Electronic Supplementary Information for

An electrochemiluminescence cloth-based biosensor with smartphone-based imaging for detection of lactate in saliva

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Table S1. Materials cost estimation for the single cloth-based device

Material	Quantity used per device	Cost per device ($)
Cotton cloth ($2.7/m^2)	9.0 cm^2	0.00243
Solid wax ($0.02/g)	0.027 g	0.00055
Conductive carbon ink ($0.095/g)	0.1066 g	0.01013
Total		0.01311

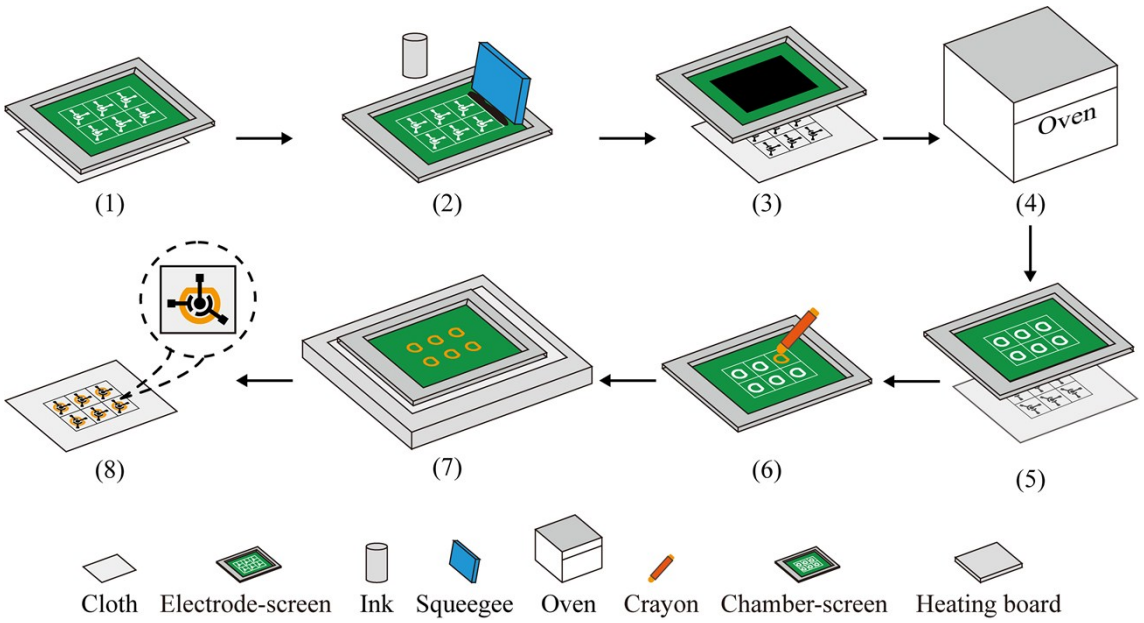
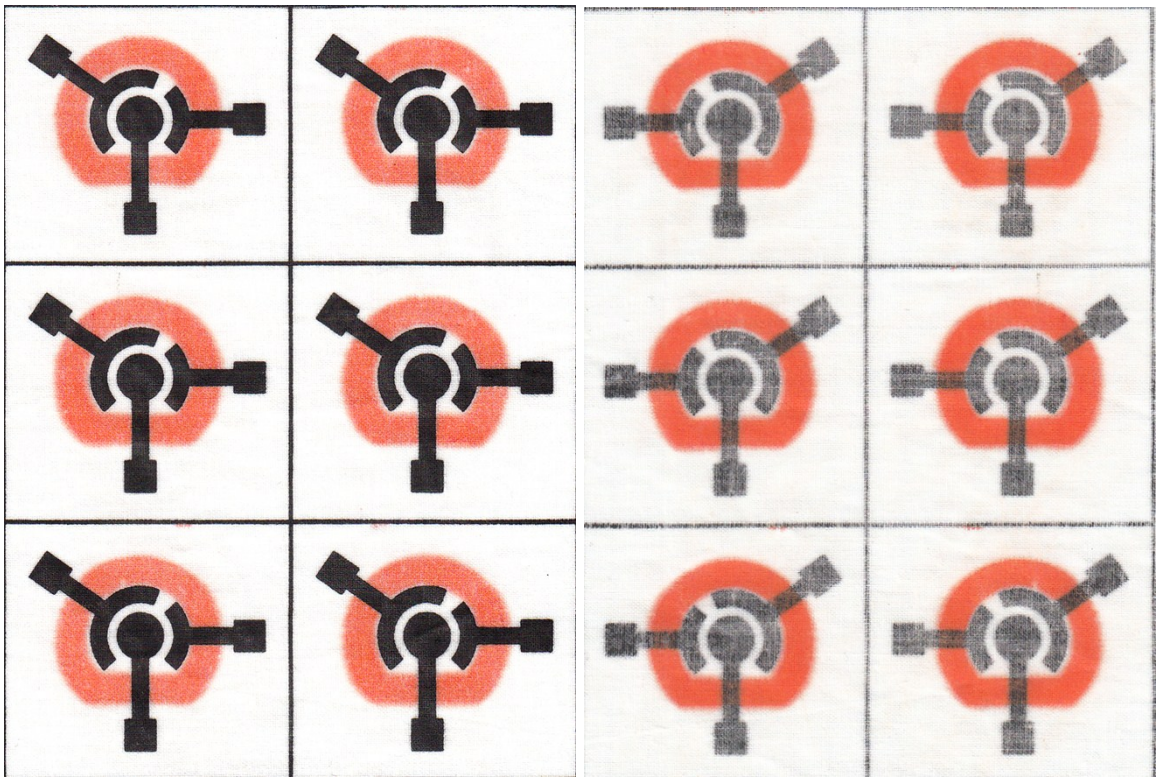
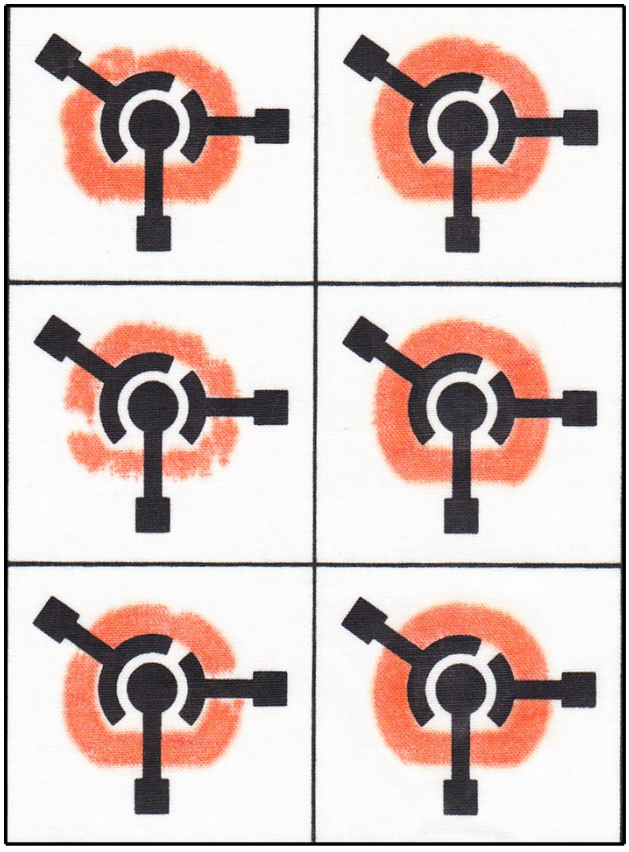


Fig. S1. Schematic of the screen-printing process for the fabrication of cloth-based devices.



(A) (B)

Fig. S2. A typical screen-printed cloth-based array containing six sets of ECL units. (A) Front of the cloth-based array; and (B) back of the cloth-based array.



(A) (B)

Fig. S3. Fabrication of a cloth-based array without (A) or with (B) a smoothening utensil.

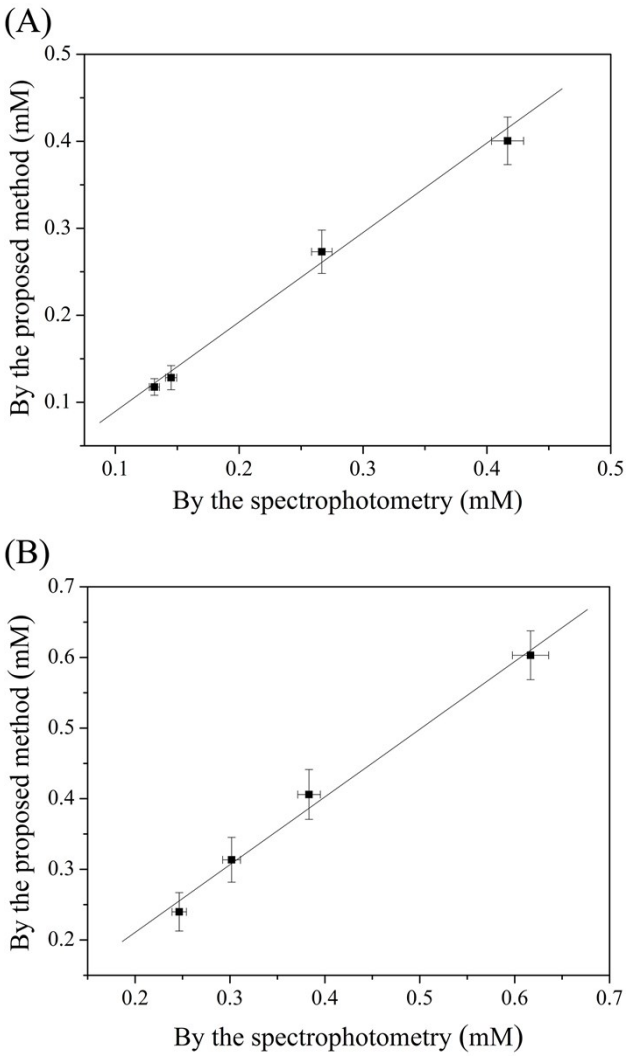


Fig. S4. Correlation of the salivary lactate levels under fasting conditions (A) and after meals (B), measured by the spectrophotometry and the proposed method. For the proposed method, the saliva samples were directly applied for their lactate measurements, while for the spectrophotometry, the saliva samples were appropriately diluted before the determination, and then were analyzed on the spectrophotometer (UV-T6, Beijing Purkinje General Instrument Co., Ltd., Beijing, China) by using the lactate assay kit. The error bar represents the standard deviation from five independent measurements.

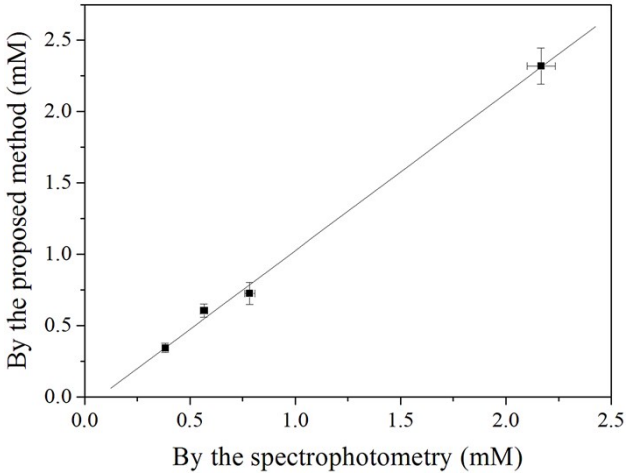


Fig. S5. Potential application of the proposed method for determination of lactate levels in human serum samples. The ECL results were in good agreement with those obtained by the spectrophotometry, where the regression equations of $Y = 1.1017X - 0.0754$ ($R^2 = 0.9971$) was obtained. The serum samples were directly applied for their lactate measurements, while for the spectrophotometry, the serum samples were appropriately diluted before the determination, and then were analyzed on the spectrophotometer (UV-T6, Beijing Purkinje General Instrument Co., Ltd., Beijing, China) by using the lactate assay kit. The error bar represents the standard deviation from five independent measurements.

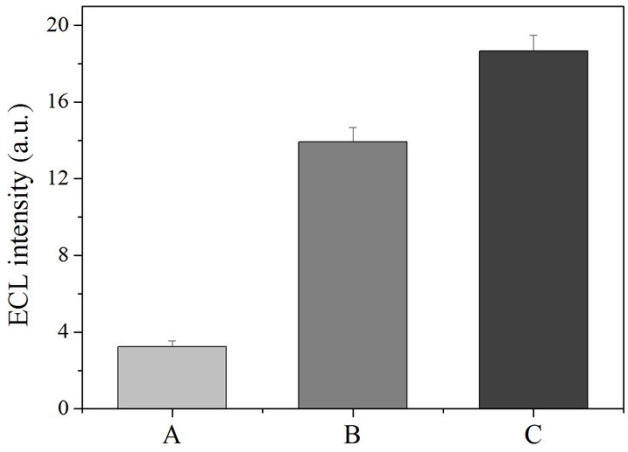


Fig. S6. Potential application of the ECL method for determining glucose levels in human urine samples (Columns “A”-1.7 mM, “B”-5.6 mM, and “C”-8.3 mM). The urine samples with different glucose concentrations, which were analyzed by the glucose oxidase (GOD)-peroxidase (POD) method on a Sysmex UF-1000i Urine Analyzer in the clinical laboratory of Guangzhou First People's Hospital, could produce various levels of ECL signals on the proposed biosensor. Assay conditions: Applied potential: 0.9 V; pH of substrate solution: 10.0; Luminol concentration: 2.0 mM; Volume of assay solution: 35 μL; and [GOD]-1 unit/μL. The error bar represents the standard deviation from five independent measurements.