

Article

Micro-Clotting of Platelet-Rich Plasma Upon Loading in Hydrogel Microspheres Leads to Prolonged Protein Release and Slower Microsphere Degradation

Miran Hannah Choi ^{1,2}, Alexandra Blanco ^{1,2}, Samuel Stealey ¹, Xin Duan ³, Natasha Case ¹, Scott Allen Sell ¹, Muhammad Farooq Rai ^{3,4} and Silviya Petrova Zustiak ^{1,*}

¹ Program of Biomedical Engineering, School of Engineering, Saint Louis University, 63103, Saint Louis, MO, USA. miranc2@illinois.edu (M.H.C); ablanco3@illinois.edu (A.B); samuel.stealey@slu.edu (S.S); natasha.case@slu.edu (N.C); scott.sell@slu.edu (S.A.S)

² Current address: Department of Bioengineering, University of Illinois at Urbana-Champaign, 61801, Urbana, IL, USA

³ Department of Orthopedic Surgery, Washington University in St. Louis, School of Medicine, 63110, Saint Louis, MO, USA. duan.x@wustl.edu (X.D); rai.m@wustl.edu (M.F.R)

⁴ Department of Cell Biology & Physiology, Washington University in St. Louis, School of Medicine, 63110, Saint Louis, MO, USA

* Correspondence: silviya.zustiak@slu.edu; 314-977-8331

Received: 30 June 2020; Accepted: 28 July 2020; Published: dateSupplemental Information

Supplemental Information

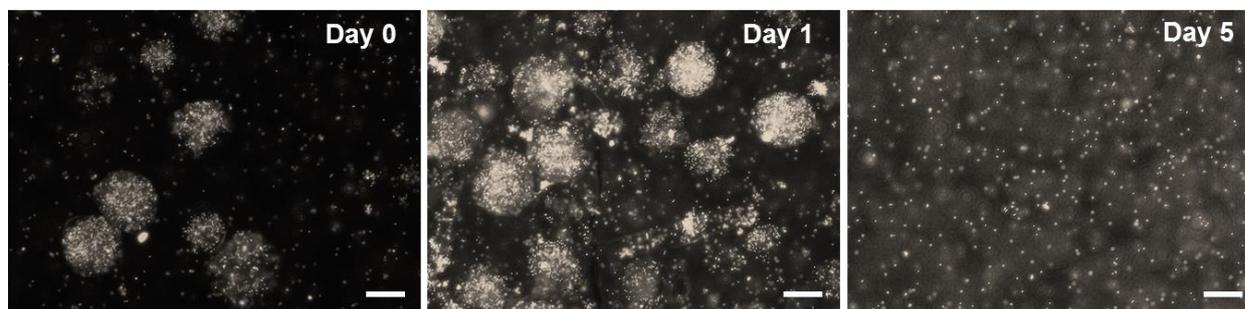


Figure 1. Degradation of microspheres loaded with 10% w/v liquid PRP. Microspheres were prepared with four-arm PEG-Ac and PEGDD-1 as a crosslinker at 7.5% w/v in PEG. Red fluorescent beads were added to the microspheres for visualization. The scale bar is 100 μm .

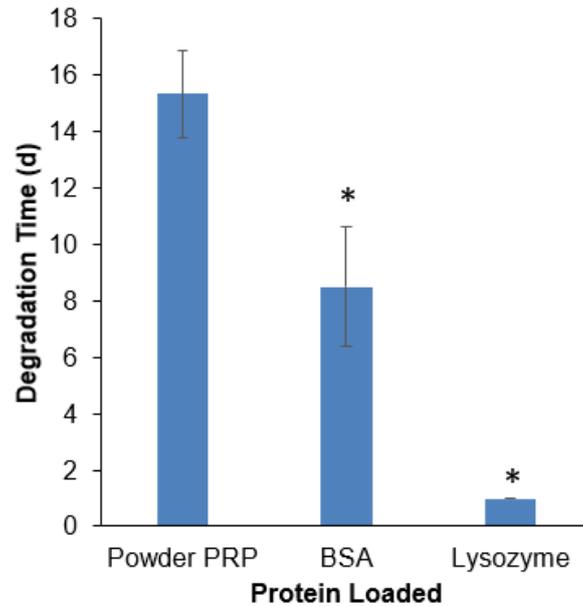


Figure 2. Degradation of microspheres loaded with 10% w/v protein as a function of protein type. Microspheres were prepared with four-arm PEG-Ac and PEGDD-1 as a crosslinker at 7.5% w/v in PEG and loaded with powder PRP, BSA or lysozyme. *denotes significant difference from powder PRP (n = 50; p < 0.05)..

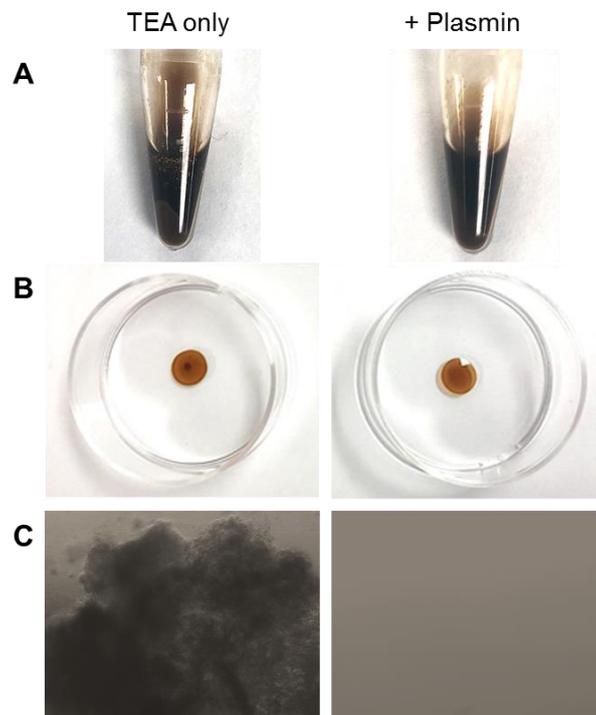


Figure 3. Plasmin activity. (A, B) Macroscopic images of powder PRP at 10% w/v reconstituted in TEA buffer only or in TEA buffer containing 1% v/v plasmin. (B) Macroscopic images of powder PRP at 10% w/v reconstituted in TEA buffer only or in TEA buffer containing 1% v/v plasmin.