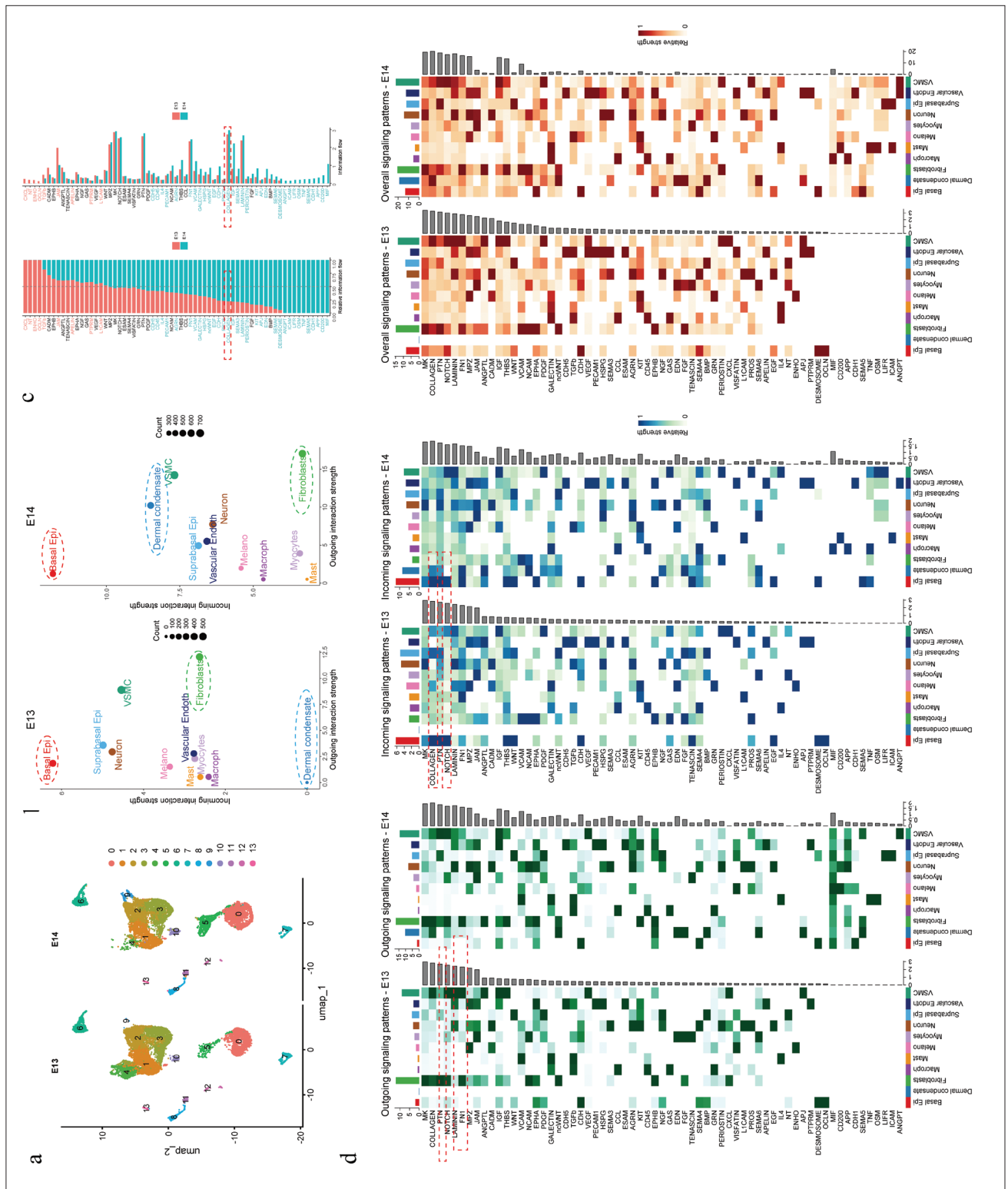


RESEARCH ARTICLE

3D-printed degradable hair follicular hanging-drop scaffolds
integrated with tissue-engineered skin promote hair follicle
regeneration *in vitro*

Supplementary file



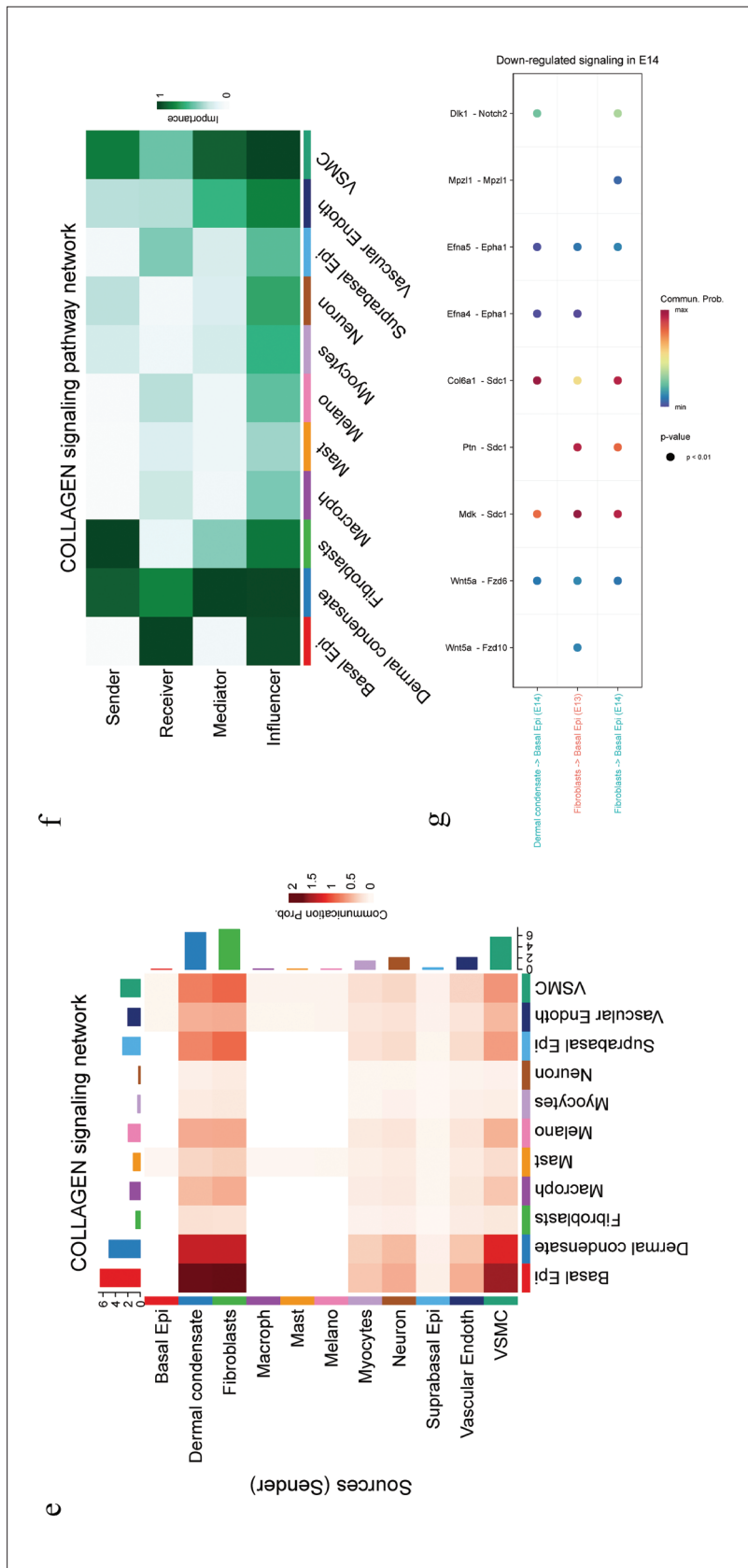


Figure S1. Single-cell RNA sequencing analysis of mouse embryonic skin. (a) UMAP plots showing 14 distinct cell clusters (labeled 0–13) identified from single-cell RNA sequencing data of mouse embryonic skin at E13.5 (left) and E14.5 (right). (b) Scatter plots of outgoing (x-axis) and incoming (y-axis) interaction strengths for different cell types at E13.5 (left) and E14.5 (right). (c) Bar plots comparing the relative (left) and absolute (right) information flow of signaling pathways between E13.5 (red) and E14.5 (blue). (d) Heatmaps depicting outgoing (left), incoming (middle), and overall (right) signaling patterns for different cell types at E13.5 and E14.5. Each row represents a signaling pathway, and each column corresponds to a cell type. (e) Heatmap illustrating the communication probabilities of the COLLAGEN signaling network among different cell types at E14.5. Rows represent signal senders, and columns represent signal receivers. (f) Heatmap showing the roles of different cell types in the collagen signaling network at E14.5. Rows represent functional roles (sender, receiver, mediator, influencer), and columns correspond to specific cell types. Darker shades indicate higher importance in the network. (g) Dot plot of down-regulated signaling pathways at E14.5. Abbreviations: VSMC: Vascular smooth muscle cells; Suprabasal Epi: Suprabasal epithelial cells; Basal Epi: Basal epithelial cells; Vascular Endoth: Vascular endothelial cells; Melano: Melanocytes; Macroph: macrophages.