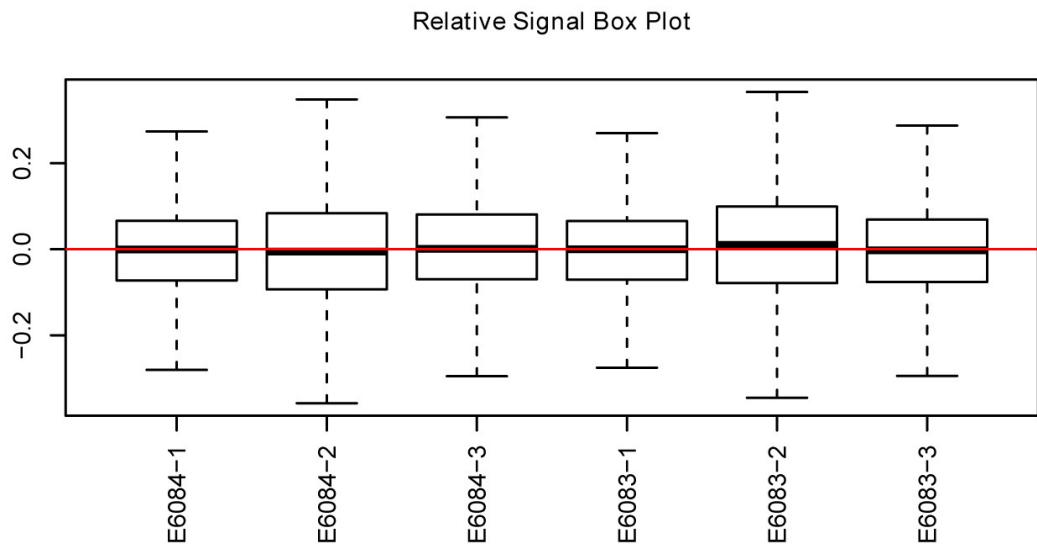


## Supplementary

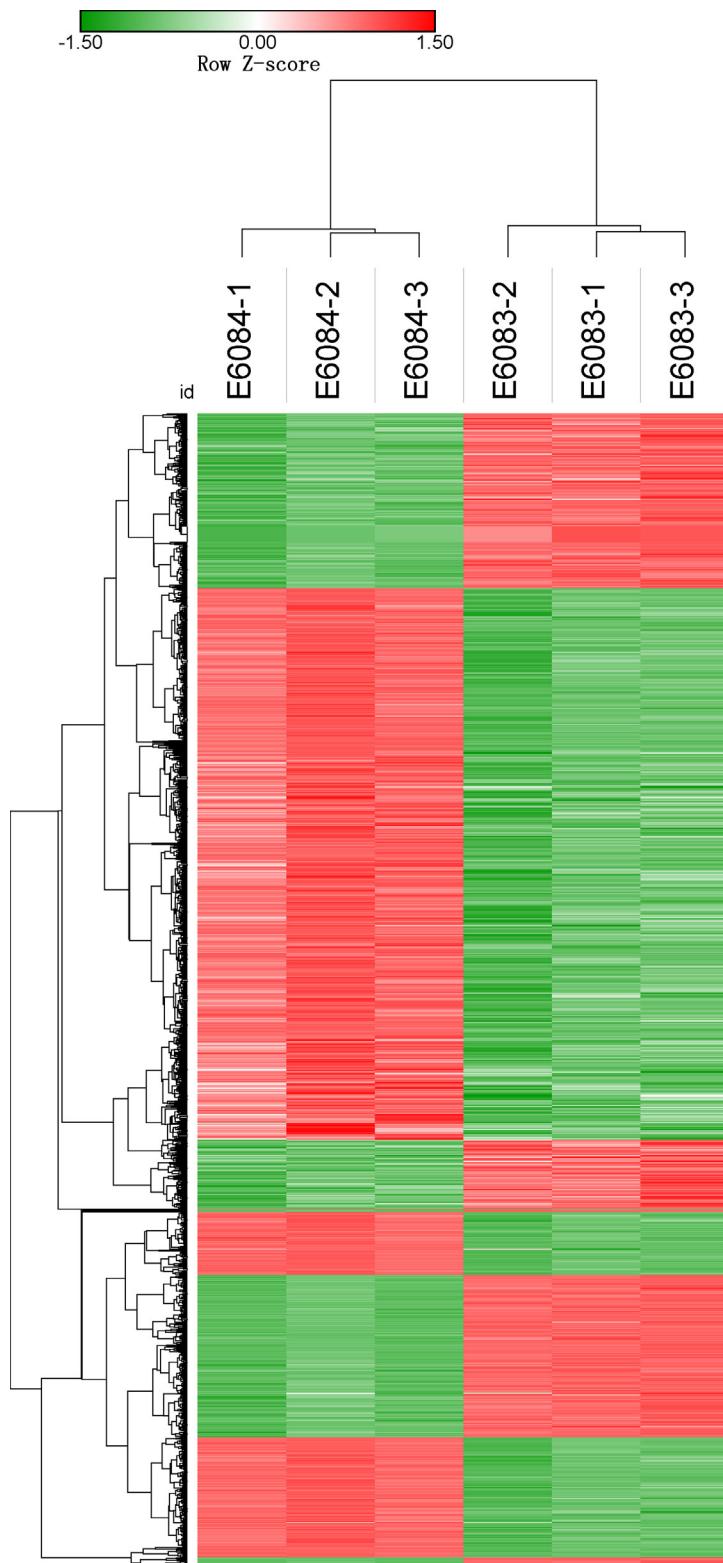
**Table S1** The three different target sequences for GPSM2 (siGPSM2#1, siGPSM2#2, and siGPSM2#3)

| No.                | Target Seq          |
|--------------------|---------------------|
| ShGPSM2#1          | AGATACTATTGGAGATGAA |
| ShGPSM2#2          | ACTTTACAATCTTGGGAAT |
| ShGPSM2#3          | ATGATTATGCCAAAGCATT |
| Scrambled sequence | TTCTCCGAACGTGTCACGT |

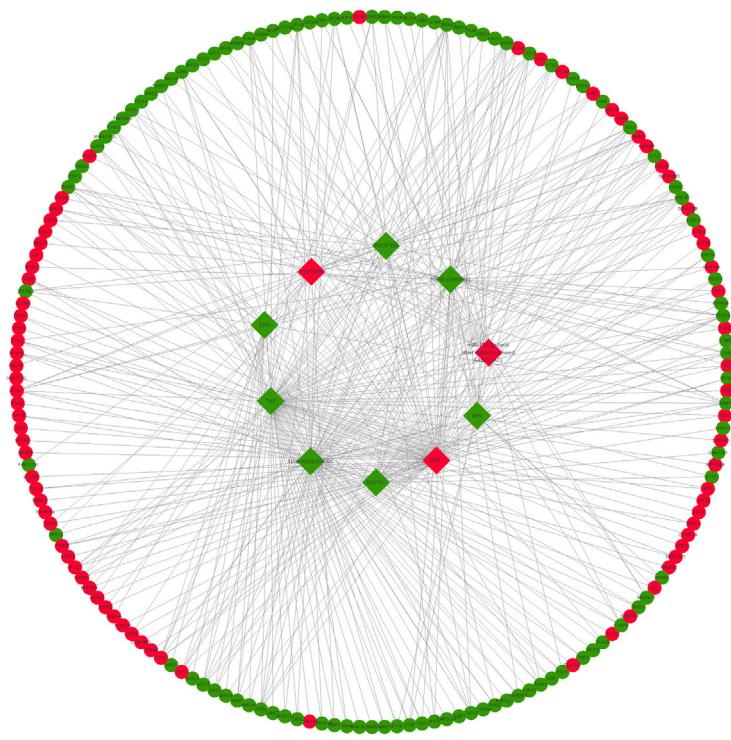
GPSM2, G-protein signaling modulator 2.



**Figure S1** The relative signal boxplot of six microarrays after normalization.



**Figure S2** Heatmap of the differentially expressed genes (DEGs) in cells transfected with shGPSM2#2 (E6083-1, E6083-2 and E6083-3) and cells transfected with the scrambled sequence (shNC) (E6084-1, E6084-2 and E6084-3). Red patch, upregulation; green patch, downregulation. FDR <0.05 and |Fold Change| >1.5 were set as the cut-off criteria. FDR, false discovery rate.



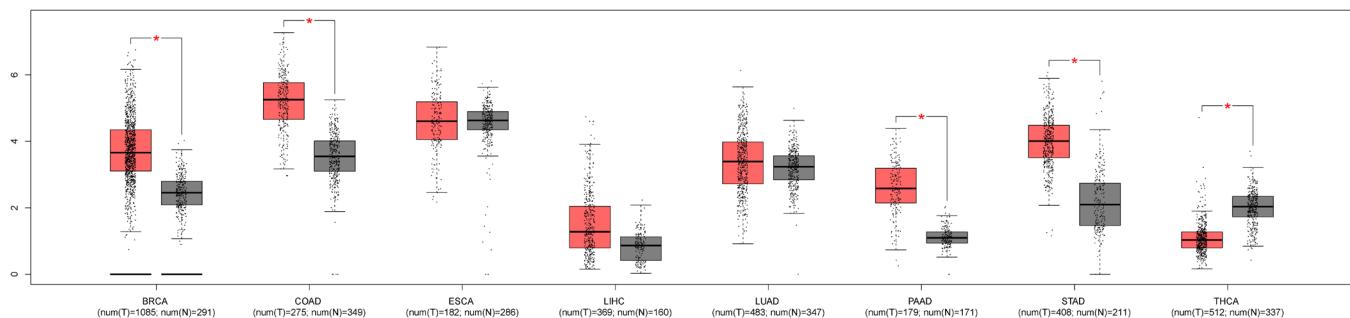
**Figure S3** Network of the top ten upstream regulators and their downstream genes. Diamond, upstream regulators; circle, downstream genes. Red, upregulation; green, downregulation.

**Table S2** Top ten regulator effects analysis of upstream regulatory factors on downstream functions

| ID | Consistency score | Node total | Regulator total | Regulators  | Target total | Target molecules in dataset   | Disease & function total | Diseases & functions  | Known regulator-disease/function relationship | Counts of antibody list |
|----|-------------------|------------|-----------------|---|--------------|---|--------------------------|---|---|-------------------------|
| 1  | 31.843            | 95         | 35              | ALB, ATF4, C3, CD40LG, CSF1, CYR61, DICER1, EDN1, EGR1, ERK1/2, EZH2, F2, F2R, F3, FGF7, IL17A, IL36B, ITGB1, MAP3K8, MAPK14, Mek, MYD88, NFkB (complex), PDGF BB, PGR, PRKCD, PTGS2, RELA, SMARCA4, STAT4, TLR2, TLR3, TLR4, TLR5, TRADD | 54           | AHR, AKAP12, AKT1, ANGPTL4, ATF3, ATP2A2, AXL, CAPN2, CCL2, CD44, CD69, CX3CL1, CXCL1, CXCL2, CXCL8, EDIL3, EGFR, ETV4, F2RL1, FGFR2, FOXO1, HBEGF, IL18, IL1R1, IL6R, ITGA2, ITGA5, ITGA6, ITGAM, KIT, KRAS, LIF, LTB, MAP2K1, MELTF, MET, MMP1, MMP14, NRG1, PLAUR, PLPP3, PPARA, PTX3, RAC2, RICTOR, SDC2, SERPINF1, SERPINH1, SNAI2, SPARC, SPHK1, STON1, THBS1, VEGFA  | 6                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Homing of tumor cell lines, Increased Levels of AST, Migration of endothelial cell lines, Proliferation of hepatic stellate cells            | 20% (41/210)                                  | 14                      |
| 2  | 24.4              | 37         | 7               | ALB, C3, EDN1, F2, IL36B, ITGB1, TRADD  | 25           | ANGPTL4, ATP2A2, CASP1, CCL2, CD44, CX3CL1, CXCL1, CXCL2, CXCL8, DDT3, EGFR, F3, HBEGF, IL18, IRF1, ITGA2, ITGA5, ITGAM, MAP2K1, MMP1, NRG1, PLAUR, RAC2, THBS1, VEGFA  | 5                        | Accumulation of neutrophils, Apoptosis of kidney cells, Cell movement of connective tissue cells, Homing of tumor cell lines, Migration of endothelial cell lines   | 29% (10/35)                                   | 10                      |
| 3  | 24.218            | 48         | 13              | CREB1, ERK1/2, F2, FGF7, IL17A, IL36B, NFkB (complex), SMAD3, SPP1, TGFB3, TNFSF11, TP73, TRADD   | 32           | AHR, AKT1, ANGPTL4, ATP2A2, C3, CAPN2, CCL2, CD44, CD69, CX3CL1, CXCL1, CXCL2, CXCL8, EDIL3, EDN1, EGFR, F3, FGFR2, IL18, ITGA2, ITGA5, ITGAM, MAP2K1, MMP1, NRG1, PLAUR, RAC2, THBS1, VEGFA  | 3                        | Accumulation of neutrophils, Homing of tumor cell lines, Migration of endothelial cell lines  | 10% (4/39)                                    | 11                      |
| 4  | 21.372            | 53         | 10              | ALB, BRAF, CCL5, ECSIT, EGR1, F2, GLIS2, IL36B, MAPK3, mir-515  | 37           | AHR, ANGPTL4, ATF3, ATP2A2, C3, CAPN2, CCL2, CD44, CD69, CDH1, CX3CL1, CXCL1, CXCL2, CXCL8, DUSP6, EDN1, EGFR, ETS1, F3, HBEGF, IGF1R, IL18, ITGAM, ITGB1, LTBP2, MMP1, MMP14, NDRG1, PLAUR, RAC2, RFFL, SERPINE1, SNAI2, SPARC, TFPI, THBS1, VEGFA   | 6                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Cell movement of melanoma cell lines, Homing of tumor cell lines, Migration of breast cancer cell lines, Migration of endothelial cell lines | 13% (8/60)                                    | 12                      |
| 5  | 19.941            | 80         | 9               | CSF1, CYR61, EDN1, ERK1/2, F2, F2R, IL17A, PDGF BB, TLR4  | 66           | AKAP12, ANGPTL4, ATP2A2, BCL10, BCL2L11, BIRC5, C3, CCL2, CD40, CD44, CD68, CDH1, CX3CL1, CXCL1, CXCL2, CXCL8, DCBLD2, DOCK10, DST, EDIL3, EGFR, ENPP1, ETS1, F3, FGFR2, FOXO1, FZD7, HBEGF, HMGA1, HSP90AA1, ID1, IDH2, IGF1R, IL18, IRF1, ITGA2, ITGA5, ITGA6, ITGAM, ITGB1, ITGB5, ITPR1, KCNH2, KRAS, LIF, LMNA, MAP2K1, MCL1, MET, MMP1, MMP14, MMP2, MYD88, NRG1, OCLN, PLAUR, PTX3, RAC2, RUNX1, SKP2, SNAI2, SPHK1, TFPI, THBS1, TUBB3, VEGFA | 5                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Homing of tumor cell lines, Leukemia, Migration of endothelial cell lines  | 49% (22/45)                                   | 24                      |
| 6  | 19.936            | 46         | 10              | ALB, BRAF, C3, EGR1, F2, GLIS2, IL17A, IL36B, ITGB1, TRADD  | 31           | ANGPTL4, ATP2A2, CCL2, CD44, CDH1, CX3CL1, CXCL1, CXCL2, CXCL8, EDIL3, EDN1, EGFR, F3, HBEGF, IL18, ITGA5, ITGAM, ITPR1, LIF, LTBP2, MMP1, MMP14, MMP2, PLAUR, RAC2, RFFL, SERPINE1, SNAI2, SPARC, THBS1, VEGFA   | 5                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Cell movement of melanoma cell lines, Homing of tumor cell lines, Migration of endothelial cell lines  | 24% (12/50)                                   | 9                       |
| 7  | 19.894            | 58         | 21              | CD40LG, CHUK, EDN1, F2, F3, IKBKG, IL18, IL1B, IL2, MAPK14, MYD88, NFkB (complex), PDGF BB, PTGS2, TLR2, TLR3, TLR4, TLR5, TLR7, TNFRSF1A, TYROBP   | 34           | AHR, ANGPTL4, ATP2A2, CCL2, CD44, CX3CL1, CXCL1, CXCL2, CXCL8, EGFR, ENAH, FGFR2, FOXO1, HBEGF, IL1R1, ITGA2, ITGA5, ITGA6, ITGAM, ITGB1, KRAS, L1CAM, MAP2K1, MET, MMP1, MMP14, NRG1, PLAUR, PLPP3, PTX3, RAC2, SPARC, THBS1, VEGFA  | 3                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Migration of endothelial cell lines  | 25% (16/63)                                   | 10                      |
| 8  | 16.384            | 59         | 16              | ALB, C3, CCL5, ECSIT, ETV5, F2, F7, IL17A, IL36B, ITGB1, MAPK3, miR-200b-3p (and other miRNAs w/seed AAUACUG), mir-515, NOD2, RHOA, TRADD   | 38           | AHR, ANGPTL4, CAPN2, CCL2, CD44, CD69, CDH1, CX3CL1, CXCL1, CXCL2, CXCL8, DUSP6, EDIL3, EDN1, ETS1, F3, FHOD1, HBEGF, IGF1R, IL18, ITGA5, ITGAM, ITGB5, ITGBL1, LIF, MAP1, MMP1, MMP14, MMP2, PLAUR, PPM1F, RAC2, SDC2, SERPINE1, SNAI2, TFPI, THBS1, TWIST2, VEGFA   | 5                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Homing of tumor cell lines, Migration of breast cancer cell lines, Migration of endothelial cell lines                                       | 20% (16/80)                                   | 14                      |
| 9  | 15.629            | 59         | 8               | CYR61, EDN1, F2, F2R, F3, IL17A, TNFSF11, TRADD   | 46           | ANGPTL4, ATP2A2, C3, CAPN2, CCL2, CD44, CEBPD, CLDN3, CX3CL1, CXCL1, CXCL2, CXCL8, DUSP6, EDIL3, EFEMP1, EGFR, EHD1, FOXO1, FZD7, HBEGF, HSP90AA1, IGF1R, IGFBP7, IL15RA, IL18, ITGA2, ITGA5, ITGA6, ITGAM, ITGB1, JAG1, KRAS, LIF, MAP2K1, MMP1, MMP2, NRG1, PLAUR, PLPP3, RAC2, SDC1, SERPINE1, STMN1, TFPI, THBS1, VEGFA   | 5                        | Accumulation of neutrophils, Cell movement of connective tissue cells, Homing of tumor cell lines, Migration of endothelial cell lines, Secondary neoplasm of digestive system                                      | 30% (12/40)                                   | 15                      |
| 10 | 12.4              | 35         | 7               | ERK1/2, F2R, IL17A, MYD88, TICAM1, TNFSF11, TRADD   | 25           | C3, CAPN2, CCL2, CD44, CX3CL1, CXCL1, CXCL2, CXCL8, EDIL3, EDN1, F3, FGFR2, IGF1R, IL15RA, IL18, ITGA2, ITGA5, ITGA6, ITGAM, LIF, MAP2K1, PLAUR, SERPINE1, SNAI2, VEGFA   | 3                        | Accumulation of neutrophils, Homing of tumor cell lines, Liver metastasis   | 10% (2/21)                                    | 11                      |

**Table S3** The top 15 differentially expressed genes with higher scores, identified by the number of degrees

| Name            | Description   | Degree |
|-----------------|---|--------|
| <i>AKT1</i>     | Protein kinase B                                    | 235    |
| <i>EGFR</i>     | Epidermal Growth Factor Receptor                    | 183    |
| <i>VEGFA</i>    | Vascular Endothelial Growth Factor A                | 149    |
| <i>CDH1</i>     | Cadherin 1  | 129    |
| <i>HSP90AA1</i> | Heat Shock Protein 90 Alpha Family Class A Member 1 | 120    |
| <i>CXCL8</i>    | C-X-C Motif Chemokine Ligand 8                      | 98     |
| <i>KRAS</i>     | Kirsten rat sarcoma viral oncogene homolog          | 91     |
| <i>CD44</i>     | CD44 Molecule                                       | 91     |
| <i>MMP2</i>     | Matrix Metallopeptidase 2                           | 73     |
| <i>MDM2</i>     | Mouse double minute 2                               | 71     |
| <i>ITGB1</i>    | Integrin Subunit Beta 1                             | 70     |
| <i>KIT</i>      | KIT proto-oncogene                                  | 68     |
| <i>ITGAM</i>    | integrin subunit alpha M                            | 67     |
| <i>NRAS</i>     | Neuroblastoma RAS Viral Oncogene Homolog            | 67     |
| <i>CCL2</i>     | C-C Motif Chemokine Ligand 2                        | 62     |



**Figure S4** Expression levels of GPSM2 in primary cancer and adjacent normal tissues. \*, P<0.05. BRCA, breast invasive carcinoma; COAD, colon adenocarcinoma; ESCA, esophageal carcinoma; LUAD, lung adenocarcinoma; PAAD, pancreatic adenocarcinoma; LIHC, liver hepatocellular carcinoma; STAD, stomach adenocarcinoma; THCA, thyroid carcinoma.