

**Supplemental Fig. 1. A:** Shear modulus of polyacrylamide gels obtained from varying combinations of acrylamide and bisacrylamide displays a range of physiological stiffnesses from 100 Pa (soft) to 30 kPa (stiff). Error bars indicate standard deviation. **B:** Protein coverage on polyacrylamide gels coated with N-cadherin, fibronectin, and collagen type I was stained and imaged under the same conditions. The densitometric mean between the same threshold range was measured and subtracted from the densitometric mean of an uncoated gel as a way to quantify the surface density of protein coverage (i.e., not the equal potency of the ligand function). Five images of each gel were taken, normalized, and reported (mean - standard deviation). We found no statistically significant difference evaluated through t-test for each data point.

**Supplemental Fig. 2.** Video of a beating cardiac myocyte plated on N-cadherin functionalized substrate of stiffness 300 Pa taken after 24 h (x20).

**Supplemental Fig. 3. A -F:** Beta-catenin staining on myocytes plated on surfaces of varying stiffness. No differences were observed in co-localization on gels of varying stiffness. Left: merged image of F-actin (red),  $\alpha$ -actinin (green), and beta catenin. Right: beta-catenin staining (magenta). Scale bars, 10  $\mu$ m for all images.

**Supplemental Fig. 4.** Myocytes were cultured on N-cadherin-coated polyacrylamide substrates for 48 h. The substrates were stained for N-cadherin, fibronectin, and nucleus (BBZ). N-cadherin staining (red, left) shows a uniform coating of the protein on the substrate; no fibronectin was present on the substrate (middle).

**Supplemental Fig. 5.** Neonatal ventricular rat myocytes (NVRM) were plated (48 h) on N-cadherin-Fc-coated polyacrylamide (PA) gels of varying stiffnesses. Images show the change in area and morphology of myocytes in response to stiffness (x20).