

Supporting Information

Matrix metalloproteinase responsive hydrogel microplates for programmed killing of invasive tumour cells

Alexander B. Cook^{*a+}, Annalisa Palange^a, Michele Schlich^a, Elena Bellotti^a, Sayanti Brahmachari^a,
Martina di Francesco^a, Paolo Decuzzi^a

^a Laboratory of Nanotechnology for Precision Medicine

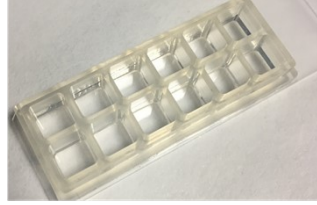
Istituto Italiano di Tecnologia

Via Morego, 16163 Genova, Italy

⁺ Present address: Bio-organic chemistry group,

Department of Chemical Engineering and Chemistry, 5600 MB Eindhoven, Netherlands

*Corresponding author: Alexander B Cook; a.b.cook@tue.nl



Template: 1cm x 1cm x 0.5cm

Figure S1. Macroscale hydrogel template utilized in this study.

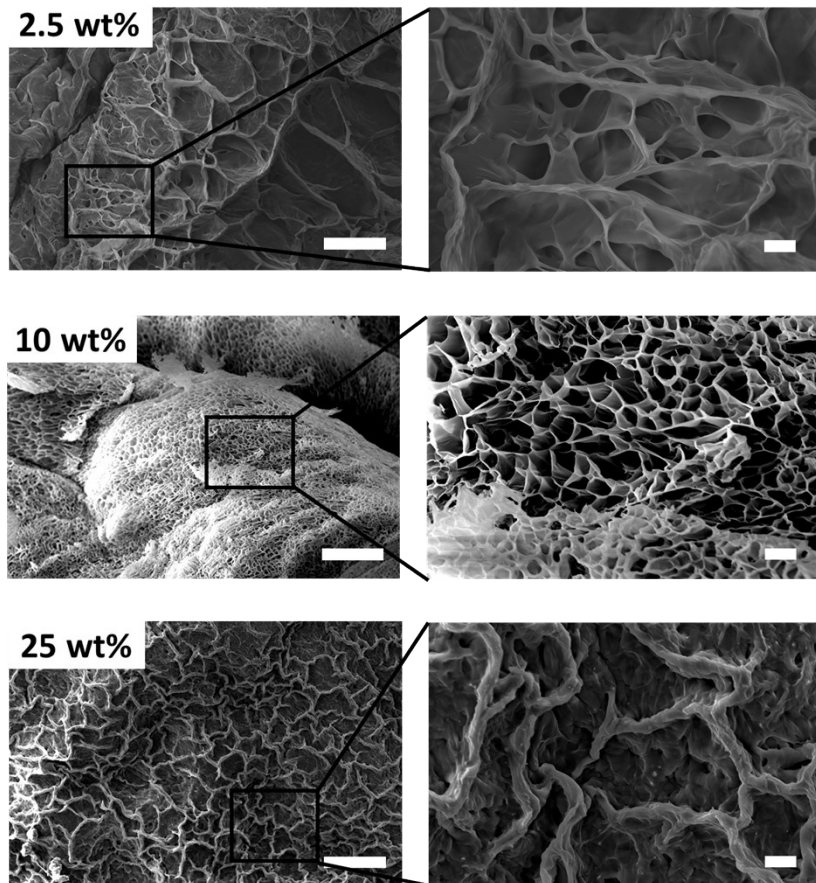


Figure S2. SEM images of lyophilized macroscopic hydrogels from different gel precursor initial concentrations (scale bars left panels: 100 μm , scale bars right panels: 10 μm).

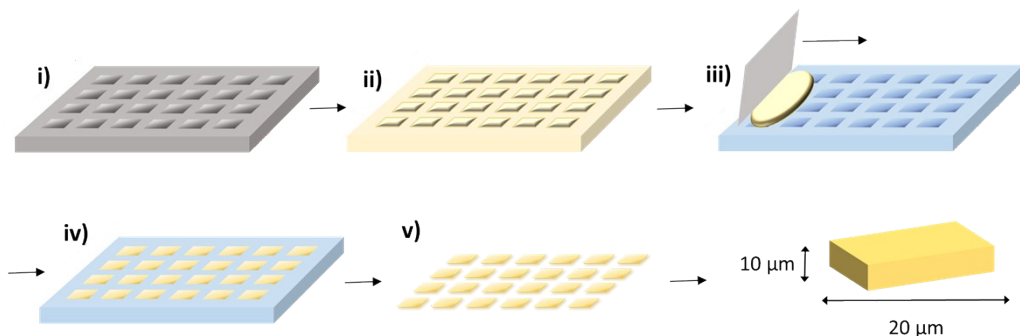


Figure S3. Fabrication and characterization of hydrogel microplates using soft-lithography method, **i)** Silicon master template with electron beam etched features, **ii)** PDMS inverse template, **iii)** Sacrificial PVA replica template, **iv)** PVA template filled with hydrogel precursor solution and crosslinked with 365 nm UV light, **v)** dissolution of PVA template in water and purification of hydrogel microplates

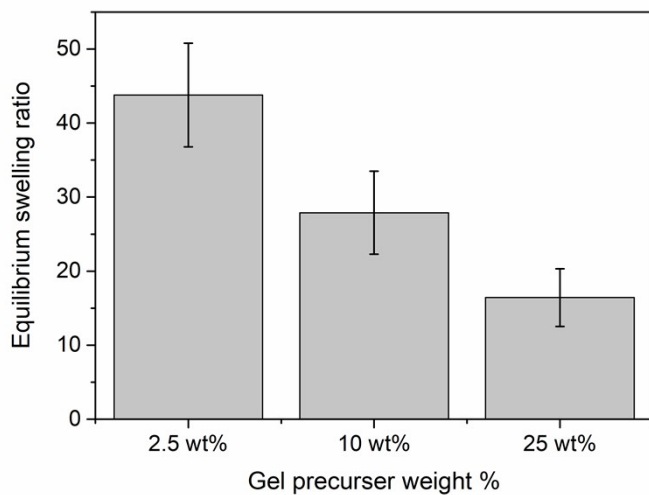


Figure S4. Equilibrium swelling ratios (mass) of macroscopic polyethylene glycol peptide thiol-ene hydrogels of varying stiffness (error bar represents S.D. of three measurements).

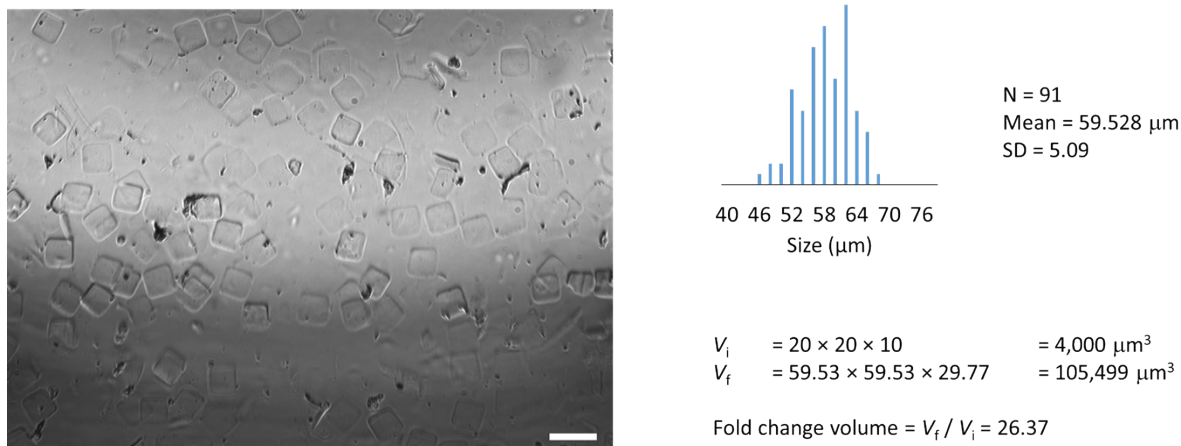


Figure S5. Size distribution of microplates in solution from optical microscopy, and associated 10 wt% microgel swelling characterization, in comparison to PVA template idealized particle sizes ($20 \times 20 \times 10 \mu\text{m}$). Scale bar: $100 \mu\text{m}$.

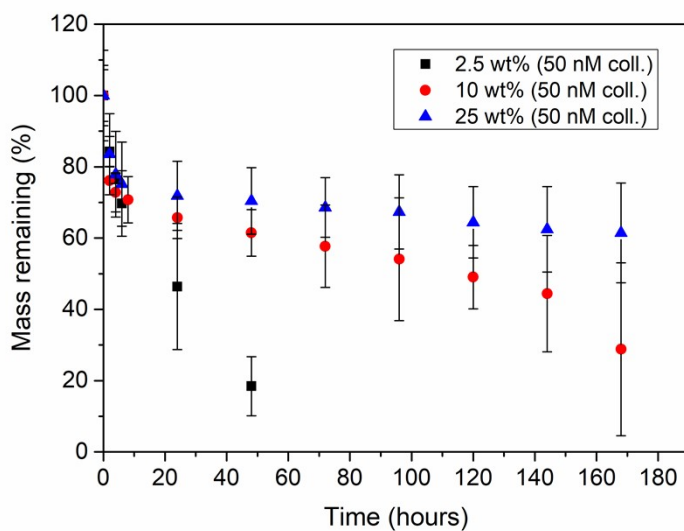


Figure S6. Macroscale hydrogel mass degradation (varying stiffness from different hydrogel precursor initial concentrations) in 50 nM solutions of MMP-2/9 (collagenase IV) at $37 \text{ }^\circ\text{C}$ over time.

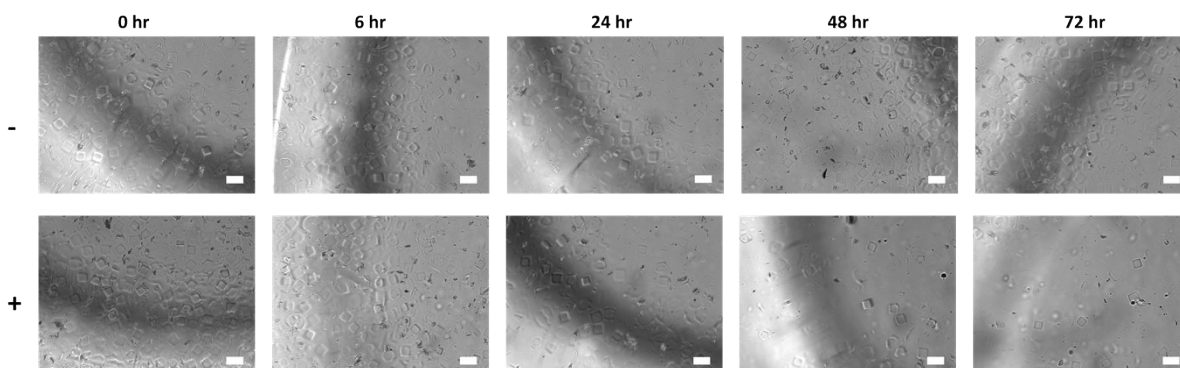


Figure S7. Optical microscopy images of hydrogel microplates and their degradation in either presence (bottom '+ line') or absence (top '- line') of 50 nM concentrations of MMP-2/9 (collagenase IV) at 37 °C over time (scale bars: 100 μ m).

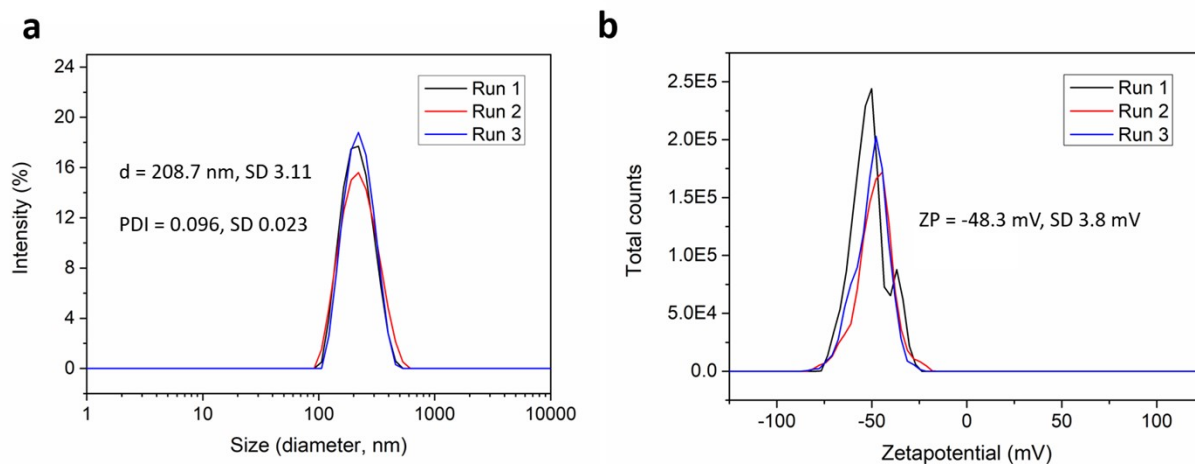


Figure S8. **a)** DLS size distribution of DTXL containing PLGA SPNs in water, **b)** Zeta potential distribution of DTXL containing PLGA SPNs in water.

