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Supporting Information

Gold Nanorod-Collagen Plasmonic Nanosolders for Laser Welding of Ruptured Porcine Intestines

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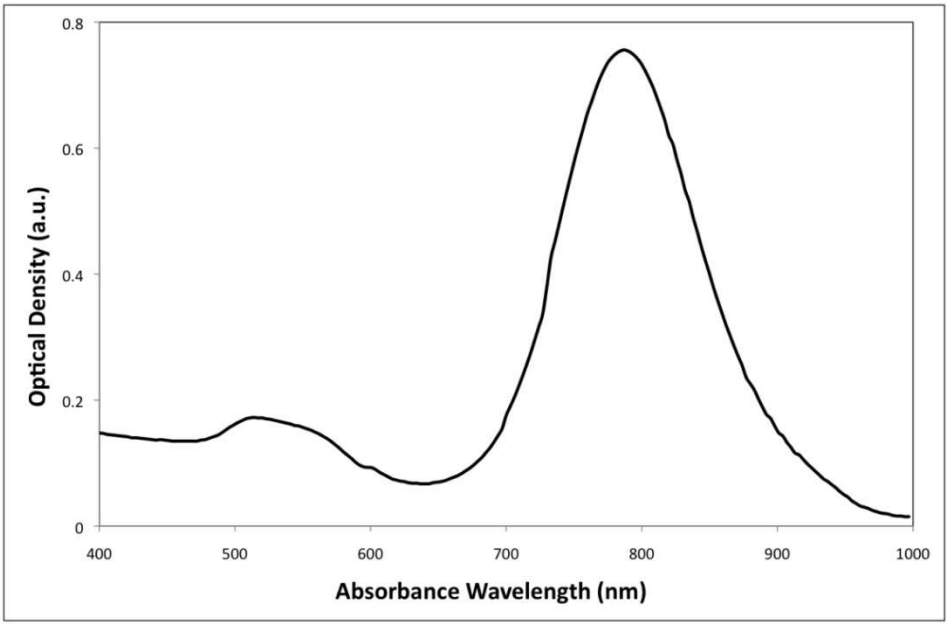

Figure S1. Representative absorbance spectrum of gold nanorod dispersions. Gold nanorods tuned to maximum absorbance at 800 nm.

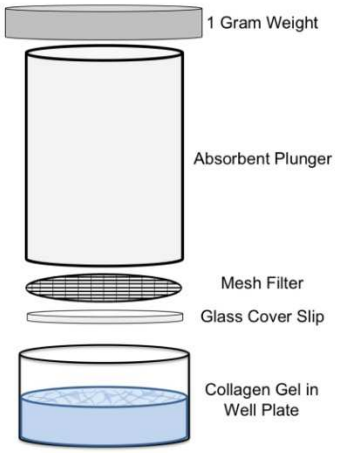

Figure S2. Illustration of plastic compression device. An absorbent plunger simultaneously compresses the hydrogels and absorbs excess fluid from the gels.

Figure S3. Depiction of leak and burst pressure testing device. Bifurcated tubing from a syringe leads to a digital manometer and a needle. The needle is inserted into clamped intestine and filled with saline solution. Simultaneously, the pressure is recorded when leakage first occurs from the intestine (leak pressure) and at the maximum pressure reached (burst pressure).

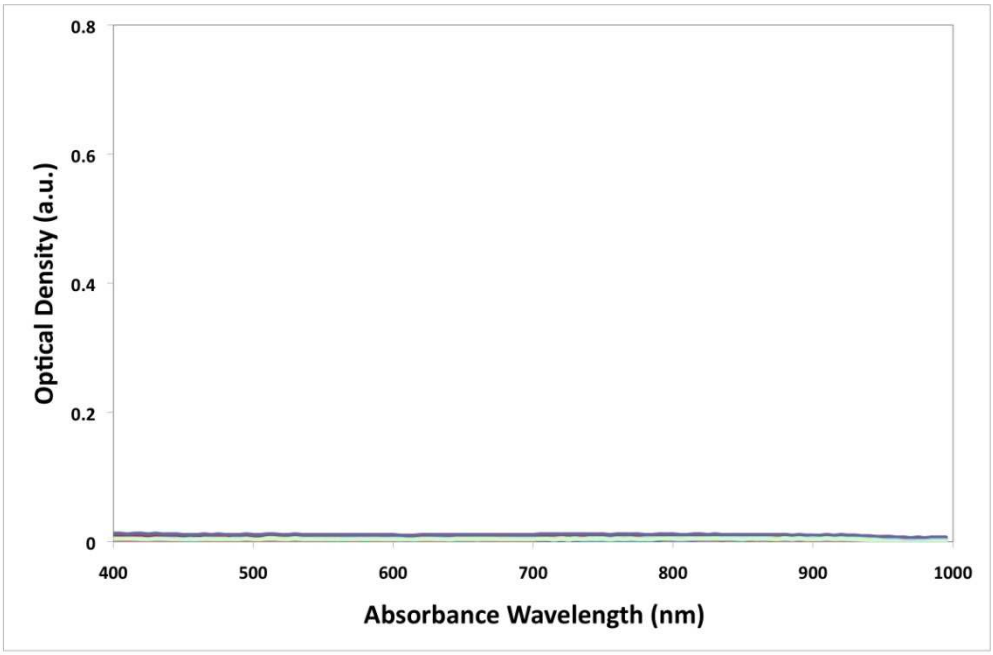

Figure S4. Representative absorbance spectrum of supernatant in gold nanorod leaching experiments. Gold nanorods tuned to maximum absorbance at 800 nm. As shown, GNR-collagen nanocomposites show no leaching based on lack of absorbance peak at 800 nm.

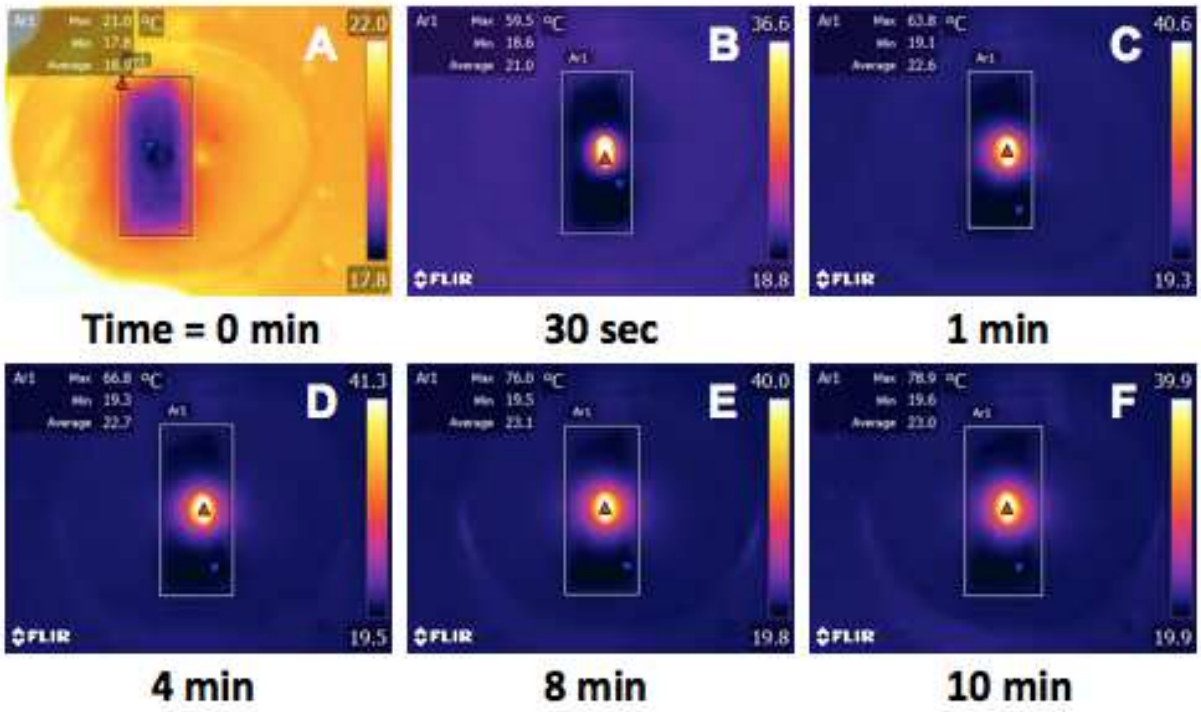

Figure S5. Near-infrared images of nanocomposite placed over intact intestine. A-F show temperature profiles of the tissue and nanocomposite surface from 0 to 10 minutes of pulsed wave laser radiation at 2.00 W/cm^2. The blue inverted triangles pinpoint the location of the minimum temperature, and the red triangles indicate the maximum temperature of the area measured. The rate of increase in temperature greatly decreases over time. These images are representative of n=5 independent experiments at these conditions.

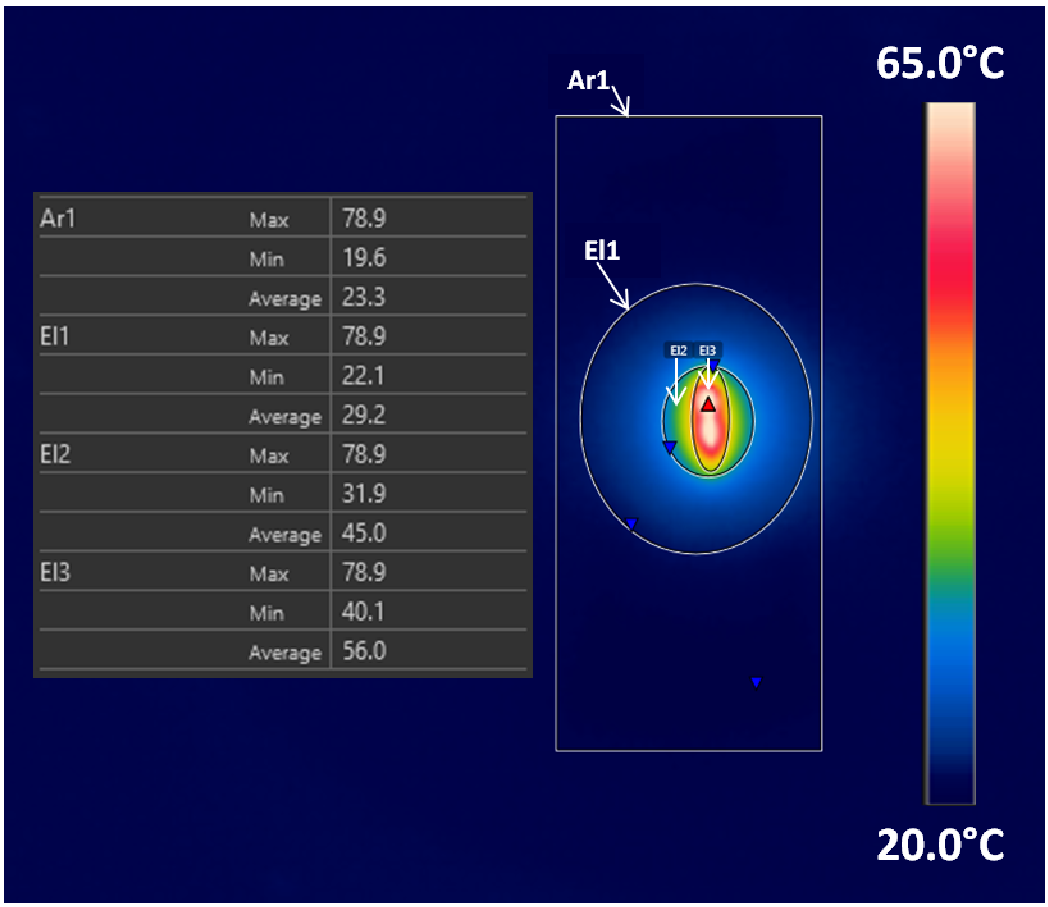

Figure S6. Detailed infrared image of nanocomposite placed over intact tissue surface from Figure S5F. This detailed image of Figure S5F was captured at 10 minutes of 2.00 W/cm^2 pulsed wave laser radiation. Area Ar1 represents the area of the tissue (50 mm x 20 mm). El1 indicates the area where the temperature has been significantly raised. El2 highlights the approximate location of the nanocomposite (8 mm diameter), and El3 represents the approximate area of exposure of the laser (2mm x 10 mm). Inverted blue triangles represent the minimum temperature in the enclosed area, and the red triangle indicates the maximum temperature in the enclosed areas. Image has been modified to clarify each region.

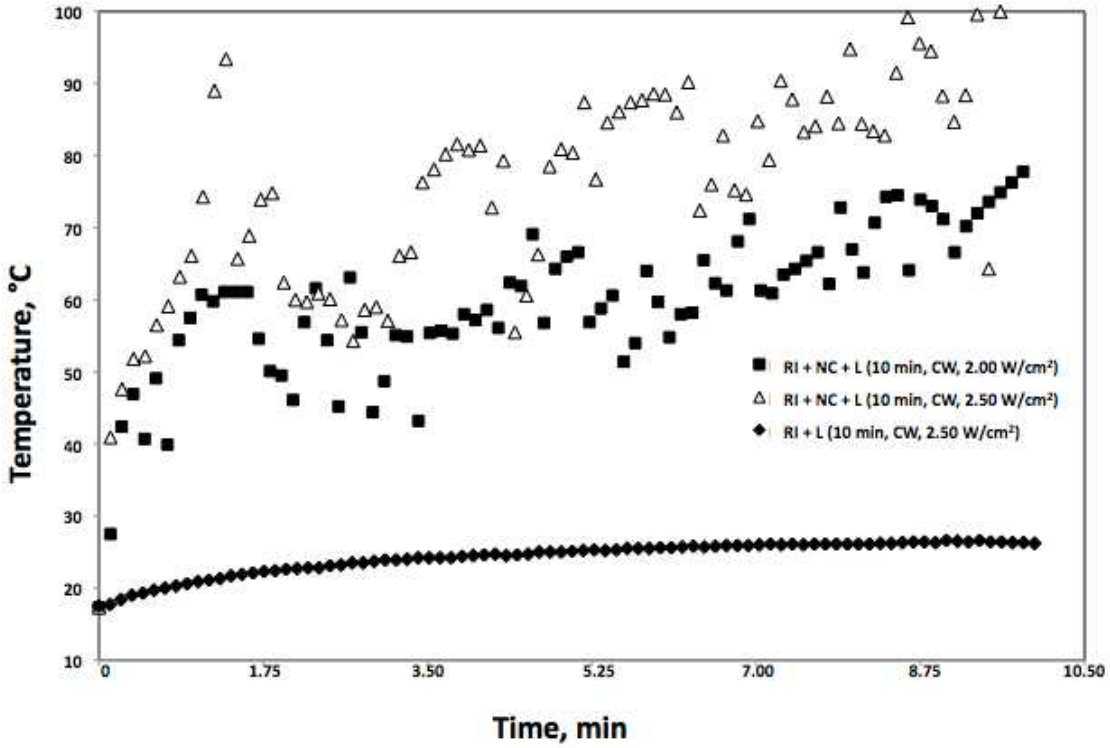

Figure S7. Maximum nanocomposite surface temperature during laser tissue welding procedure. Dried nanocomposites (NC) placed over intestinal tissue and irradiated at 2.00 (squares) or 2.50 (triangles) W/cm^2 for 10 minutes were measured for maximum surface temperature using IR images. In addition, the surface temperature profile of ruptured intestine (RI) alone irradiated at 2.50 W/cm^2 in absence of collagen-GNR nanocomposite is shown. Representative curves of n=5 independent experiments.