

Supplementary Information

A bioinspired multifunctional hydrogel patch targeting inflammation and regeneration in chronic intestinal wounds

Marco Araújo,^{*a,b} João Silveira,^{a,b,c} Aureliana Sousa,^{a,b} Mafalda Bessa-Gonçalves,^{a,b,d} Susana G. Santos^{a,b,d} and Cristina C. Barrias,^{*a,b,d}

^a *i3S - Instituto de Inovação e Investigação em Saúde, Universidade do Porto, Porto, Portugal*

^b *INEB - Instituto de Engenharia Biomédica, Universidade do Porto, Porto, Portugal*

^c *FEUP – Faculdade de Engenharia, Universidade do Porto, Porto, Portugal*

^d *ICBAS - Instituto de Ciências Biomédicas Abel Salazar, Universidade do Porto, Porto, Portugal*

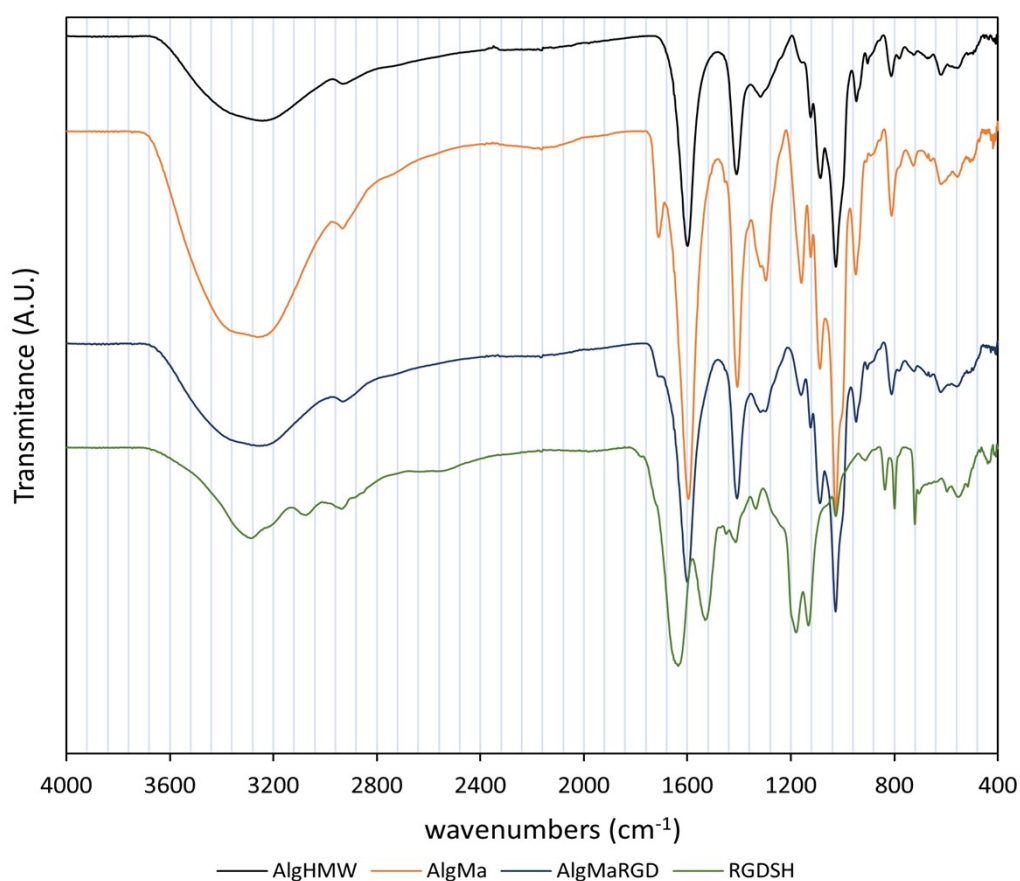


Figure S1. ATR-FTIR spectrum of alginate samples before (**AlgHMW**) and after modification with methacrylic anhydride (**AlgMa**) and grafting of the cell-adhesive peptide (**AlgMaRGD**). ATR-FTIR spectrum of cell-adhesive peptide CGGGGRGDSP (**RGDSH**).

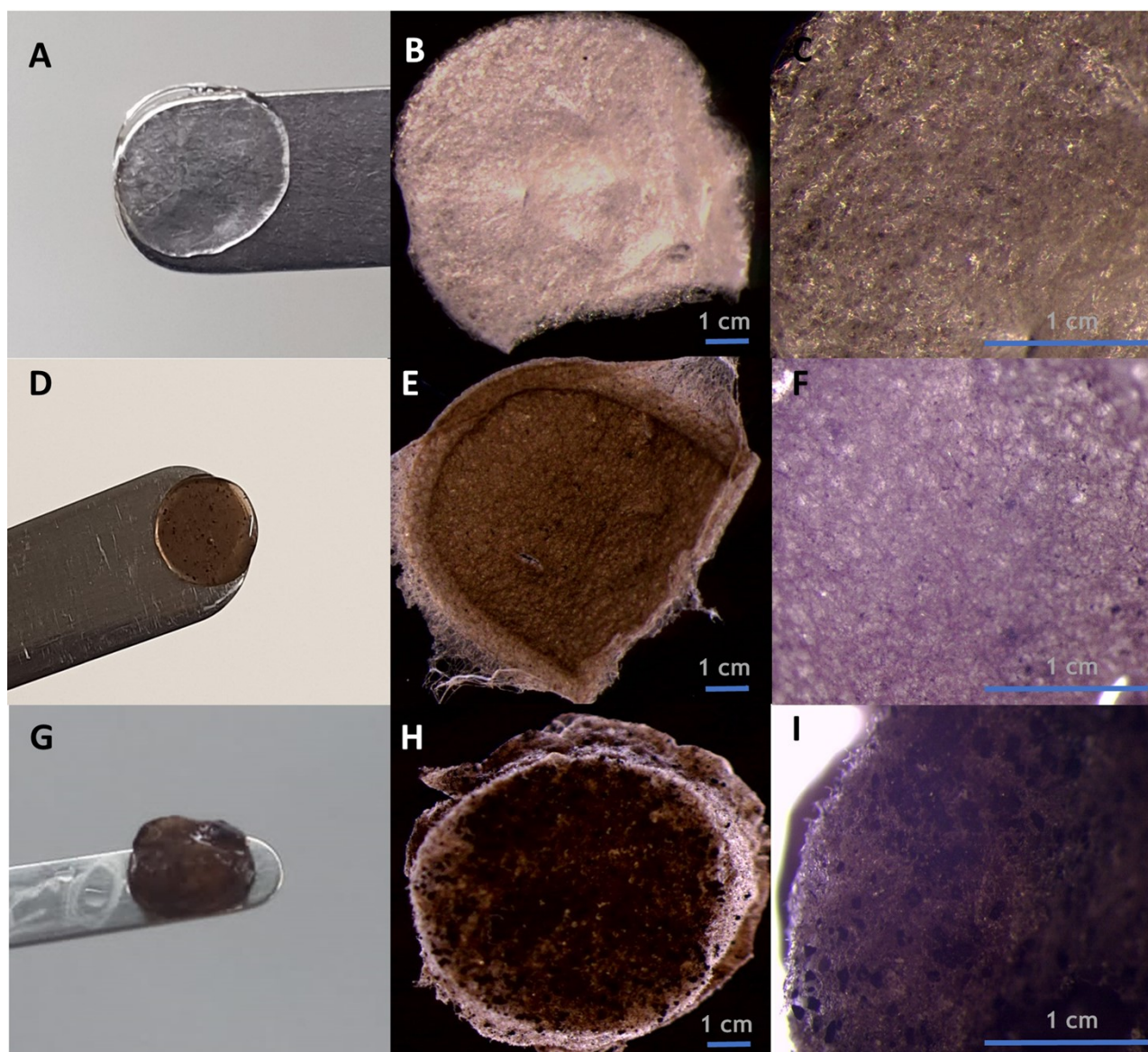


Figure S2. Macroscopic aspect of hydrogel formulations **Pep4** (A) and **mNP0.3Pep4** (D, G) and representative images of the spongy-like appearance of freeze-dried **Pep4** (B, C) and **mNP0.3Pep4** (D-I) scaffolds obtained from 14 μL (A-F) and 80 μL (G-I) of precursor solution. It is well observed the 3D aspect of the spongy scaffolds and the presence of mNP.

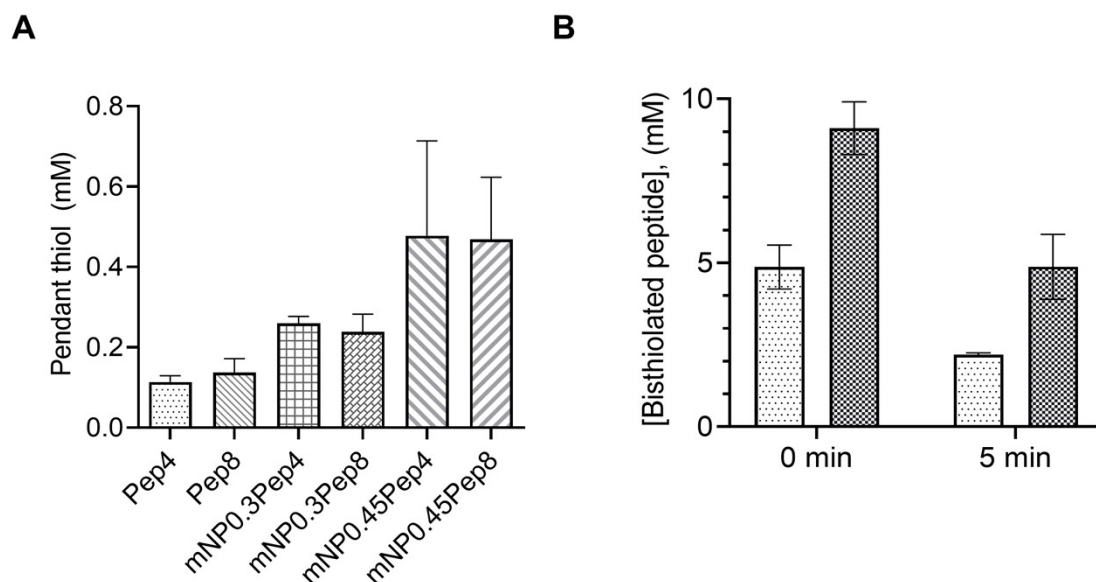


Figure S3. A: Concentration of pendant thiol groups on hydrogel matrices containing 4 mM and 8 mM of bisthiolated MMP-cleavable peptide without mNP (**Pep4**, **Pep8**), with 0.3 mNP (**mNP0.3Pep4** and **mNP0.3Pep8**) and 0.45 mNP (**mNP0.45Pep4** and **mNP0.45Pep8**). B: Amount of bisthiolated peptide in 4 mM and 8 mM solutions containing 0.05 wt% Irgacure 2959 before (0 min) and after photopolymerization (5 min).

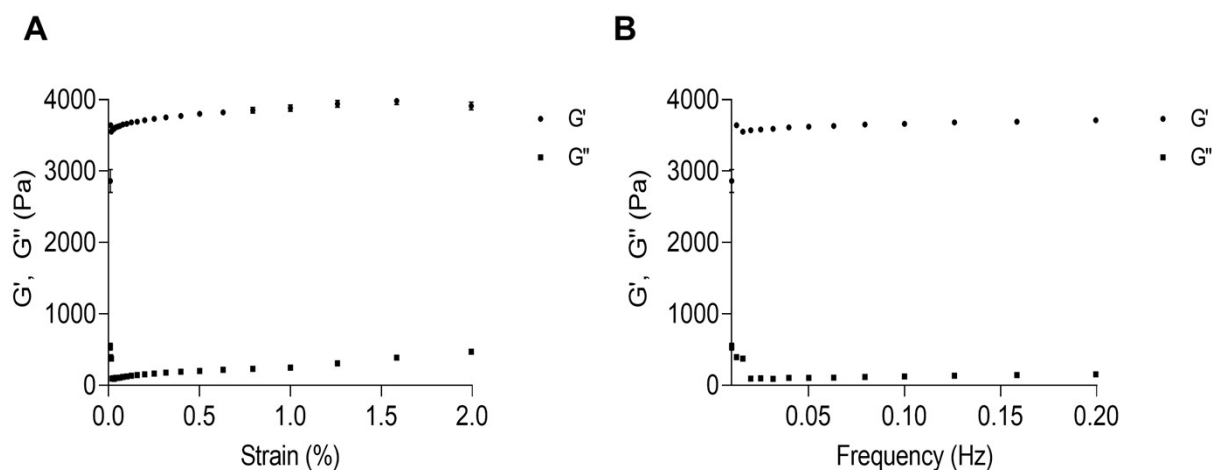


Figure S4. Strain-sweep (A) and frequency-sweep (B) tests performed on sample **mNP0.3Pep4**. Analysis were performed from 0.1-100% at 0.1 Hz frequency and from 0.01-10Hz maintaining 1% strain, which are both in the linear viscoelastic region.

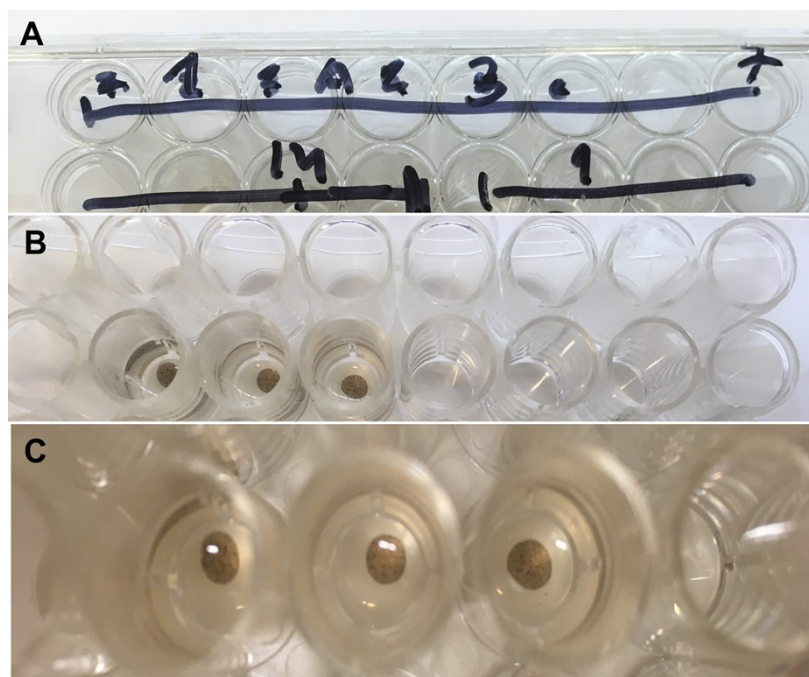


Figure S5. Layout of the 48-well plate (A) containing **mNP0.3Pep4** hydrogel samples incubated in a cocktail solution composed by Collagenase type II + Collagenase type IV (10U + 200U), at 37 °C and along 14 days (B). Amplified photo of the **mNP0.3Pep4** hydrogels (C).

Video S1. 3D rotating projection of HIFs and Caco-2 co-culture

[Supplementary movie 1.mov](#)