

**Epithelial mesenchymal transition related genes in unruptured aneurysms identified through weighted gene coexpression network analysis**

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**Figure S1:** research procedure.

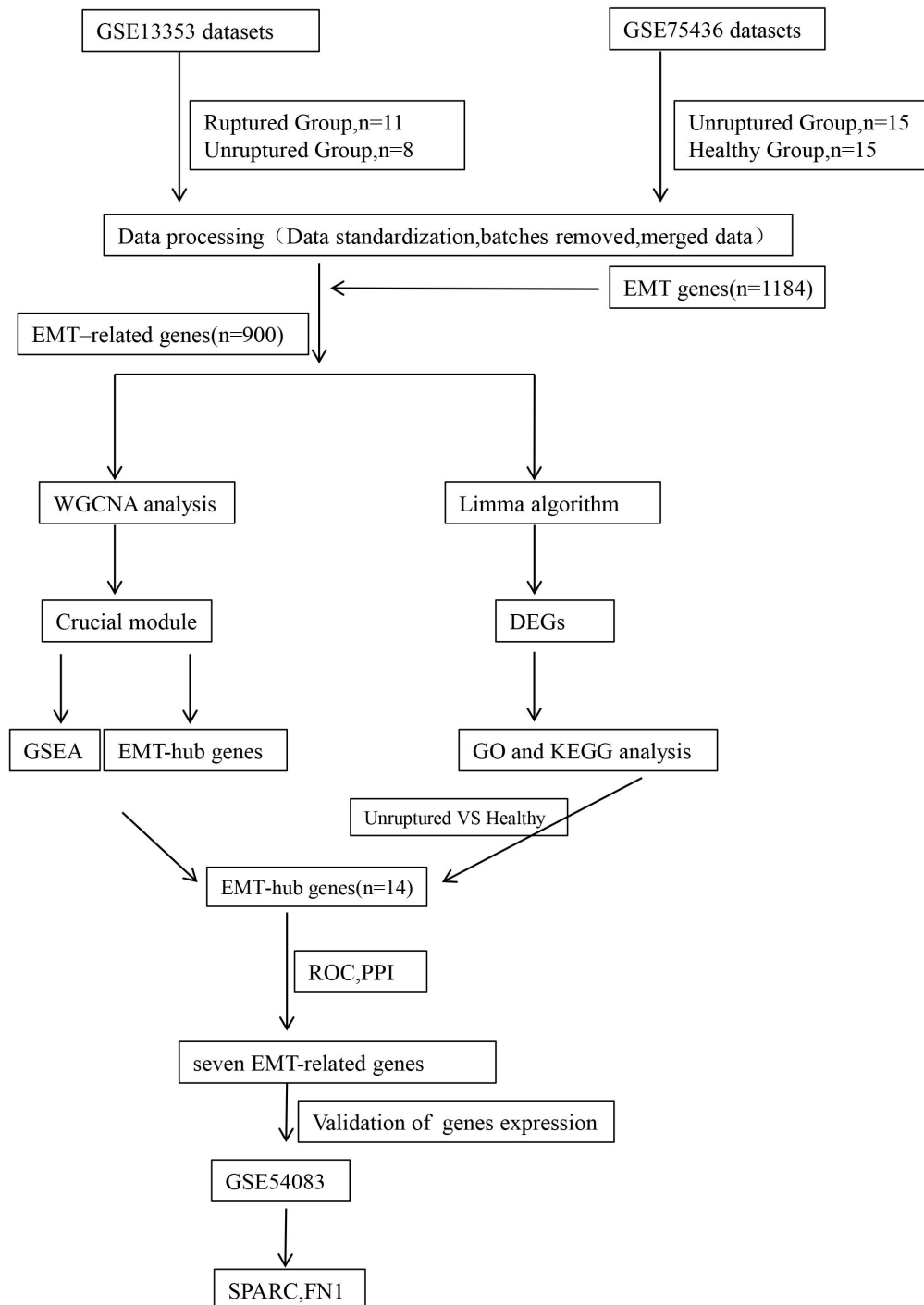


**Figure S2:**

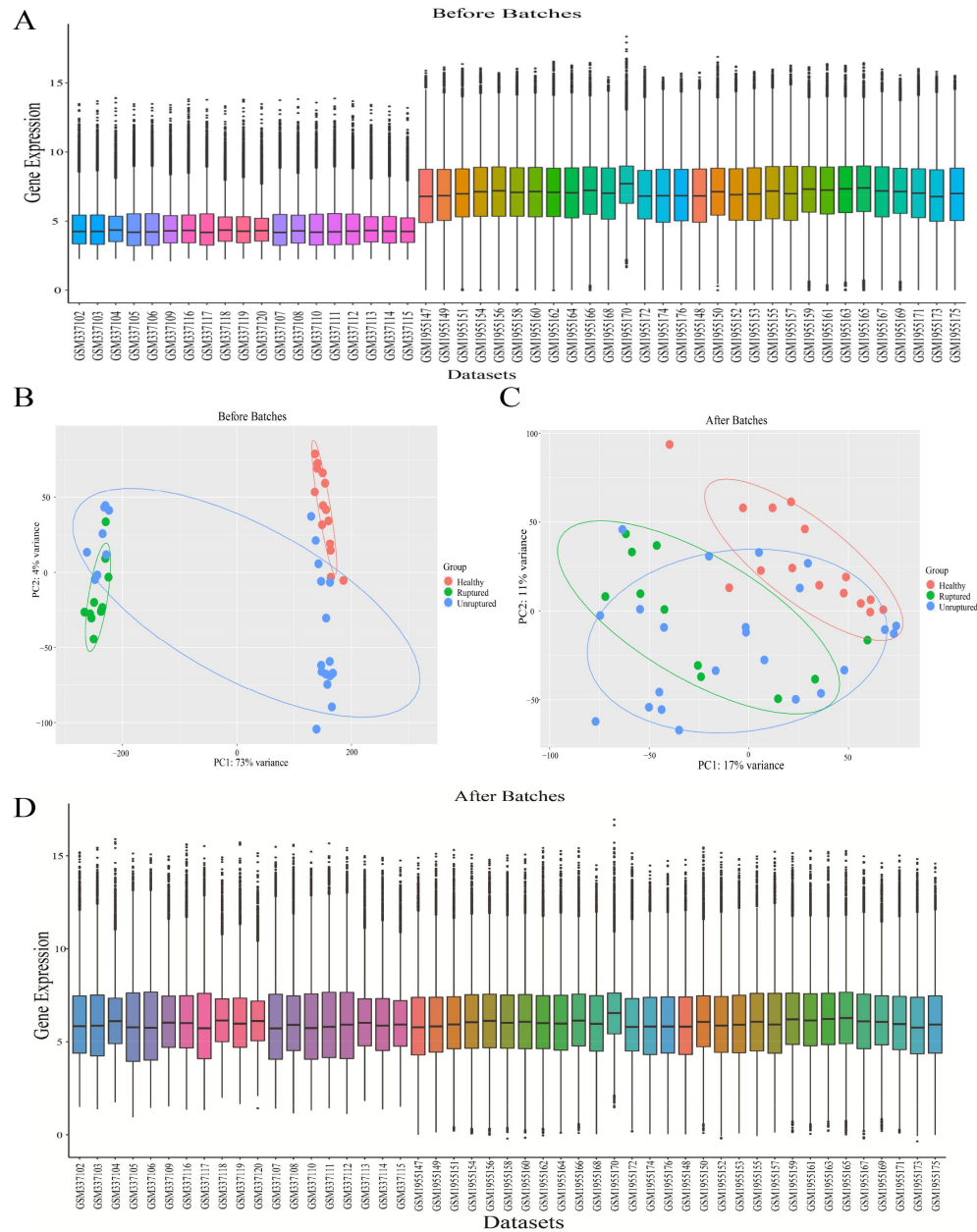


**Figure S2:** Merged datasets and removed batch effects. **A.** Datasets (GSE13353, GSE75436) standardized process, before removing batches. **B.** Principal Component Analysis(PCA) before removing batches. **C.** PCA analysis after removing batches. **D.** after removing batches. above all figures were visualized by R software 4.0.3.

Figure S3:

A

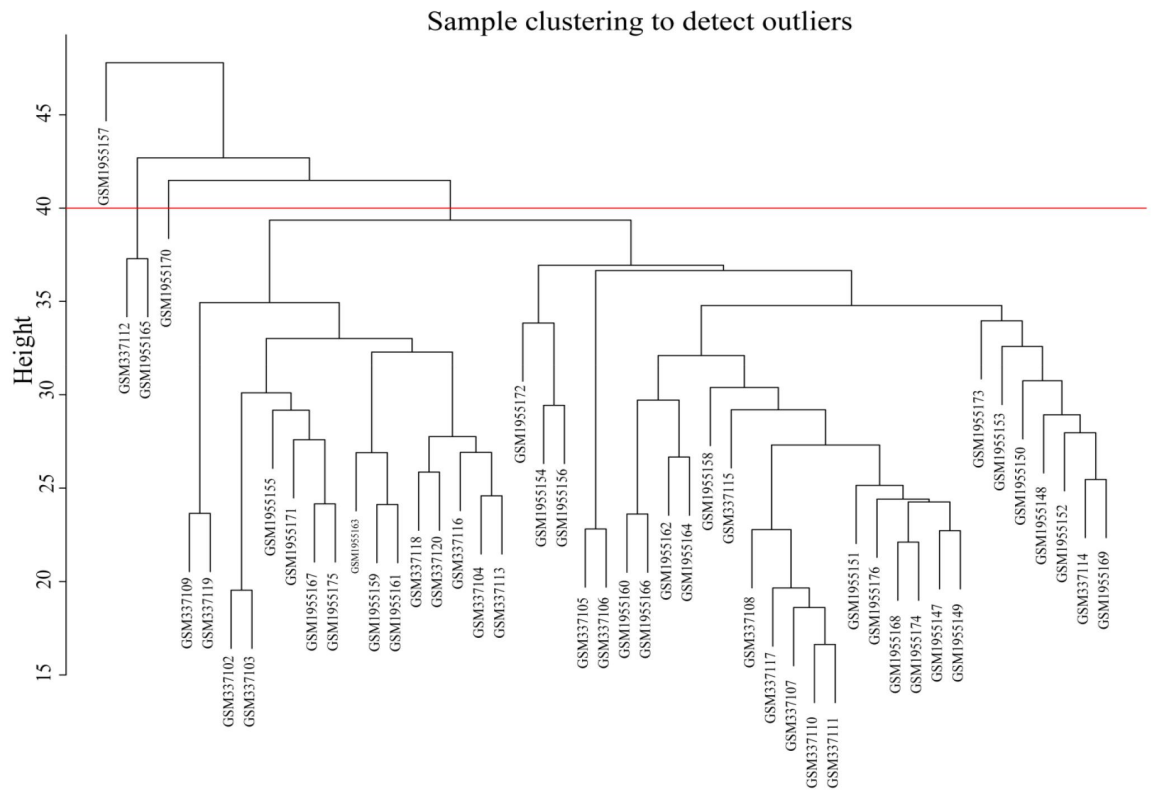
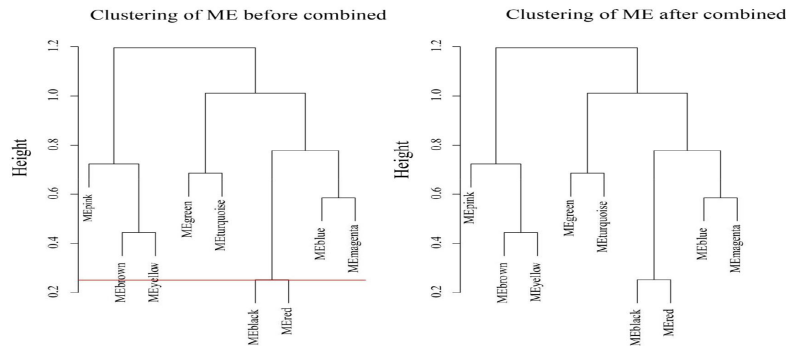


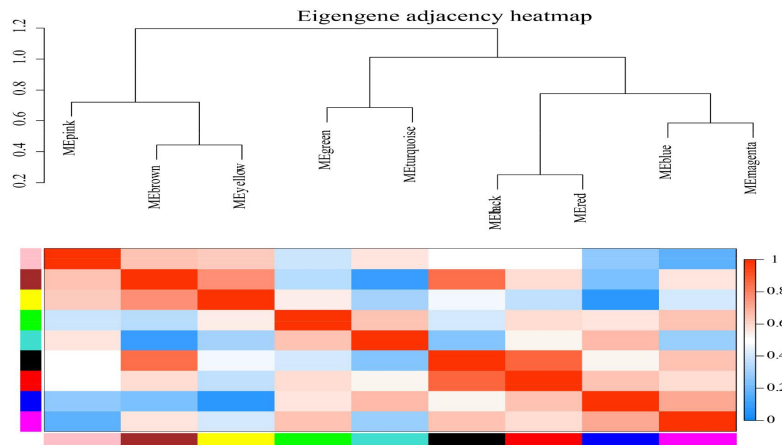
**Figure S3: A.** Sample clustering screened out outliers(red line)=40.above all figures were visualized by R software 4.0.3.

**Figure S4:**

**A**



**B**



**C**

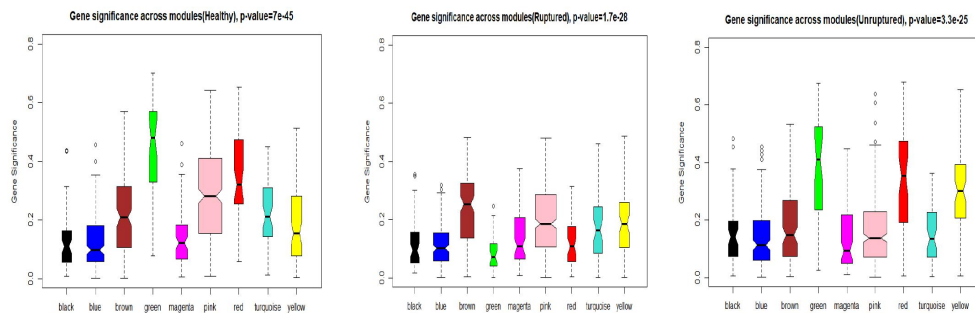


**Figure S4: A.** (Before being combined) The dendrogram of the characteristic genes of the consensus module obtained via WGCNA on the consensus correlation. The red line is the merge threshold (0.25). Eigengenes below the threshold indicate the modules whose expression profiles should be merged due to similarity. **B.** Clustering of MEs after being combined. **B.** The relationship between the module and neighboring modules. Red represents high correlation, and blue represents negative correlation. **C.** The important modules in the three groups (unruptured, ruptured, healthy) are represented by box diagrams. above all figures were visualized by R software 4.0.3.

**Table S1 :** information on samples and authors of datasets (GSE13353, GSE75436, GSE54083)

| datasets | samples                                                                                                             | Platforms | Contributor(s)                 |
|----------|---------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|
| GSE13353 | aneurysm_ruptured(n=11);<br>aneurysm_unruptured(n=8)                                                                | GPL570    | Yu L et.al <sup>1</sup>        |
| GSE75436 | aneurysm_unruptured(n=15);<br>superficial temporal artery(n=15)                                                     | GPL570    | Kurki MI<br>et.al <sup>2</sup> |
| GSE54083 | Ruptured intracranial aneurysm(n=8);<br>Unruptured intracranial aneurysm(n=5);<br>Superficial temporal artery(n=10) | GPL4133   | Inoue I et.al <sup>3</sup>     |

- 1 Kurki, M. I. *et al.* Upregulated signaling pathways in ruptured human saccular intracranial aneurysm wall: an emerging regulative role of Toll-like receptor signaling and nuclear factor- $\kappa$  B, hypoxia-inducible factor-1A, and ETS transcription factors. *Neurosurgery* **68**, 1667-1675; discussion 1675-1666, doi:10.1227/NEU.0b013e318210f001 (2011).
- 2 Wang, W. *et al.* Aberrant expression of lncRNAs and mRNAs in patients with intracranial aneurysm. *Oncotarget* **8**, 2477-2484, doi:10.18632/oncotarget.13908 (2017).
- 3 Nakaoka, H. *et al.* Gene expression profiling reveals distinct molecular signatures associated with the rupture of intracranial aneurysm. *Stroke* **45**, 2239-2245, doi:10.1161/strokeaha.114.005851 (2014).

**Table S2:** DEGs of (Unruptured VS Healthy, Ruptured VS Unruptured and Ruptured VS Healthy).

| DEG_Unruptured_Healthy | symbol | logFC        | Pvalue      | direction |
|------------------------|--------|--------------|-------------|-----------|
|                        | ADIPOQ | -3.414312601 | 1.04E-10    | Down      |
|                        | WNT11  | -2.490269899 | 1.18E-10    | Down      |
|                        | GPC3   | -1.701181    | 8.73E-10    | Down      |
|                        | CCL21  | -2.840780977 | 4.90E-08    | Down      |
|                        | CEMIP  | 2.879414244  | 2.51E-07    | Up        |
|                        | CDKN2A | 1.389749422  | 2.79E-07    | Up        |
|                        | HAS2   | -1.46907007  | 2.85E-07    | Down      |
|                        | AGTR1  | -1.94339542  | 4.99E-07    | Down      |
|                        | TNC    | -2.503298935 | 1.81E-06    | Down      |
|                        | CDH2   | 1.775682567  | 1.95E-06    | Up        |
|                        | CDH11  | 1.665029441  | 2.09E-06    | Up        |
|                        | GLI1   | -1.810649614 | 2.21E-06    | Down      |
|                        | SALL1  | 2.31139036   | 4.21E-06    | Up        |
|                        | CXCL14 | -2.527971286 | 5.02E-06    | Down      |
|                        | CTHRC1 | 1.996241729  | 7.82E-06    | Up        |
|                        | VCAN   | 1.696766658  | 8.49E-06    | Up        |
|                        | SDC1   | 1.379015828  | 9.15E-06    | Up        |
|                        | L1CAM  | -1.303169011 | 9.98E-06    | Down      |
|                        | LEFTY1 | -1.332973791 | 2.03E-05    | Down      |
|                        | SEMA3E | -1.654174731 | 3.61E-05    | Down      |
|                        | PDGFD  | -1.097233622 | 5.48E-05    | Down      |
|                        | SOX17  | -1.290679344 | 6.11E-05    | Down      |
|                        | KRT18  | 2.042998207  | 6.77E-05    | Up        |
|                        | CLDN7  | 1.491705712  | 9.75E-05    | Up        |
|                        | TNF    | 1.455946393  | 0.000131612 | Up        |
|                        | PTN    | 1.568125807  | 0.000137237 | Up        |
|                        | ISG15  | 1.445825957  | 0.000171209 | Up        |
|                        | NF1    | -1.007068535 | 0.000176212 | Down      |
|                        | IL1B   | 1.577071573  | 0.000184751 | Up        |
|                        | CRMP1  | 1.542459453  | 0.000202571 | Up        |
|                        | LAMA1  | 1.238790341  | 0.000241835 | Up        |
|                        | ADAM12 | 1.667261493  | 0.000245338 | Up        |
|                        | AOC4P  | -1.239395524 | 0.000265903 | Down      |
|                        | CD36   | -1.72395086  | 0.000270276 | Down      |

|           |              |             |      |
|-----------|--------------|-------------|------|
| WNT5A     | 1.488664713  | 0.000278884 | Up   |
| VSNL1     | 1.440534975  | 0.000279326 | Up   |
| POSTN     | 1.5405255    | 0.000299393 | Up   |
| PDPN      | 1.024021369  | 0.00035859  | Up   |
| TLR4      | 1.043221964  | 0.00048203  | Up   |
| IL18      | 1.38552503   | 0.000722122 | Up   |
| LEP       | -1.891124869 | 0.000735556 | Down |
| SERPINE1  | 1.424864926  | 0.000735717 | Up   |
| RBP2      | -1.021140801 | 0.000781664 | Down |
| CCR5      | 1.497903371  | 0.000812172 | Up   |
| HAVCR2    | 1.120219955  | 0.000843781 | Up   |
| KLF5      | -1.305651546 | 0.001228823 | Down |
| HOXB7     | 1.047121093  | 0.001375249 | Up   |
| CCL19     | -1.467900815 | 0.001536093 | Down |
| CXCL16    | 1.433998972  | 0.001723536 | Up   |
| SPRY2     | -1.032049561 | 0.001817461 | Down |
| ROR2      | 1.292879485  | 0.001855635 | Up   |
| TNFAIP8L2 | 1.107666433  | 0.001877938 | Up   |
| SPP1      | 2.078169546  | 0.001908017 | Up   |
| PLAC8     | 1.419875765  | 0.002200013 | Up   |
| ACTG2     | -1.257230125 | 0.002256496 | Down |
| IRF8      | 1.07788524   | 0.002631756 | Up   |
| ALDH1A1   | -1.159208631 | 0.002997022 | Down |
| MMP13     | 1.08828474   | 0.003911253 | Up   |
| P2RY2     | -1.182187035 | 0.005198312 | Down |
| FOXQ1     | 1.260314723  | 0.005245344 | Up   |
| VSIG4     | 1.548411145  | 0.005424095 | Up   |
| KIT       | 1.112751337  | 0.005456265 | Up   |
| CD14      | 1.561482419  | 0.005870081 | Up   |
| FLNA      | -1.121623804 | 0.005978445 | Down |
| MYL2      | -1.862430795 | 0.006305062 | Down |
| MYC       | -1.141033958 | 0.006599565 | Down |
| CRYAB     | -1.064617998 | 0.006680457 | Down |
| SERPINI1  | -1.037613267 | 0.007073019 | Down |
| CCL20     | 1.989521867  | 0.00758511  | Up   |
| HMOX1     | 1.77805992   | 0.008235887 | Up   |
| GREM1     | 1.585070789  | 0.010283712 | Up   |
| CXCR4     | 1.15675893   | 0.014828955 | Up   |
| DKK1      | 1.041438727  | 0.015225929 | Up   |
| CCL18     | 2.072846104  | 0.017414638 | Up   |
| C5AR1     | 1.080511394  | 0.029110488 | Up   |
| IL6       | -1.544384641 | 0.030116074 | Down |
| CXCL8     | 1.3231133    | 0.049808489 | Up   |

| DEG_Ruptured_Unruptured | symbol       | logFC        | Pvalue      | direction |
|-------------------------|--------------|--------------|-------------|-----------|
|                         | CD36         | 1.945101497  | 0.000206825 | Up        |
|                         | NUAK1        | -0.94943931  | 0.000439436 | Down      |
|                         | WNT11        | 1.268145203  | 0.00048186  | Up        |
|                         | HAS2         | 0.98638323   | 0.000722536 | Up        |
|                         | PDGFD        | 0.96185361   | 0.000986021 | Up        |
|                         | MYC          | 1.536432188  | 0.001128997 | Up        |
|                         | ADIPOQ       | 1.577940183  | 0.00131497  | Up        |
|                         | SOCS3        | 1.083689396  | 0.001438089 | Up        |
|                         | CDH11        | -1.081108058 | 0.002724222 | Down      |
|                         | DLX2         | -0.990401426 | 0.002769707 | Down      |
|                         | SPHK1        | 1.013904587  | 0.003644024 | Up        |
|                         | TNC          | 1.552301435  | 0.003809356 | Up        |
|                         | FZD7         | -1.286224076 | 0.004031134 | Down      |
|                         | IL6          | 2.291991335  | 0.00421511  | Up        |
|                         | CCL21        | 1.444246502  | 0.004762857 | Up        |
|                         | KDM6B        | 0.945487596  | 0.007679641 | Up        |
|                         | VCAN         | -1.03411864  | 0.008538159 | Down      |
|                         | SALL1        | -1.323086693 | 0.010023533 | Down      |
|                         | LEP          | 1.544704789  | 0.010459407 | Up        |
|                         | PTX3         | 1.718303865  | 0.011131976 | Up        |
|                         | ANGPT<br>L4  | 1.32315373   | 0.011801521 | Up        |
|                         | THBD         | 0.925711539  | 0.012420975 | Up        |
|                         | SERPIN<br>F1 | 1.247922064  | 0.013413321 | Up        |
|                         | ITGA5        | 1.100361505  | 0.014447205 | Up        |
|                         | CXCL14       | 1.349961692  | 0.016848401 | Up        |
|                         | NAMPT        | 1.126017316  | 0.017694818 | Up        |
|                         | KLF4         | 0.883921855  | 0.018140427 | Up        |
|                         | ADM          | 1.108970845  | 0.019077506 | Up        |
|                         | SEMA3E       | 0.944285076  | 0.023061995 | Up        |
|                         | NFIL3        | 0.90208518   | 0.024528402 | Up        |
|                         | PLAUR        | 1.069383831  | 0.026728759 | Up        |
|                         | TIMP1        | 0.978877374  | 0.029377665 | Up        |
|                         | KLF5         | 0.911396664  | 0.035105954 | Up        |
|                         | ID1          | -0.917335346 | 0.036484394 | Down      |
|                         | CXCR2        | 1.224816936  | 0.03861071  | Up        |
|                         | P2RY2        | 0.946075169  | 0.039195903 | Up        |
|                         | CXCL8        | 1.53610638   | 0.039620311 | Up        |
|                         | AQP9         | 1.584584323  | 0.040862962 | Up        |
|                         | S100A8       | 1.661108205  | 0.041288341 | Up        |
|                         | CCL2         | 1.253207254  | 0.043680305 | Up        |

|                      |          |              |             |           |
|----------------------|----------|--------------|-------------|-----------|
| DEG_Ruptured_Healthy | MMP9     | 1.095566347  | 0.045590557 | Up        |
|                      | NTRK3    | -0.867817826 | 0.04754577  | Down      |
|                      | S100P    | 1.25551415   | 0.049129356 | Up        |
|                      | symbol   | logFC        | Pvalue      | direction |
|                      | SDC1     | 1.543680353  | 2.69E-05    | Up        |
|                      | HK2      | 1.095821385  | 0.000137303 | Up        |
|                      | TIMP1    | 1.911106745  | 0.000182303 | Up        |
|                      | HAVCR2   | 1.515700847  | 0.000197324 | Up        |
|                      | CCR5     | 1.946081957  | 0.000313916 | Up        |
|                      | CXCL16   | 1.982905745  | 0.000359151 | Up        |
|                      | HMOX1    | 2.956111974  | 0.000364578 | Up        |
|                      | LYN      | 1.417782685  | 0.000398022 | Up        |
|                      | CXCR4    | 2.066229649  | 0.000434    | Up        |
|                      | CD14     | 2.442080676  | 0.000441761 | Up        |
|                      | MYD88    | 1.006080403  | 0.000457164 | Up        |
|                      | CSK      | 1.055906157  | 0.000485265 | Up        |
|                      | CEMIP    | 2.14863231   | 0.000504104 | Up        |
|                      | SERPINI1 | -1.616633098 | 0.000609957 | Down      |
|                      | ADIPOQ   | -1.836372418 | 0.000609997 | Down      |
|                      | CXCL8    | 2.85921968   | 0.000662891 | Up        |
|                      | AGTR1    | -1.460673116 | 0.000674226 | Down      |
|                      | SERPINE1 | 1.717181586  | 0.000676964 | Up        |
|                      | C5AR1    | 2.037771994  | 0.000870558 | Up        |
|                      | CTSL     | 1.409488183  | 0.000904003 | Up        |
|                      | ADAM12   | 1.777609744  | 0.00092708  | Up        |
|                      | AFAP1L2  | -1.062601665 | 0.000967754 | Down      |
|                      | CCL20    | 2.998201013  | 0.000970718 | Up        |
|                      | SPP1     | 2.644095624  | 0.00102916  | Up        |
|                      | FBP1     | 1.381060285  | 0.001046778 | Up        |
|                      | VSIG4    | 2.21364601   | 0.00106618  | Up        |
|                      | TLR4     | 1.143435059  | 0.001245014 | Up        |
|                      | ABCC3    | 1.32571505   | 0.001288235 | Up        |
|                      | ST14     | 1.504750417  | 0.001362979 | Up        |
|                      | GRN      | 1.391153261  | 0.001387686 | Up        |

|               |              |                 |      |
|---------------|--------------|-----------------|------|
| IRF8          | 1.366776367  | 0.00151487<br>7 | Up   |
| TNFAIP<br>8L2 | 1.354146948  | 0.00151853<br>6 | Up   |
| WNT5A         | 1.524045712  | 0.00155967<br>3 | Up   |
| WNT11         | -1.222124696 | 0.00166496      | Down |
| PLAUR         | 1.682940058  | 0.00169867<br>8 | Up   |
| DAB2          | 1.132975405  | 0.00200041      | Up   |
| CTS2          | 1.042885601  | 0.002003093     | Up   |
| NLRP3         | 1.23623685   | 0.002017872     | Up   |
| MCAM          | -1.029087359 | 0.002319889     | Down |
| AR            | -1.194539637 | 0.002337149     | Down |
| DKK1          | 1.527847249  | 0.00333489      | Up   |
| MMP19         | 1.131602523  | 0.003651876     | Up   |
| PTPN6         | 1.124565098  | 0.004313693     | Up   |
| CLDN7         | 1.258093056  | 0.004351941     | Up   |
| CRYAB         | -1.327079248 | 0.004829505     | Down |
| PHLDA1        | 1.005577178  | 0.005132826     | Up   |
| POSTN         | 1.370587869  | 0.00565866      | Up   |
| IL18          | 1.320357003  | 0.005980773     | Up   |
| CCL5          | 1.556570486  | 0.006182523     | Up   |
| PSTPIP1       | 1.059045966  | 0.006969773     | Up   |
| NTRK3         | -1.297223429 | 0.007165658     | Down |
| CAV1          | -1.156720569 | 0.007804753     | Down |
| TACC3         | 1.331605     | 0.007827392     | Up   |
| CCL18         | 2.786820749  | 0.007962084     | Up   |
| PRKAA2        | -1.086418221 | 0.0085121       | Down |
| PLAC8         | 1.403258371  | 0.010264892     | Up   |
| ACTA2         | -1.404907204 | 0.010472398     | Down |
| CCL21         | -1.396534475 | 0.011071656     | Down |
| CDH2          | 1.030467045  | 0.011816487     | Up   |
| GREM1         | 1.849451682  | 0.012170229     | Up   |
| UCP2          | 1.23827826   | 0.01387672      | Up   |
| HPSE          | 1.115539889  | 0.015386041     | Up   |
| CYP1B1        | 1.126984303  | 0.017142347     | Up   |
| ROR2          | 1.135786973  | 0.019456908     | Up   |
| PCDH9         | -1.067607421 | 0.021913941     | Down |
| EMP3          | 1.005252626  | 0.022357887     | Up   |
| AQP9          | 1.923867068  | 0.022558476     | Up   |
| FLNA          | -1.092100615 | 0.023452776     | Down |
| CTHRC1        | 1.111123612  | 0.024430974     | Up   |
| ANGPT         | 1.260350988  | 0.025704714     | Up   |

|       |             |             |    |
|-------|-------------|-------------|----|
| L4    |             |             |    |
| IL1B  | 1.070194608 | 0.026166817 | Up |
| LIF   | 1.130484289 | 0.02795256  | Up |
| FOXM1 | 1.036298268 | 0.030257012 | Up |
| MMP1  | 1.986151642 | 0.031094204 | Up |
| PTN   | 1.004203068 | 0.0315546   | Up |
| MMP9  | 1.245671474 | 0.036175181 | Up |