Supporting Information

Biodegradable nanoparticles enhanced adhesiveness of mussel-like hydrogels at tissue interface.

Author(s), and Corresponding Author(s)*

Nikhil Pandey[1,2], Amirhossein Hakamivala[1,2], Cancan Xu[1,2], Prashant Hariharan[1,2], Boris Radionov[1,2], Zhong Huang[1], Jun Liao[1,2], Liping Tang[1,2], Philippe Zimmern[3], Kytai T. Nguyen[1,2], Yi Hong[1,2]**

1. Department of Bioengineering, University of Texas at Arlington, Arlington, TX, 76010, USA

2. Joint Biomedical Engineering Program, University of Texas Southwestern Medical Center, Dallas, TX 75390, USA

3. Department of Urology, University of Texas Southwestern Medical center, Dallas, TX 75390, USA

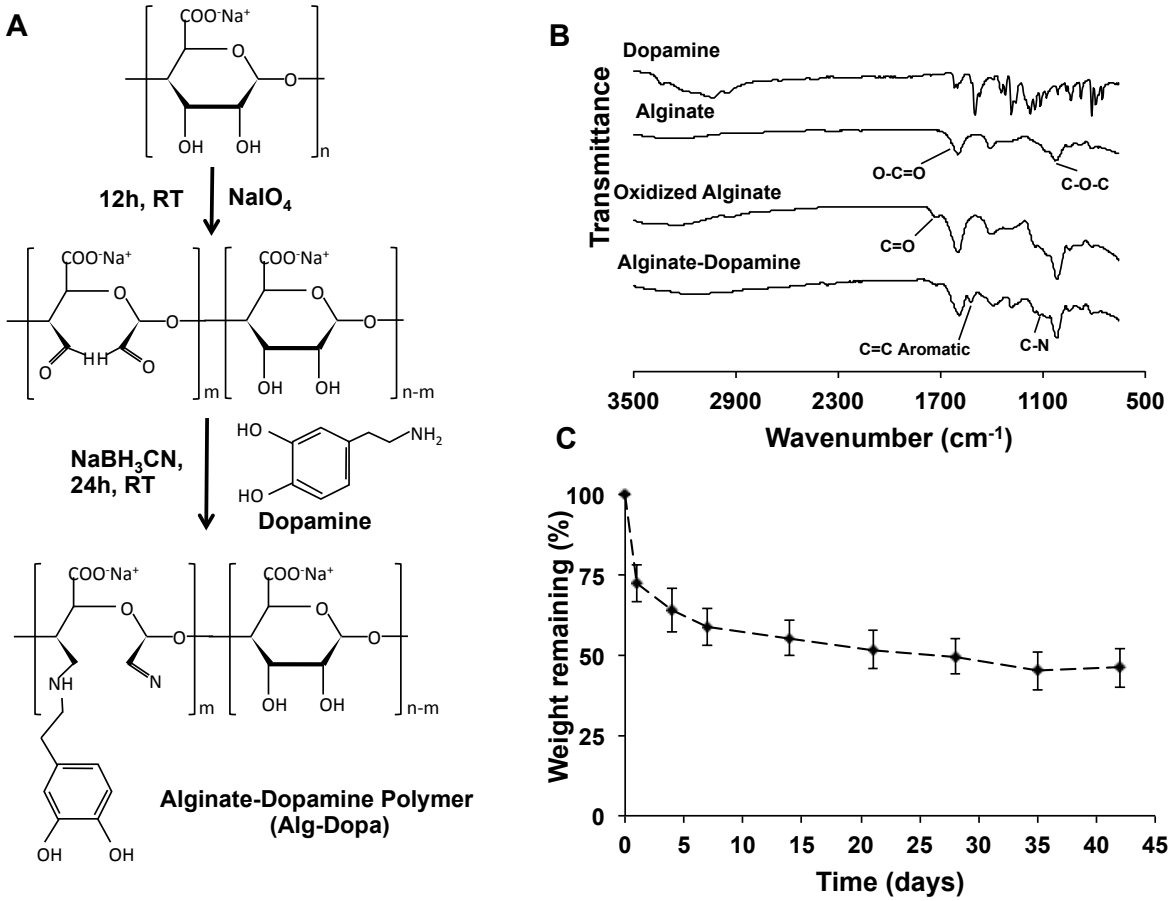

Figure S1. Alginate-Dopamine synthesis and characterization. (A) Synthetic scheme of the oxidation of alginate and subsequent grafting of dopamine onto oxidized alginate to achieve alginate-dopamine polymer (Alg-Dopa). (B) FTIR spectra of the oxidized alginate and the dopamine grafted alginate (Alg-Dopa) to verify the grafting of dopamine onto the alginate. (C) Degradation curve of alginate-dopamine polymer in PBS at 37^{o}C over a period of 45 days.

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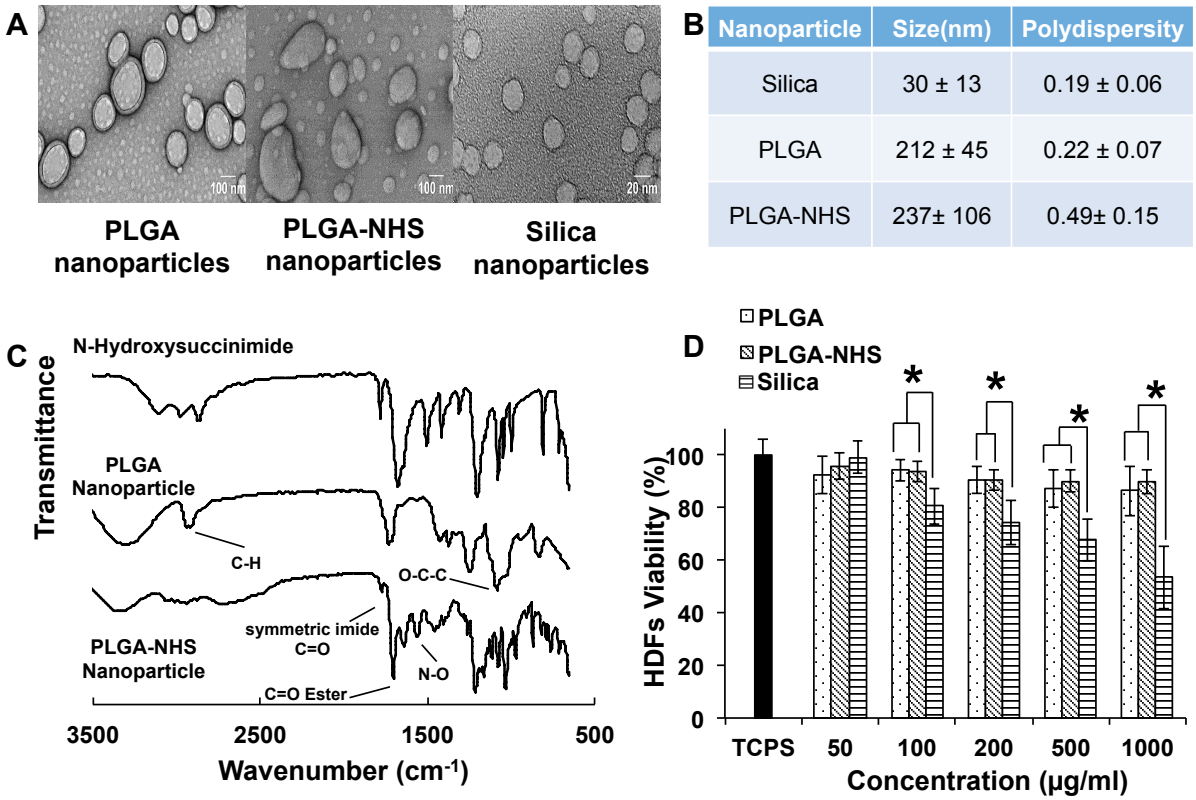

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726 **Figure S2.** Nanoparticle characterization. (A) Transmission electron microscopy
727 images of PLGA, NHS modified PLGA (PLGA-NHS), and silica nanoparticles. (B)
728 A table list of hydrodynamic radius and polydispersity of nanoparticles measured via
729 dynamic light scattering. (C) FTIR spectra of NHS, PLGA nanoparticles, and PLGA-
730 NHS nanoparticles to verify NHS grafting. (D) Cell compatibility of PLGA, PLGA-
731 NHS and silica nanoparticles through co-culturing with human dermal fibroblasts
732 (HDFs). Tissue culture polystyrene (TCPS) was used as a control.
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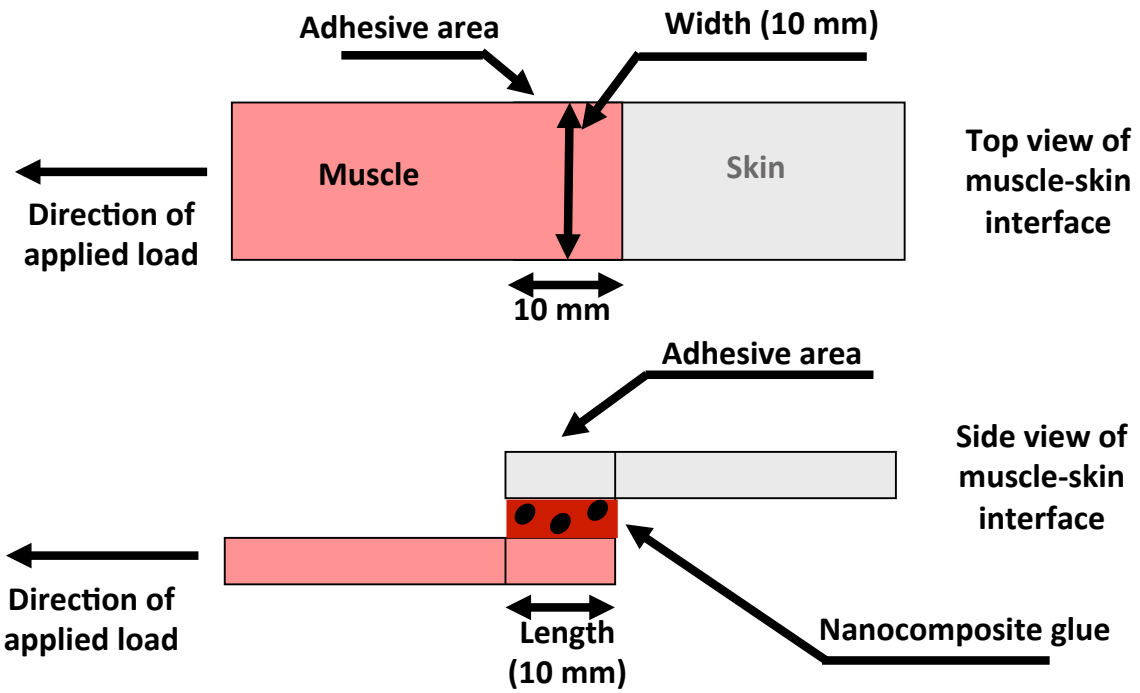

Figure S3. Schematic adhesive strength measurement size and technique. The schematic depicts the dimensions of the adhesive lap joint interface formed between the skin and muscle tissues and an overview of the uniaxial lap shear testing used to measure the adhesive strengths of the nanocomposite glues.