

Supplementary Information

Single-cell and bulk RNA-seq unveils the immune infiltration landscape associated with cuproptosis in cerebral cavernous malformations

Chengwei Chen,^{#1,2,3,4,5,6,7} Yuting Bao,^{#1,2,3,4,5,6} Sihan Ju,^{#1,2,3,4,5,6} Conglin Jiang,^{1,2,3,4,5,6}
Xiang Zou,^{1,2,3,4,5,6} Xin Zhang^{1,2,3,4,5,6} and Liang Chen^{* 1,2,3,4,5,6}

Author affiliations:

1. Neurosurgical department of Huashan hospital and MOE Frontiers Center for 1 Brain Science, Fudan University, Shanghai 200040, China
2. Tianqiao and Chrissy Chen Institute Clinical Translational Research Center, 2 Shanghai 200040, China
3. National Center for Neurological Disorders, Shanghai 200040, China
4. Shanghai Key Laboratory of Brain Function Restoration and Neural 4 Regeneration, Shanghai 200040, China
5. Neurosurgical Institute of Fudan University, Shanghai 200040, China
6. Shanghai Clinical Medical Center of Neurosurgery, Shanghai 200040, China
7. Neurosurgery Center, Department of Cerebrovascular Surgery, The National 7 Key Clinical Specialty, The Engineering Technology Research Center of Education Ministry of China on Diagnosis and Treatment of Cerebrovascular Disease, Guangdong Provincial Key Laboratory on Brain Function Repair and Regeneration, The Neurosurgery Institute of Guangdong Province, Zhujiang Hospital, Southern Medical University, Guangzhou 510282, China

#Chengwei Chen,Yuting Bao and Sihan Ju contributed equally to this work.

*Correspondence to

Professor Liang Chen, Huashan Hospital, Shanghai Medical College, Fudan University, Shanghai
200040, China; hschenliang@fudan.edu.cn

Fig. S1

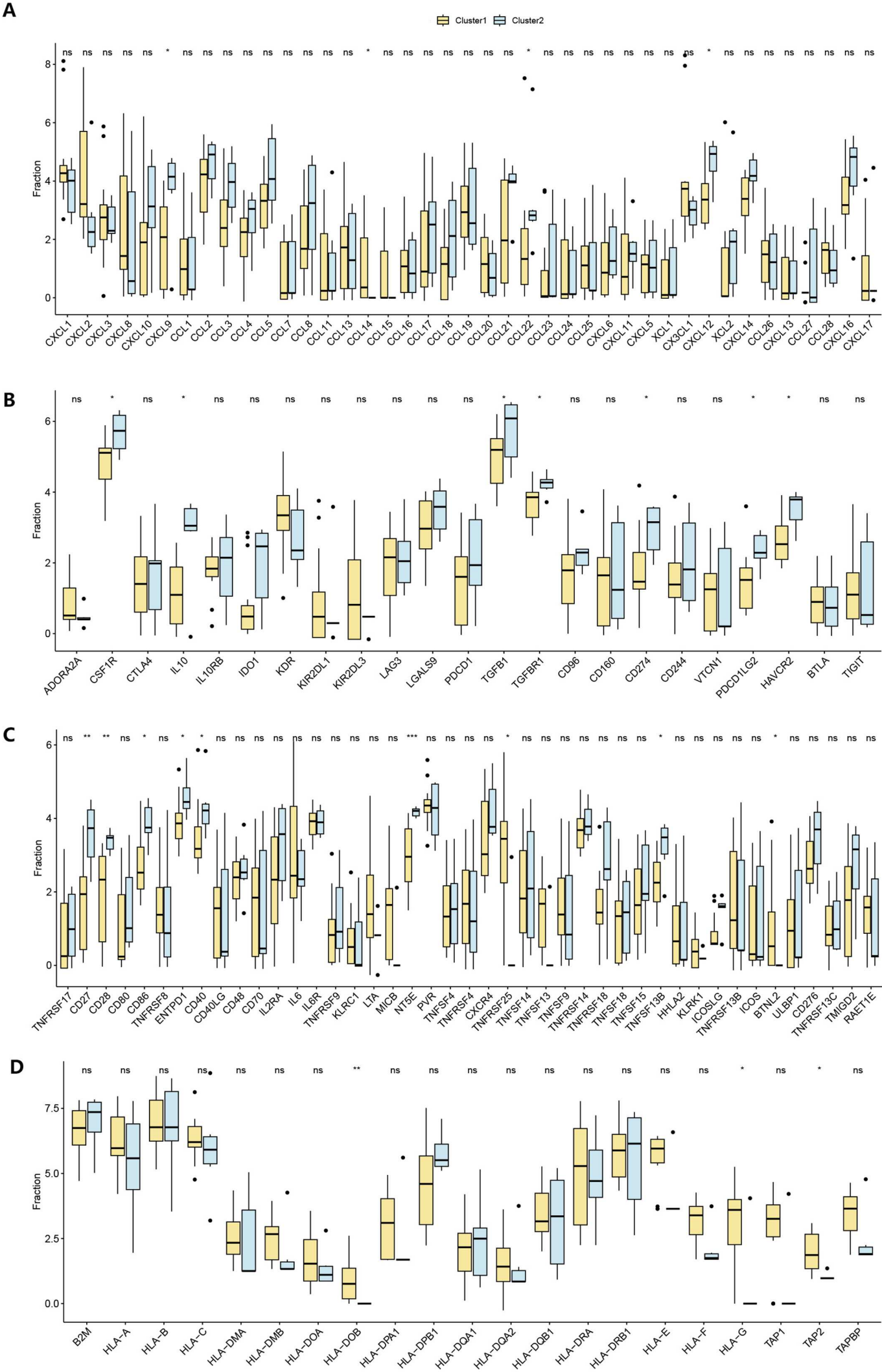
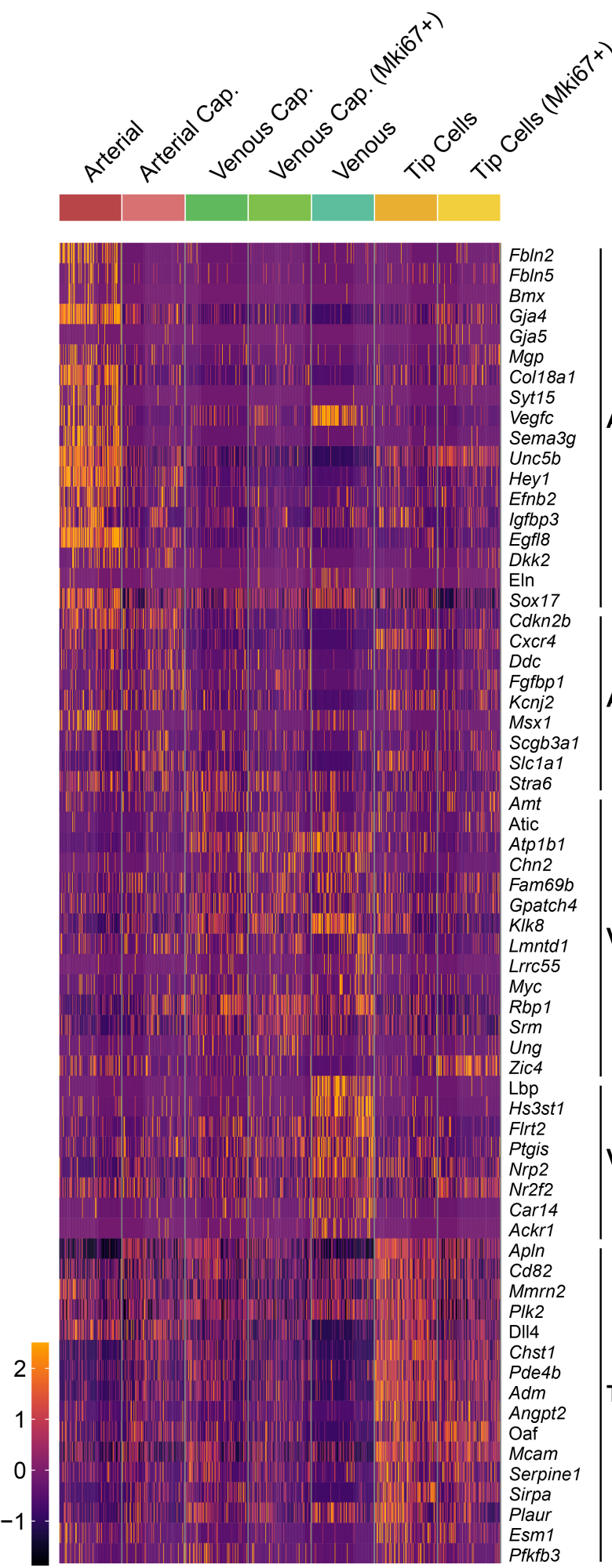
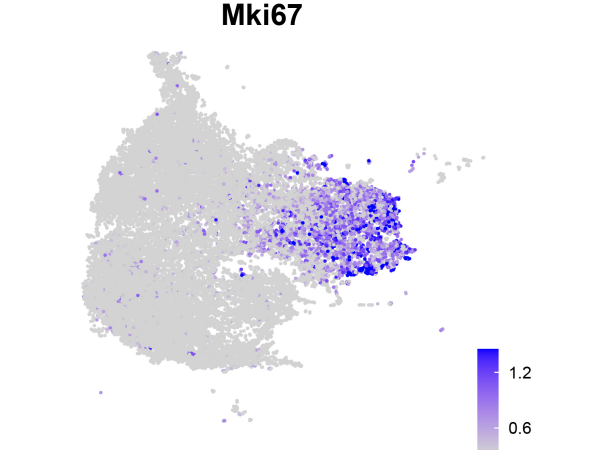


Fig. S2

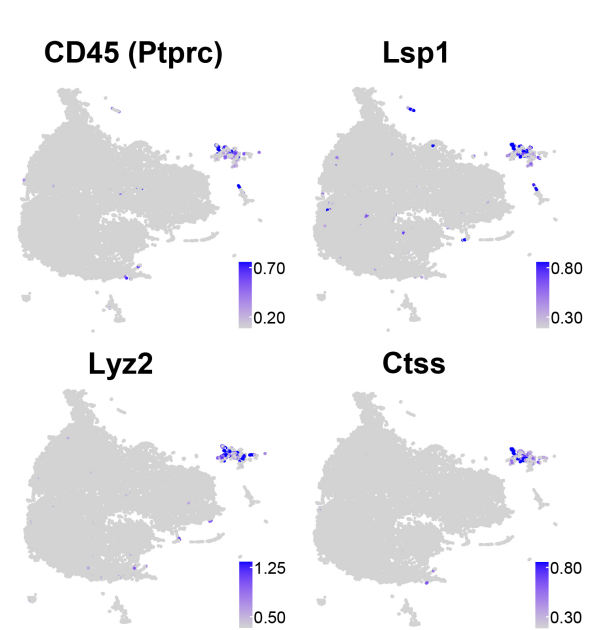
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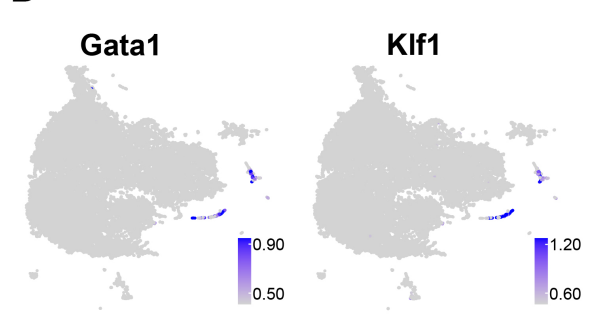
B



C



D



E

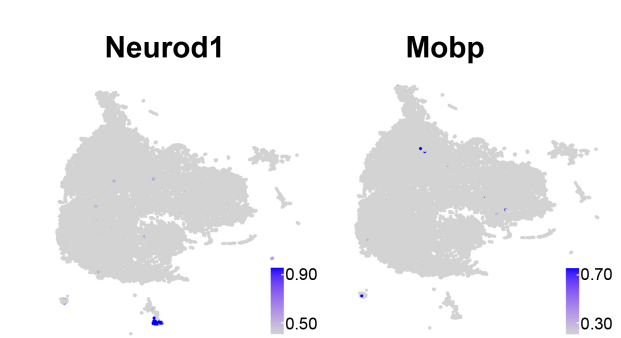


Fig. S3

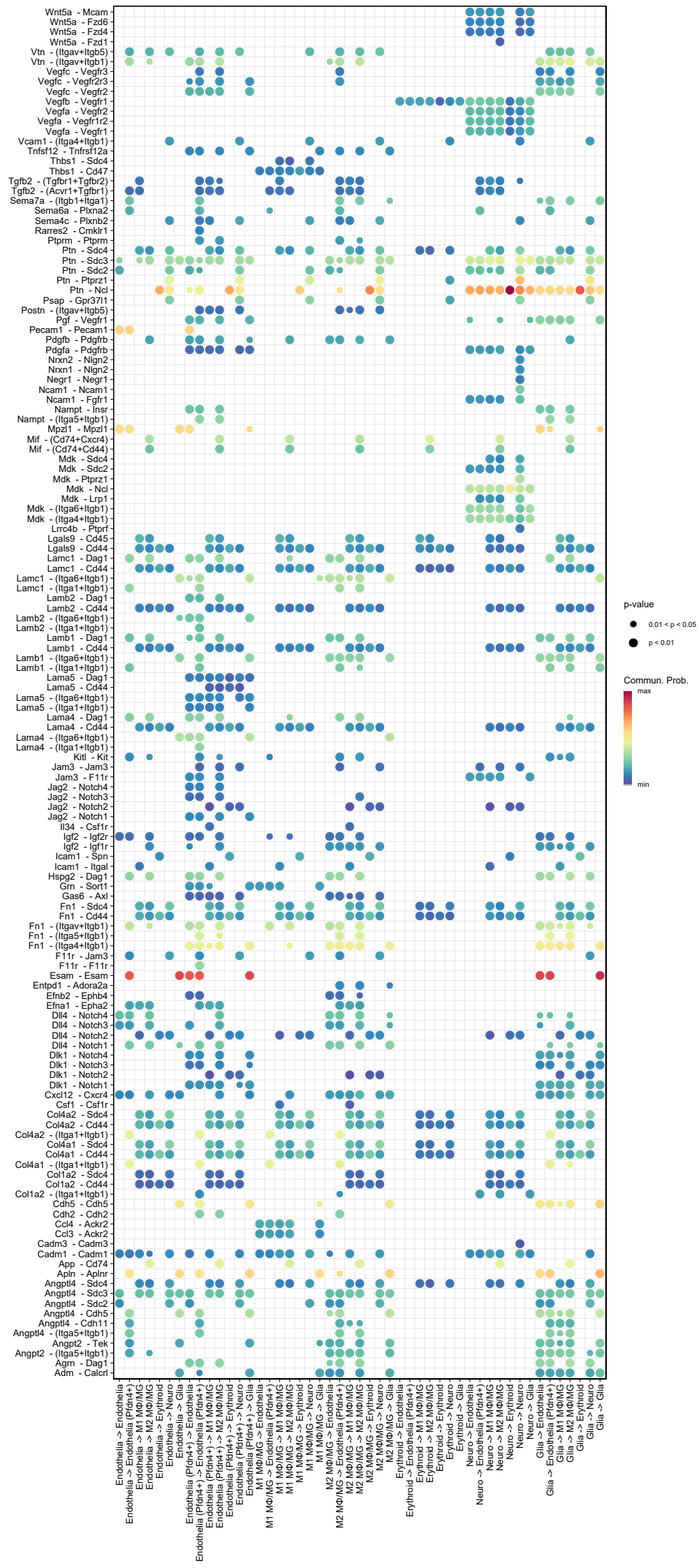


Fig. S4

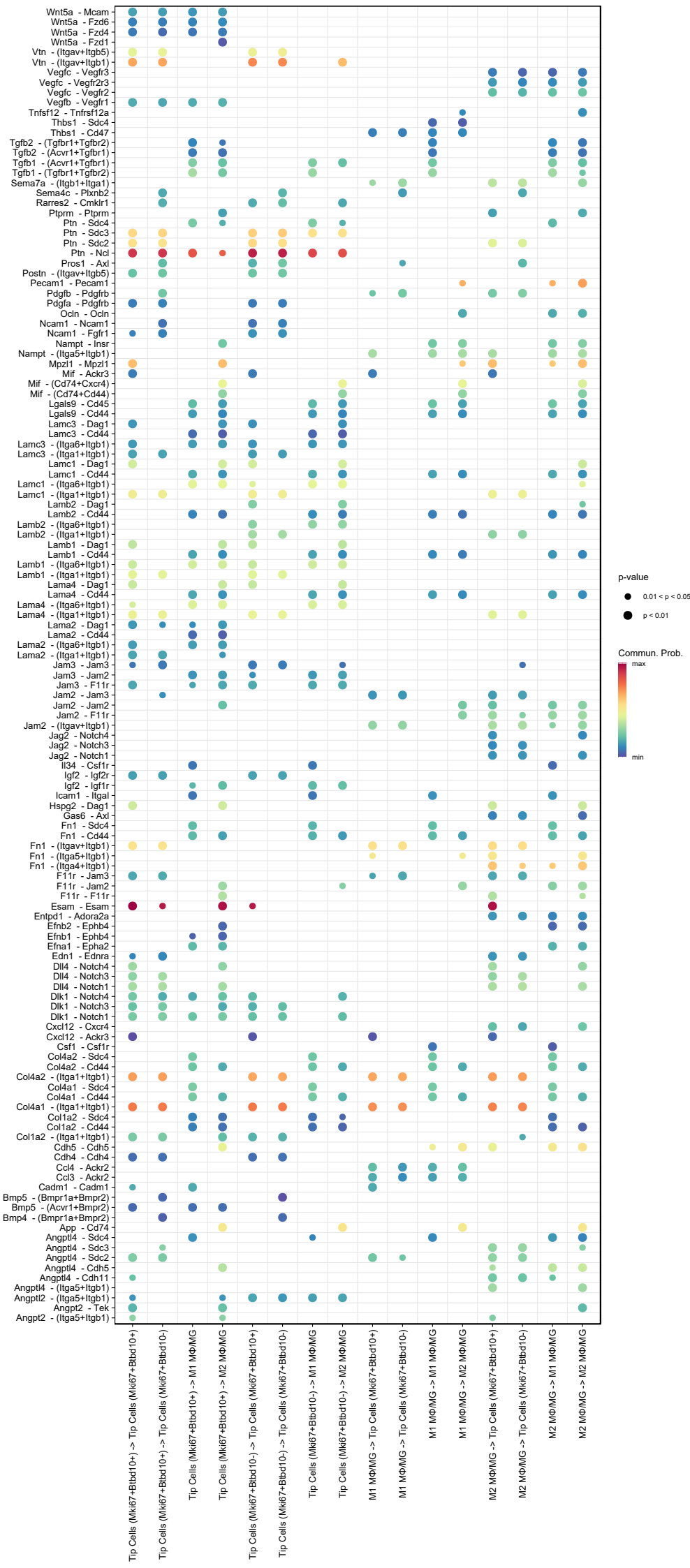


Figure legends

Fig. S1 Comparison of immune system interactions in two clusters. Comparisons of immune infiltration of (A) immune-related chemokines, (B) immunosuppressive factors, (C) immunostimulatory factors and (D) MHC between the Cluster 1 and Cluster 2. Values are represented as the mean $\pm$ SD. *P*-values are denoted by asterisks: **P* < 0.05, ***P* < 0.01, ****P* < 0.001 and ns indicates no significant difference.

Fig. S2 Expression profiling of marker genes across identified cell types. (A) A heatmap showcases the expression of canonical markers for 6 endothelial subtypes, with color gradients indicating expression levels; (B- E) UMAP plots depict the expression of proliferation marker (Mki 67), M ϕ /MG markers (Ptprc, Lsp 1, Lyz 2, Ctss), erythroid markers (Gata1, Klf1), and neuro/glia markers (Neurod1, Mobp) across all identified cell types.

Fig. S3 A dotplot displays the enriched pathways, receptors, and ligands involved in cellchat communication between different cell clusters. *P*-value was indicated by the size of the dot, with smaller *P*-values represented by larger dots. Communicate probability of cellchat was presented using a color bar, where shades closer to red represent a higher probability, and shades closer to blue represent a lower probability. M Φ , macrophage; MG, microglia.

Fig. S4 A dotplot displays the enriched pathways, receptors, and ligands involved in cellchat communication between M2 M Φ /MG and Tip cell (Mki 67 + Btbd 10 $\pm$). *P*-value was indicated by the size of the dot, with smaller *P*-values represented by larger dots. Communicate probability of cellchat was presented using a color bar, where shades closer to red represent a higher probability, and shades closer to blue represent a lower probability. M Φ , macrophage; MG, microglia.