Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

Flexible Pressure Sensing Film Based on Conductive SWCNT/PDMS Sphere for Monitoring Human Pulse Signals

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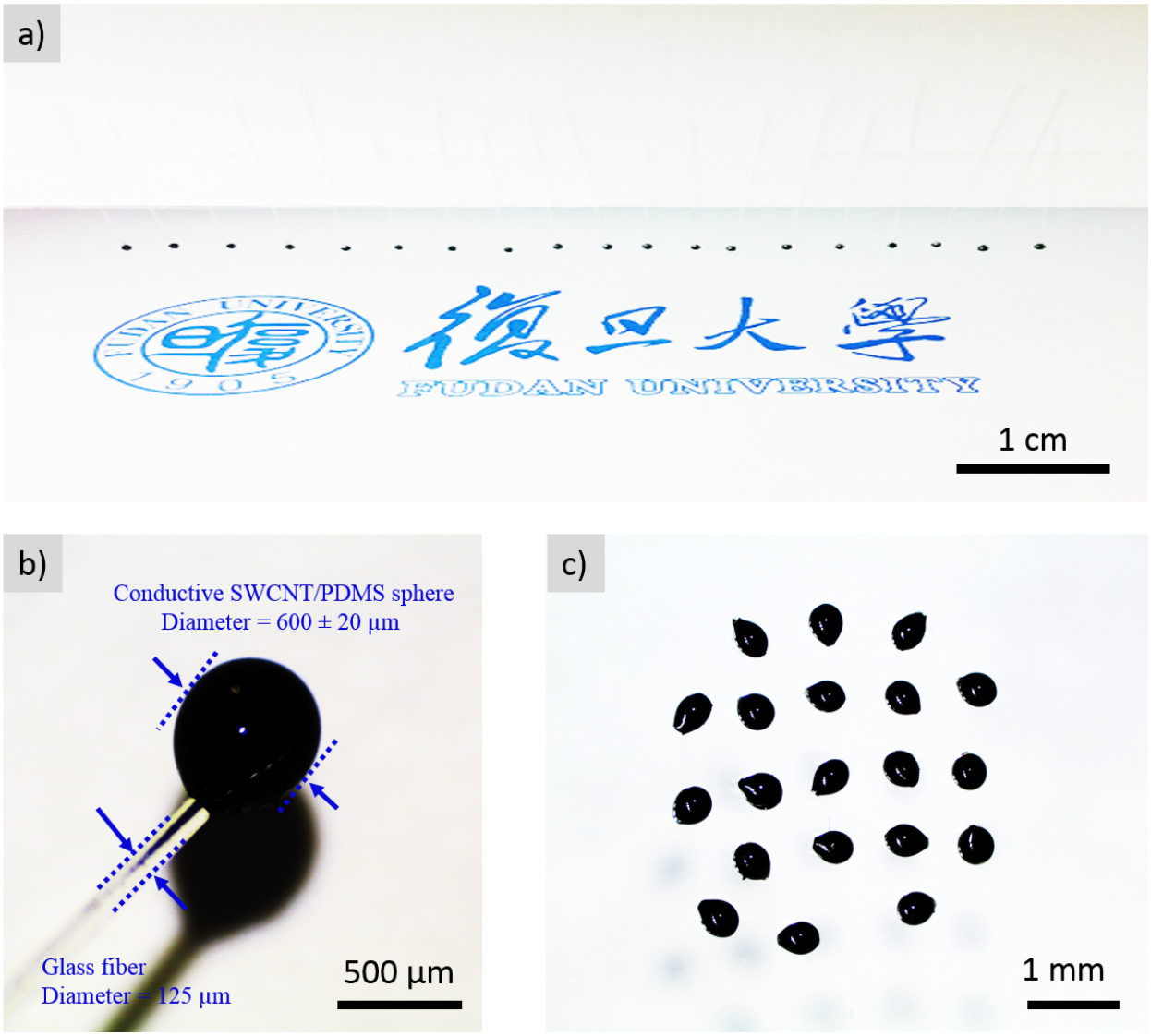

Fig. S1 Preparation of conductive SWCNT/PDMS sphere with the diameter = 600 ± 20 μm

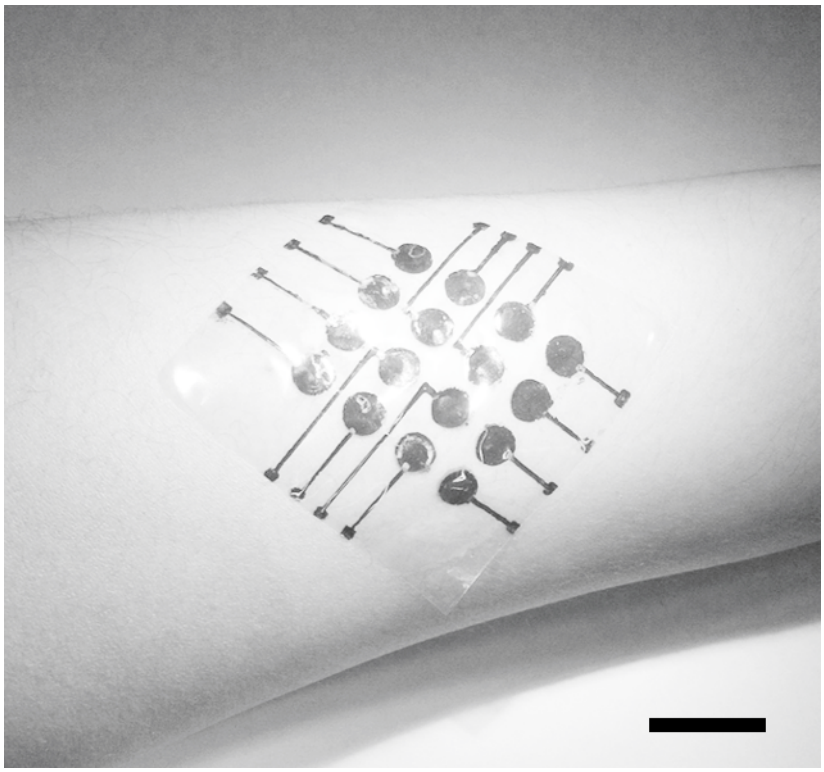

Fig. S2 the bottom skin with silver electrode array (4×4) on PET substrate. The scale bar is 1 cm.

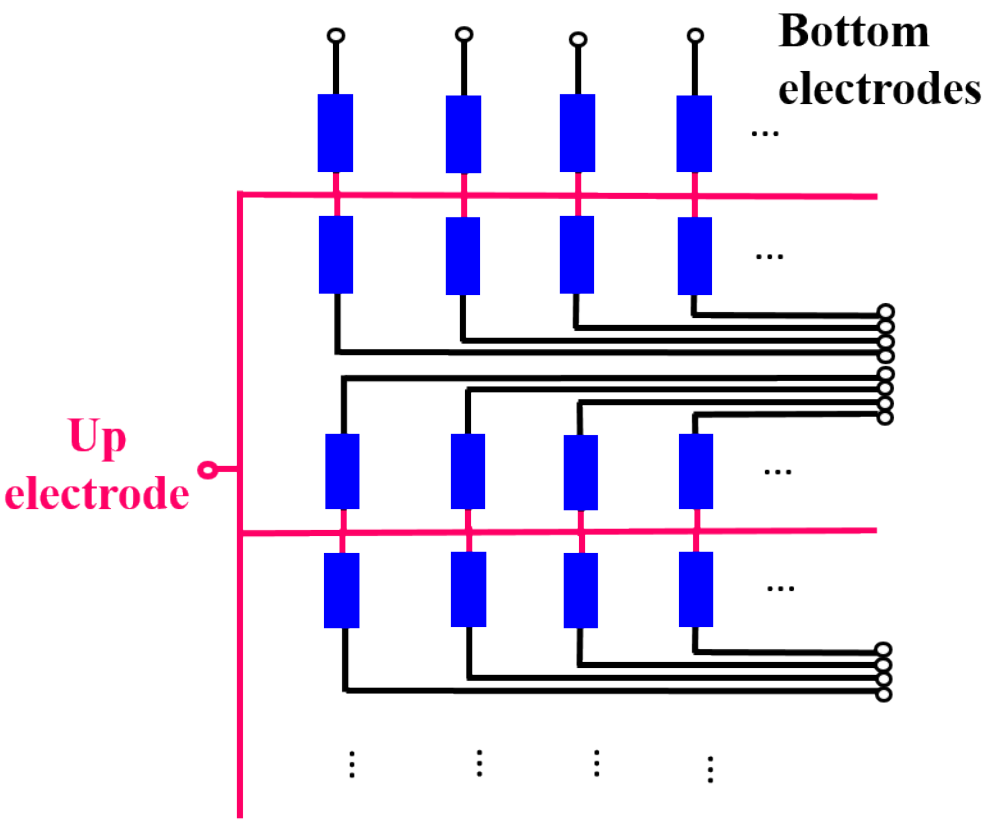

Fig. S3 the equivalent circuit mode of the flexible pressure sensing film, in which every detecting unit is regards as a chip-type sensing component.

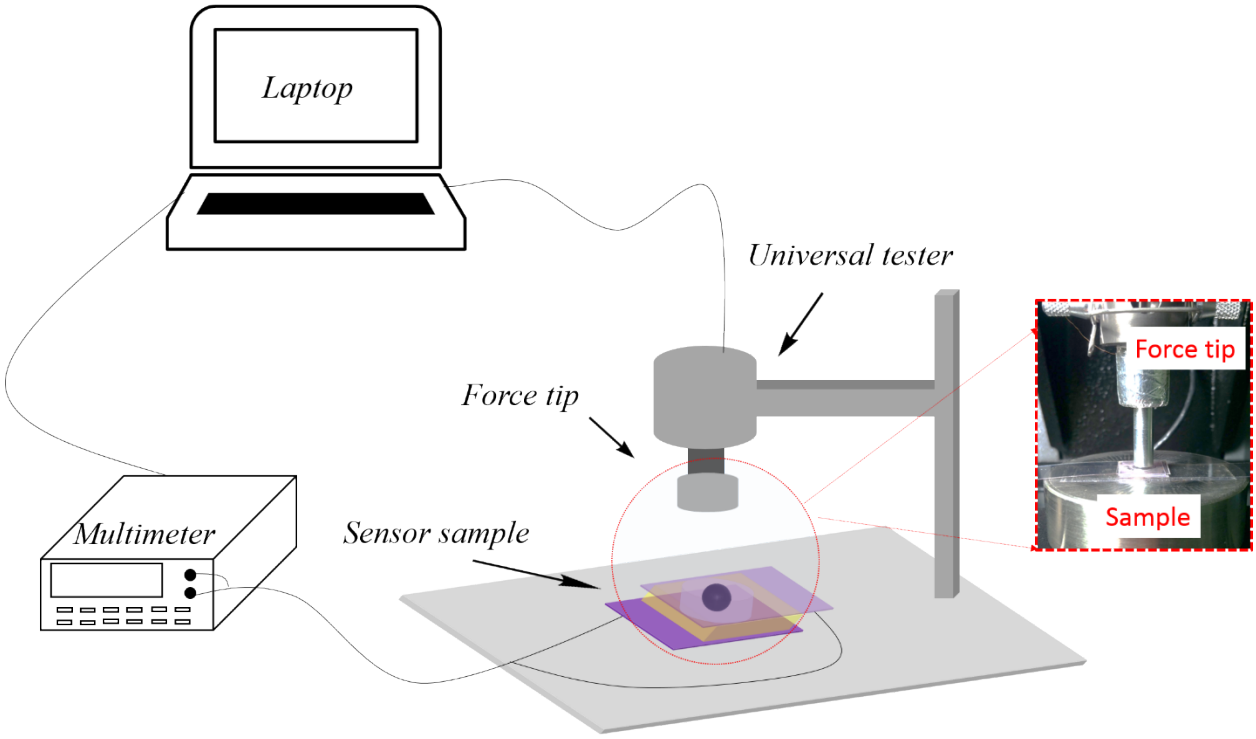

Fig. S4 the home-made measurement system for mechanical-resistance response test

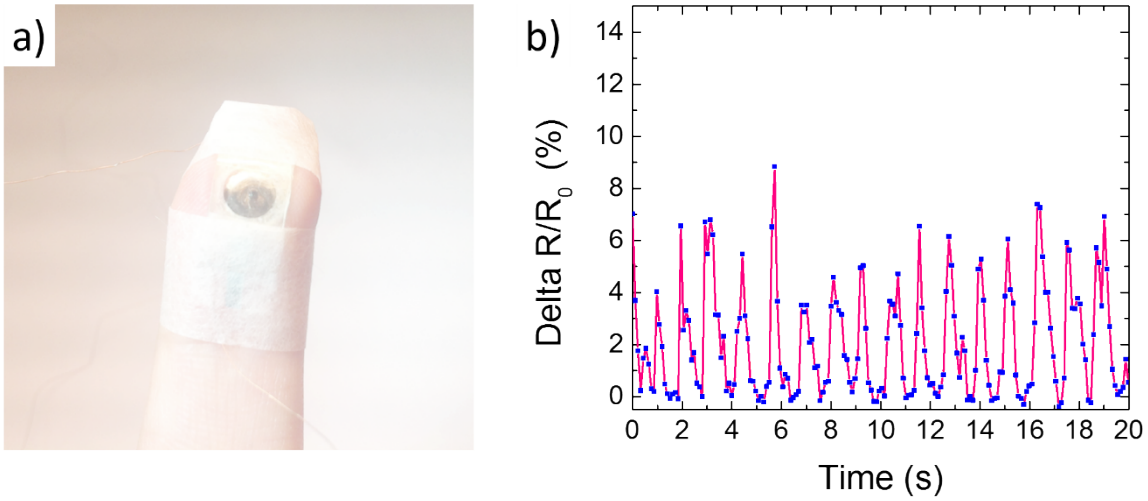

Fig. S5 a) Digital image of a single-sphere sensor attached on the index fingertip for signal detecting; b) The resistance response to the pulse signals on the index fingertip.

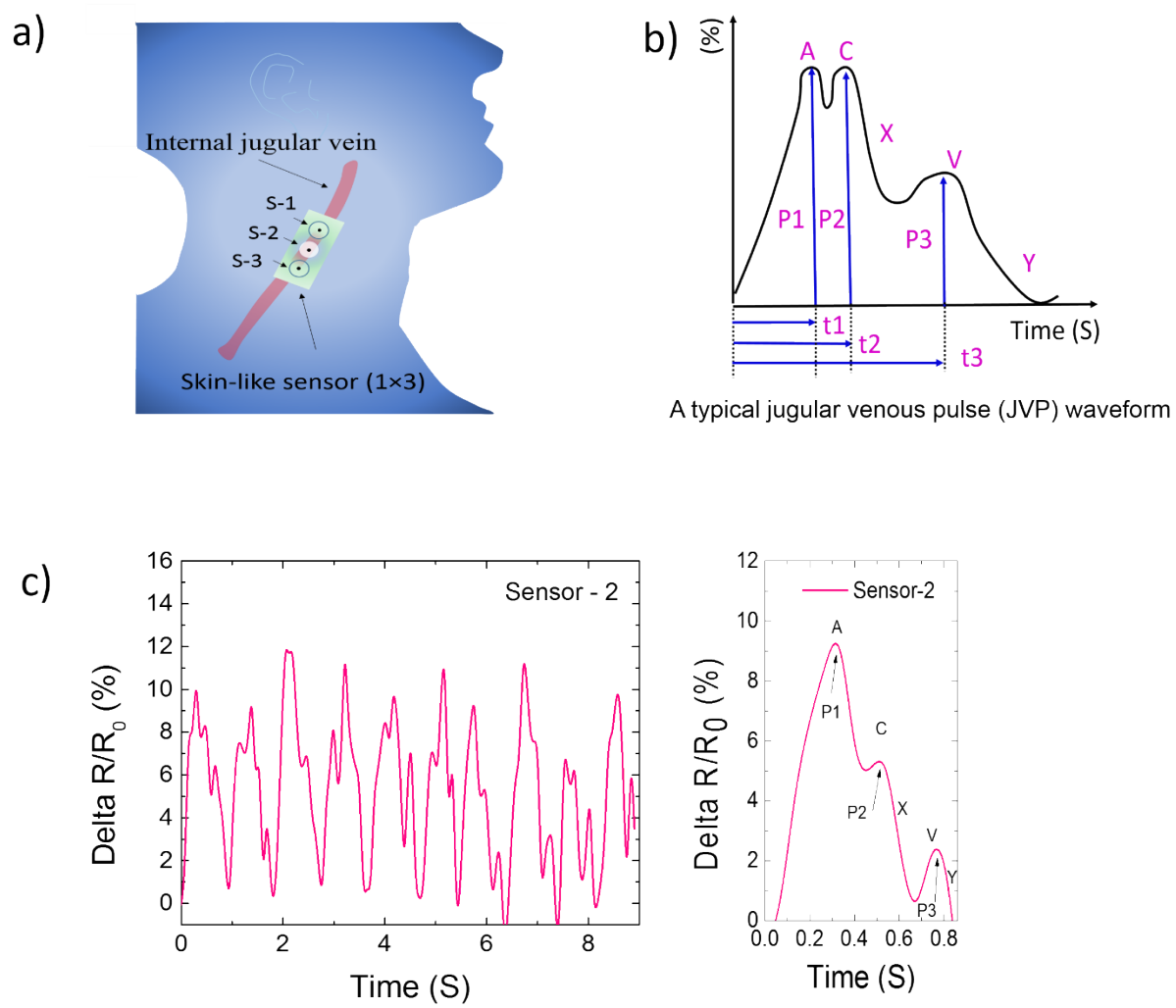

Fig. S6 a) A detailed schematic showing how the pulse of internal jugular vein in human neck was monitored using flexible pressure sensor (1*3); b) illustration shows the typical waveform of jugular venous pulse (JVP); c) Real-time resistance-response waveform from S-2.

To demonstrate the efficiency of the as prepared flexible pressure sensor, this device (1×3) was attached onto the internal jugular vein in human neck in Fig.S6a. The objective was to observe jugular venous pulse (JVP) signals in real-time. Clinically, JVP signals are very useful for exigent heart diseases. Because they are generated from a series of activities of heart inherently and can reflect health status of the heart directly or indirectly. As for a typical JVP waveform, it is composed of three upward (A, C, V) and two downward (X, Y) deflections, as show in Fig. S6b. Presently, sophisticated and expensive systems were required to obtain these signals. Now, our developed device will provide a cheap, convenient alternative. Fig. S6c exhibited these results of the real-time resistance response detected through S2. It shows the maximum resistance response variations compared with S1 and S3, and was defined as the optimal tracked position. Results show that from the waveform of S2, the classic deflections of A, C, X, V, Y can be found clearly with the relevant happening time of 0.302 S, 0.516 S, 0.595 S, 0.753 S, 0. 814 S, respectively. These are just what we want to get exactly. Effective detection and collection of this data will be very promising for the establishment of a complete system used for heart disease analysis.