

## **Description of Additional Supplementary Files**

**Supplementary Data 1.** The Excel file includes Metadata of all cells from 13 scRNA-seq skin samples.

**Supplementary Data 2.** The Excel file contains marker genes of clusters derived from all skin cells.

**Supplementary Data 3.** The Excel file comprises Metadata pertaining to the subclusters of all immune cells derived from 13 scRNA-seq skin samples.

**Supplementary Data 4.** The Excel file includes marker genes of clusters derived from all immune cells across 13 scRNA-seq skin samples.

**Supplementary Data 5.** The Excel file comprises Metadata pertaining to the subclusters of all fibroblasts cells derived from 13 scRNA-seq skin samples.

**Supplementary Data 6.** The Excel file includes marker genes of clusters derived from all fibroblasts cells across 13 scRNA-seq skin samples.

**Supplementary Data 7.** The Excel file comprises Metadata pertaining to the subclusters of all keratinocytes cells derived from 13 scRNA-seq skin samples.

**Supplementary Data 8.** The Excel file includes marker genes of clusters derived from all keratinocytes cells across 13 scRNA-seq skin samples.

**Supplementary Data 9.** The Excel file includes differentially expressed genes between BP and controls in *CCL19*<sup>+</sup> FB cluster.

**Supplementary Data 10.** The Excel file includes differentially expressed genes between BP and controls in *APCDD1*<sup>+</sup> FB cluster.

**Supplementary Data 11.** The Excel file includes Metadata of all cells from 16 scRNA-seq PBMC samples.

**Supplementary Data 12.** The Excel file contains marker genes of clusters derived from all PBMC cells.

**Supplementary Data 13.** The Excel file includes Metadata of all cells from 4 scRNA-seq blister samples.

**Supplementary Data 14.** The Excel file contains marker genes of clusters derived from all blister cells.

**Supplementary Data 15.** The Excel file contains information of pathways in figure 3a from CellChat database.