

## Supporting Information

### Wet nitrocellulose membrane for level 3 feature visualization of various latent fingerprints and gender determination

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## S1 Quality assessment of wet-NC-membrane-developed fingerprints

For evaluating the wet-NC-membrane method, the quality of 30 fingerprints obtained from 30 donors was graded according to the Home Office CAST scale (Table 1). Donorship was characterized by referring to the average quality score a specific donor obtained after their prints were graded by a grading scale. Donors were characterized as “strong” if the average quality score was superior to 2, “medium” for an average score between 1 and 2 (incl.), and “poor” for an average score below or equal to 1. Among the 30 donors, 17 females and 9 males were graded as “strong” donors, 3 females and 1 male were graded as “medium” donors, which were shown in Fig S1c.

Table 1 Grading scale considered in this study.

Score	Description
0	No ridge detail; no indication of fingermark
1	Ridges are visible over a small area of the mark or over the whole mark, but it is extremely difficult to retrieve second-level characteristics (such as minutiae) due to extremely poor contrast or ridge details
2	Ridges are visible on almost the whole area of the mark, and second-level characteristics can be retrieved. Nevertheless, the quality is not optimal due to a low contrast (e.g., strong background staining or faint ridges)
3	Ridges are very well defined on the whole mark. Second-level characteristics can easily be retrieved. The contrast is optimal with no (or extremely low) background staining

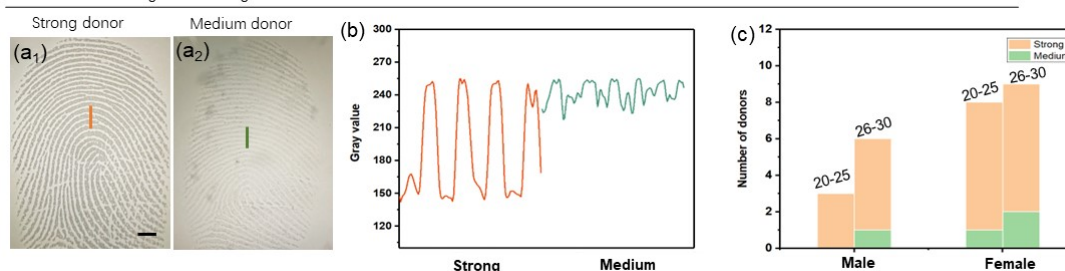


Fig. S1 (a<sub>1</sub> and a<sub>2</sub>) Representative images for fingerprints graded strong and medium. The scale bar is 1 mm. (b) Comparison of cross-sectional gray values over a few parallel ridges as indicated by the orange solid line in (a<sub>1</sub>) and the green solid line in (a<sub>2</sub>). (c) Summary of the quality of wet-NC-membrane-developed fingerprints for all male donors and female donors at different ages.

## S2 Visualization of LFPs lifted from A4 paper by wet-NC-membrane

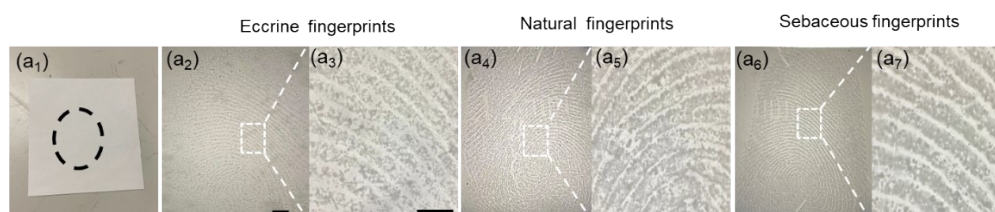


Fig. S2 Micrographs of eccrine fingerprints (a<sub>2</sub>), natural fingerprints (a<sub>4</sub>), and sebaceous fingerprints (a<sub>6</sub>) respectively lifted from A4 paper (a<sub>1</sub>) using wet-NC-membrane. The magnified micrographs of local eccrine, natural, and sebaceous fingerprints are shown in (a<sub>3</sub>), (a<sub>5</sub>), and (a<sub>7</sub>), corresponding to the respective rectangle regions marked with white dashed lines. The scale bar is 500 μm.

### S3 Reproducibility test of the level 3 details in wet-NC-membrane-developed fingerprints

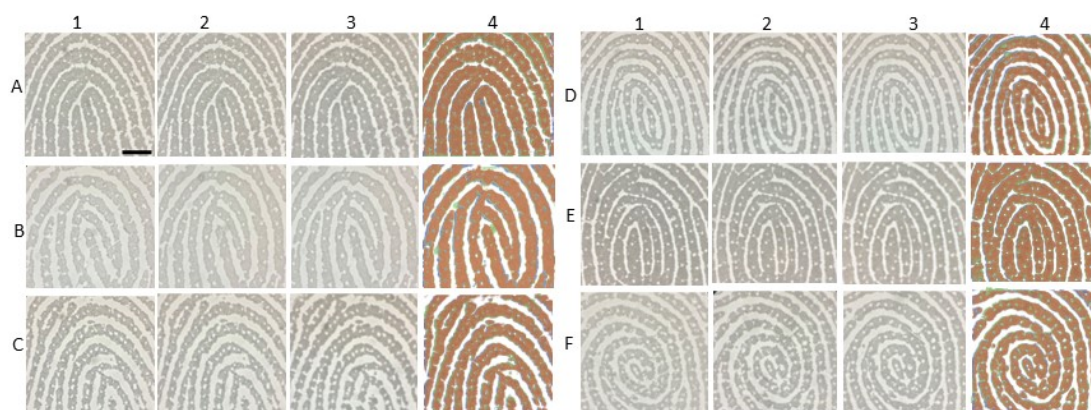


Fig. S3 Reproducibility of the level 3 details in wet-NC-membrane-developed fingerprints. Micrographs of three independent fingerprints (1-3) from the same fingertip obtained by the wet-NC-membrane method at various times, and the superimposed images (4) of three independent fingerprints from the same fingertip.

Table 2 A list of the pore number of fingerprint samples from Fig S3

Donor	Pore Number			Donor	Pore Number		
A	91	91	91	D	94	94	94
B	70	70	70	E	101	101	102
C	98	98	98	F	92	92	92

### S4 Comparison of sweat pore density from fingerprint donors with different height or hand size

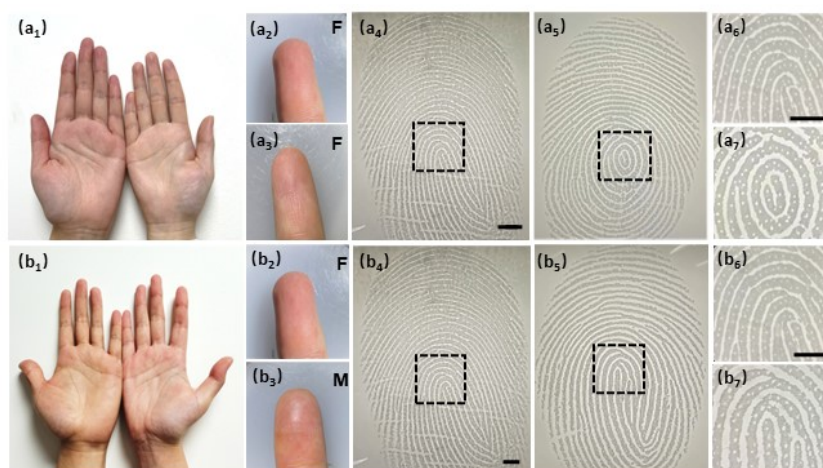


Fig. S4 (a) Comparison of sweat pore density from two females in different height. (a<sub>1</sub>) Photograph of two hands from two females; (a<sub>2</sub> and a<sub>3</sub>) two fingertips from hands in Fig a<sub>1</sub>; (a<sub>4</sub> and a<sub>5</sub>) their developed fingerprints. The enlarged region in (a<sub>6</sub>) and (a<sub>7</sub>) corresponds approximately to the rectangular region marked (with black dotted lines) in Fig a<sub>4</sub> and a<sub>5</sub>, respectively. (b) Comparison of sweat pore density from a male and a female in same hand size. (b<sub>1</sub>) Photograph of two hands from a male and a female; (b<sub>2</sub> and b<sub>3</sub>) two fingertips from hands in Fig b<sub>1</sub>; (b<sub>4</sub> and b<sub>5</sub>) their developed fingerprints. The enlarged region in (b<sub>6</sub>) and (b<sub>7</sub>) corresponds approximately to the rectangular region marked (with black dotted lines) in Fig b<sub>4</sub> and b<sub>5</sub>, respectively. The scale bar is 1 mm.