Supporting Information

The Matrisome Provides a Supportive Microenvironment for Skin Functions of Diverse Species

Binghui Liu[2, †], Shikun Zhang[3, †], Wenjuan Wang[4, †], Zhimin Yun[3], Luye Lv[5], Mi Chai[6], Zhihong Wu[1], Yunping Zhu[2, 7, *], Jie Ma[2, *], Ling Leng[1, *]

[1] Department of Medical Science Research Center, Translational Medicine Center, Peking Union Medical College Hospital, Peking Union Medical College and Chinese Academy of Medical Sciences, No.1 Shuaifuyuan, Beijing 100730, China.

[2] State Key Laboratory of Proteomics, Beijing Proteome Research Center, National Center for Protein Sciences (Beijing), Beijing Institute of Life Omics, No. 38 Life Science Park Road, Beijing 102206, China.

[3] Department of Stem Cell and Regenerative Medicine Laboratory, Institute of Health Service and Transfusion Medicine, No. 27 Taiping Road, Beijing 100850, China.

[4] Department of Dermatology, Chinese PLA General Hospital, No. 28 Fuxing Road, Beijing 100853, China.

[5] Institute of NBC Defense, No.1 Central North Street, Beijing 102205, China.

[6] Department of Plastic and Reconstruction Surgery, Chinese PLA General Hospital, No. 28 Fuxing Road, Beijing 100853, China.

[7] Basic Medical School, Anhui Medical University, No. 81 Meishan Road, Anhui 230032, China.

[†]These authors contributed equally to this work.

*Corresponding authors:

E-mail: zhuyunping@gmail.com (Y.Z.).

E-mail: majie729@163.com (J.M.).

E-mail: zhenlinger@126.com (L.L.).

This file includes:

8 pages.

Figures S1 to S5.

Lists of Table S1 to Table S4.

Supplementary Figures

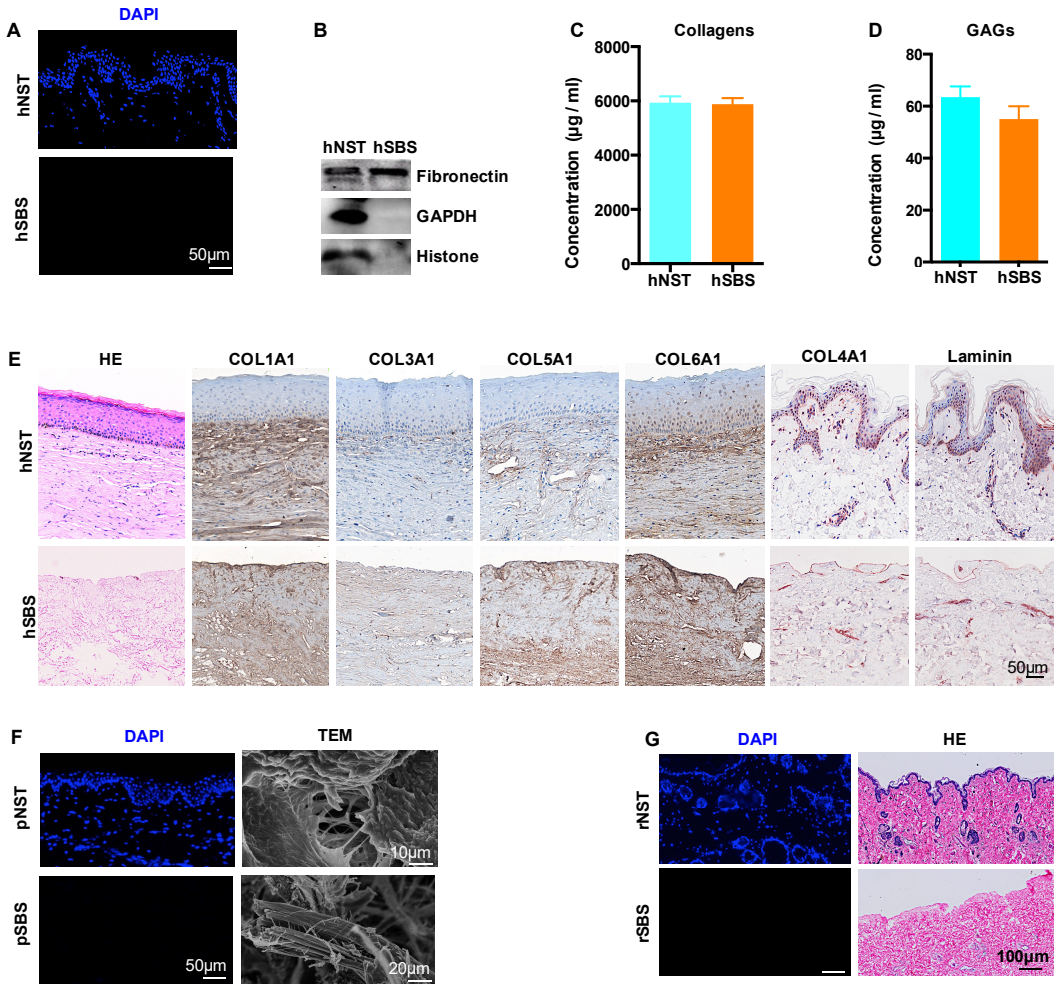

Figure S1. Quality control of decellularization. (A) Immunofluorescence analysis of DAPI staining of hNSTs and hSBSs (scale bar = 50 μm). (B) Western blot analysis of the levels of fibronectin, histones, and GAPDH. Concentrations of collagens (C) and GAGs (D) in hNSTs and hSBSs. (E) HE and immunohistochemical analyses of the expression of COL1A1, COL3A1, COL5A1, COL6A1, COL4A1, and Laminin in hNSTs and hSBSs (scale bar = 50 μm). (F) Immunofluorescence (scare bar = 50 μm) and = TEM (scare bars = 10 μm and 20 μm) analyses of pNSTs and pSBSs. (G) Immunofluorescence (scare bar = 50 μm) and HE (scale bar: 100 μm) analyses and DAPI staining of rNSTs and rSBSs.

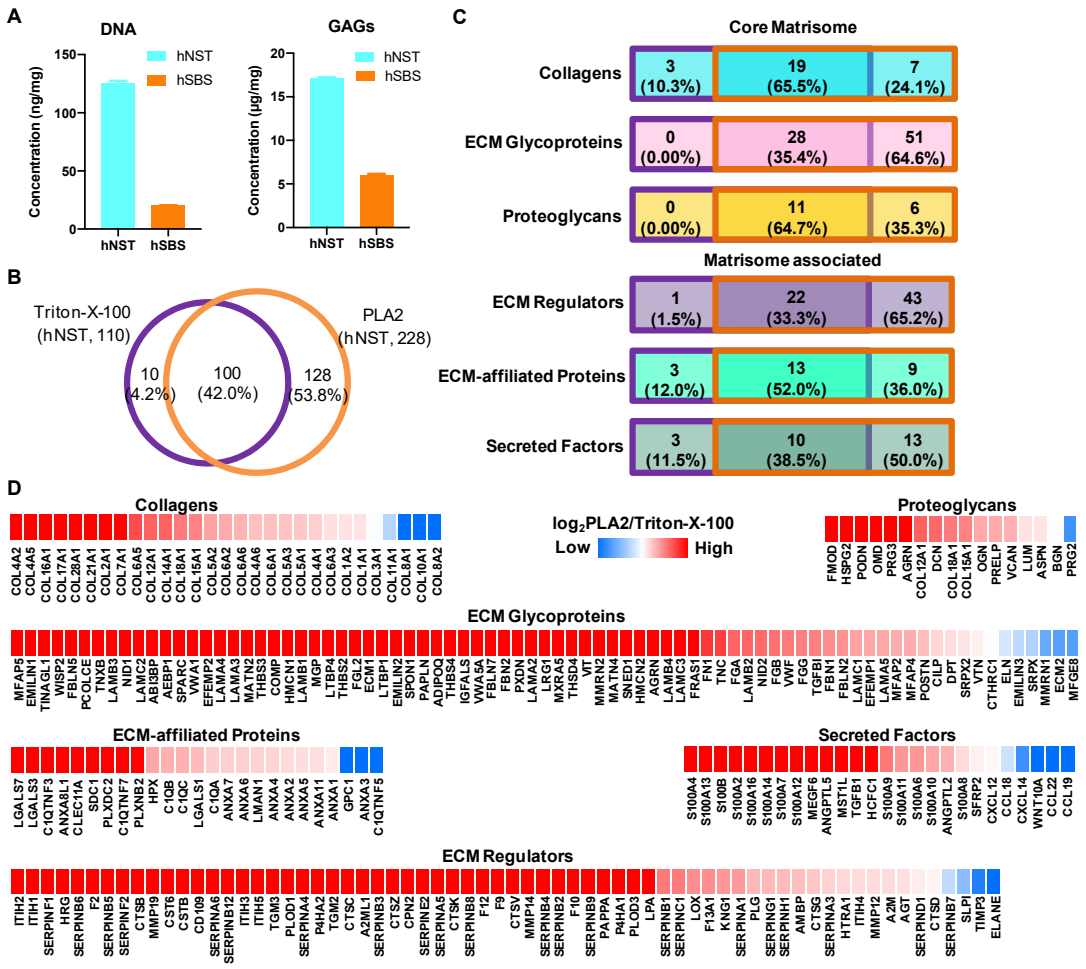

Figure S2. Comparison of the ECM proteins identified in hSBSs generated by PLA2 and Triton-X-100 methods. (A) Concentrations of DNA and GAGs in hNSTs and hSBSs, where the hSBSs are produced by Triton-X-100 method. (B) Pie charts represent the numbers and proportions of ECM proteins of two methods. (C) The Venn diagrams represent the proportions of the categories that constitute the Matrisome in hSBSs of two methods as follows: collagens, ECM glycoproteins, proteoglycans, ECM regulators, ECM-affiliated proteins, and secreted factors. (D) Heatmaps represent the $\log_2$ of ECMs protein intensities between PLA2 and Triton-X-100 methods.

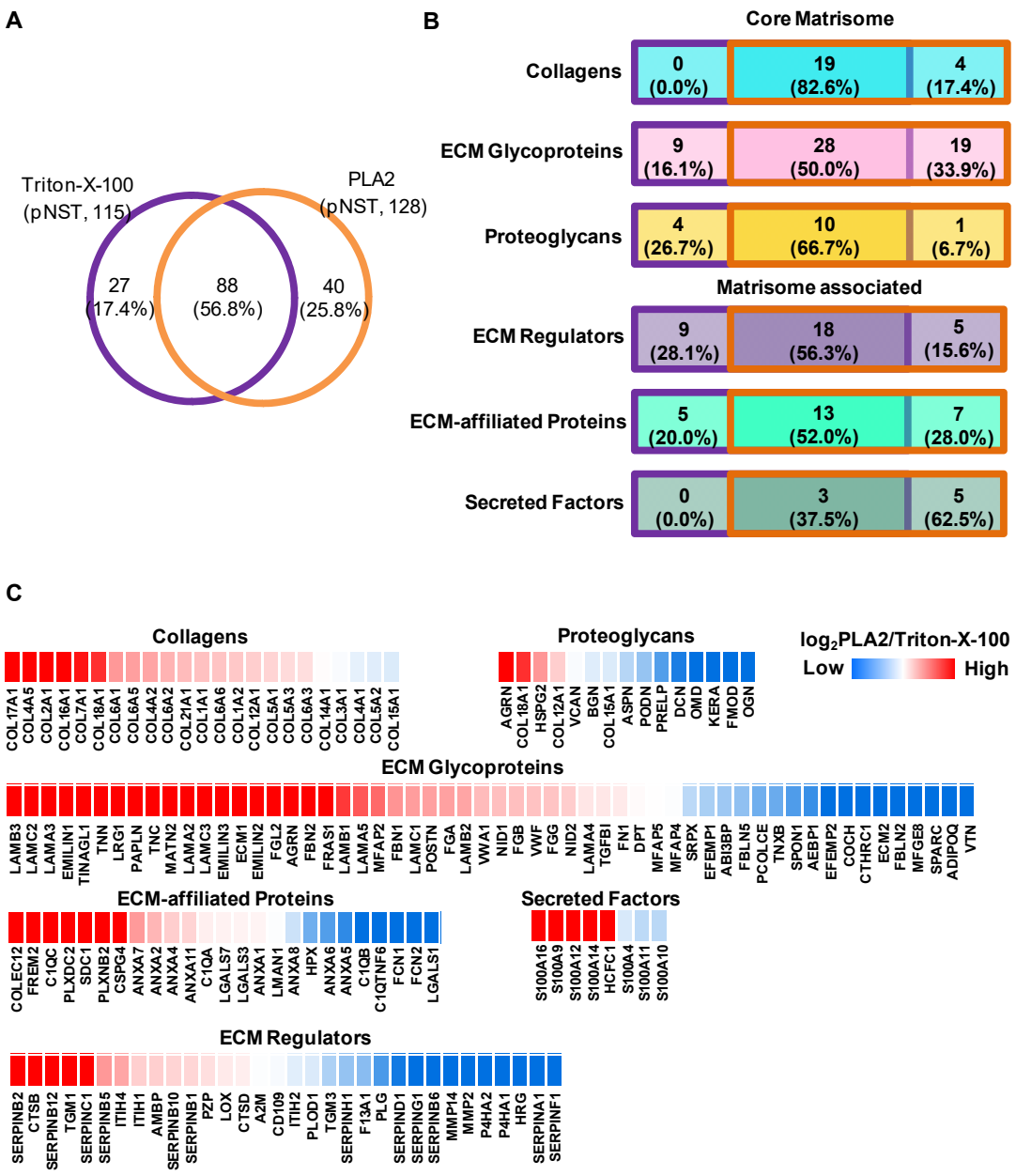

Figure S3. Comparison of the ECM proteins identified in pSBSs generated by PLA2 and Triton-X-100 methods. (A) Pie charts represent the numbers and proportions of ECM proteins of two methods. (C) The Venn diagrams represent the proportions of the categories that constitute the Matrisome in pSBSs of two methods as follows: collagens, ECM glycoproteins, proteoglycans, ECM regulators, ECM-affiliated proteins, and secreted factors. (D) Heatmaps represent the $\log_2$ of ECMs protein intensities between PLA2 and Triton-X-100 methods..

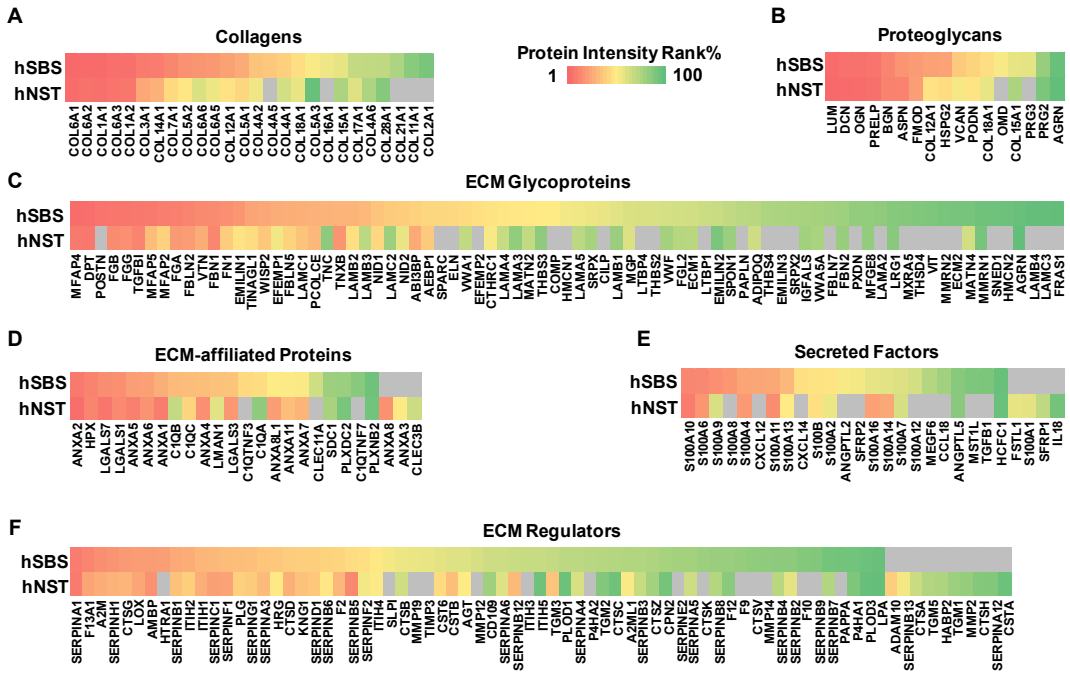

Figure S4. Unbiased Analysis on the skin Matrisome of hNSTs and hSBSs. Heatmaps represent the protein intensity ranks (%) of the Matrisome proteins (A) collagens, (B) proteoglycans, (C) ECM glycoproteins, (D) ECM-affiliated proteins, (E) secreted factors, and (F) ECM regulators between NSTs and SBSs. Red and green boxes indicate the rank percentages of Matrisome proteins that were present at high or low levels in hNSTs and hSBSs, respectively.

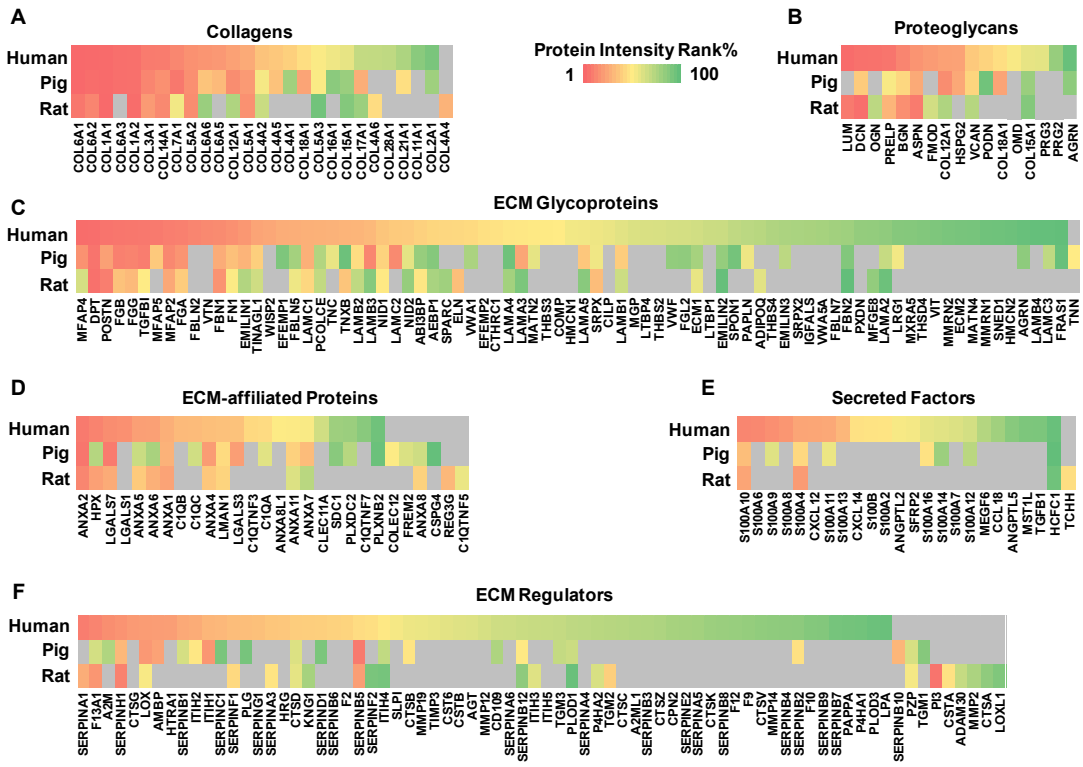

Figure S5. Unbiased Analysis of the overall skin Matrisome. Heatmaps represent the protein intensity ranks (%) of Matrisome proteins in the SBSs of humans, pigs, and rats: (A) collagens, (B) proteoglycans, (C) ECM glycoproteins, (D) ECM-affiliated proteins, (E) secreted factors, and (F) ECM regulators. Red and green boxes indicate the rank percentages of Matrisome proteins present in high and low abundances in NSTs and SBSs, respectively.

Supplementary Tables

Table S1. Overview of healthy human individuals involved in the study.

Table S2. List of all Matrisome proteins identified in human natural skin tissue (hNST) and human skin bioscaffold (hSBS).

Table S3. List of Matrisome proteins identified in pig skin bioscaffold (pSBS).

Table S4. List of Matrisome proteins identified in rat skin bioscaffold (rSBS).