Figure S1. Proton nuclear magnetic resonance

Methods: Proton nuclear magnetic resonance (^{1}H NMR) was performed whereby 10 mg/mL Hep-^{N}MAm and PEGDA samples were each dissolved in deuterated H_2O (Sigma), run on a Bruker Avance III spectrometer at 400 Hz, and analyzed using iNMR software.[35] Percent modification was determined by dividing the integral of the methacrylamide peak by the heparin peak for Hep-^{N}MAm and the acrylate peaks by the PEG peak for PEGDA.

Results: Using ^{1}H NMR analysis, PEGDA was determined to be ~55% functionalized (Figure S1A) and Hep-^{N} methacrylamide was determined to be 22-28% functionalized (Figure S1B).

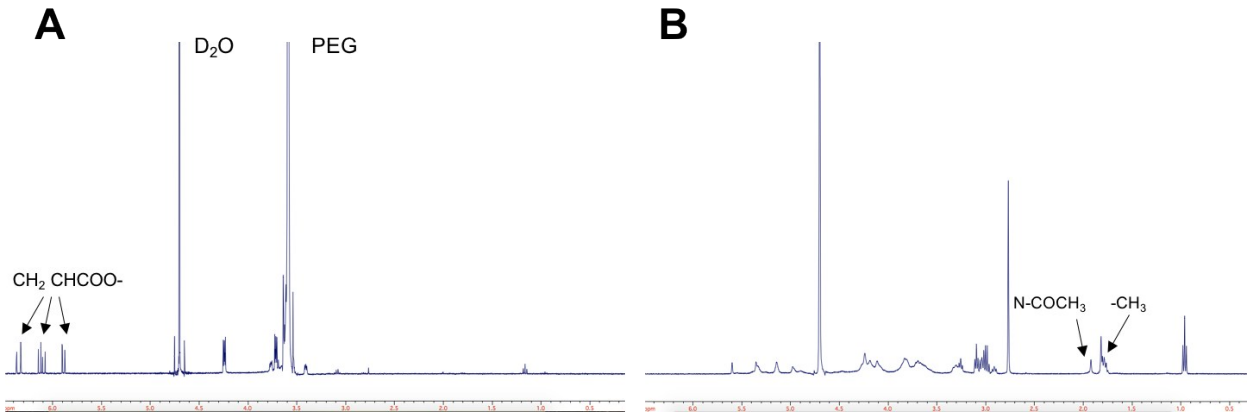

Figure S1. ^{1}H NMR of poly (ethylene glycol) diacrylate and N-desulfated heparin methacrylamide. (A) Characteristic peaks for acrylate groups were present in the PEGDA spectra and (B) characteristic peaks for methacrylamide peaks were present in the N-desulfated heparin methacrylamide.

Figure S2. Microparticle size and morphology before and after TSG-6 loading

Methods: TSG-6 was loaded onto microparticles (MPs) using the same method for all other *in vitro* and *in vivo* studies. Briefly, 0.6 mg 10 wt% Hep^{-N} MPs were incubated with 1.0 µg TSG-6 for 2 hours at 4°C. Phase microscopy and ImageJ software were used to image and quantify the diameter of microparticles before and after the loading protocol.

Results: MPs appear to have similar morphology (Figure S2A-B) and exhibit no difference in size distribution (Figure S2C) before and after loading.

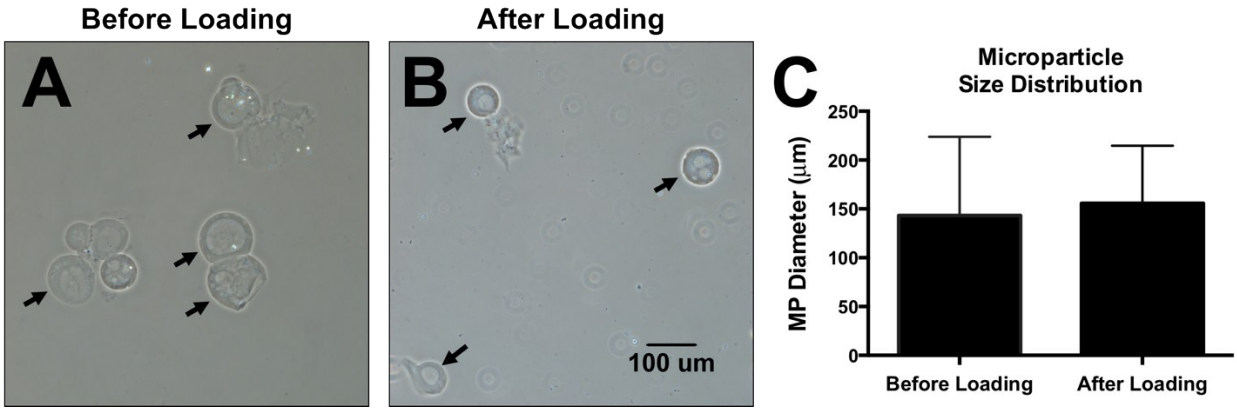

Figure S2. Microparticle size and morphology before and after TSG-6 loading. (A-B) 10 wt% Hep^{-N} MPs appeared similar in morphology before and after TSG-6 loading, and (C) were not significantly different in average size distribution. Before loading and after loading group were not significantly different; $p \leq 0.05$; two-tailed t-test; $n > 30$ microparticles per group; data shown as mean ± SD.