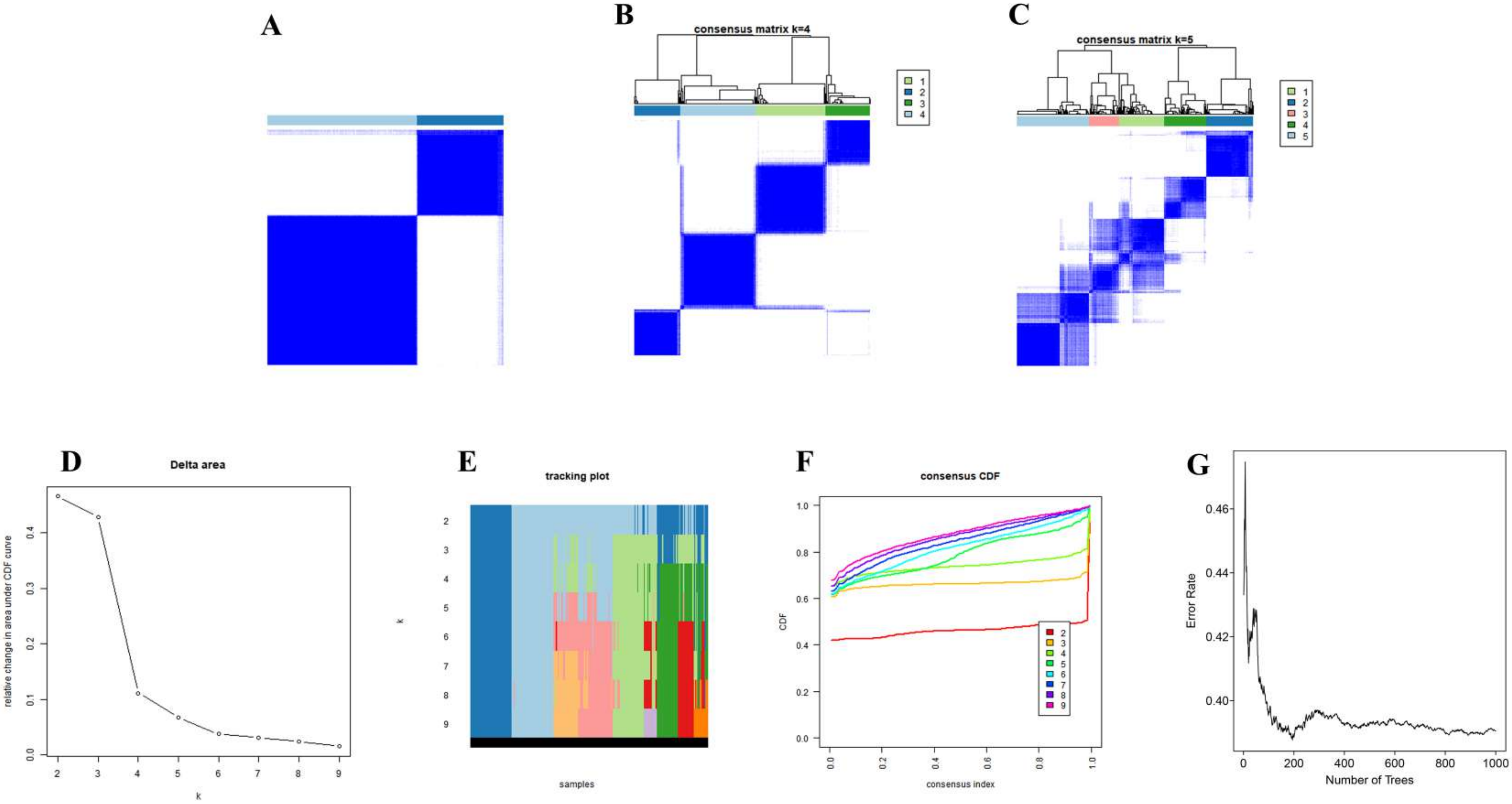
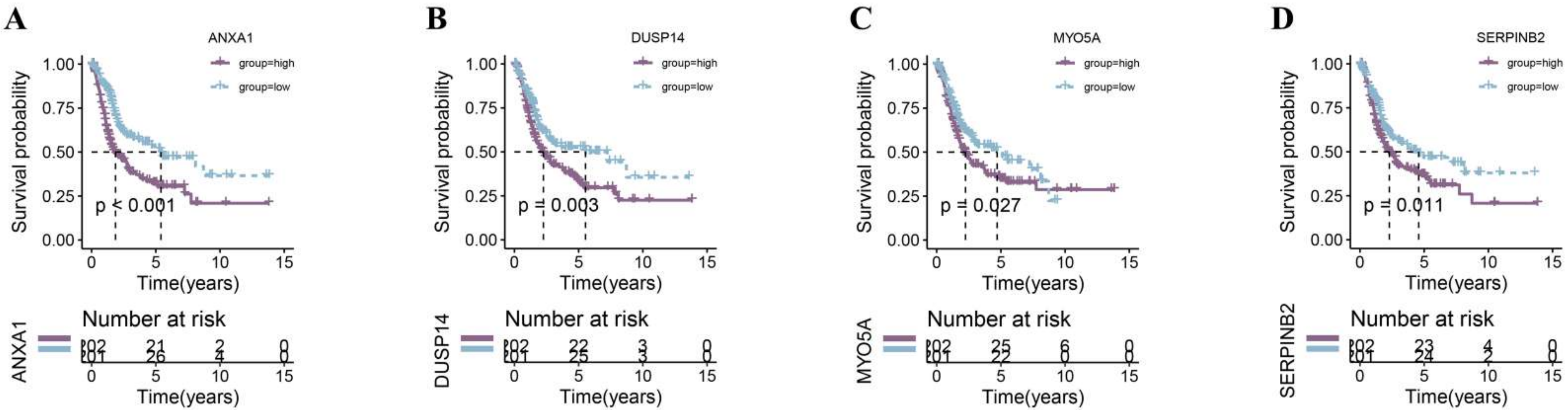
Supplementary Figure S1.



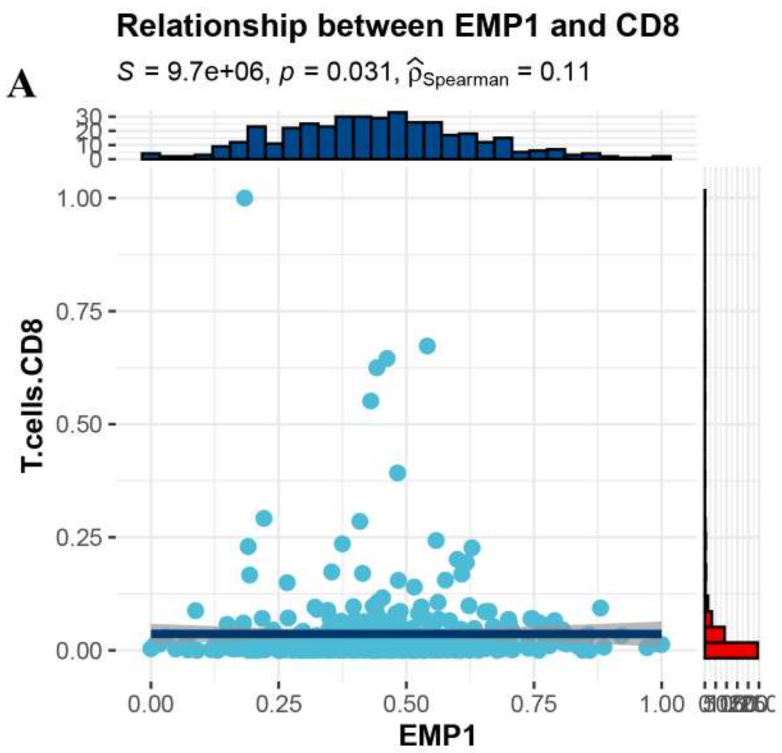
A-C, Consensus matrixes of the TCGA . **D**, Optical clustering chosen by delta area. **E-F**, Tracking plot and cumulative distribution function (CDF) curve describing the distribution of random variables. **G**, The change of error rate with the increasing number of trees.

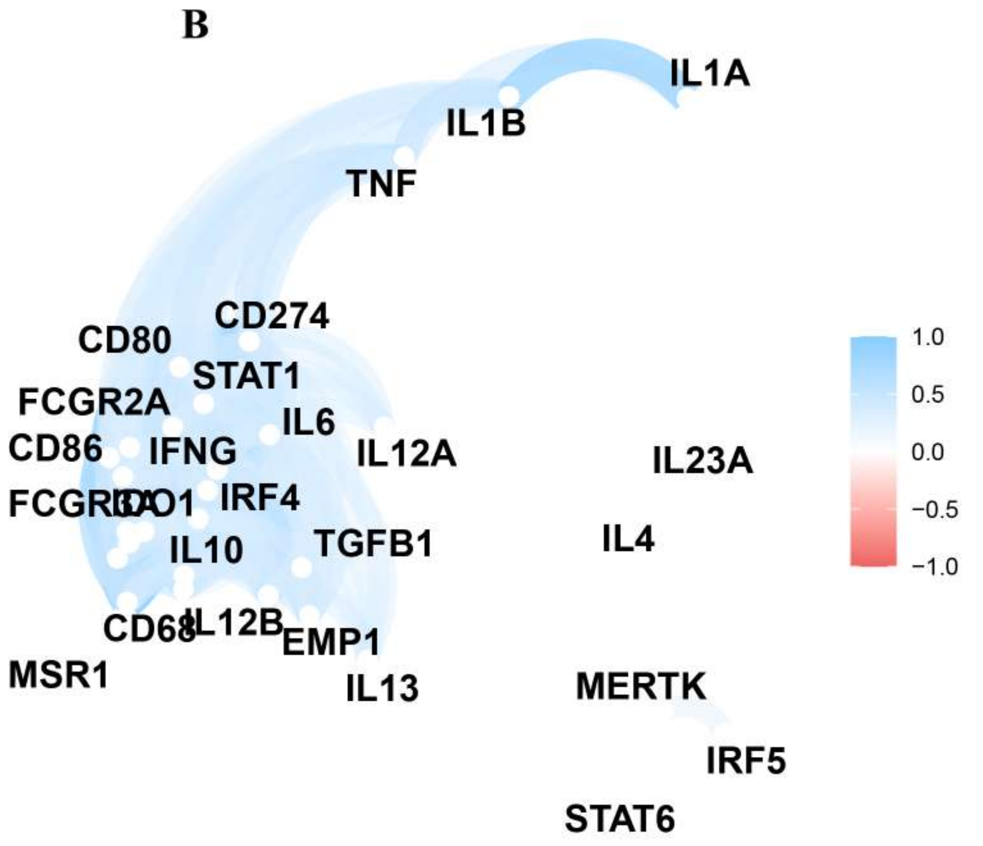
Supplementary Figure S2.

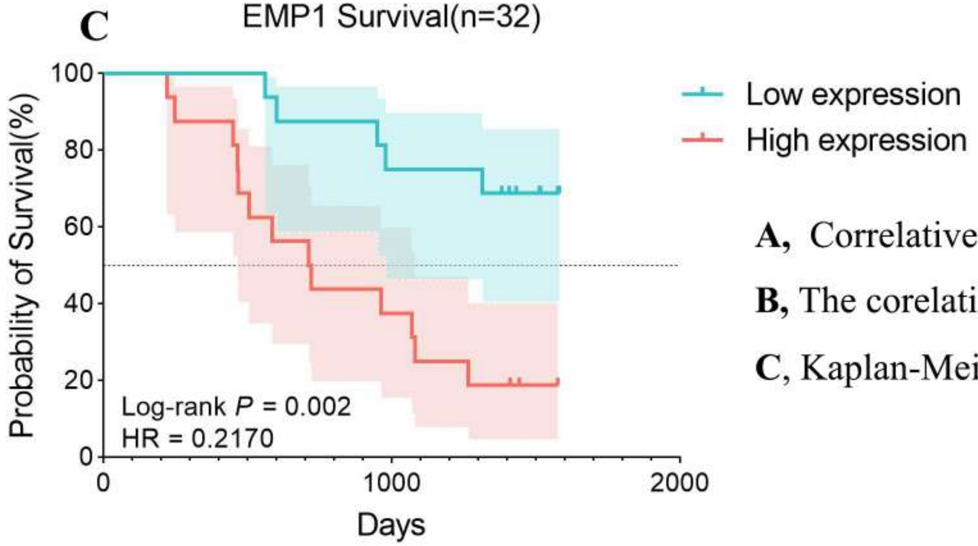


A-D, Survival plot showing the prognostic value of 4 out of the 8 essential genes.

Supplementary Figure S3.





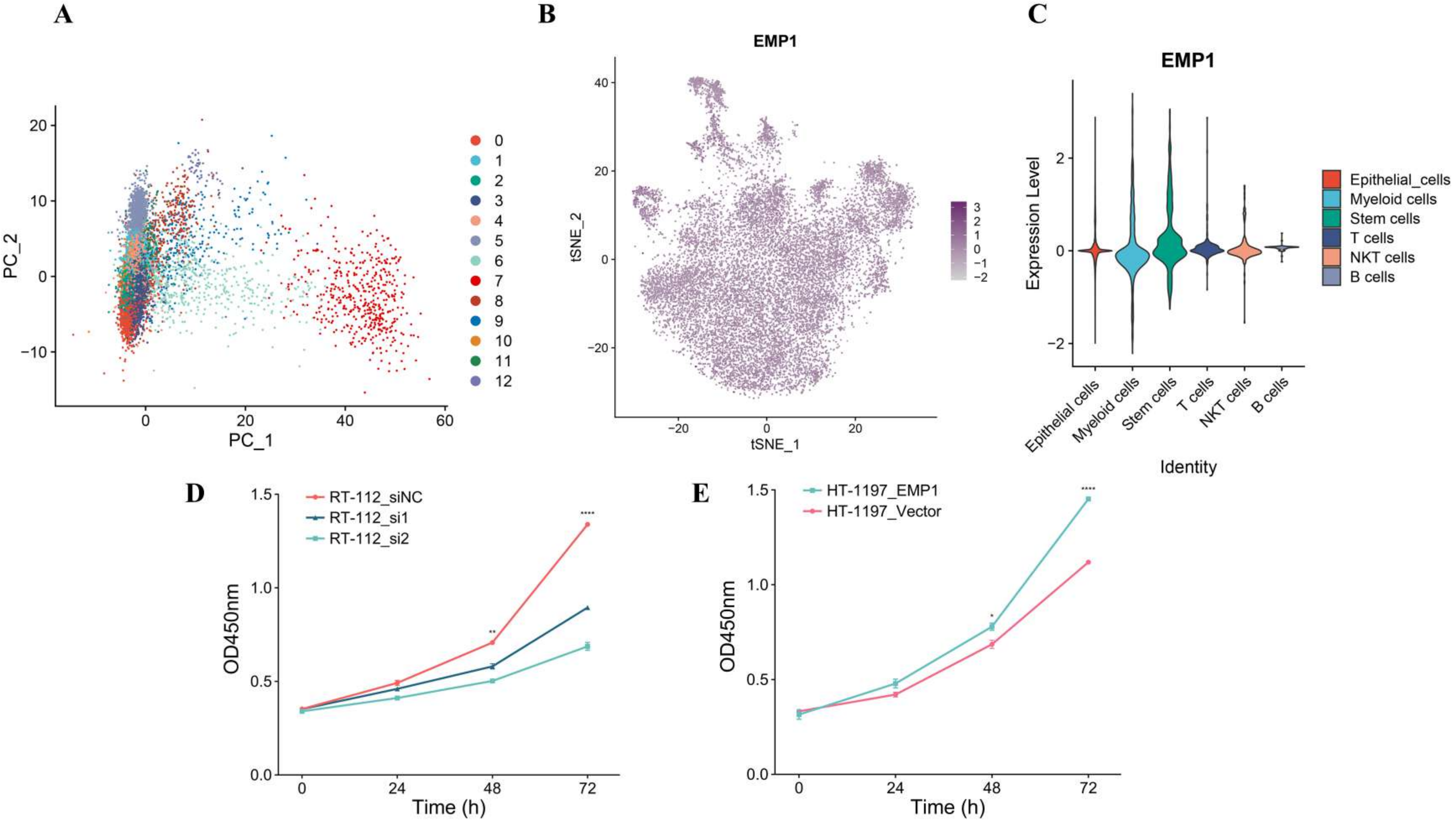


A, Correlative plot showing the correation between EMP1 level and quantity of CD8+ T cells.

B, The corelation between exprssion of M1 or M2 related markers and EMP1 level.

C, Kaplan-Meier curve presenting the survival difference between EMP1 High and Low group.

Supplementary Figure S4.

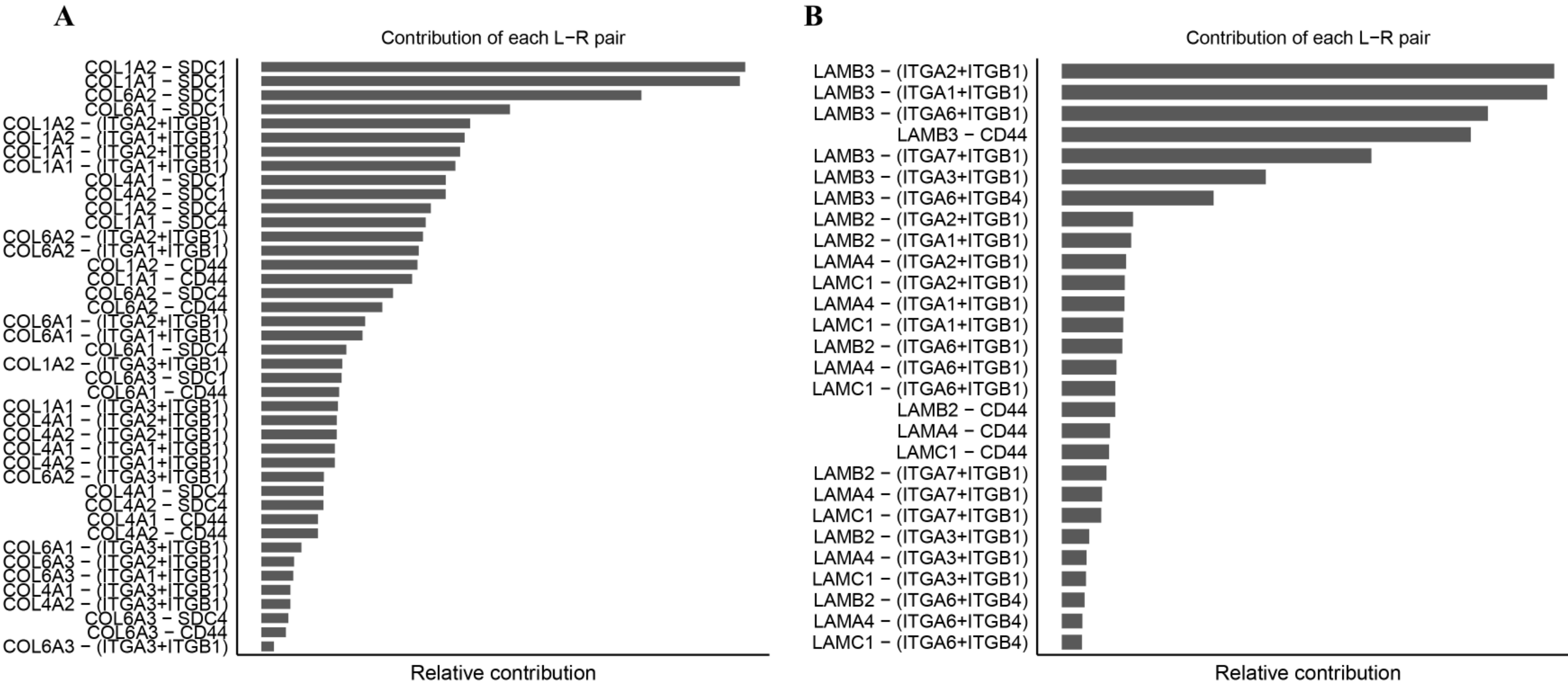


A, PCA analysis of the scRNA data. **B,** The distribution of EMP1 expression on all kinds of clusters.

C, Violin plot showing the EMP1 level on these 6 kinds of cells.

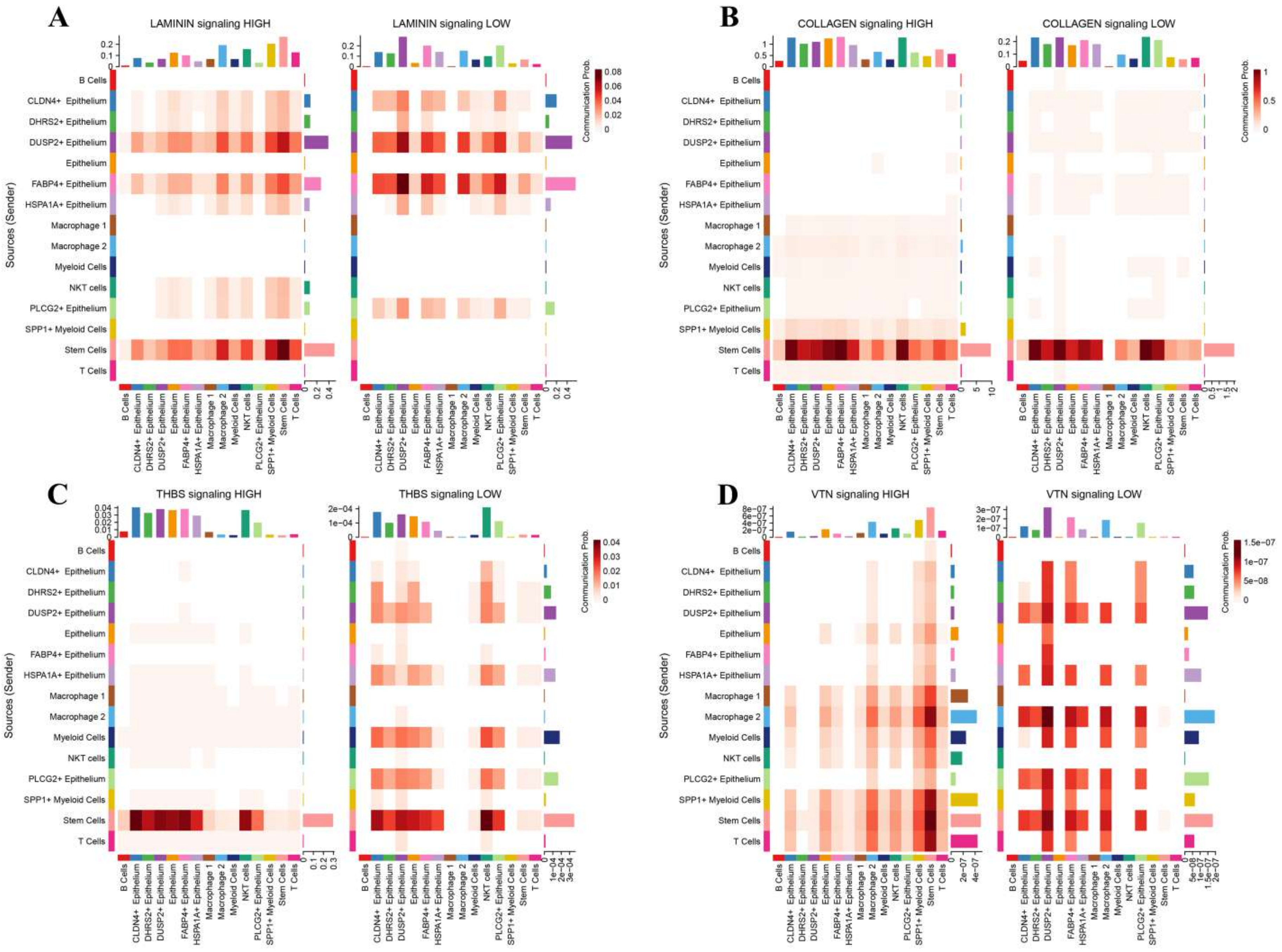
D, E, CCK8 assay plotting the efficacy of EMP1 in promoting Cancer cells proliferation.

Supplementary Figure S5.



A, B, The contribution of each L-R pair in Collagen and LAMININ networks respectively.

Supplementary Figure S6.



A-D, Heatmap exhibiting the different communication activity between EMP1 high and low group based on the four ECM relevant networks.