Supporting Information

Capsule Integrated Polypeptide Multilayer Films for Effective pH-Responsive Multiple Drug Co-Delivery

Shichao Zhang, PhD,† Malcolm Xing, PhD,‡ and Bingyun Li, PhD,†*

† Department of Orthopaedics, School of Medicine, West Virginia University, Morgantown, WV, USA

‡ Department of Mechanical Engineering, University of Manitoba, and The Children's Hospital Research Institute of Manitoba, Winnipeg, MB, Canada

* Correspondence to:

Bingyun Li, PhD, Professor
Department of Orthopaedics
Director, Nanomedicine Laboratory
School of Medicine, West Virginia University
Morgantown, WV 26506-9196
Email: bili@hsc.wvu.edu; Tel: 304-293-1075; Fax: 304-293-7070
Website: http://medicine.hsc.wvu.edu/ortho/li
On average, our publications have been cited 6.939 times/paper/year (h-index=33; http://medicine.hsc.wvu.edu/ortho/li/publications)

Supporting Information contains:

Supplementary Figures S1-S7

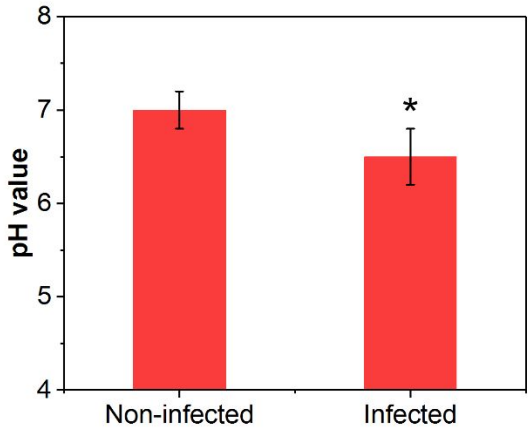

Figure S1. pH values of tissue samples around infected and uninfected rat femurs in our open fracture rat model. Using our previously reported open fracture rat model, we measured the pH of tissue samples around infected and non-infected femurs at post-operative day 10. $^{*}p < 0.05$ compared to non-infected sample.

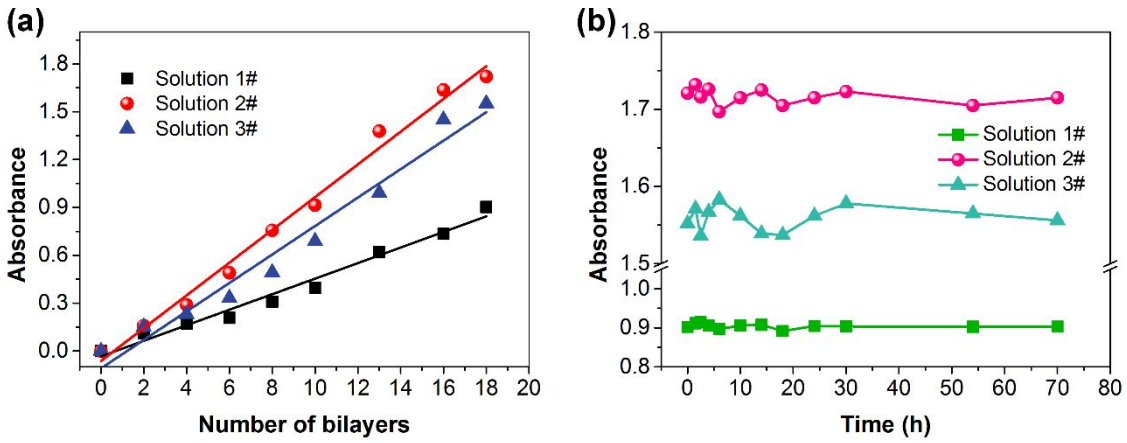

Figure S2. Absorbance (at 195 nm) of multilayer films fabricated from different solutions (a) during the assembly process and (b) after immersing in PBS with different durations. Solution 1#, PL and PG solutions at pH = 10; solution 2#, PL and PG solutions with 50 mM NaCl at pH = 10; solution 3#, PL and PG solutions with 50 mM at pH = 7.4.

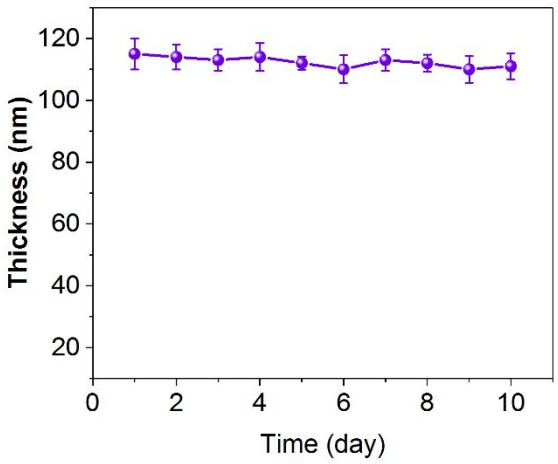

Figure S3. Thickness of the capsule integrated multilayer films of $L_5/C^G/L_8/C^L/L_8$ after immersion treatment in PBS with different duration.

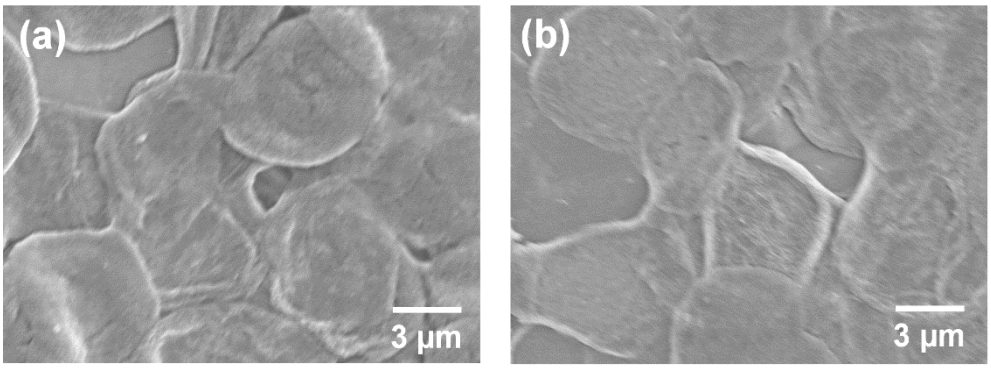

Figure S4. SEM images of the capsule integrated multilayer films of $L_5/C^G/L_8/C^L/L_8$ before and after the immersion in PBS for 5 days.

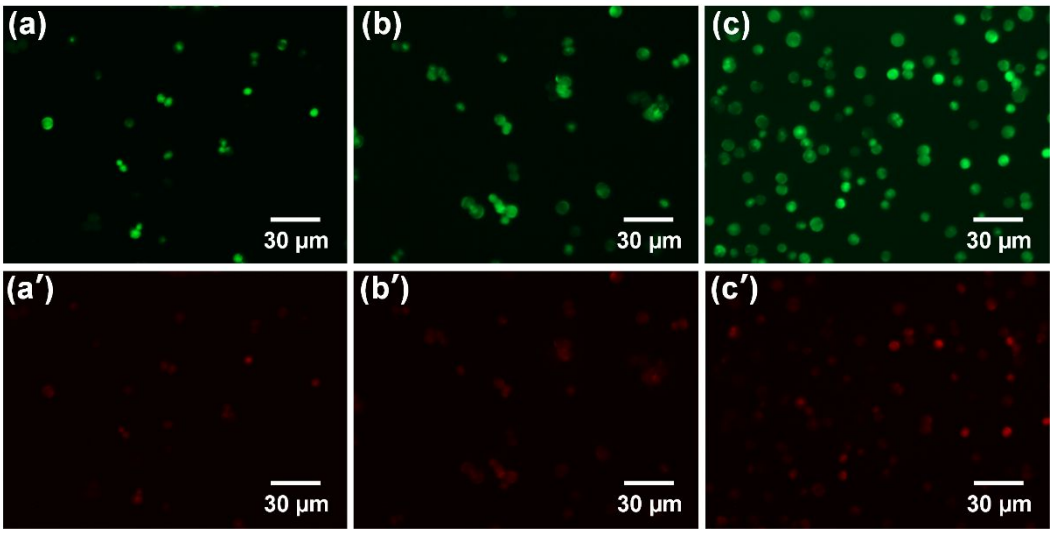

Figure S5. Polypeptide multilayer films of $L_5/C^G/L_8/C^{L\text{-}FITC}/L_8$ loaded with Alexa Fluor 647 conjugated BSA for (a) 3, (b) 10, and (c) 15 min. PL-FITC and BSA were visualized at (a-c) 480 and (a'-c') 647 nm, respectively.

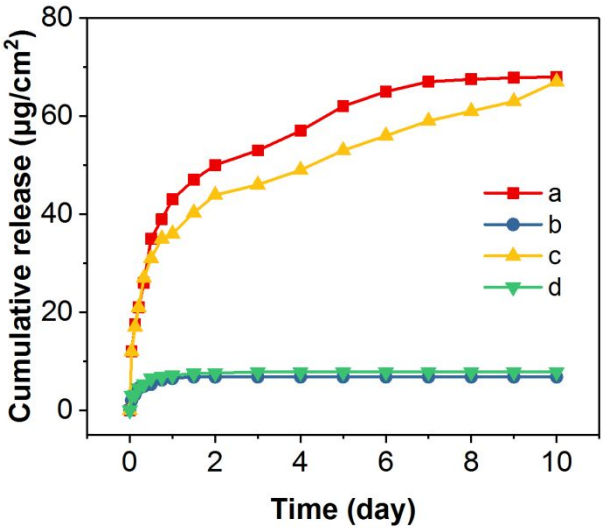

Figure S6. Cumulative release profiles of proteins from PL/PG multilayer films with and without capsule^{PL} or capsule^{PG} in SBF. The samples used are a and c - $L_5/C^G/L_8/C^L/L_8$ films, b and d - L_{18} films. a and b are for BSA release, c and d are for histone release.

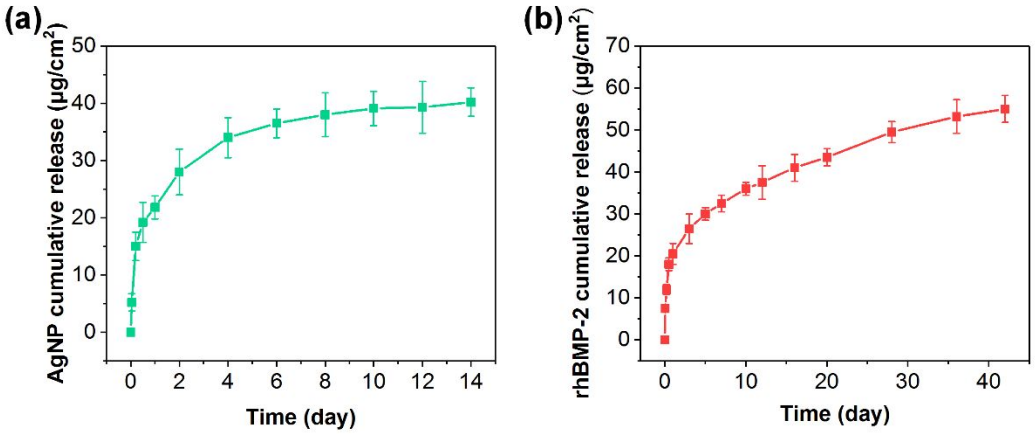

Figure S7. Cumulative release profiles of (a) AgNPs and (b) rhBMP-2 from the $L_5/C^G/L_8/C^L/L_8$ films. The sample used in (a) was incubated in 0.1 mg mL^{-1} AgNP suspension for 40 min, and the sample used in (b) was incubated in 4 μg mL^{-1} rhBMP-2 solution for 15 min.