

## Supporting Information

### **A bioinspired neuromuscular system enabled by flexible electro-optical N2200 nanowire synaptic transistor**

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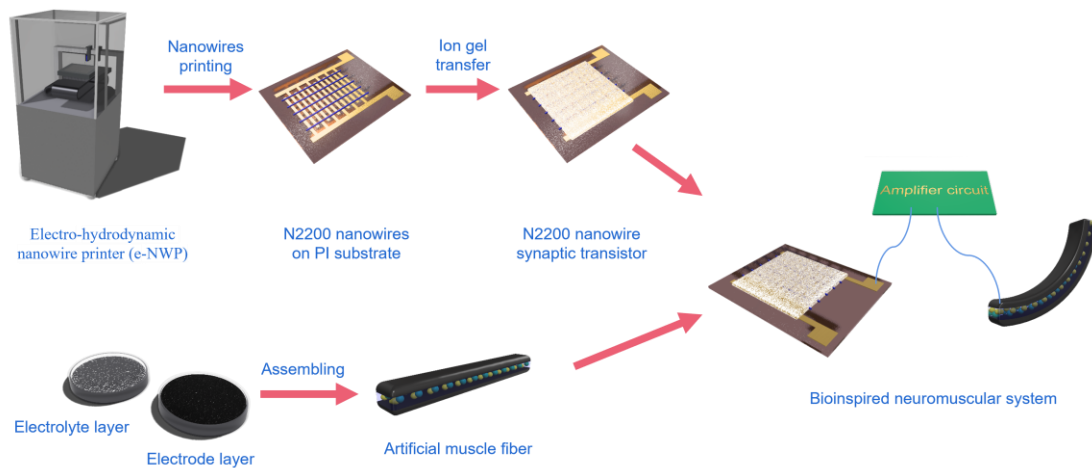
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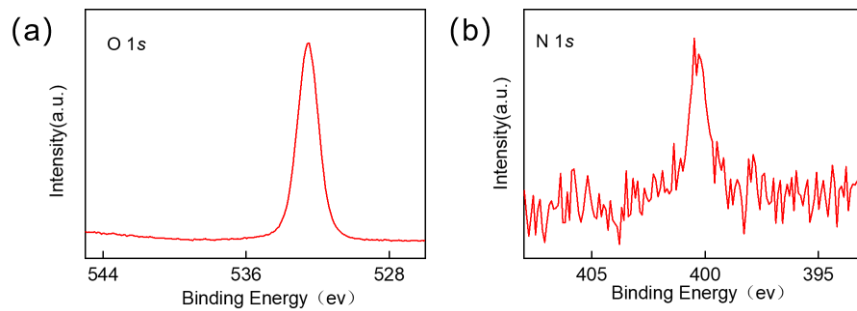
<sup>3</sup>These authors contributed equally to this work.

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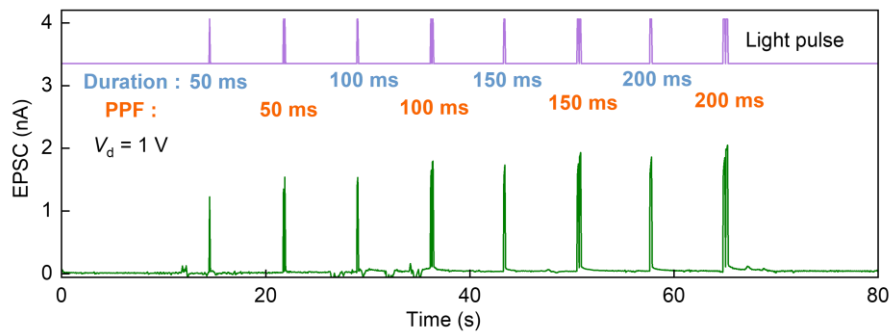
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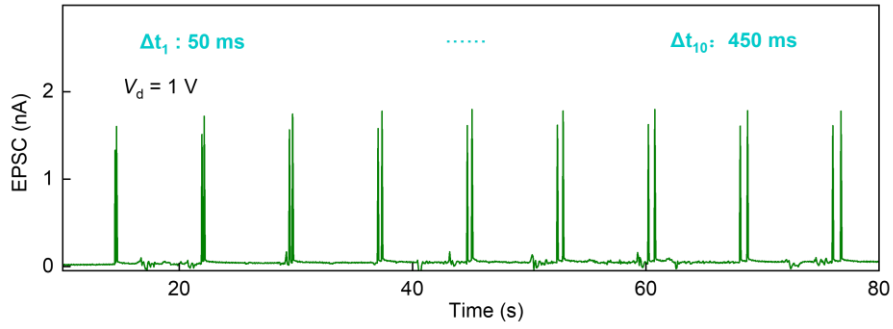
**Figure S1.** The preparation process of the bioinspired neuromuscular system.



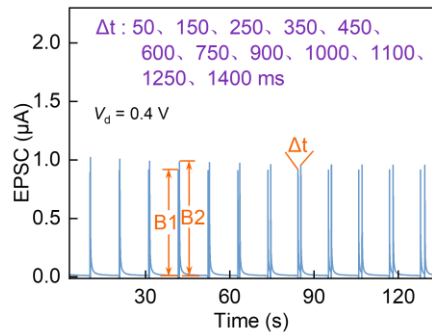
**Figure S2.** XPS spectra of (a) O 1s peaks. (b) N 1s peaks of N2200 NWs.



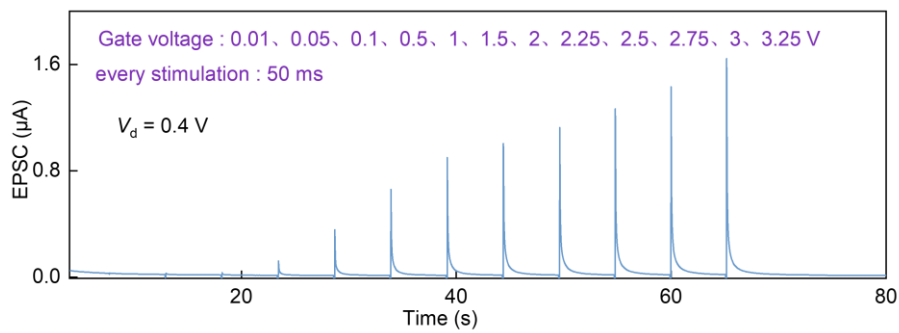
**Figure S3.** EPSC of the FNST triggered by a single light pulse or a pair of light pulses with duration of 50, 100, 150 or 200 ms under  $V_d = 1$  V.



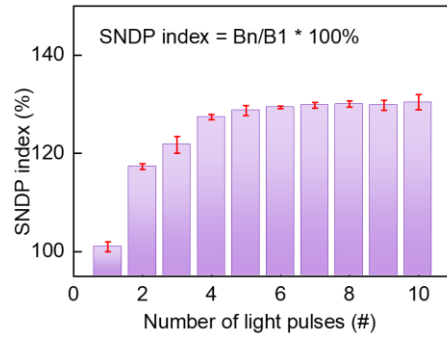
**Figure S4.** EPSC of the FNST triggered by a pair of light pulses under  $V_d = 1$  V with interval  $\Delta t$  of 50, 100, 150, 200, 250, 300, 350, 400, or 450 ms between them.



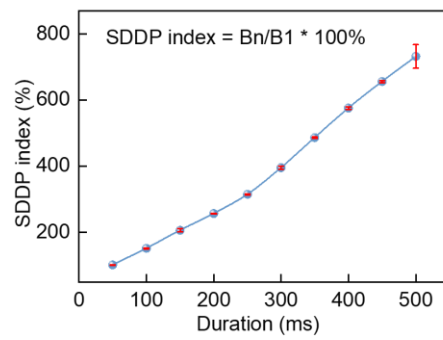
**Figure S5.** EPSC of the FNST triggered by a pair of electrical spikes under  $V_d = 0.4$  V with interval  $\Delta t$  of 50, 150, 250, 350, 450, 600, 750, 900, 1000, 1100, 1250 or 1400 ms between them.



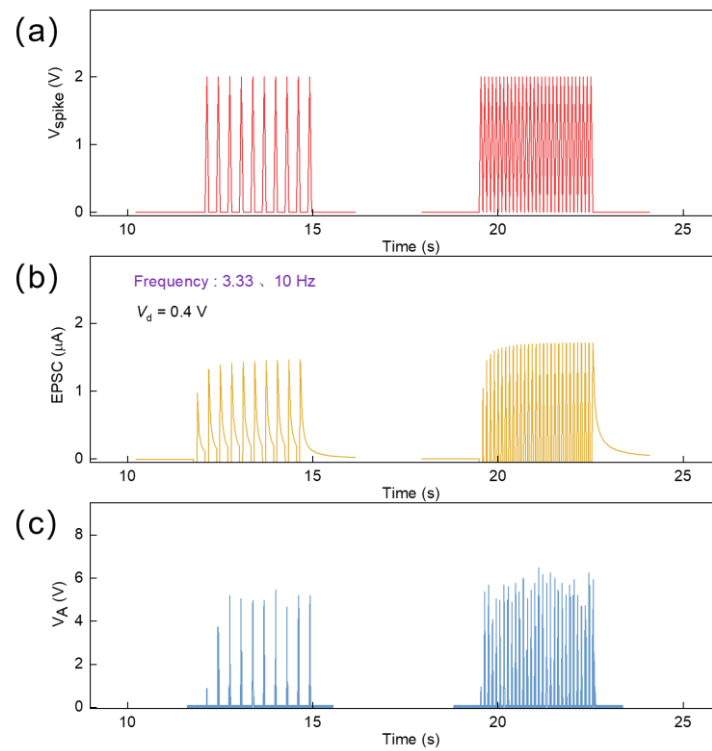
**Figure S6.** EPSC of the FNST triggered by electrical spikes with voltage amplitudes 0.01 to 3.25 V under  $V_d = 0.4$  V.



**Figure S7.** Spike-number dependent plasticity index vs electrical spike numbers.

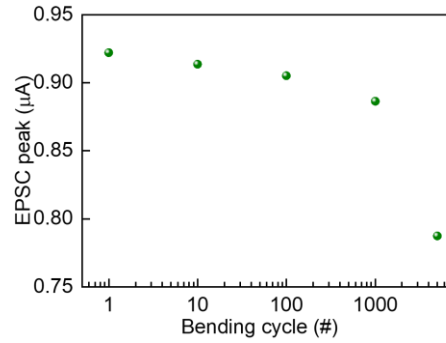


**Figure S8.** Spike-duration dependent plasticity index vs electrical spike durations.



**Figure S9.** Statistical curve of signal output for each part of the bioinspired

neuromuscular system, presynaptic spikes (a), EPSC output from the FNST (b), output from the amplifier circuit (c).



**Figure S10.** EPSC peak of the FNST triggered by a single electrical spike (2 V, 50 ms) under 1, 10, 100, 1000, and 5000 bending cycles.