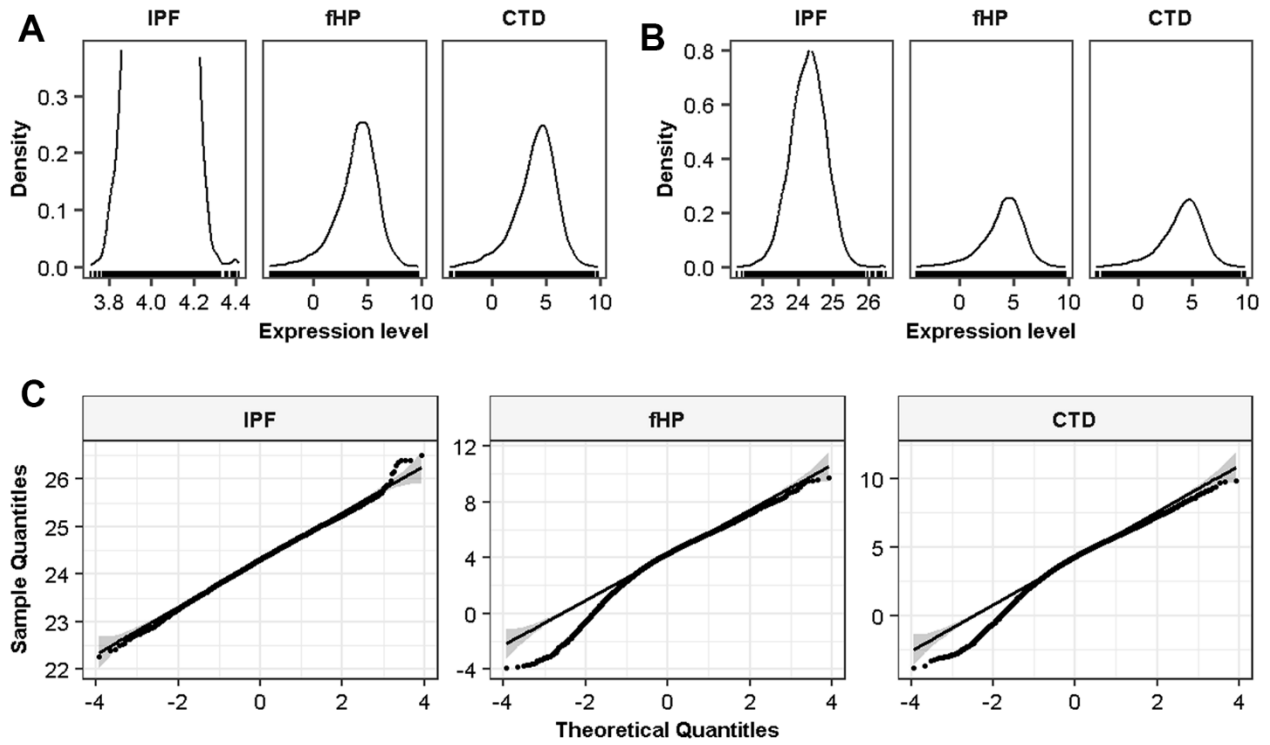
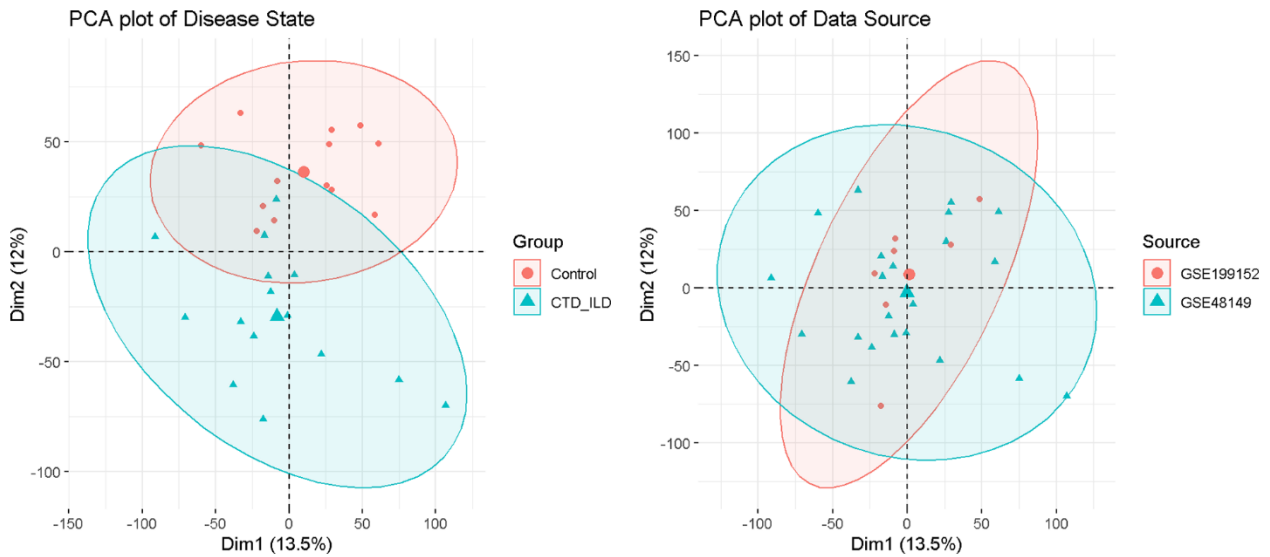


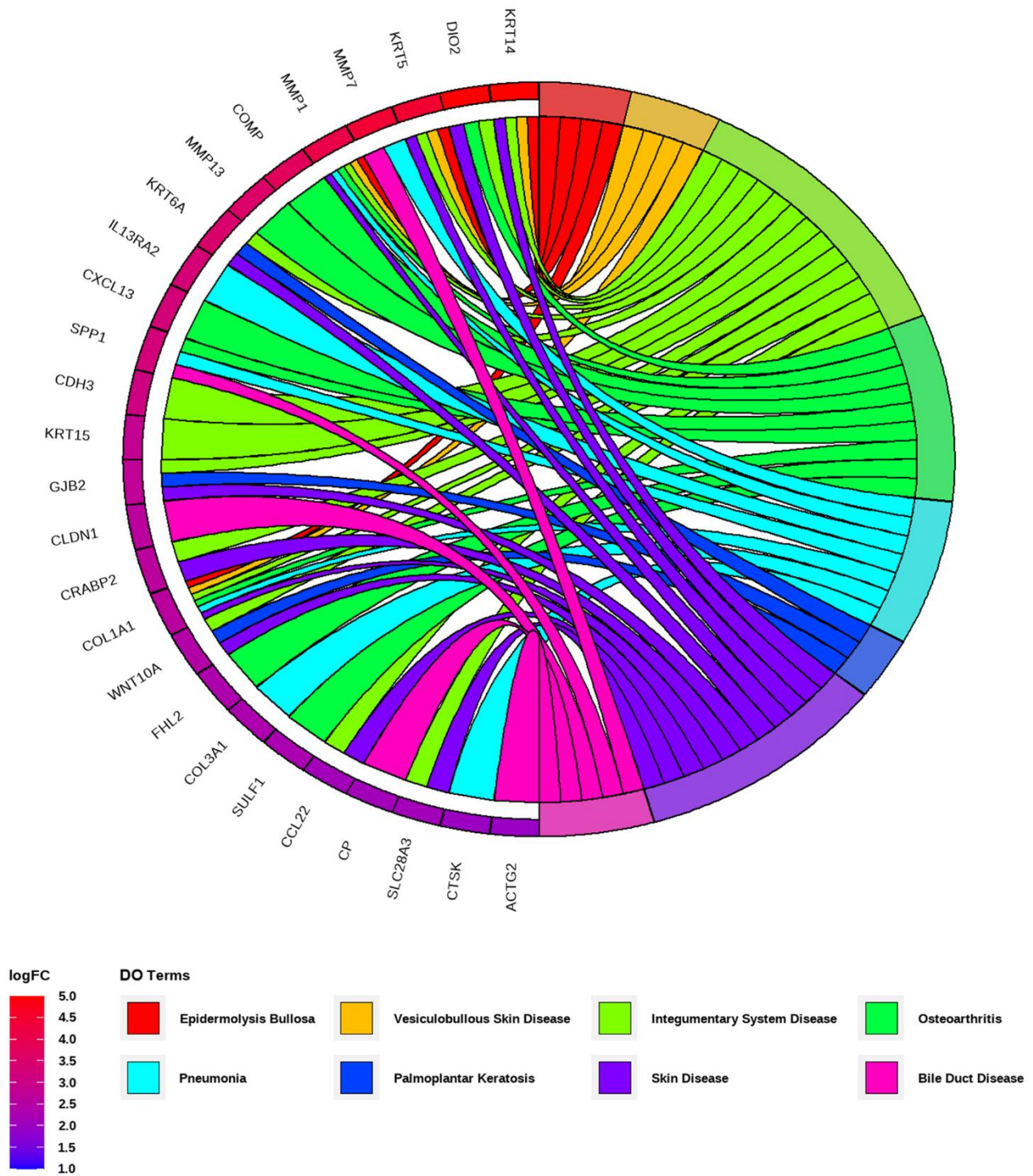
**SUPPLEMENTARY FIGURES**



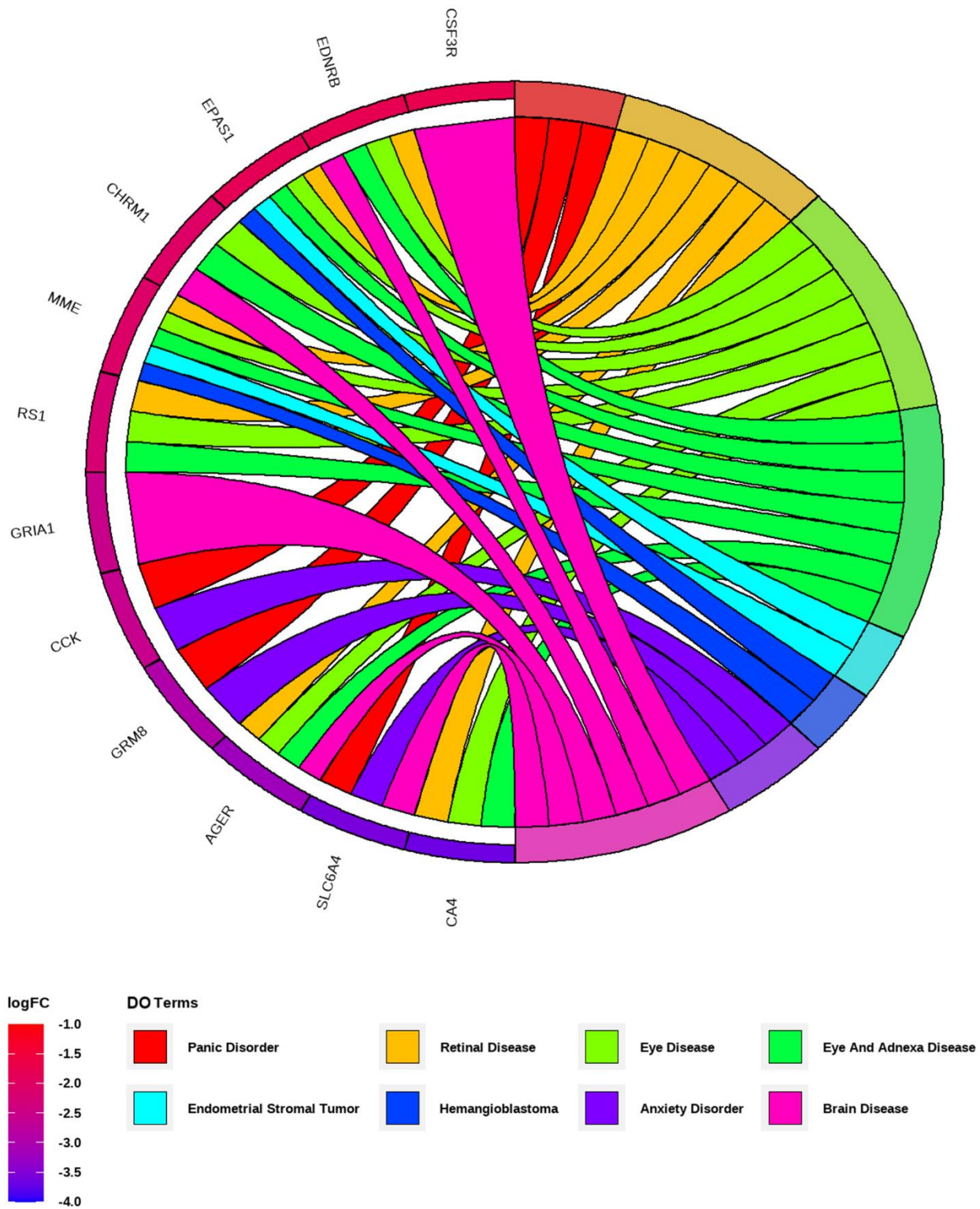
**Supplementary Figure 1. The correction of datasets used in this study. (A, B)** The density plots of IPF, fHP and CTD-ILD datasets before (A) and after (B) normalization and removing batch-effects. (C) The Q-Q plot of the three datasets after correction.



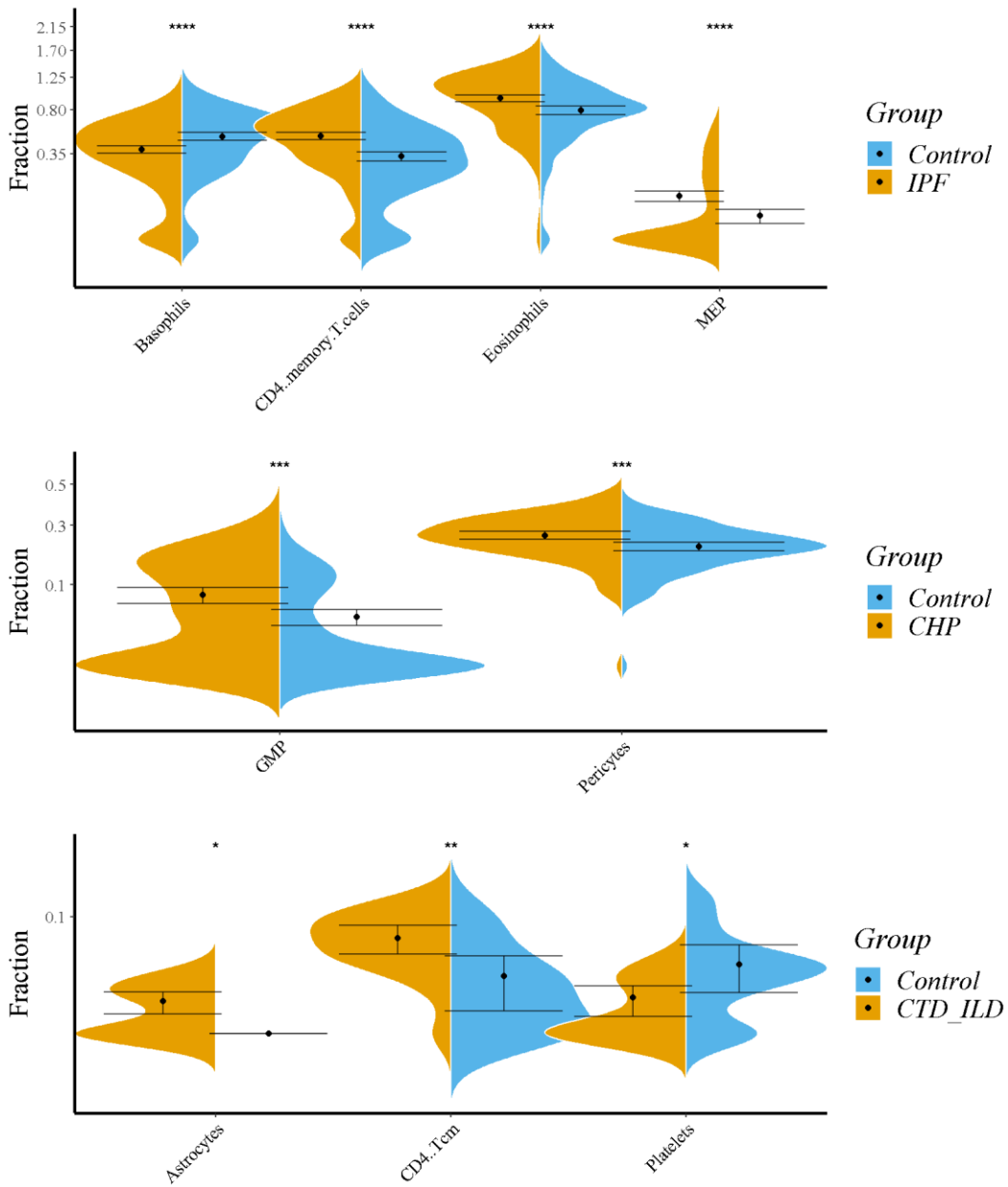
**Supplementary Figure 2. The principal component analysis (PCA) plot of the merged dataset by disease state and the original datasets.**



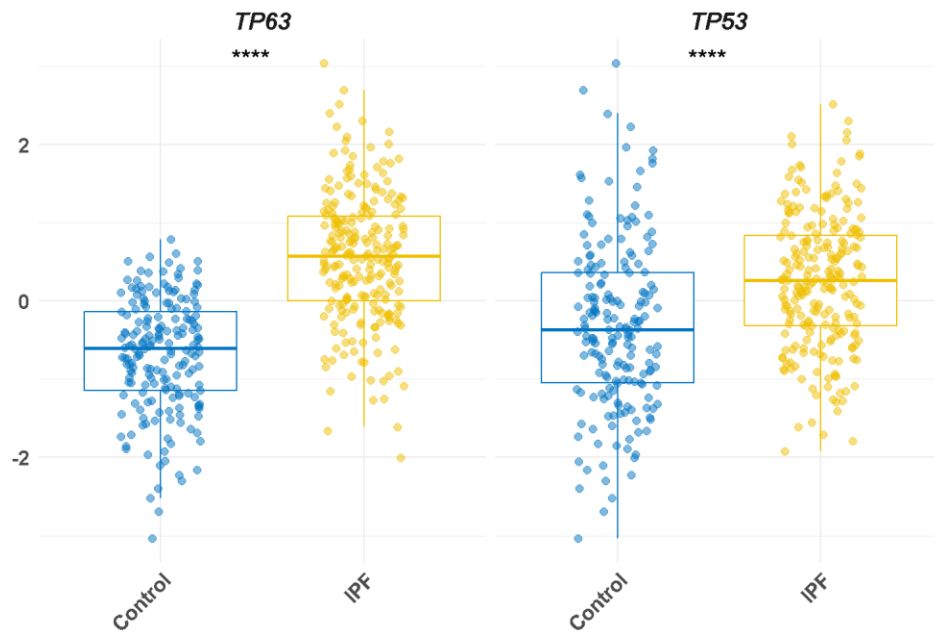
**Supplementary Figure 3. DO enrichment analysis.** Chord diagram showed the correlation between diseases and common down-regulated DEGs, with different colors corresponding to different DO terms.



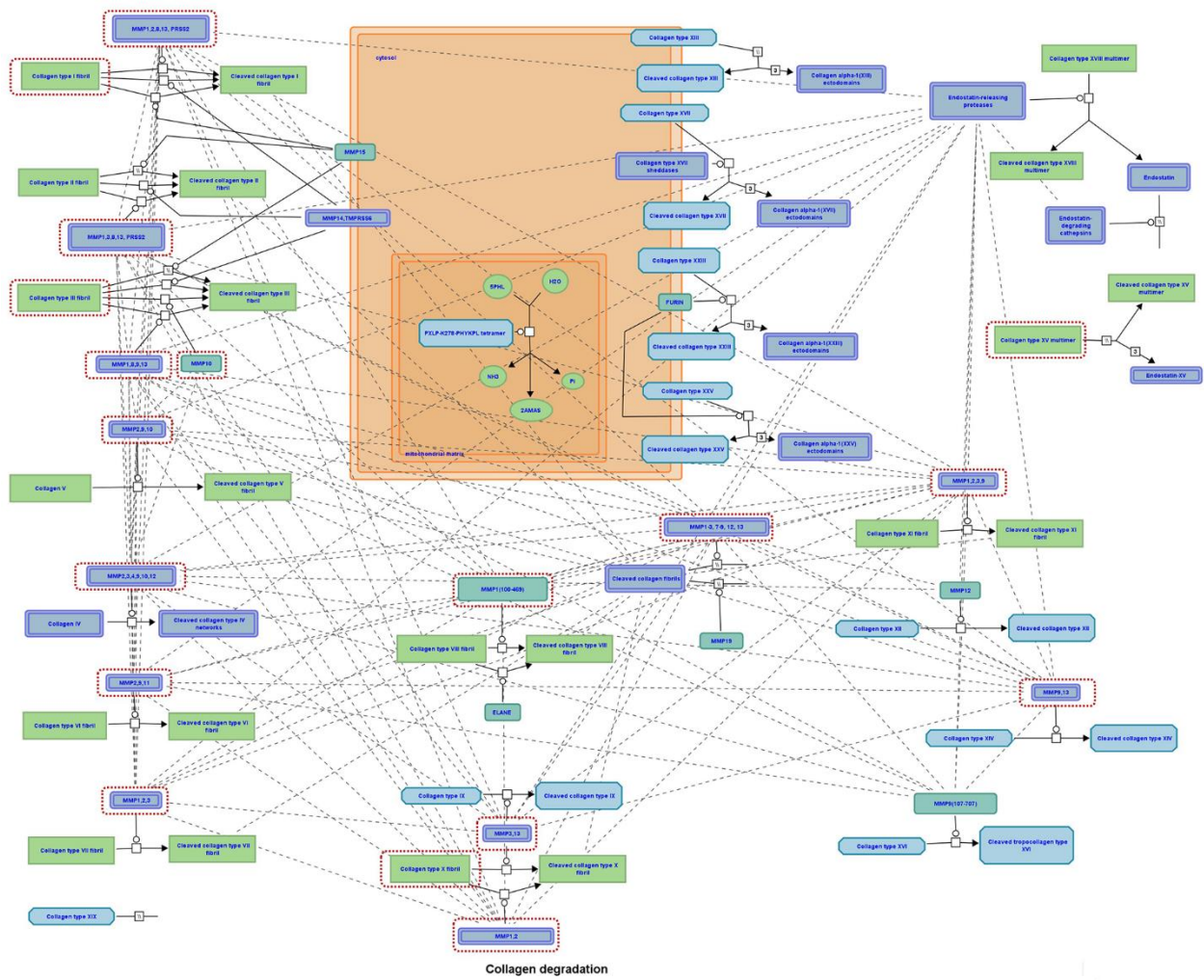
**Supplementary Figure 4. Immune infiltration analysis.** Violin diagram showing three diseases' unique proportion variation of immune cells obtained using the xCell. \*:P < 0.05; \*\*:P < 0.01; \*\*\*:P < 0.001; \*\*\*\*:P < 0.0001



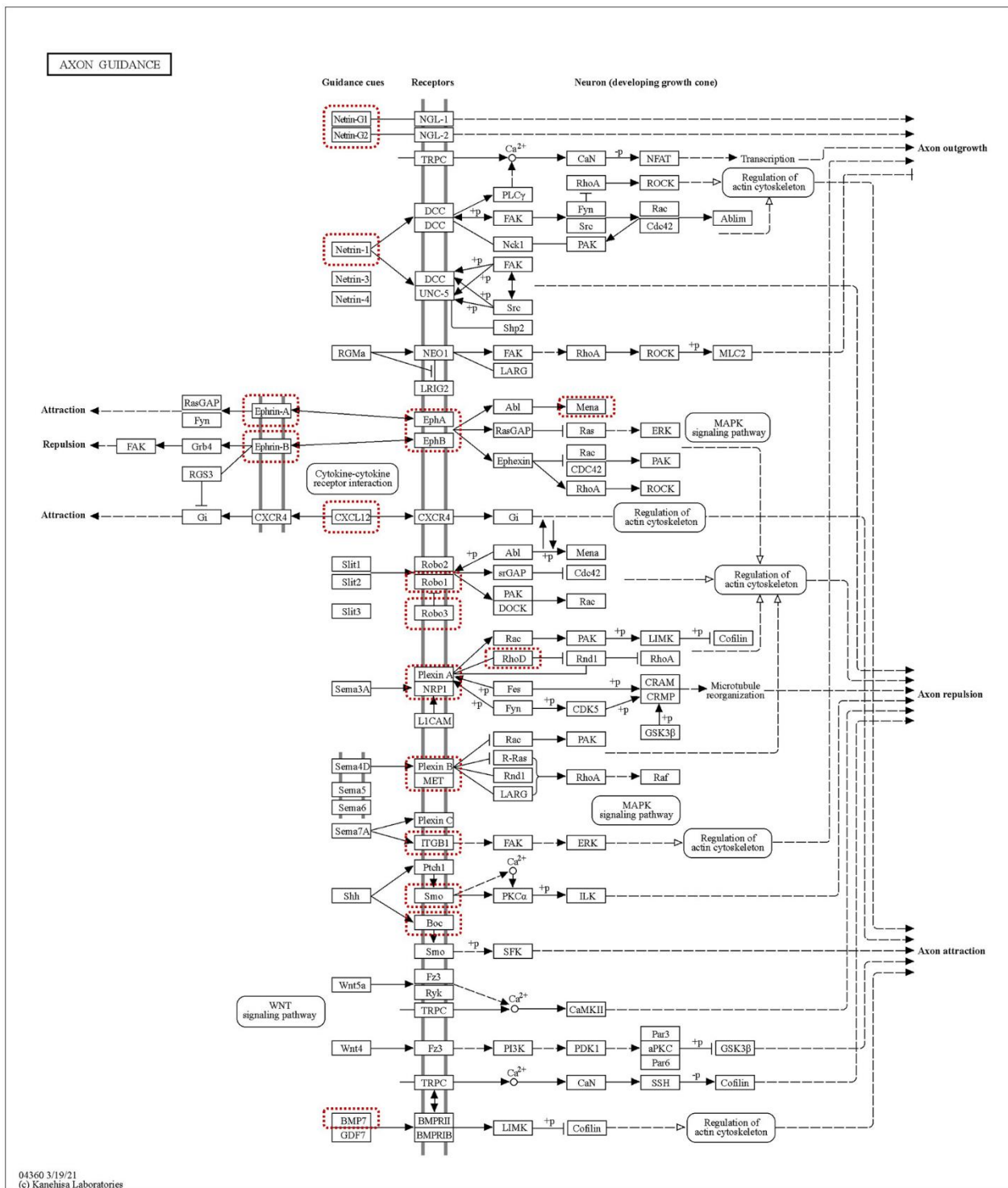
**Supplementary Figure 5. Activation of the p53 family in IPF patients.** Boxplot showing the up-regulation of p53 family members in patients with idiopathic lung fibrosis. \*\*\*\*:  $P < 0.0001$ .



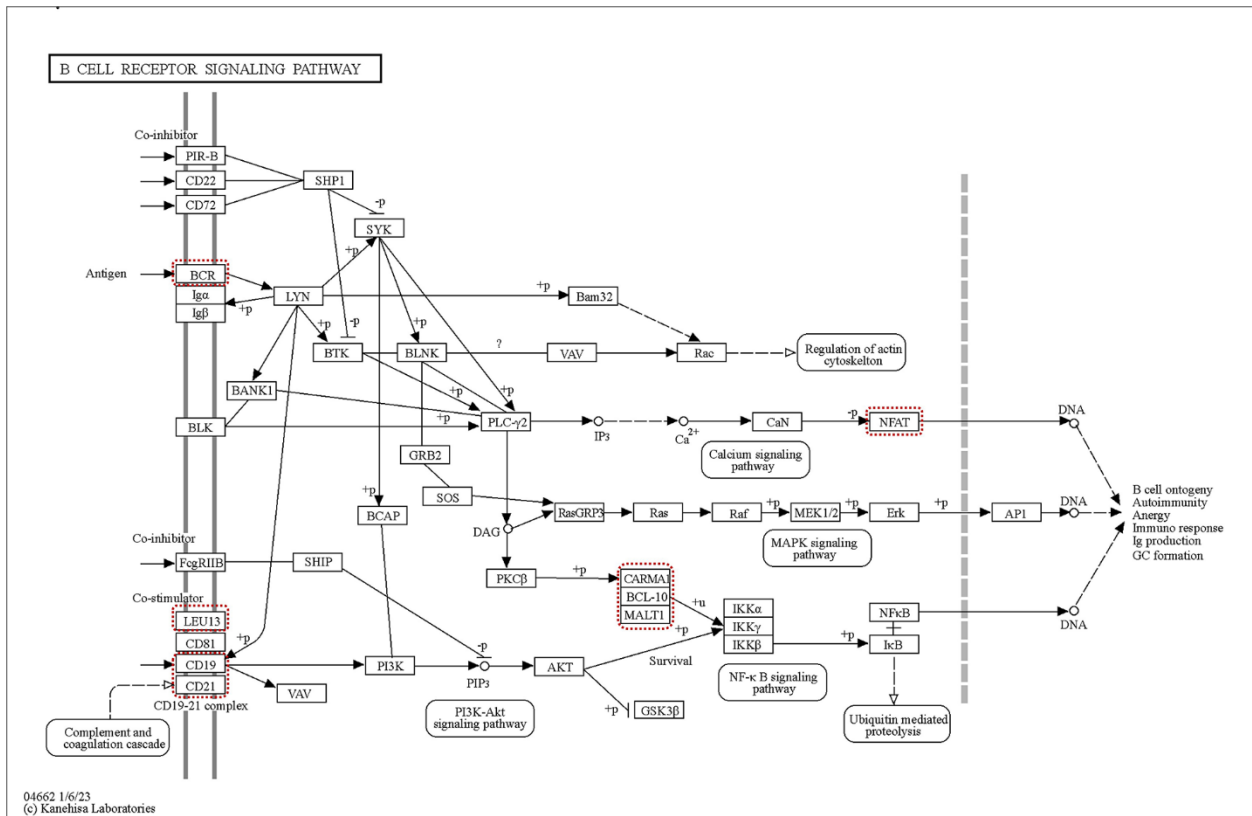
**Supplementary Figure 6. Activation of the p53 family in IPF patients.** Boxplot showing the up-regulation of p53 family members in patients with idiopathic lung fibrosis. \*\*\*\*:  $P < 0.0001$ .



Supplementary Figure 7. Pathway view of collagen degradation. The common DEGs were emphasized with red box.

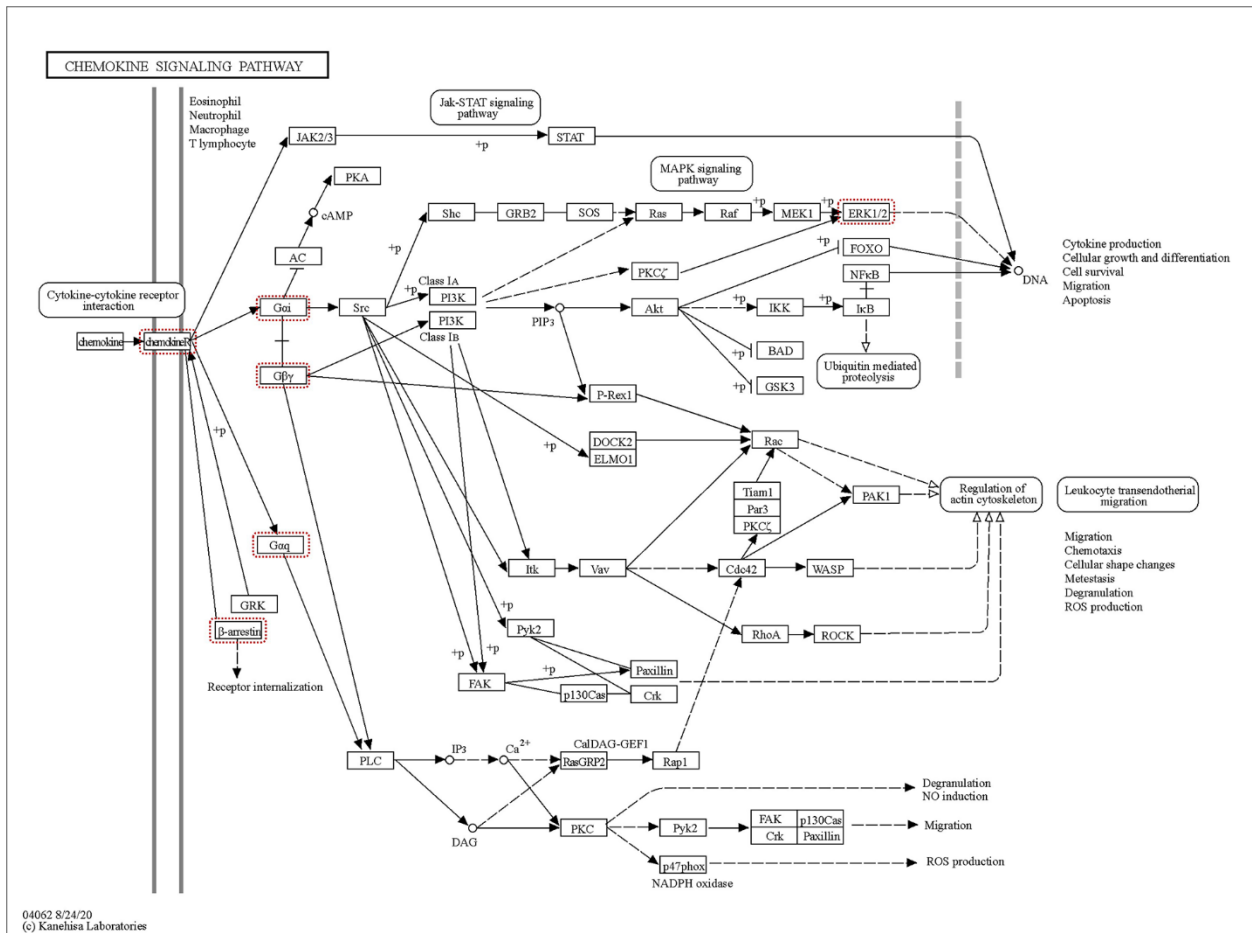


**Supplementary Figure 8. Pathway view of axon guidance.** The IPF-specific DEGs were emphasized with red box.



**Supplementary Figure 9. Pathway view of B cell receptor signaling.** The CHP-specific DEGs were emphasized with red box.





**Supplementary Figure 10. Pathway view of chemokine signaling.** The CTD\_ILD-specific DEGs were emphasized with red box.