSG00000059991.7 | Nptx2 | chr5:144545902-144557478 | -0.736933874 | 0.600013192 |
| 403 | ENSMUSG00000024600.8 | Slc27a6 | chr18:58556257-58612773 | -0.735609375 | 0.600564301 |
| 404 | ENSMUSG00000019932.8 | Kera | chr10:97606879-97613692 | -0.735002259 | 0.600817084 |
| 405 | ENSMUSG00000019467.15 | Arhgef25 | chr10:127182525-127190083 | -0.734282242 | 0.601117013 |
| 406 | ENSMUSG00000054404.13 | Slfn5 | chr11:82951349-82964840 | -0.734012388 | 0.601229462 |
| 407 | ENSMUSG00000043336.14 | Filip11 | chr16:57353093-57573126 | -0.733874749 | 0.601286824 |
| 408 | ENSMUSG00000042473.8 | Tbc1d8b | chrX:139684996-139753405 | -0.733777559 | 0.601327332 |
| 409 | ENSMUSG00000004508.6 | Gab2 | chr7:97081586-97308946 | -0.733401309 | 0.601484177 |
| 410 | ENSMUSG00000031889.9 | D230025D16Rik | chr8:105225145-105253053 | -0.732542212 | 0.601842456 |
| 411 | ENSMUSG000000110170.1 | St6galnac2 | chr11:116677483-116681290 | -0.73157052 | 0.602247949 |
| 412 | ENSMUSG00000034906.15 | Ncaph | chr2:127103809-127133954 | -0.73102513 | 0.602475663 |
| 413 | ENSMUSG00000074342.3 | I830077J02Rik | chr3:105924358-105932664 | -0.730350877 | 0.6027573 |
| 414 | ENSMUSG00000040703.11 | Cyp2s1 | chr7:25802475-25816913 | -0.729656559 | 0.603047455 |
| 415 | ENSMUSG00000030259.12 | Rassf8 | chr6:145746748-145821079 | -0.728683274 | 0.603454427 |
| 416 | ENSMUSG00000049932.3 | H2afx | chr9:44334694-44336077 | -0.728181453 | 0.603664366 |

| | | | | | |
|-----|-----------------------|---------------|---------------------------|--------------|-------------|
| 417 | ENSMUSG00000034947.13 | Tmem106a | chr11:101582242-101591788 | -0.727731775 | 0.603852553 |
| 418 | ENSMUSG00000025246.13 | Tbl1x | chrX:77511013-77662983 | -0.727421825 | 0.603982299 |
| 419 | ENSMUSG00000028937.14 | Acot7 | chr4:152178134-152271855 | -0.726865185 | 0.604215381 |
| 420 | ENSMUSG00000047534.17 | Mis18bp1 | chr12:65132734-65172604 | -0.726760093 | 0.604259396 |
| 421 | ENSMUSG00000027248.13 | Pdia3 | chr2:121413775-121438687 | -0.724488165 | 0.605211722 |
| 422 | ENSMUSG00000029177.9 | Cenpa | chr5:30666777-30674830 | -0.724116467 | 0.605367669 |
| 423 | ENSMUSG00000063019.5 | Manbal | chr2:157367594-157396763 | -0.723096492 | 0.605795811 |
| 424 | ENSMUSG00000043943.14 | Naalad2 | chr9:18321951-18402995 | -0.722741793 | 0.60594477 |
| 425 | ENSMUSG0000001750.15 | Tcirc1 | chr19:3896050-3907133 | -0.722711592 | 0.605957454 |
| 426 | ENSMUSG00000022748.7 | Cmss1 | chr16:57302199-57606825 | -0.72237068 | 0.606100661 |
| 427 | ENSMUSG00000049047.11 | Armcx3 | chrX:134756595-134761455 | -0.720339203 | 0.606954719 |
| 428 | ENSMUSG00000037552.17 | Plekhg2 | chr7:28359604-28372599 | -0.718354038 | 0.607790471 |
| 429 | ENSMUSG00000020439.17 | Smtn | chr11:3517523-3540612 | -0.718346744 | 0.607793544 |
| 430 | ENSMUSG00000032596.14 | Uba7 | chr9:107975505-107984060 | -0.717320933 | 0.608225862 |
| 431 | ENSMUSG00000054293.10 | A630033H20Rik | chrX:107148927-107173661 | -0.716188871 | 0.608703316 |
| 432 | ENSMUSG00000018920.11 | Cxcl16 | chr11:70453983-70459984 | -0.713471378 | 0.609850963 |
| 433 | ENSMUSG0000002870.8 | Mcm2 | chr6:88883474-88898780 | -0.713204977 | 0.609963586 |
| 434 | ENSMUSG00000052584.10 | Serp2 | chr14:76532814-76556889 | -0.71253985 | 0.610244863 |
| 435 | ENSMUSG00000050107.2 | Haspin | chr11:73135485-73138294 | -0.712056931 | 0.610449167 |
| 436 | ENSMUSG00000042029.7 | Ncapg2 | chr12:116405402-116463731 | -0.711886885 | 0.610521122 |
| 437 | ENSMUSG00000055660.8 | Mettl4 | chr17:94727080-94749892 | -0.711215136 | 0.61080546 |
| 438 | ENSMUSG00000010529.6 | Gm266 | chr12:111484609-111485823 | -0.708296336 | 0.612042467 |
| 439 | ENSMUSG00000069721.2 | Krtap3-2 | chr1:99555823-99556853 | -0.707871989 | 0.612222517 |
| 440 | ENSMUSG00000030824.17 | Nucb1 | chr7:45490458-45510406 | -0.707635509 | 0.612322878 |
| 441 | ENSMUSG00000052485.7 | Tmem171 | chr13:98686235-98694834 | -0.70616198 | 0.612948607 |
| 442 | ENSMUSG0000001240.13 | Ramp2 | chr11:101246028-101259546 | -0.703371494 | 0.61413533 |
| 443 | ENSMUSG00000039349.5 | C130074G19Rik | chr1:184871926-184883218 | -0.703236635 | 0.61419274 |
| 444 | ENSMUSG00000038827.11 | Fam206a | chr4:56802345-56809601 | -0.702283553 | 0.614598626 |
| 445 | ENSMUSG00000036676.14 | Tmtc3 | chr10:100443902-100487350 | -0.701439119 | 0.614958466 |
| 446 | ENSMUSG00000027811.9 | 4930579G24Rik | chr3:79629079-79632820 | -0.701133818 | 0.615088617 |
| 447 | ENSMUSG00000104346.1 | Pcdhga3 | chr18:37674307-37841873 | -0.701114218 | 0.615096973 |
| 448 | ENSMUSG00000034041.4 | Lyl1 | chr8:84701457-84704715 | -0.701109243 | 0.615099094 |
| 449 | ENSMUSG00000034773.16 | BC030867 | chr11:102248882-102265187 | -0.700361427 | 0.615418012 |
| 450 | ENSMUSG00000037469.9 | Acp7 | chr7:28607634-28631332 | -0.699129463 | 0.615943761 |
| 451 | ENSMUSG00000040841.5 | Six5 | chr7:19094594-19098549 | -0.697879413 | 0.616477689 |
| 452 | ENSMUSG00000042035.11 | Igsf3 | chr3:101377083-101463059 | -0.697376501 | 0.616692625 |
| 453 | ENSMUSG00000029413.14 | Naaa | chr5:92257659-92278170 | -0.69605239 | 0.617258888 |
| 454 | ENSMUSG00000038679.16 | Trps1 | chr15:50654752-50890463 | -0.694453356 | 0.617943416 |
| 455 | ENSMUSG00000035390.16 | Brsk1 | chr7:4690604-4715997 | -0.693363052 | 0.618410598 |
| 456 | ENSMUSG00000032383.7 | Ppib | chr9:66060222-66066623 | -0.691161668 | 0.61935494 |
| 457 | ENSMUSG00000030754.9 | Copb1 | chr7:114215559-114254711 | -0.689403783 | 0.620110068 |
| 458 | ENSMUSG00000038151.13 | Prdm1 | chr10:44437177-44528501 | -0.688920744 | 0.620317726 |
| 459 | ENSMUSG00000059713.12 | Rcan3 | chr4:135412308-135433853 | -0.686537827 | 0.621343159 |
| 460 | ENSMUSG00000034911.8 | Ushbp1 | chr8:71384272-71395802 | -0.68637202 | 0.621414573 |

| | | | | | |
|-----|-----------------------|---------------|---------------------------|--------------|-------------|
| 461 | ENSMUSG00000027220.2 | Syt13 | chr2:92915098-92956058 | -0.685580105 | 0.62175577 |
| 462 | ENSMUSG00000050919.9 | Zfp366 | chr13:99184823-99250656 | -0.683466598 | 0.622667292 |
| 463 | ENSMUSG00000026970.16 | Rbms1 | chr2:60750193-60963192 | -0.681364761 | 0.623575106 |
| 464 | ENSMUSG00000078670.3 | Fam174b | chr7:73740302-73776919 | -0.681164061 | 0.62366186 |
| 465 | ENSMUSG00000029108.14 | Pcdh7 | chr5:57717967-58133230 | -0.680386116 | 0.623998248 |
| 466 | ENSMUSG00000022179.5 | 4931414P19Rik | chr14:54583663-54605993 | -0.679311816 | 0.62446308 |
| 467 | ENSMUSG00000058192.16 | Zfp846 | chr9:20581291-20605409 | -0.67700565 | 0.625462091 |
| 468 | ENSMUSG00000028873.16 | Cdca8 | chr4:124918465-124939311 | -0.676727918 | 0.625582509 |
| 469 | ENSMUSG0000003573.15 | Homer3 | chr8:70282827-70294361 | -0.674835273 | 0.626403738 |
| 470 | ENSMUSG00000021242.9 | Npc2 | chr12:84754562-84773152 | -0.674774224 | 0.626430245 |
| 471 | ENSMUSG00000039068.16 | Zzz3 | chr3:152395473-152462826 | -0.674602275 | 0.626504912 |
| 472 | ENSMUSG00000072115.11 | Ang | chr14:51091150-51102009 | -0.674070474 | 0.626735894 |
| 473 | ENSMUSG00000053080.10 | 2700081O15Rik | chr19:7417625-7425904 | -0.673164694 | 0.627129507 |
| 474 | ENSMUSG00000023940.14 | Sgo1 | chr17:53674786-53689333 | -0.672117633 | 0.627584822 |
| 475 | ENSMUSG00000019303.14 | Psmc3ip | chr11:101091823-101095436 | -0.670764795 | 0.628173594 |
| 476 | ENSMUSG00000054920.12 | Klhl5 | chr5:65107539-65168188 | -0.670680038 | 0.6282105 |
| 477 | ENSMUSG00000050271.12 | Prag1 | chr8:36094828-36147787 | -0.669271634 | 0.628824078 |
| 478 | ENSMUSG00000033033.10 | Calhm2 | chr19:47105353-47138294 | -0.669223048 | 0.628845256 |
| 479 | ENSMUSG00000039988.14 | Ankrd13c | chr3:157947239-158008034 | -0.669122718 | 0.628888989 |
| 480 | ENSMUSG00000026705.16 | Klhl20 | chr1:161088375-161131511 | -0.668731009 | 0.629059763 |
| 481 | ENSMUSG0000001986.16 | Gria3 | chrX:41400854-41678601 | -0.666751491 | 0.629923487 |
| 482 | ENSMUSG00000060288.13 | Ppih | chr4:119300010-119320546 | -0.666253741 | 0.630140857 |
| 483 | ENSMUSG00000027006.13 | Dnajc10 | chr2:80315466-80354043 | -0.666056708 | 0.630226923 |
| 484 | ENSMUSG00000044807.13 | Zfp354c | chr11:50811086-50827724 | -0.665857775 | 0.630313831 |
| 485 | ENSMUSG00000058325.6 | Dock1 | chr7:134670654-135173639 | -0.66585103 | 0.630316778 |
| 486 | ENSMUSG00000058290.3 | Esp11 | chr15:102296293-102324356 | -0.665617186 | 0.630418953 |
| 487 | ENSMUSG00000021608.15 | Lpcat1 | chr13:73467197-73516422 | -0.664632231 | 0.630849499 |
| 488 | ENSMUSG00000063060.6 | Sox7 | chr14:63943673-63950732 | -0.663829704 | 0.631200519 |
| 489 | ENSMUSG00000021900.10 | Btd | chr14:31641028-31668579 | -0.663218643 | 0.631467924 |
| 490 | ENSMUSG00000068856.3 | Sf3b4 | chr3:96172332-96177564 | -0.662016174 | 0.631994464 |
| 491 | ENSMUSG0000007458.14 | M6pr | chr6:122308720-122317680 | -0.660865001 | 0.632498954 |
| 492 | ENSMUSG00000041112.16 | Elmo1 | chr13:20090596-20608353 | -0.660548214 | 0.632637853 |
| 493 | ENSMUSG00000057363.12 | Uxs1 | chr1:43746966-43827800 | -0.660407817 | 0.632699422 |
| 494 | ENSMUSG00000001098.15 | Kctd10 | chr5:114363567-114380508 | -0.660341191 | 0.632728642 |
| 495 | ENSMUSG00000095217.1 | Hist1h2bn | chr13:21754123-21754503 | -0.659726809 | 0.632998151 |
| 496 | ENSMUSG0000001089.14 | Luzp1 | chr4:136469761-136554780 | -0.659536405 | 0.633081699 |
| 497 | ENSMUSG00000028657.14 | Ppt1 | chr4:122836242-122859175 | -0.657783192 | 0.633851509 |
| 498 | ENSMUSG00000096001.2 | 2610528A11Rik | chr14:37102140-37114022 | -0.657096228 | 0.6341534 |
| 499 | ENSMUSG00000031558.15 | Slit2 | chr5:47983138-48307733 | -0.656329234 | 0.634490631 |
| 500 | ENSMUSG0000002320.15 | Tm9sf1 | chr14:55635965-55643806 | -0.655298596 | 0.634944063 |
| 501 | ENSMUSG00000032046.15 | Abhd12 | chr2:150832493-150904741 | -0.654828796 | 0.63515086 |
| 502 | ENSMUSG00000069873.4 | 4930438A08Rik | chr11:58274799-58294289 | -0.654061766 | 0.635488637 |
| 503 | ENSMUSG00000041633.14 | Kctd12b | chrX:153685154-153696391 | -0.653532736 | 0.635721711 |
| 504 | ENSMUSG00000045980.13 | Tmem104 | chr11:115187487-115247023 | -0.653415377 | 0.635773427 |

| | | | | | |
|-----|-----------------------|----------|---------------------------|--------------|-------------|
| 505 | ENSMUSG00000032470.16 | Mras | chr9:99385420-99437381 | -0.652492814 | 0.636180116 |
| 506 | ENSMUSG00000026357.3 | Rgs18 | chr1:144752683-144775435 | -0.651506045 | 0.636615397 |
| 507 | ENSMUSG00000038903.13 | Ccdc68 | chr18:69925426-69969484 | -0.650175153 | 0.637202948 |
| 508 | ENSMUSG00000031246.14 | Sh3bgrl | chrX:109095365-109197873 | -0.649388638 | 0.637550427 |
| 509 | ENSMUSG00000037997.12 | Parp11 | chr6:127446840-127494261 | -0.647604676 | 0.638339277 |
| 510 | ENSMUSG00000003037.16 | Rab8a | chr8:72161200-72183904 | -0.647466713 | 0.638400323 |
| 511 | ENSMUSG00000043207.10 | Zmpste24 | chr4:121059237-121098241 | -0.647454662 | 0.638405656 |
| 512 | ENSMUSG00000022443.16 | Myh9 | chr15:77760587-77842175 | -0.647118357 | 0.638554491 |
| 513 | ENSMUSG00000020185.16 | E2f7 | chr10:110745439-110787384 | -0.646384042 | 0.638879591 |
| 514 | ENSMUSG00000001576.14 | Ergic1 | chr17:26561489-26656931 | -0.645187325 | 0.639409762 |
| 515 | ENSMUSG00000047604.3 | Frat2 | chr19:41845972-41848132 | -0.644775731 | 0.639592208 |
| 516 | ENSMUSG00000038369.14 | Ncoa6 | chr2:155390656-155473894 | -0.643721315 | 0.640059835 |
| 517 | ENSMUSG00000059456.13 | Ptk2b | chr14:66153257-66281052 | -0.642581828 | 0.640565575 |
| 518 | ENSMUSG00000047090.13 | Tmem198b | chr10:128800036-128804370 | -0.64223139 | 0.64072119 |
| 519 | ENSMUSG00000022793.16 | B4galt4 | chr16:38742264-38769049 | -0.64112434 | 0.641213035 |
| 520 | ENSMUSG00000019916.14 | P4ha1 | chr10:59323296-59373304 | -0.64092378 | 0.641302182 |
| 521 | ENSMUSG00000037548.14 | H2-DMb2 | chr17:34143307-34151553 | -0.640833963 | 0.641342108 |
| 522 | ENSMUSG00000004263.15 | Atn1 | chr6:124742544-124756524 | -0.640275334 | 0.641590492 |
| 523 | ENSMUSG00000028664.14 | Ephb2 | chr4:136647539-136835988 | -0.64008496 | 0.64167516 |
| 524 | ENSMUSG00000034263.13 | Ints14 | chr9:64960905-64986978 | -0.639188726 | 0.642073906 |
| 525 | ENSMUSG00000024379.3 | Tslp | chr18:32815383-32819799 | -0.638951626 | 0.642179437 |
| 526 | ENSMUSG00000054150.12 | Syne3 | chr12:104929933-105009809 | -0.638390867 | 0.642429093 |
| 527 | ENSMUSG00000037921.15 | Ddx60 | chr8:61928087-62038244 | -0.637525025 | 0.642814766 |
| 528 | ENSMUSG00000018654.17 | Ikzf1 | chr11:11685003-11772926 | -0.637279074 | 0.642924363 |
| 529 | ENSMUSG0000006585.3 | Cdt1 | chr8:122568015-122573554 | -0.636437451 | 0.643299534 |
| 530 | ENSMUSG00000020898.18 | Ctc1 | chr11:69015911-69036473 | -0.636278355 | 0.643370479 |
| 531 | ENSMUSG00000037306.13 | Man1c1 | chr4:134561690-134704290 | -0.635513707 | 0.643711565 |
| 532 | ENSMUSG00000028800.15 | Hdac1 | chr4:129516104-129542713 | -0.633987728 | 0.644392797 |
| 533 | ENSMUSG00000069310.4 | Hist1h3c | chr13:23744973-23745602 | -0.633026491 | 0.644822285 |
| 534 | ENSMUSG00000022528.7 | Hes1 | chr16:30064384-30067796 | -0.62692752 | 0.647554031 |
| 535 | ENSMUSG00000033952.14 | Aspm | chr1:139454772-139494091 | -0.626485565 | 0.647752433 |
| 536 | ENSMUSG00000035325.16 | Sec31a | chr5:100361649-100416234 | -0.626184614 | 0.647887571 |
| 537 | ENSMUSG00000014932.15 | Yes1 | chr5:32611171-32687057 | -0.625791424 | 0.648064169 |
| 538 | ENSMUSG00000024298.14 | Zfp871 | chr17:32771236-32788287 | -0.625361146 | 0.64825748 |
| 539 | ENSMUSG00000020902.12 | Ntn1 | chr11:68209364-68400823 | -0.623753731 | 0.648980155 |
| 540 | ENSMUSG00000042548.14 | Asxl1 | chr2:153345829-153404007 | -0.623453749 | 0.649115113 |
| 541 | ENSMUSG00000037169.15 | Mycn | chr12:12936093-12941914 | -0.623267913 | 0.649198732 |
| 542 | ENSMUSG0000005198.15 | Polr2a | chr11:69733997-69758637 | -0.621753853 | 0.649880402 |
| 543 | ENSMUSG00000042363.14 | Lgals1 | chr11:20823576-20831056 | -0.620967579 | 0.650234685 |
| 544 | ENSMUSG00000036768.6 | Kif15 | chr9:122951046-123018733 | -0.620866019 | 0.650280461 |
| 545 | ENSMUSG00000095677.1 | Dynlt1f | chr17:6648941-6655939 | -0.620716855 | 0.650347699 |
| 546 | ENSMUSG00000021892.14 | Sh3bp5 | chr14:31359880-31436078 | -0.619960778 | 0.650688617 |
| 547 | ENSMUSG00000033705.16 | Stard9 | chr2:120629126-120731895 | -0.619260448 | 0.651004559 |
| 548 | ENSMUSG00000020315.18 | Sptbn1 | chr11:30099395-30268175 | -0.618941643 | 0.651148433 |

| | | | | | |
|-----|-----------------------|---------------|---------------------------|--------------|-------------|
| 549 | ENSMUSG00000037972.6 | Snn | chr16:11066298-11074983 | -0.618764864 | 0.651228226 |
| 550 | ENSMUSG00000025151.16 | Maged1 | chrX:94535474-94542143 | -0.61835134 | 0.651414916 |
| 551 | ENSMUSG00000027490.17 | E2f1 | chr2:154559407-154569892 | -0.618159137 | 0.651501706 |
| 552 | ENSMUSG00000028541.14 | B4galt2 | chr4:117869260-117883487 | -0.618089302 | 0.651533244 |
| 553 | ENSMUSG00000040084.9 | Bub1b | chr2:118598211-118641591 | -0.617969216 | 0.651587478 |
| 554 | ENSMUSG00000044719.4 | E230025N22Rik | chr18:36684923-36695925 | -0.616532994 | 0.652236465 |
| 555 | ENSMUSG00000025277.14 | Abhd6 | chr14:8002902-8056763 | -0.616166671 | 0.652402099 |
| 556 | ENSMUSG00000026547.15 | Tagln2 | chr1:172500047-172507380 | -0.614877268 | 0.652985442 |
| 557 | ENSMUSG00000034311.3 | Kif4 | chrX:100625737-100727214 | -0.614695466 | 0.653067733 |
| 558 | ENSMUSG00000024791.10 | Cdea5 | chr19:6084983-6091777 | -0.613710773 | 0.653513628 |
| 559 | ENSMUSG0000003363.15 | Pld3 | chr7:27532000-27553218 | -0.613638035 | 0.653546578 |
| 560 | ENSMUSG00000039037.5 | St6galnac5 | chr3:152817081-152982246 | -0.612672415 | 0.653984154 |
| 561 | ENSMUSG00000030774.13 | Pak1 | chr7:97788541-97912381 | -0.612350111 | 0.654130273 |
| 562 | ENSMUSG00000041429.2 | Nthl1 | chr17:24632682-24638838 | -0.612164642 | 0.654214372 |
| 563 | ENSMUSG00000045751.16 | Mms22l | chr4:24496451-24602950 | -0.611698512 | 0.65442578 |
| 564 | ENSMUSG00000028479.18 | Gne | chr4:44034075-44084177 | -0.609805348 | 0.655285108 |
| 565 | ENSMUSG00000031787.8 | Katnb1 | chr8:95081186-95103149 | -0.607607051 | 0.656284356 |
| 566 | ENSMUSG00000019843.14 | Fyn | chr10:39368855-39565381 | -0.607596195 | 0.656289295 |
| 567 | ENSMUSG00000027669.14 | Gnb4 | chr3:32580332-32616585 | -0.606424884 | 0.656822346 |
| 568 | ENSMUSG00000039477.16 | Tnrc18 | chr5:142724661-142817662 | -0.606311764 | 0.656873849 |
| 569 | ENSMUSG00000020380.16 | Rad50 | chr11:53649519-53707319 | -0.604209513 | 0.657831723 |
| 570 | ENSMUSG00000024835.14 | Coro1b | chr19:4148619-4154035 | -0.603700483 | 0.658063868 |
| 571 | ENSMUSG00000018474.17 | Chd3 | chr11:69343273-69369406 | -0.602731866 | 0.658505837 |
| 572 | ENSMUSG00000020048.13 | Hsp90b1 | chr10:86690209-86705509 | -0.602649515 | 0.658543427 |
| 573 | ENSMUSG00000029576.17 | Radil | chr5:142484839-142551098 | -0.601945499 | 0.658864865 |
| 574 | ENSMUSG00000021036.10 | Sptlc2 | chr12:87305058-87388355 | -0.60181362 | 0.658925096 |
| 575 | ENSMUSG00000042699.11 | Dhx9 | chr1:153455758-153487660 | -0.601334295 | 0.659144056 |
| 576 | ENSMUSG00000041202.12 | Pla2g2d | chr4:138775735-138782046 | -0.600950667 | 0.659319352 |
| 577 | ENSMUSG00000021707.5 | Dhfr | chr13:92354726-92389053 | -0.59809831 | 0.660624184 |
| 578 | ENSMUSG00000024897.8 | Apba1 | chr19:23758876-23949597 | -0.598021514 | 0.660659351 |
| 579 | ENSMUSG00000040016.16 | Ptger3 | chr3:157566892-157645888 | -0.597952692 | 0.660690868 |
| 580 | ENSMUSG00000050157.6 | Gm867 | chr10:75937723-75940672 | -0.595902731 | 0.661630327 |
| 581 | ENSMUSG00000034118.15 | Tpst1 | chr5:130073326-130135729 | -0.5958723 | 0.661644283 |
| 582 | ENSMUSG00000027940.18 | Tpm3 | chr3:90072649-90100902 | -0.595832289 | 0.661662633 |
| 583 | ENSMUSG00000040310.12 | Alx4 | chr2:93642384-93681339 | -0.595818903 | 0.661668772 |
| 584 | ENSMUSG00000017204.4 | Gsdma | chr11:98664351-98677708 | -0.595601539 | 0.66176847 |
| 585 | ENSMUSG00000014867.9 | Surf4 | chr2:26920040-26933928 | -0.595382627 | 0.661868893 |
| 586 | ENSMUSG00000027833.16 | Shox2 | chr3:66971727-66981771 | -0.595373667 | 0.661873004 |
| 587 | ENSMUSG00000035212.14 | Leprot | chr4:101647718-101659364 | -0.593951061 | 0.662525982 |
| 588 | ENSMUSG00000021294.7 | Kif26a | chr12:112146208-112181747 | -0.591155076 | 0.663811222 |
| 589 | ENSMUSG00000091243.2 | Vgll3 | chr16:65815257-65866368 | -0.590993761 | 0.66388545 |
| 590 | ENSMUSG0000005667.8 | Mthfd2 | chr6:83305691-83325908 | -0.590911783 | 0.663923175 |
| 591 | ENSMUSG00000024269.11 | Tpgs2 | chr18:25127223-25169007 | -0.588300004 | 0.665126195 |
| 592 | ENSMUSG0000000127.14 | Fer | chr17:63896018-64139494 | -0.586838922 | 0.665800139 |

| | | | | | |
|-----|-----------------------|----------|--------------------------|--------------|-------------|
| 593 | ENSMUSG00000040158.12 | Tax1bp3 | chr11:73177083-73183162 | -0.586401835 | 0.666001885 |
| 594 | ENSMUSG00000035517.17 | Tdrd7 | chr4:45965334-46034761 | -0.5862495 | 0.666072212 |
| 595 | ENSMUSG00000017721.15 | Pigt | chr2:164497520-164508301 | -0.585876614 | 0.66624439 |
| 596 | ENSMUSG00000089809.9 | Rasgef1b | chr5:99217426-99729065 | -0.585637151 | 0.666354985 |
| 597 | ENSMUSG00000050148.9 | Ubqln2 | chrX:153498227-153501570 | -0.585617995 | 0.666363833 |

Supplementary Table 3. Top 10 terms of GO_BP analysis in wound tissue from Dock5 KO mice.

| ID | Term | Ontology | Count | Size | P_value | FDR | Enrichment_Score | Fold_Enrichment | GeneRatio |
|------------|-------------------------------------|--------------------|-------|-------|------------|------------|------------------|-----------------|------------|
| GO:0048731 | System_development | Biological Process | 177 | 4209 | 3.7976E-15 | 1.0669E-11 | 14.4204899 | 1.75036291 | 0.30890052 |
| GO:0009966 | Regulation_of_signal_transduction | Biological Process | 136 | 2894 | 5.0078E-15 | 1.0669E-11 | 14.300352 | 1.95602384 | 0.23734729 |
| GO:0050793 | Regulation_of_developmental_process | Biological Process | 126 | 2621 | 1.3208E-14 | 1.8759E-11 | 13.8791782 | 2.00095483 | 0.21989529 |
| GO:0009987 | Cellular_process | Biological Process | 454 | 15499 | 3.4391E-14 | 3.6635E-11 | 13.4635559 | 1.21923083 | 0.79232112 |
| GO:0016043 | Cellular_component_organization | Biological Process | 196 | 5072 | 3.0851E-13 | 2.2058E-10 | 12.5107269 | 1.6084612 | 0.34205934 |
| GO:0007275 | Multicellular_organism_development | Biological Process | 188 | 4792 | 3.106E-13 | 2.2058E-10 | 12.5078002 | 1.6329572 | 0.32809773 |
| GO:0001568 | Blood_vessel_development | Biological Process | 43 | 516 | 1.644E-12 | 9.8483E-10 | 11.7840869 | 3.46858639 | 0.07504363 |
| GO:0042127 | Regulation_of_cell_proliferation | Biological Process | 87 | 1634 | 1.849E-12 | 9.8483E-10 | 11.7330604 | 2.21615923 | 0.15183246 |
| GO:0030334 | Regulation_of_cell_migration | Biological Process | 56 | 822 | 2.6066E-12 | 1.1115E-09 | 11.583927 | 2.83563267 | 0.09773124 |
| GO:0035239 | Tube_morphogenesis | Biological Process | 51 | 703 | 2.6085E-12 | 1.1115E-09 | 11.5836141 | 3.01959441 | 0.08900524 |

Supplementary Table 4. Top 10 terms of KEGG analysis for differentially expressed genes in wound tissue from Dock5 KO mice.

Down-regulated pathway:

| ID | Term | Count | Size | P_value | FDR | Enrichment_Score | Gene_Ratio | Genes |
|----------|--|-------|------|---------|-------|------------------|------------|--|
| mmu04974 | Protein_digestion_and_absorption | 11 | 90 | <0.001 | 0.011 | 4.161 | 0.046 | Col12a1//Col1a1//Col1a2//Col27a1//Col3a1//Col5a1//Col5a2//Col6a1//Col6a2//Col6a3//Dpp4 |
| mmu04510 | Focal_adhesion | 17 | 199 | <0.001 | 0.011 | 4.053 | 0.071 | Ccnd1//Col1a1//Col1a2//Col6a1//Col6a2//Col6a3//Dock1//Flna//Fyn//Itga11//Kdr//Lama3//Pak1//Pdgfrb//Thbs2//Tnn//Vegfc |
| mmu04512 | ECM-receptor_interaction | 10 | 83 | <0.001 | 0.014 | 3.778 | 0.042 | Col1a1//Col1a2//Col6a1//Col6a2//Col6a3//Hmmr//Itga11//Lama3//Thbs2//Tnn |
| mmu04145 | Phagosome | 15 | 180 | <0.001 | 0.019 | 3.520 | 0.063 | Calr//Colec12//Ctss//Cybb//Fcgr1//H2-Aa//H2-DMa//H2-DMb2//H2-M3//H2-T24//M6pr//Mrc2//Sec61a1//Tcirg1//Thbs2 |
| mmu04141 | Protein_processing_in_endoplasmic_reticulum | 14 | 166 | <0.001 | 0.021 | 3.373 | 0.058 | Calr//Ckap4//Dnajc10//Hsp90b1//Lman1//Man1c1//Pdia3//Pdia4//Pdia6//Rpn2//Rrbp1//Sec31a//Sec61a1//Ubqln2 |
| mmu04142 | Lysosome | 11 | 124 | 0.001 | 0.047 | 2.939 | 0.046 | Arsb//Ctsk//Ctss//Gnptab//Hexb//Lipa//M6pr//Npc2//Pla2g15//Ppt1//Tcirg1 |
| mmu00565 | Ether_lipid_metabolism | 6 | 45 | 0.002 | 0.065 | 2.691 | 0.025 | Lpcat1//Lpcat4//Pafah1b1//Pla2g2d//Pld3//Pld4 |
| mmu00670 | One_carbon_pool_by_folate | 4 | 19 | 0.002 | 0.065 | 2.677 | 0.017 | Aldh1l2//Dhfr//Mthfd1l//Mthfd2 |
| mmu00532 | Glycosaminoglycan_biosynthesis-chondroitin_sulfate | 4 | 20 | 0.003 | 0.071 | 2.590 | 0.017 | Chst12//Dse//Ust//Xylt1 |
| mmu04310 | Wnt_signaling_pathway | 11 | 146 | 0.004 | 0.104 | 2.377 | 0.046 | Apc//Ccnd1//Frat2//Nkd1//Nkd2//Notum//Prickle1//Serpinf1//Tбл1x//Tcf7l1//Vang11 |

Up-regulated pathway:

| ID | Term | Count | Size | P_value | FDR | Enrichment_Score | Gene_Ratio | Genes |
|----------|--|-------|------|---------|--------|------------------|------------|--|
| mmu04260 | Cardiac_muscle_contraction | 11 | 78 | <0.001 | <0.001 | 12.811 | 0.256 | Atp1a2//Cacng1//Cacng6//Myl4//Tnnc1//Tnnt2//Tpm1//Tpm2//Uqcr11//Uqcrfs1//Uqcrq |
| mmu04261 | Adrenergic_signaling_in_cardiomyocytes | 9 | 147 | <0.001 | <0.001 | 7.228 | 0.209 | Atp1a2//Cacng1//Cacng6//Mapk12//Myl4//Tnnc1//Tnnt2//Tpm1//Tpm2 |
| mmu05410 | Hypertrophic_cardiomyopathy_(HCM) | 7 | 84 | <0.001 | <0.001 | 6.601 | 0.163 | Cacng1//Cacng6//Des//Tnnc1//Tnnt2//Tpm1//Tpm2 |
| mmu05414 | Dilated_cardiomyopathy | 7 | 89 | <0.001 | <0.001 | 6.428 | 0.163 | Cacng1//Cacng6//Des//Tnnc1//Tnnt2//Tpm1//Tpm2 |
| mmu05412 | Arrhythmogenic_right_ventricular_cardiomyopathy_(ARVC) | 4 | 72 | 0.001 | 0.012 | 3.252 | 0.093 | Actn2//Cacng1//Cacng6//Des |
| mmu05016 | Huntington's_disease | 5 | 192 | 0.003 | 0.062 | 2.469 | 0.116 | Ndufa12//Polr2l//Uqcr11//Uqcrfs1//Uqcrq |
| mmu00190 | Oxidative_phosphorylation | 4 | 134 | 0.006 | 0.082 | 2.260 | 0.093 | Ndufa12//Uqcr11//Uqcrfs1//Uqcrq |
| mmu04550 | Signaling_pathways_regulating_pluripotency_of_stem_cells | 4 | 137 | 0.006 | 0.082 | 2.226 | 0.093 | Fgfr4//Isl1//Mapk12//Myf5 |
| mmu05012 | Parkinson's_disease | 4 | 144 | 0.007 | 0.084 | 2.150 | 0.093 | Ndufa12//Uqcr11//Uqcrfs1//Uqcrq |
| mmu01230 | Biosynthesis_of_amino_acids | 3 | 78 | 0.008 | 0.084 | 2.086 | 0.070 | Gpt2//Mat2a//Pgam2 |

Supplementary Table 5. Clinical characteristics of DFU patients and healthy subjects.

| Characteristics | Healthy subjects | DFU patients |
|--|----------------------|--------------------------|
| Age (year) | 54.67 ± 3.84 | 61.33 ± 2.68 |
| Sex (Male/Female) | 2/4 | 3/3 |
| FBG (mmol/L) | 5.15 ± 0.07 | $8.20 \pm 0.42^{***}$ |
| HbA1c (% (mmol/mol)) | 5.18 ± 0.11 (33) | 8.20 ± 0.31 (66) *** |
| Body Mass Index (kg/m^2) | 20.08 ± 0.11 | $24.21 \pm 0.57^{***}$ |

FBG, fasting blood glucose. ***P < 0.001 compared with healthy subjects. P values were calculated using t-test or chi-squared test. Data were presented as the mean \pm S.E.M.