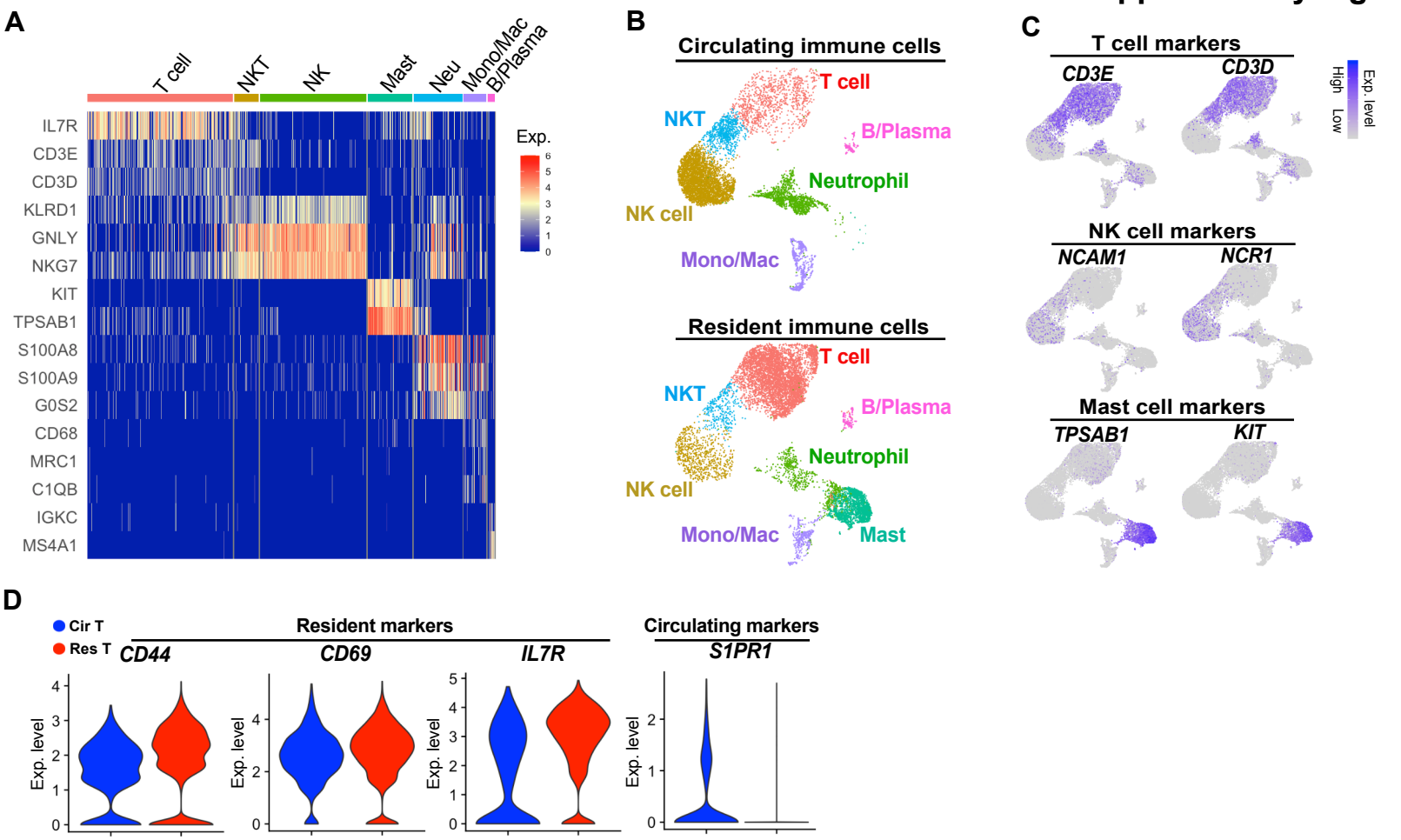


**Fig. S1. scRNA-seq analysis of resident and circulating immune cells of human lungs**

(**A**) Heatmap showing the markers in each cell type of resident (Res) and circulating (Cir) immune cells of human lungs . (**B**) Separated UMAP plots showing cell clusters in the Res and Cir immune populations. (**C**) Feature plots showing the signature gene expression of T, NK, and mast cells. (**D**) Violin plots showing resident and circulating marker expression in Res and Cir T cells.

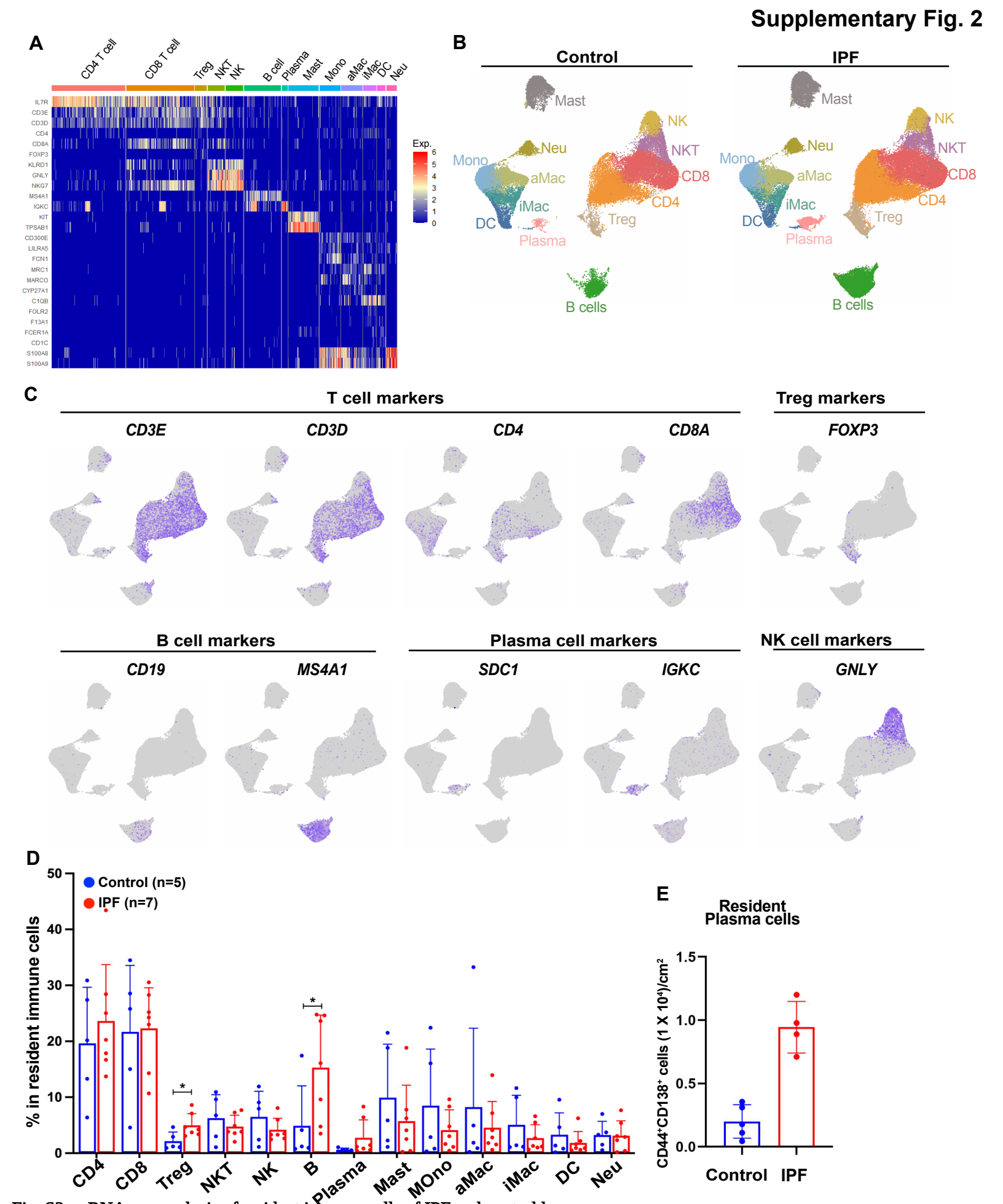


**Fig. S2. scRNA-seq analysis of resident immune cells of IPF and control lungs**

(**A**) UMAP plots showing the markers in each cell type. (**B**) Separated UMAP plots showing cell clusters in the resident immune populations of IPF vs. control lungs. (**C**) Feature plots showing the signature gene expression of T, Treg, B, plasma, and NK cells. (**D**) Percentage of each cell type in total resident immune cells in IPF vs. control lungs analyzed from scRNA-seq. (**E**) Image quantification of resident plasma cell numbers per unit area in the alveoli of IPF vs. control lungs.

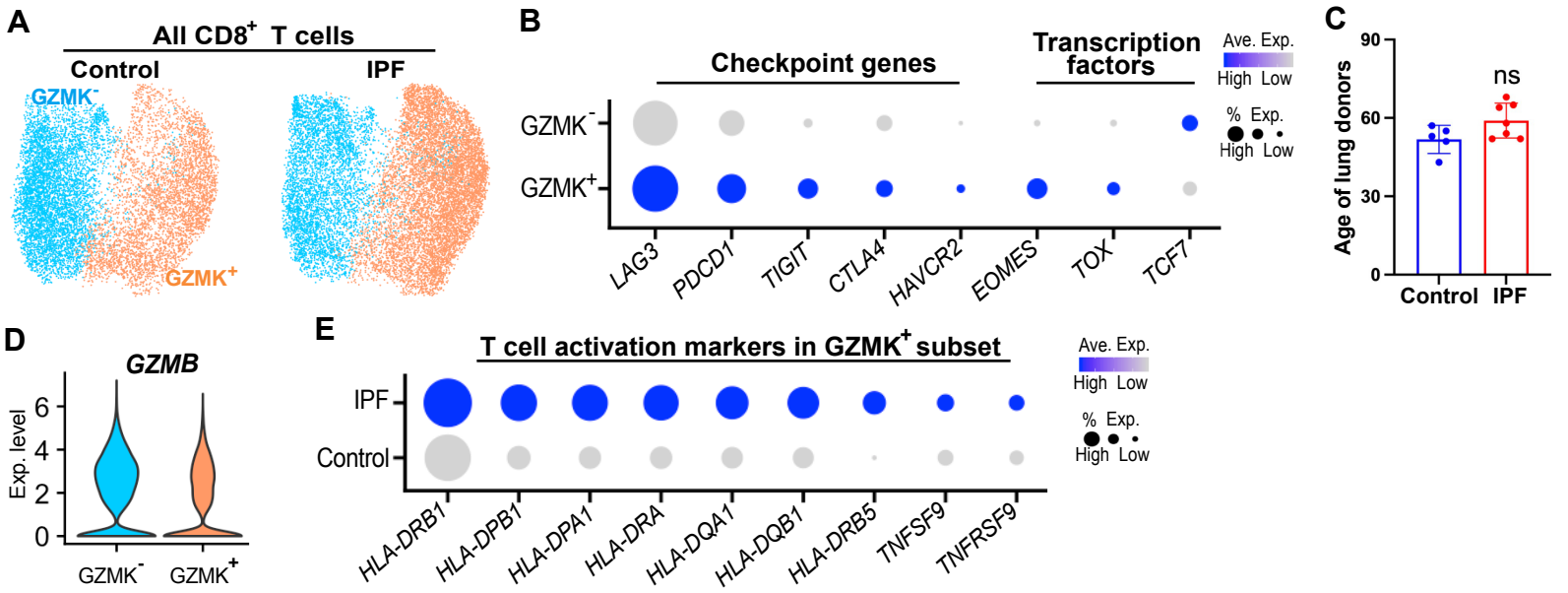


**Fig. S3 scRNA-seq analysis of resident CD8$^+$ T cells in IPF lungs**

(**A**) UMAP plots showing cell clusters in CD8$^+$ T cells of IPF and control lungs. (**B**) Dot plots showing the expression of checkpoint genes transcription factors in GZMK$^+$ vs. GZMK$^-$ CD8$^+$ T cells. (**C**) Analysis of the difference in age of IPF and control lung donors. ns: no significance. (**D**) Violin plots showing the expression of *GZMB* in GZMK$^+$ vs. GZMK$^-$ CD8$^+$ T cells. (**E**) Dot plots showing the expression of T cell activation markers in GZMK$^+$ CD8$^+$ T cells, IPF vs. control.

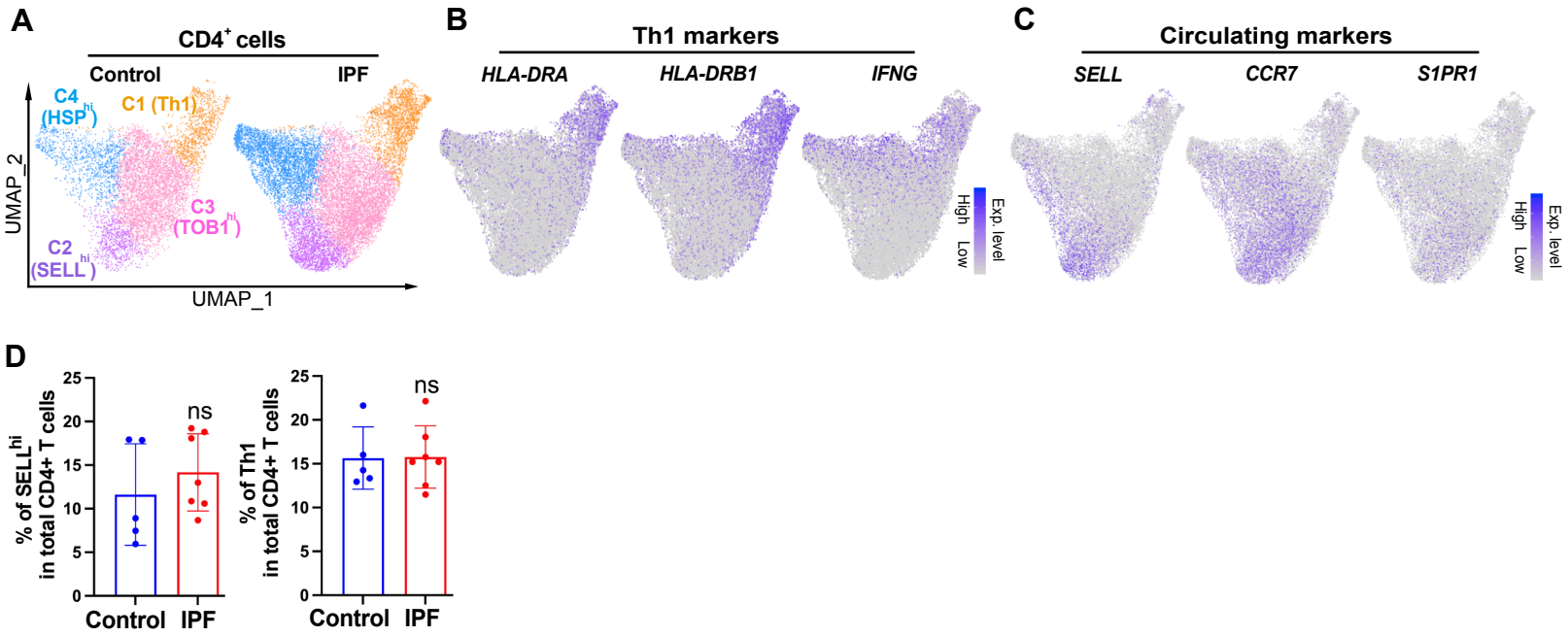





**Fig. S4 scRNA-seq analysis of resident CD4⁺ T cells in IPF lungs**

(**A**) UMAP plots showing cell clusters in CD4⁺ T cells of IPF and control lungs. (**B** and **C**) Feature plots showing the expression of Th1 and circulating markers. (**D**) Percentage of SELL$^{hi}$ and Th1 cells in total CD4⁺ T cells, respectively.

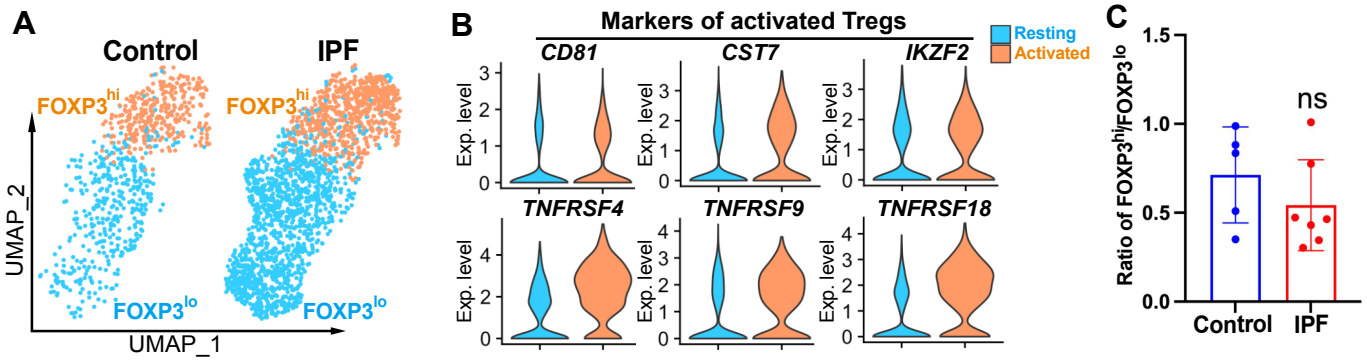


**Fig. S5 scRNA-seq analysis of resident Treg cells in IPF lungs**

(**A**) UMAP plots showing cell clusters in Tregs of IPF and control lungs. (**B**) Violin plots showing the expression of activation markers in Treg subsets. (**C**) Ratio of FOXP3$^{hi}$ vs. FOXP3$^{lo}$ Tregs in IPF and control lungs.

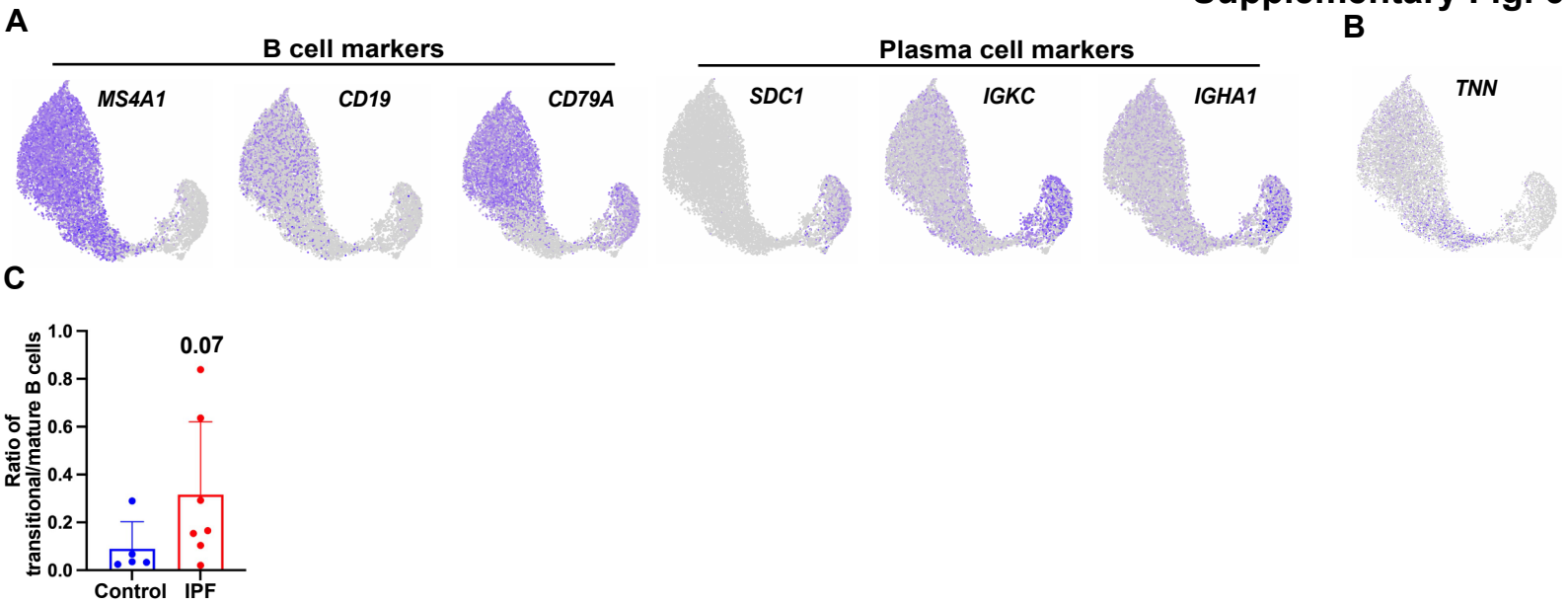


**Fig. S6 scRNA-seq analysis of resident B and plasma cells in IPF lungs**

(**A** and **B**) Feature plots showing the expression of mature B, transitional B, and plasma cell markers. (**C**) Ratio of transitional vs. mature B cells in IPF vs. control lungs.

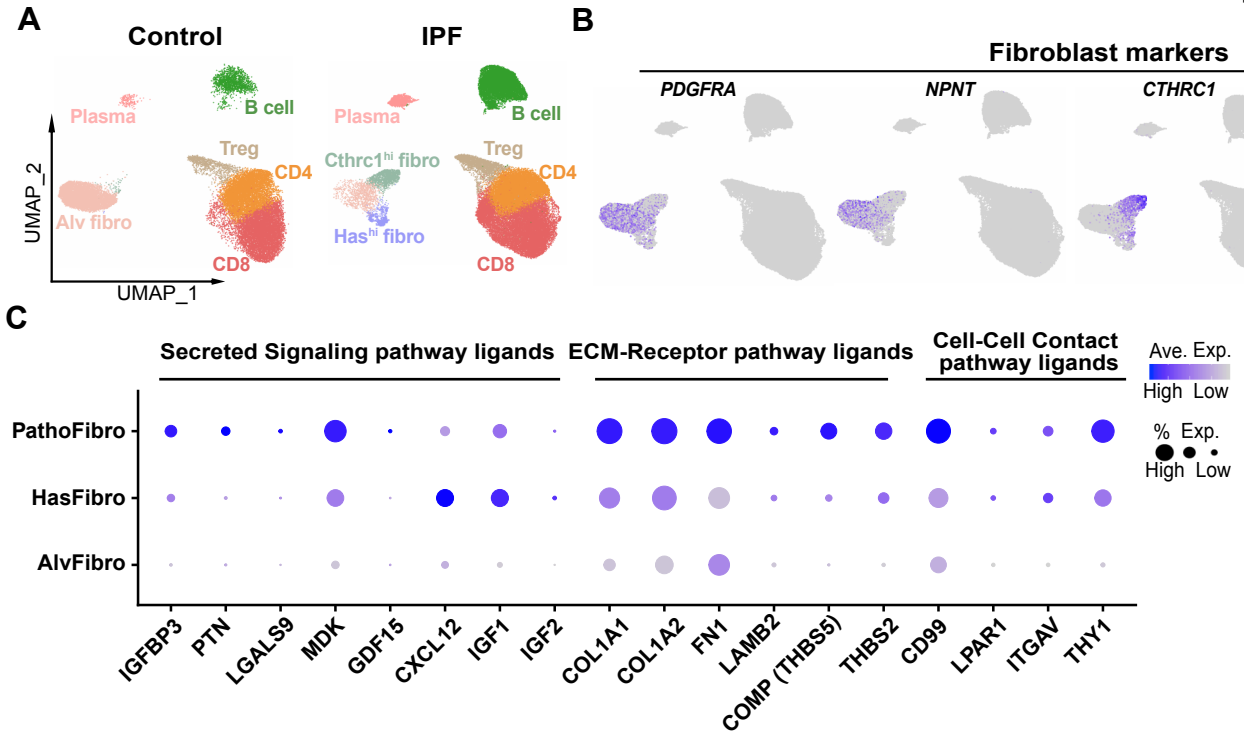


**Fig. S7 scRNA-seq analysis of resident lymphocytes and fibroblasts in IPF lungs**

(**A**) UMAP plots showing lymphocyte and fibroblast clusters in IPF and control lungs. (**B**) Expression of signature genes in each fibroblast subset. (**C**) Expression of the ligands involved in the Secreted Signaling, ECM-Receptor, and Cell-Cell Contact pathways in fibroblast subsets.