Supporting Information

Hydrogel Containing Nanoparticle-Stabilized Liposomes for Topical Antimicrobial Delivery

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Morphological observation of AuC-liposome hydrogel

To evaluate the distribution of AuC-liposomes within the hydrogel, the liposomes were first labeled with rhodamine B (RhB) and then used to prepare AuC-liposome hydrogel in a transparent cuvette. The gel contained 0.8 vol% of PEGDMA and 0.5 mol% RhB-DMPE. After the gelation, the hydrogel was examined by using an Olympus-MVX10 Macro View microscope. Under the bright field mode (**Figure S1** A), the gel showed a vibrant cherry red color characteristic to gold nanoparticles with a uniform distribution. The hydrogel was also examined under the fluorescence mode to reveal the liposome distribution. The fluorescence image (Figure S1 B) showed that the liposomes were uniformly distributed throughout the hydrogel. No liposome accumulation or aggregation was observed.

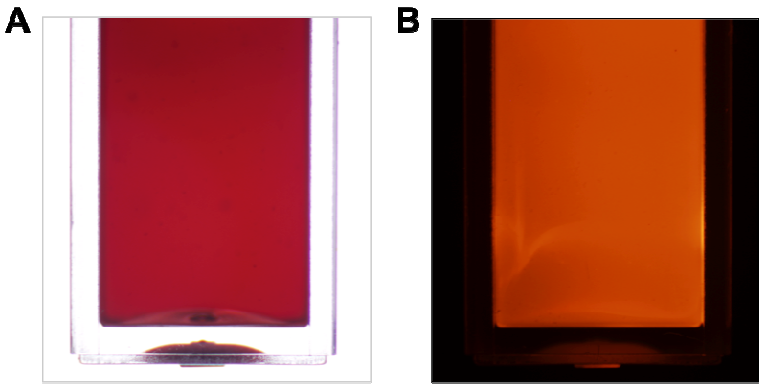

Figure S1. Morphological observation of AuC-liposome hydrogel containing 0.8 vol% of PEGDMA and 0.5 mol% RhB-DMPE under (**A**) bright field mode, and (**B**) fluorescence mode.

Stability of gold nanoparticles in the hydrogel

To study the stability of gold nanoparticles in the AuC-liposome hydrogel, the hydrogel containing 0.8 vol% of PEGDMA was cast in a 96-well plate and the plate was stored at 4°C for 7 days. After the storage, the gel in the plate together with a batch of freshly prepared AuC was measured for absorption by using a spectrophotometer (Infinite M200, TECAN, Switzerland). As show in **Figure S2**, the absorption spectra of the freshly prepared AuC and the hydrogel-bound AuC overlapped, suggesting the absence of gold aggregation in the hydrogel form after 7 days of storage.

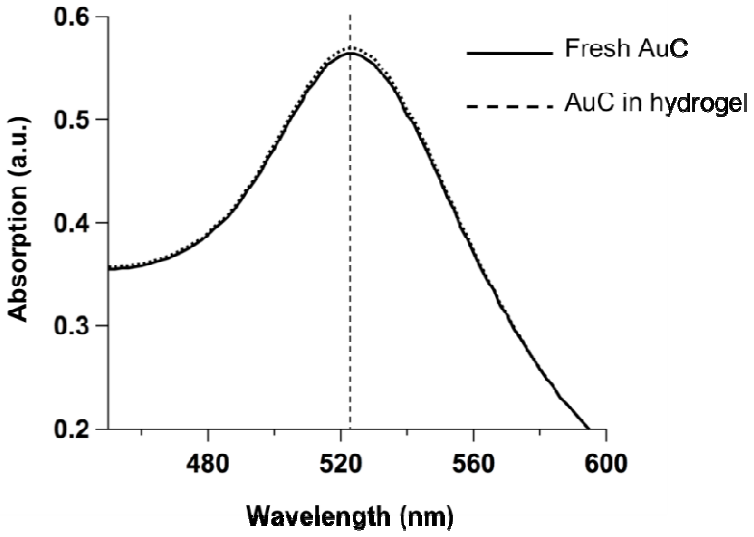

Figure S2. The comparison of the absorption spectra of the freshly prepared AuC and the hydrogel-bound AuC stored for 7 days.

AuC-liposome stability under prolonged hydrogel incubation

In the study, a hydrogel sample (5 mL, containing 0.8 vol% of PEGDMA) was cast in a 50 mL Eppendoff tube. Following the gelation, 25 mL water (pH = 7.4) was added onto the top of the gel and the tube was incubated at 37°C. Every 24 hrs, 1 mL of the supernatant was taken from the tube and DLS measurements were performed for the size and zeta-potential of the released liposomes. As shown in **Figure S3**, within a 7-day period, the size and zeta potential of the released liposomes remained constant. The results suggest that under prolonged hydrogel incubation (7 days), the released AuC-liposomes remain stable at physiological pH.

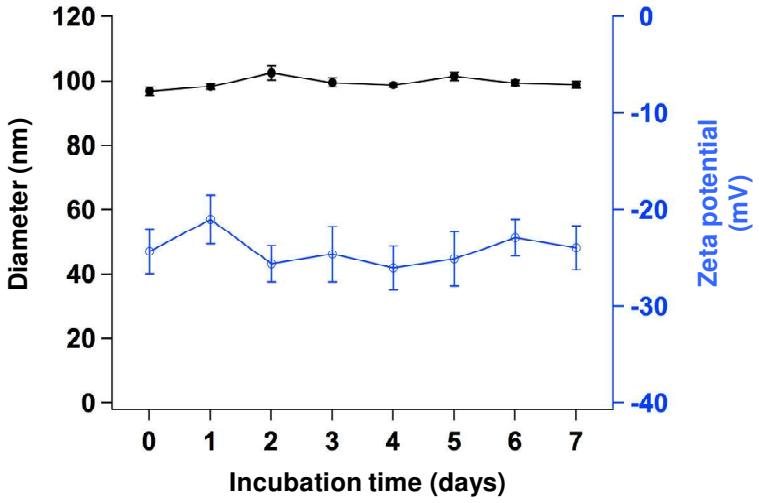

Figure S3. The size and surface zeta potential of the released AuC-liposomes when the gel was incubated in pH = 7.4 water at 37°C for a period of 7 days.