

Supplementary information for:

Electrical Recording from Hearts with Flexible Nanowire Device Arrays

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Supplementary Figures S1, S2, S3

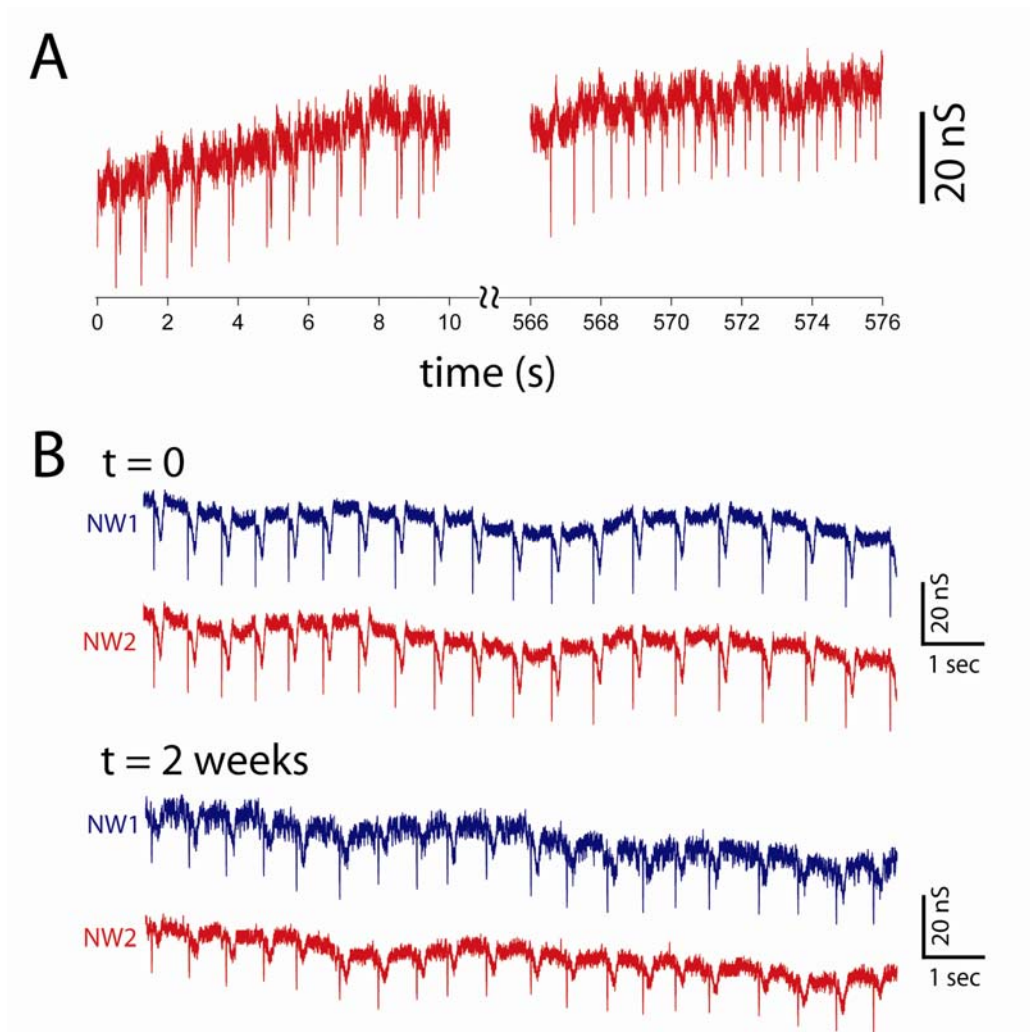


Figure S1. Interface and device stability measurements. (A) A NW-heart interface stable for >9 minutes continuous measurement. Fast transient magnitudes were 20.7 ± 2.2 and 17.5 ± 2.6 nS at the beginning and end of the experiment, respectively. The small signal degradation with time can be associated with changes and ultimate failure of heart. (B) Devices are also stable and can be used for multiple experiments over extended time periods. Upper data ($t = 0$) corresponds to the initial recording with two NWFETs device array from an embryonic heart, while the lower data ($t = 2$ weeks) corresponds to recording from a new embryonic heart using the same two devices after two weeks. These results demonstrate that the NWFET array chips are robust and can be used over extended time periods for recording under physiological conditions.

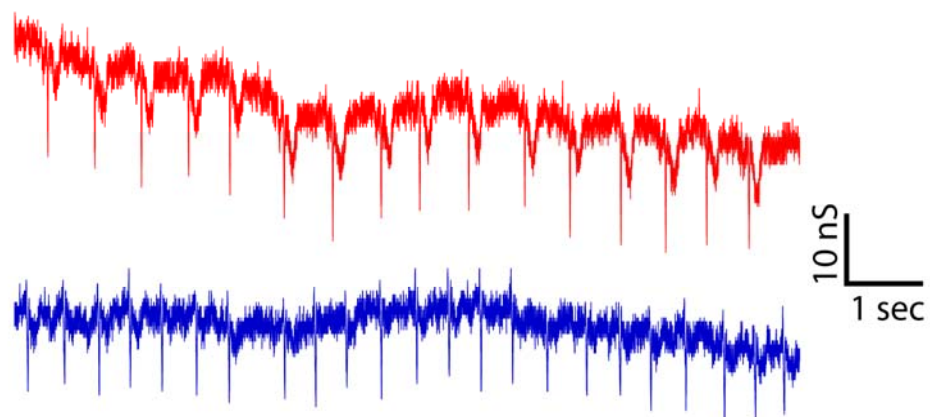


Figure S2. Traces were recorded before (red) and after (blue) application of 100 μM blebbistatin, a myosin-II ATPase inhibitor. Before application, a slow phase is clearly visible. After, beating ceased almost entirely and the slow phases nearly disappeared.

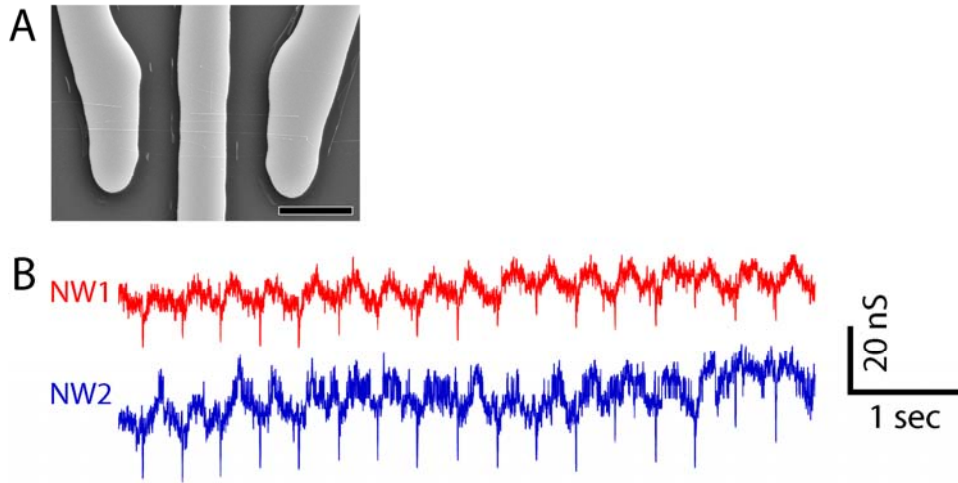


Figure S3. Recording from high-resolution devices. **(A)** Representative scanning electron microscopy image of two NWFET devices, where drain electrodes (left and right) and a common source (center) are visible. The metal electrodes are connected by aligned nanowires. Scale bar is 4 μm. The center-to-center separation of the two nanowire devices is ca. 5 μm. **(B)** Conductance traces simultaneously measured from two closely-spaced devices having the same geometry represented in A. The conductance amplitudes recorded by NW1 and NW2 are 10.7 ± 1.5 and 16.2 ± 1.7 nS, respectively. The difference in peak amplitudes reflects the different device sensitivity. The calibrated voltages for the peaks recorded by NW1 and NW2, 1.9 ± 0.3 and 1.9 ± 0.2 mV, respectively, are the same within experimental uncertainty.