**Supplementary Table 3.** **Correlation analysis between *LPAR6* and related genes and markers of immune cells in tumor and normal tissues in LIHC**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Description** | **Gene markers** | **LIHC** | | | |
| **Normal** | | **Tumor** | |
| **R** | **P** | **R** | **P** |
| CD8+ T cell | CD8A | 0.63 | \*\*\* | 0.52 | \*\*\* |
|  | CD8B | 0.64 | \*\*\* | 0.46 | \*\*\* |
| T cell, general | CD3D | 0.59 | \*\*\* | 0.46 | \*\*\* |
|  | CD3E | 0.58 | \*\*\* | 0.61 | \*\*\* |
|  | CD2 | 0.63 | \*\*\* | 0.59 | \*\*\* |
| Naive T cell | CCR7 | 0.58 | \*\*\* | 0.58 | \*\*\* |
|  | LEF1 | 0.45 | \*\* | 0.33 | \*\*\* |
|  | TCF7 | 0.4800 | \*\* | 0.0026 | 0.9600 |
|  | SELL | 0.57 | \*\*\* | 0.54 | \*\*\* |
| Effector T cell | CX3CR1 | 0.38 | \*\* | 0.50 | \*\*\* |
|  | FGFBP2 | 0.15 | 0.3 | 0.073 | 0.16 |
|  | FCGR3A | 0.72 | \*\*\* | 0.49 | \*\*\* |
| Effector memory T cell | PDCD1 | 0.58 | \*\*\* | 0.47 | \*\*\* |
|  | DUSP4 | 0.43 | \* | 0.58 | \*\*\* |
|  | GZMK | 0.66 | \*\*\* | 0.55 | \*\*\* |
|  | GZMA | 0.61 | \*\*\* | 0.49 | \*\*\* |
|  | IFNG | 0.54 | \*\*\* | 0.34 | \*\*\* |
| Central memory T cell | CCR7 | 0.58 | \*\*\* | 0.58 | \*\*\* |
|  | SELL | 0.57 | \*\*\* | 0.54 | \*\*\* |
|  | IL7R | 0.59 | \*\*\* | 0.63 | \*\*\* |
| Resident memory T cell | CD69 | 0.61 | \*\*\* | 0.61 | \*\*\* |
|  | ITGAE | 0.39 | \* | 0.28 | \*\*\* |
|  | CXCR6 | 0.59 | \*\*\* | 0.57 | \*\*\* |
|  | MYADM | 0.10 | 0.48 | 0.49 | \*\*\* |
| B cell | CD19 | 0.48 | \*\* | 0.44 | \*\*\* |
|  | CD79A | 0.54 | \*\*\* | 0.52 | \*\*\* |
| Monocyte | CD86 | 0.72 | \*\*\* | 0.64 | \*\*\* |
|  | CD115 (CSF1R) | 0.69 | \*\*\* | 0.65 | \*\*\* |
| TAM | CCL2 | 0.30 | 0.035 | 0.59 | \*\*\* |
|  | CD68 | 0.69 | \*\*\* | 0.45 | \*\*\* |
|  | IL10 | 0.48 | \*\* | 0.54 | \*\*\* |
| M1 macrophage | INOS (NOS2) | 0.13 | 0.38 | 0.19 | \* |
|  | IRF5 | 0.55 | \*\*\* | 0.31 | \*\*\* |
|  | COX2 (PTGS2) | 0.320 | 0.026 | 0.650 | \*\*\* |
| **M2 macrophage** | CD163 | 0.65 | \*\*\* | 0.50 | \*\*\* |
|  | VSIG4 | 0.69 | \*\*\* | 0.57 | \*\*\* |
|  | MS4A4A | 0.75 | \*\*\* | 0.56 | \*\*\* |
| Neutrophil | CD66b  (CEACAM8) | 0.370 | \* | 0.130 | 0.014 |
|  | CD11b (ITGAM) | 0.59 | \*\*\* | 0.46 | \*\*\* |
|  | CCR7 | 0.58 | \*\*\* | 0.58 | \*\*\* |
| Natural killer cell | KIR2DL1 | 0.2500 | 0.0780 | 0.1600 | 0.0023 |
|  | KIR2DL3 | 0.20 | 0.15 | 0.23 | \*\*\* |
|  | KIR2DL4 | 0.300 | 0.031 | 0.260 | \*\*\* |
|  | KIR3DL1 | 0.2900 | 0.0390 | 0.1400 | 0.0054 |
|  | KIR3DL2 | 0.0023 | 0.9900 | 0.2700 | \*\*\* |
|  | KIR3DL3 | 0.230 | 0.110 | 0.063 | 0.230 |
|  | KIR2DS4 | 0.20 | 0.16 | 0.19 | \* |
| Dendritic cell | HLA-DPB1 | 0.67 | \*\*\* | 0.59 | \*\*\* |
|  | HLA-DQB1 | 0.19 | 0.19 | 0.37 | \*\*\* |
|  | HLA-DRA | 0.70 | \*\*\* | 0.58 | \*\*\* |
|  | HLA-DPA1 | 0.61 | \*\*\* | 0.60 | \*\*\* |
|  | BDCA-1(CD1C) | 0.360 | 0.011 | 0.580 | \*\*\* |
|  | BDCA-4(NRP1) | 0.360 | 0.011 | 0.42 | \*\*\* |
|  | CD11c (ITGAX) | 0.50 | \*\* | 0.64 | \*\*\* |
| Th1 | TBX21 (T-bet) | 0.64 | \*\*\* | 0.51 | \*\*\* |
|  | STAT4 | 0.60 | \*\*\* | 0.52 | \*\*\* |
|  | STAT1 | 0.61 | \*\*\* | 0.39 | \*\*\* |
|  | IFNG (IFN-g) | 0.54 | \*\*\* | 0.34 | \*\*\* |
|  | TNF-a (TNF) | 0.51 | \*\* | 0.55 | \*\*\* |
| Th2 | GATA3 | 0.42 | \* | 0.64 | \*\*\* |
|  | STAT6 | 0.66 | \*\*\* | 0.26 | \*\*\* |
|  | STAT5A | 0.62 | \*\*\* | 0.44 | \*\*\* |
|  | IL13 | 0.044 | 0.760 | 0.120 | 0.018 |
| Tfh | BCL6 | 0.047 | 0.740 | 0.190 | \* |
|  | IL21 | 0.39 | \* | 0.18 | \* |
| Th17 | STAT3 | 0.13 | 0.37 | 0.32 | \*\*\* |
|  | IL17A | 0.170 | 0.250 | 0.110 | 0.038 |
| Treg | FOXP3 | 0.18 | 0.22 | 0.31 | \*\*\* |
|  | CCR8 | 0.3900 | 0.0053 | 0.5600 | \*\*\* |
|  | STAT5B | 0.4000 | 0.0044 | 0.1600 | 0.0017 |
|  | TGFB1 (TGFb) | 0.47 | \* | 0.57 | \*\*\* |
| T cell exhaustion | PDCD1 (PD-1) | 0.58 | \*\*\* | 0.47 | \*\*\* |
|  | CTLA4 | 0.450 | 0.001 | 0.480 | \*\*\* |
|  | LAG3 | 0.430 | 0.002 | 0.300 | \*\*\* |
|  | HAVCR2  (TIM-3) | 0.67 | \*\*\* | 0.63 | \*\*\* |
|  | GZMB | 0.49 | \* | 0.30 | \*\*\* |
|  | TIGIT | 0.55 | \*\*\* | 0.50 | \*\*\* |
|  | CXCL13 | 0.12 | 0.40 | 0.29 | \*\*\* |
|  | LAYN | 0.320 | 0.024 | 0.500 | \*\*\* |
| Effector Treg | FOXP3 | 0.18 | 0.22 | 0.31 | \*\*\* |
|  | CTLA4 | 0.450 | 0.001 | 0.480 | \*\*\* |
|  | CCR8 | 0.3900 | 0.0053 | 0.5600 | \*\*\* |
|  | TNFRSF9 | 0.46 | \*\* | 0.41 | \*\*\* |
| Th1-like | CXCL13 | 0.12 | 0.4 | 0.29 | \*\*\* |
|  | HAVCR2 | 0.67 | \*\*\* | 0.63 | \*\*\* |
|  | IFNG | 0.54 | \*\*\* | 0.34 | \*\*\* |
|  | CXCR3 | 0.59 | \*\*\* | 0.54 | \*\*\* |
|  | BHLHE40 | -0.14 | 0.35 | 0.24 | \*\*\* |
|  | CD4 | 0.320 | 0.022 | 0.570 | \*\*\* |

\**p<0.01;* \*\**p<0.001;* \*\*\**p<0.0001.* LIHC, liver hepatocellular carcinoma; TAM, tumor-associated macrophages; Tfh, follicular helper T; Th, T-helper; Tregs, T regulatory cells.