Supplementary material

Zinc oxide nanorod array as an inhibitory biointerface

Yongchen Wang[1], Jordan D. Prox[2], Bingxi Yan[3], Yu Wu[3], Aaron D. Argall[2], and Liang Guo[3,4]

[1] Department of Biomedical Engineering, The Ohio State University, Columbus 43210, USA

[2] Biomedical Sciences Graduate Program, The Ohio State University, Columbus 43210, USA

[3] Department of Electrical and Computer Engineering, The Ohio State University, Columbus 43210, USA

[4] Department of Neuroscience, The Ohio State University, Columbus 43210, USA

Address all correspondence to Liang Guo at guo.725@osu.edu

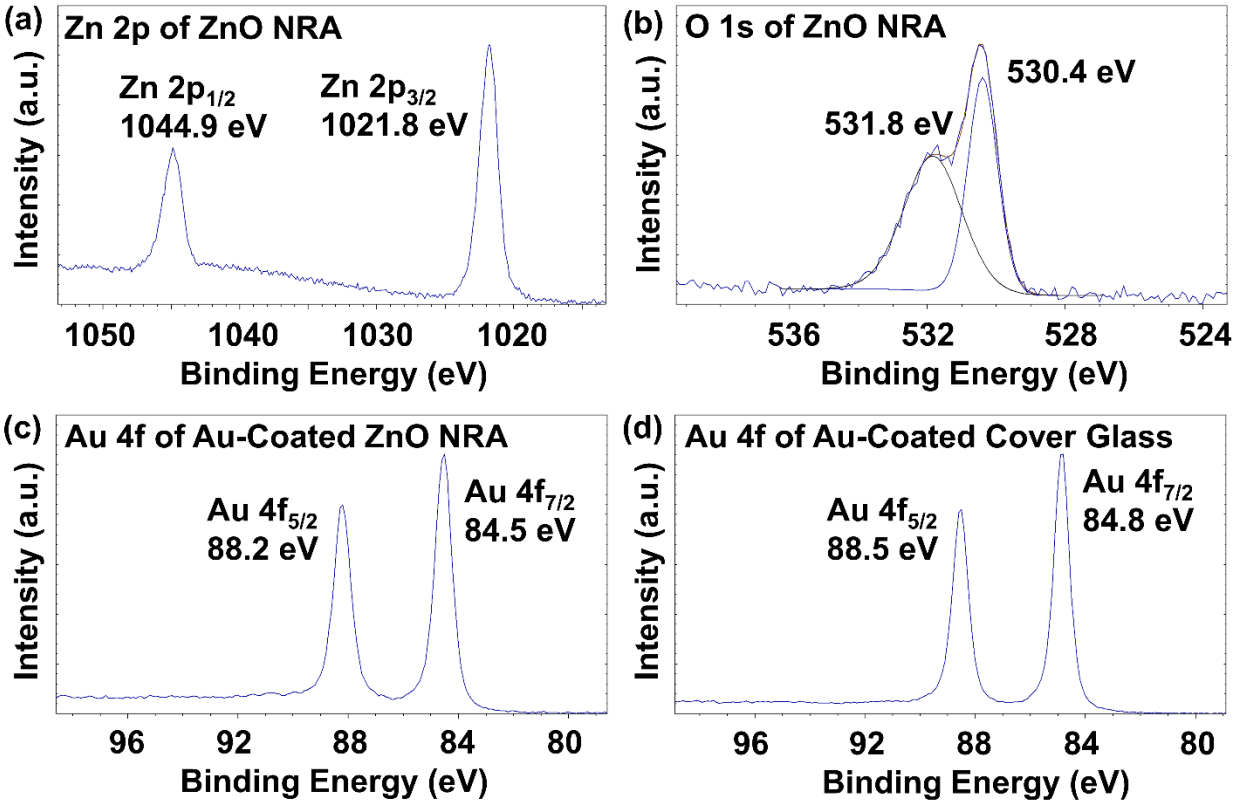

Figure S1. High-resolution XPS spectra. (a) Zn 2p spectrum of a ZnO NRA. (b) Deconvoluted O 1s spectrum of a ZnO NRA. (c) Au 4f spectrum of an Au-coated ZnO NRA. (d) Au 4f spectrum of an Au-coated cover glass.

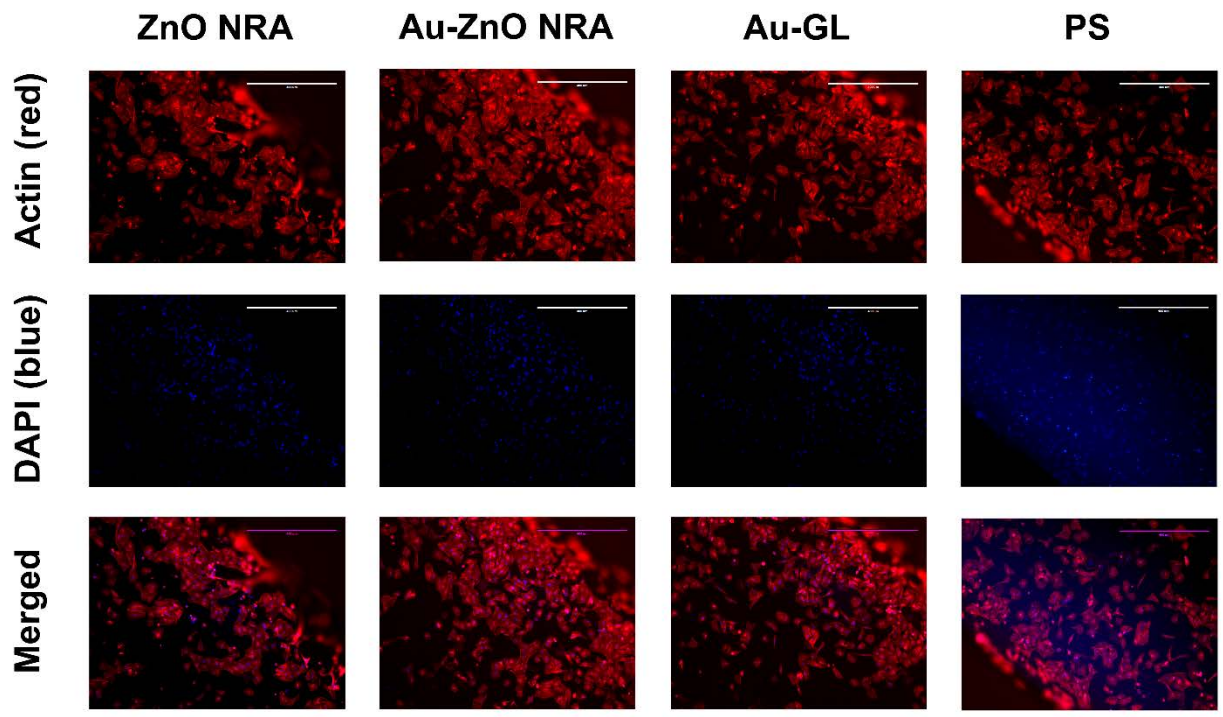

Figure S2. Fluorescent images of cardiomyocytes cultured on different substrates at the edge area [Area 2 indicated in Fig. 2(a)]. The actin filaments in the cytoskeleton were stained to red with an actin probe (first row), and the nuclei were stained to blue with DAPI (second row). Third row (merged images of first and second rows) shows that cells well attached and spread in all groups. Magnification: 10×. Scale bar: 400 μm. Abbreviations: Au-coated ZnO NRA (Au-ZnO NRA), Au-coated cover glass (Au-GL), and polystyrene (PS).

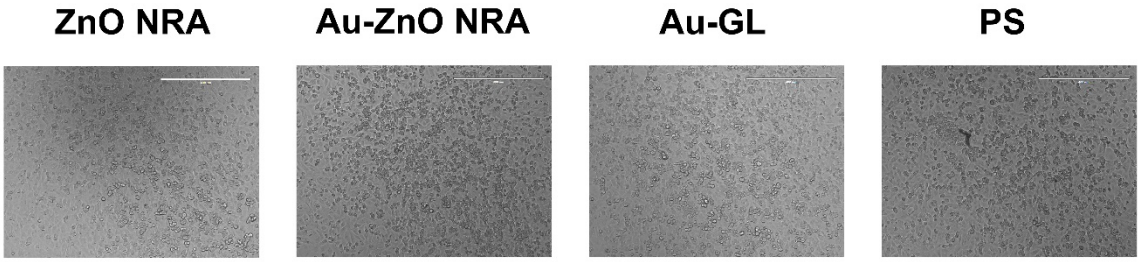

Figure S3. Morphology of cardiomyocytes after 1-day culture and before applying patches at the central area [Area 3 indicated in Fig. 2(b)]. Phase-contrast images show that cells well attached, spread and became confluent. Magnification: 10×. Scale bar: 400 μm.

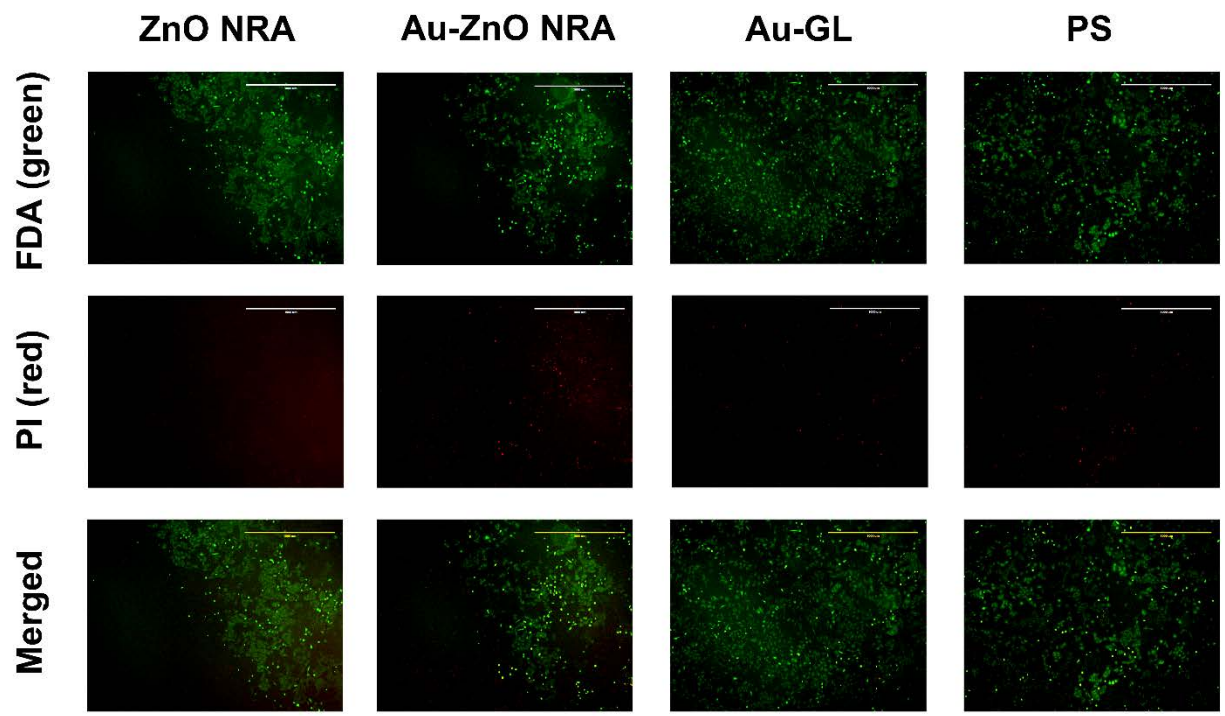

Figure S4. Fluorescent images of cardiomyocytes patched by different materials at the boundary region [Area 4 indicated in Fig. 2(b)]. Live cells were stained to green with FDA (first row), and dead cells were stained to red with PI (second row). Third row (merged images of first and second rows) shows no obvious viability difference along the boundary for polystyrene and an Au-coated cover glass, but a clearly defined boundary for the ZnO and Au-coated ZnO NRAs. Along the boundary, viability was almost zero closer to the center, but viability was high further away from the center. Magnification: 4×. Scale bar: 1 mm.

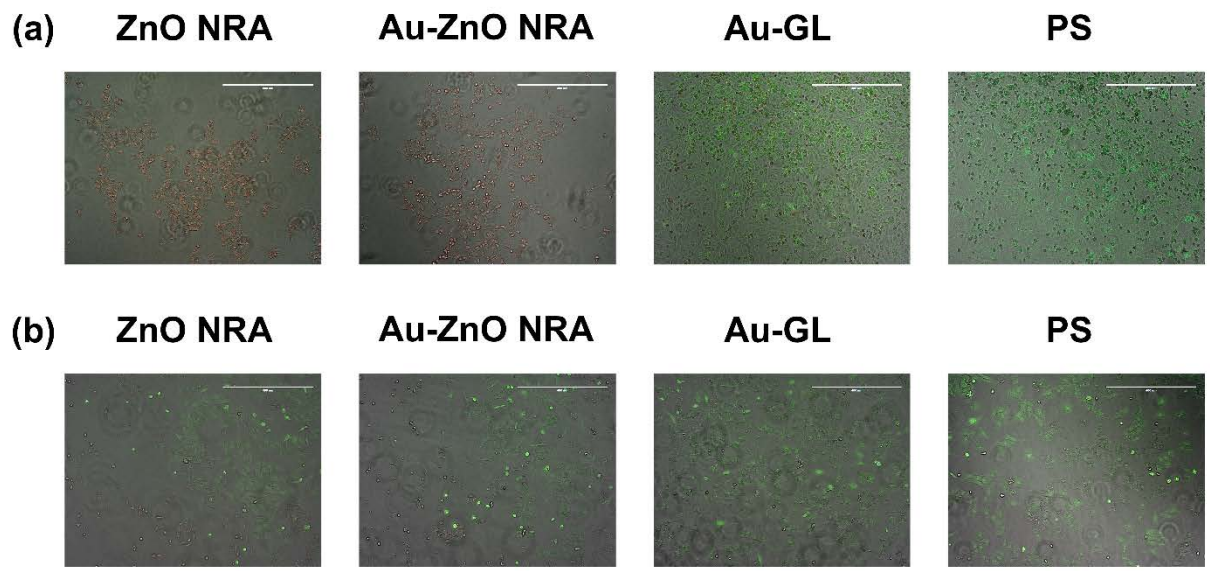

Figure S5. Morphology of cardiomyocytes patched by different materials at the (a) central area [Area 3 indicated in Fig. 2(b)] and (b) boundary region [Area 4 indicated in Fig. 2(b)]. Live cells were stained to green with FDA, dead cells were stained to red with PI, and these are phase-contrast images overlaid with images of the FDA and PI stainings at 20% opacity. Magnification: 10×. Scale bar: 400 μm.