Supporting Information

Dual Functional Lysozyme-Chitosan Conjugate for Tunable Degradation and Antibacterial Activity

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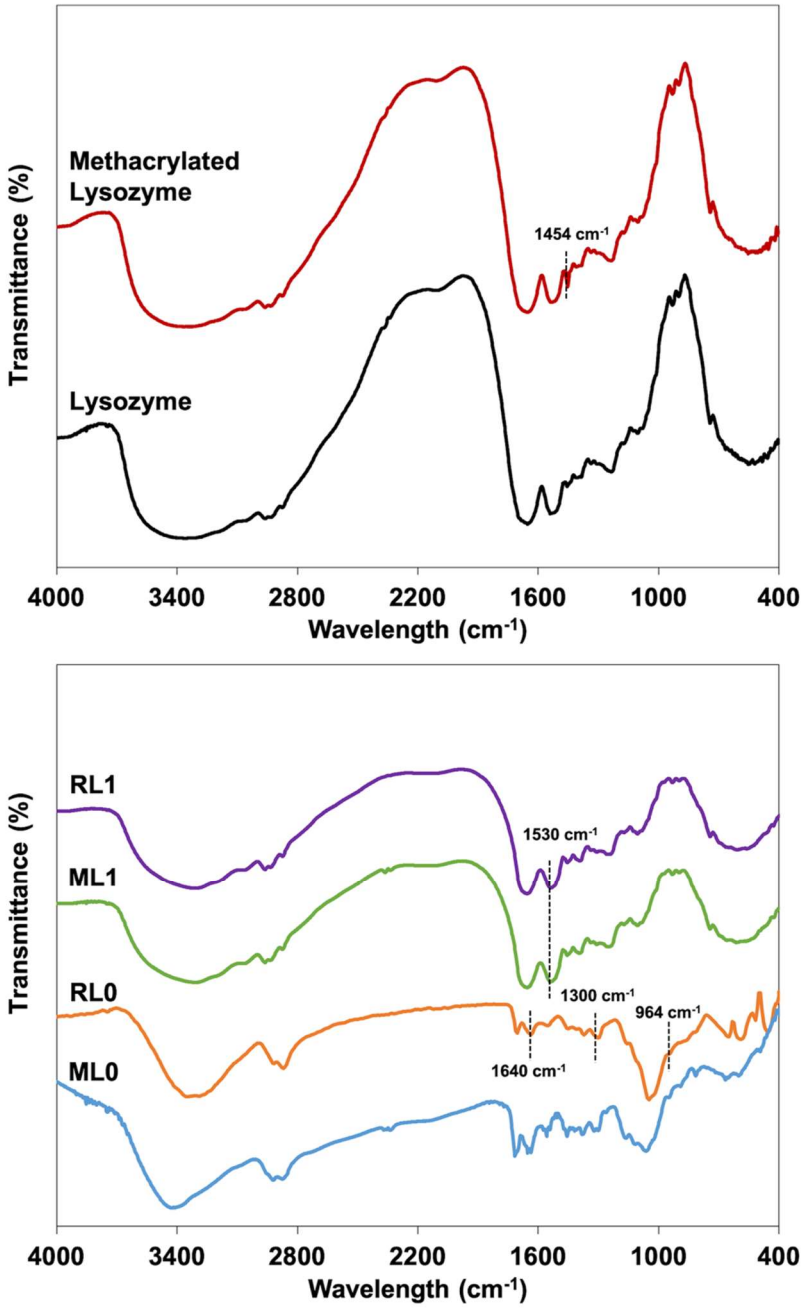

Figure S1. FTIR spectra of lysozyme and methacrylated lysozyme showing methacryl group peak at 1454 cm^{-1} (top). FTIR spectra showing RGD and lysozyme conjugation in chitosan hydrogels (bottom). The peak indicating aspartic acid at 964 cm^{-1}, glycine at 1300 cm^{-1}, and C=O at 1640

cm^{-1} confirming RGD peptide conjugation. The peak indicating amide bond at 1530 cm^{-1} confirming lysozyme conjugation.

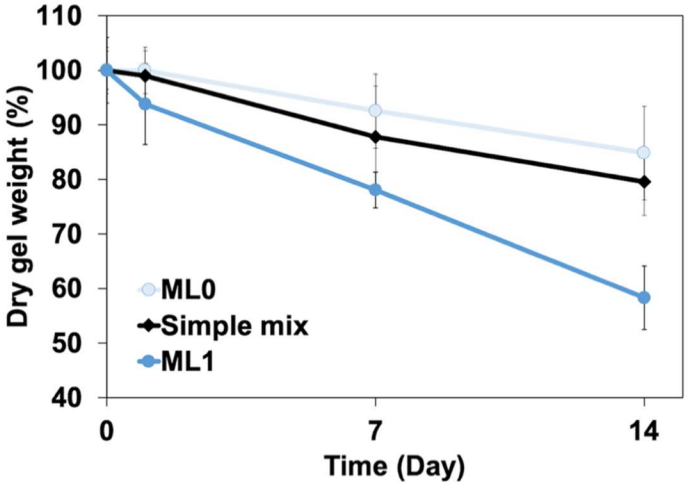

Figure S2. Degradation profile measured by the dry weight change of simple mix hydrogel for two weeks in comparison to hydrogel without lysozyme (ML0) and lysozyme conjugated hydrogel (ML1).

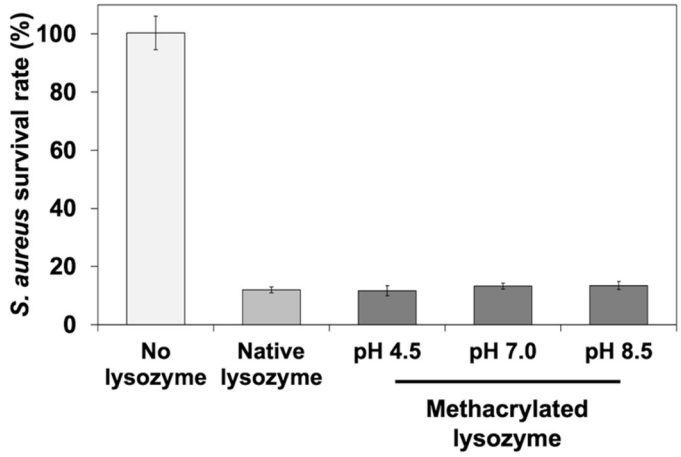

Figure S3. The bioactivity of methacrylated lysozyme. Methacrylated lysozyme, 1 mg mL^{-1}, was treated under light acid (pH 4.5), neutral (pH 7.0), and light alkaline (pH 8.5) at 37 ºC for 16 h. Then, the treated lysozyme was cultured with *S. aureus* for 5 h to measure the survival rate.

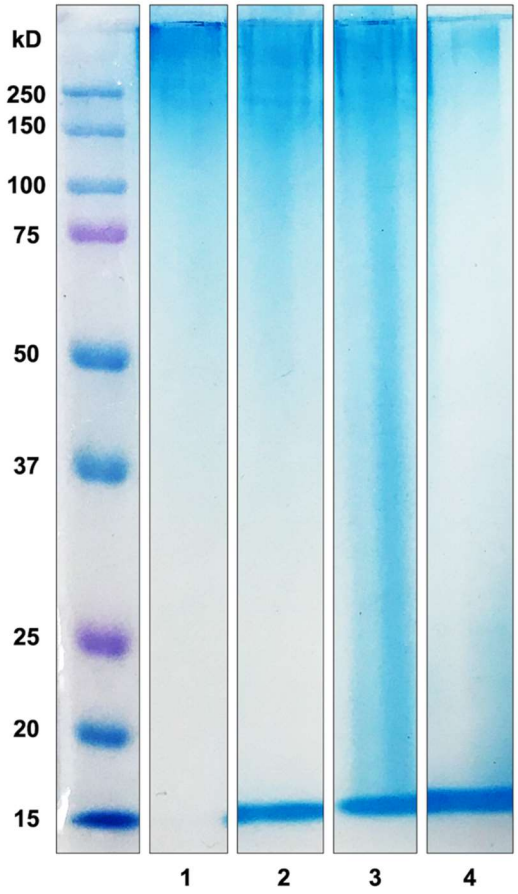

Figure S4. SDS-PAGE gel showing degraded hydrogel via lysozyme reaction. (1) Crosslinked lysozyme-chitosan conjugate only showed one bend above 250 kDa. (2) Mixture of lysozyme and chitosan (without crosslinking) exhibited two bends at 250 kDa and 15 kDa indicating no conjugation of lysozyme in hydrogel network. (3) Degraded lysozyme-chitosan had long tail along 250-15 kDa range demonstrating leaching agent included wide range of fragmented chitosan with lysozyme. (4) Free lysozyme showed one bend at 15 kDa.