

Supporting Information

Implantable and Degradable Wireless Passive Protein-based Tactile Sensor for Intracranial Dynamic Pressure Detection

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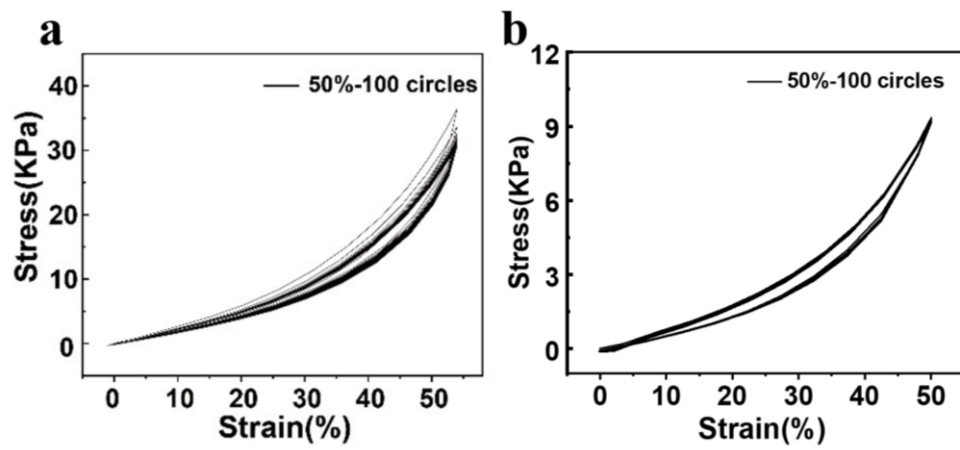


Figure S1. Comparison of cyclic compression tests of pure and modified regenerated silk hydrogel elastomers.

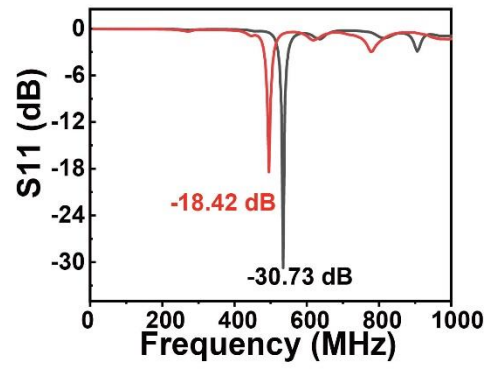


Figure S2. Measurement spectrogram of the device when no pressure is applied in vivo and in vitro.

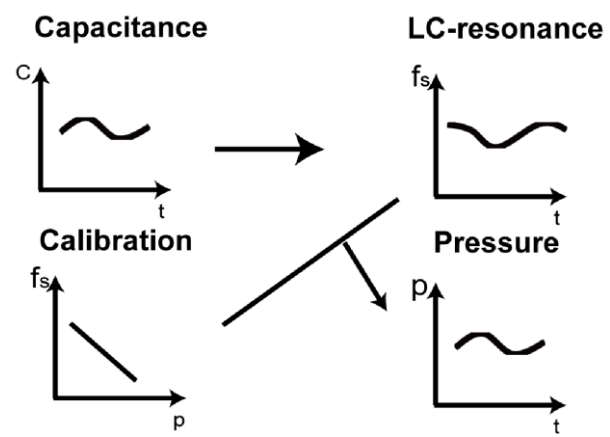


Figure S3. Signal conversion flow diagram.

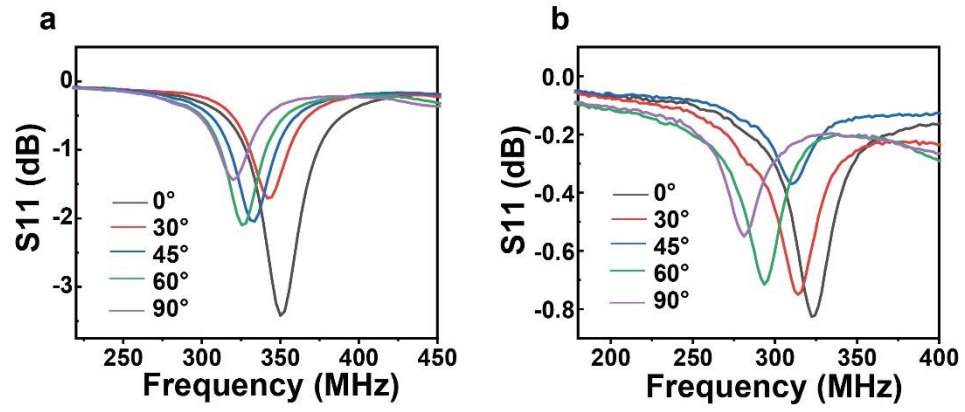


Figure S4. Response of the sensor to 0–90° bending of the finger: (a) without pigskin coverage, (b) with pigskin coverage.

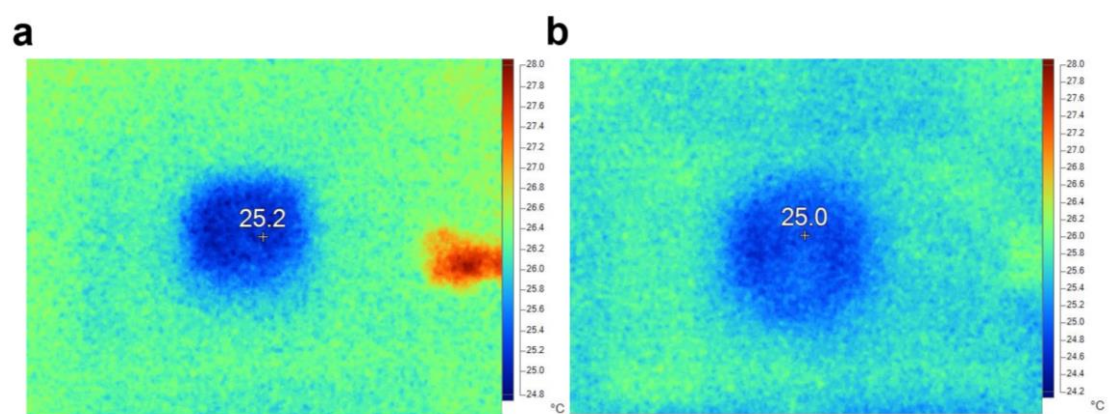


Figure S5. Thermograms before and after one hour of sensor operation. (a) before one hour, (b) after one hour.

Table S1: Resonant frequency and return loss values (S11) of the device without pigskin cover under different pressures.

Pressure_(mmHg)	0	5.1	10.19	14.7	23.85	35.64	46.46	63.04
Frequency_(MHz)	450.54	423.22	402.72	382.24	365.16	348.08	337.84	324.18
S11(dB)	-19.58	-28.76	-19.08	-19.46	-29.72	-28.55	-23.46	-22.04

Table S2: Resonant frequency and return loss values_(S11) of devices with pigskin cover under different pressures.

Pressure_(mmHg)	0	0.88	1.74	3.36	5.26	10.42	17.74	27.82	47.73	67.49
Frequency_(MHz)	377.25	354.58	331.91	313.78	297.91	277.51	261.64	245.77	223.10	209.50
S11(dB)	-2.06	-2.06	-1.93	-2.12	-2.09	-1.78	-1.45	-1.38	-1.39	-1.32

Table S3: Return loss values_(S11) of devices without pigskin coverage at different reading distances.

Readout distance(mm)	5	6	7	8	9	10	11	12	13
S11 values(dB)	-3.24	-2.15	-1.72	-1.10	-0.82	-0.60	-0.47	-0.40	-0.37

Table S4: Return loss values_(S11) of devices with pigskin coverage at different reading distances.

Readout distance(mm)	2	3	4	5	6	7
S11 values(dB)	-1.40	-1.02	-0.84	-0.69	-0.52	-0.25