

**Supplementary table 1: RNA-seq analysis of gene expression in high-invasive and low-invasive HepG2 cells**

| TOP 20 up regulation genes |           |          |        |        | TOP 20 down regulation genes |           |          |      |        |
|----------------------------|-----------|----------|--------|--------|------------------------------|-----------|----------|------|--------|
| Gene                       | FPKM.High | FPKM.Low | FC     | LOG2FC | Gene                         | FPKM.High | FPKM.Low | FC   | LOG2FC |
| TPI1                       | 707.50    | 2.62     | 270.13 | 8.08   | DSG2                         | 0.19      | 36.66    | 0.01 | -7.58  |
| DYRK1A                     | 15.23     | 0.09     | 173.77 | 7.44   | HIST1H2E                     | 6.99      | 1261.04  | 0.01 | -7.50  |
| SELENOI                    | 16.03     | 0.10     | 157.66 | 7.30   | LASP1                        | 0.30      | 52.79    | 0.01 | -7.45  |
| APLP2                      | 51.51     | 0.33     | 156.22 | 7.29   | HIST1H2F                     | 15.97     | 1263.82  | 0.01 | -6.31  |
| CTSD                       | 175.46    | 1.73     | 101.60 | 6.67   | MYOF                         | 0.20      | 16.14    | 0.01 | -6.30  |
| PAICS                      | 108.62    | 1.13     | 95.75  | 6.58   | TGOLN2                       | 0.25      | 19.92    | 0.01 | -6.30  |
| ABCC4                      | 27.69     | 0.33     | 83.59  | 6.39   | MGAT1                        | 0.34      | 25.13    | 0.01 | -6.20  |
| ACTB                       | 286.22    | 3.62     | 78.96  | 6.30   | NCAPG2                       | 0.31      | 20.03    | 0.02 | -6.02  |
| CLUH                       | 19.20     | 0.26     | 72.95  | 6.19   | NUP214                       | 0.21      | 13.74    | 0.02 | -6.00  |
| LASP1                      | 191.45    | 2.71     | 70.67  | 6.14   | COPS7A                       | 0.76      | 48.21    | 0.02 | -5.99  |
| TUBB3                      | 36.55     | 0.53     | 68.41  | 6.10   | PDXDC1                       | 0.25      | 13.97    | 0.02 | -5.79  |
| HDLBP                      | 23.82     | 0.36     | 66.50  | 6.06   | NUTF2                        | 0.86      | 45.95    | 0.02 | -5.74  |
| NCLN                       | 35.10     | 0.54     | 65.22  | 6.03   | DBNDD1                       | 0.43      | 21.99    | 0.02 | -5.68  |
| USP19                      | 13.38     | 0.22     | 60.69  | 5.92   | LIF                          | 0.24      | 12.28    | 0.02 | -5.65  |
| FGFRL1                     | 56.73     | 0.98     | 57.81  | 5.85   | PSMG2                        | 0.90      | 43.63    | 0.02 | -5.60  |
| ECE1                       | 15.90     | 0.30     | 53.40  | 5.74   | ARID1A                       | 0.21      | 10.14    | 0.02 | -5.57  |
| SPECC1L                    | 8.59      | 0.16     | 53.12  | 5.73   | GSPT1                        | 0.95      | 44.19    | 0.02 | -5.54  |
| FDFT1                      | 21.81     | 0.43     | 50.22  | 5.65   | SCRN1                        | 0.76      | 34.12    | 0.02 | -5.49  |
| MDM4                       | 6.13      | 0.12     | 49.50  | 5.63   | DDX17                        | 1.57      | 70.78    | 0.02 | -5.49  |
| EIF3L                      | 33.22     | 0.67     | 49.49  | 5.63   | HNRNPH                       | 0.75      | 33.06    | 0.02 | -5.46  |