Supporting information

Multifunctional 3D dressing unit based on the core-shell hydrogel microfiber for diabetic foot wound healing

Qiwei Huang,[a] Tingbin Wu,[a] Lihuan Wang,[a] Jichang Zhu,[a] Yongshi Guo,[a] Xi Yu,[a] Longfei Fan,[a] John H. Xin,[b] Hui Yu*[a]

[a] Guangdong-Hong Kong Joint Laboratory for New Textile Materials, School of Textile Materials and Engineering, Wuyi University, Jiangmen, 529020, China

[b] Institute of Textiles & Clothing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China

***To whom correspondence should be addressed:**

E-mail:yuhuihui_2000@163.com (Hui Yu)

Tel/fax:+86-750-3296413

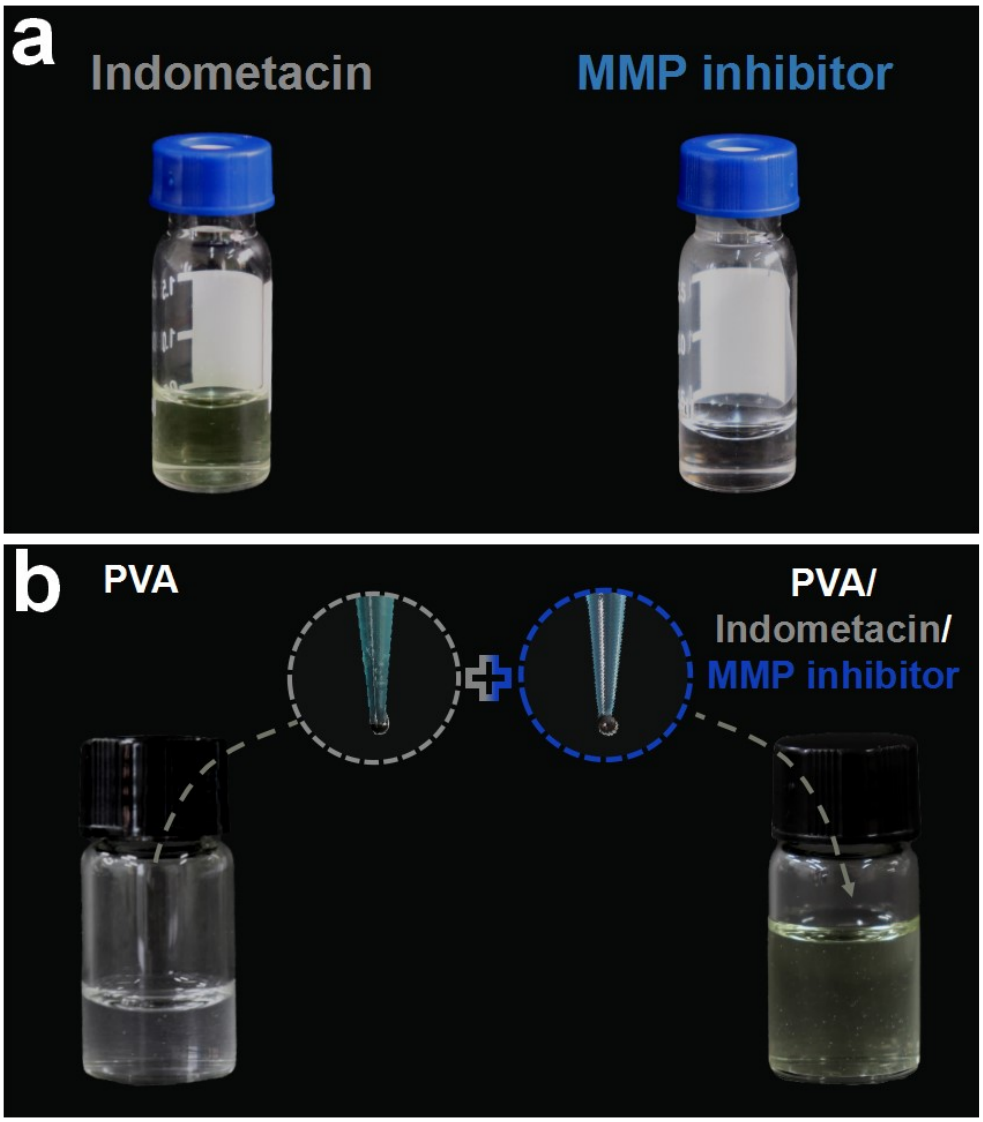

Fig. S1 Preparation of the functional bio-ink. (a) Photographs of indomethacin and MMP inhibitor solutions; (b) Photograph of the preparation of PVA/INDO/MMPI functional bio-ink.

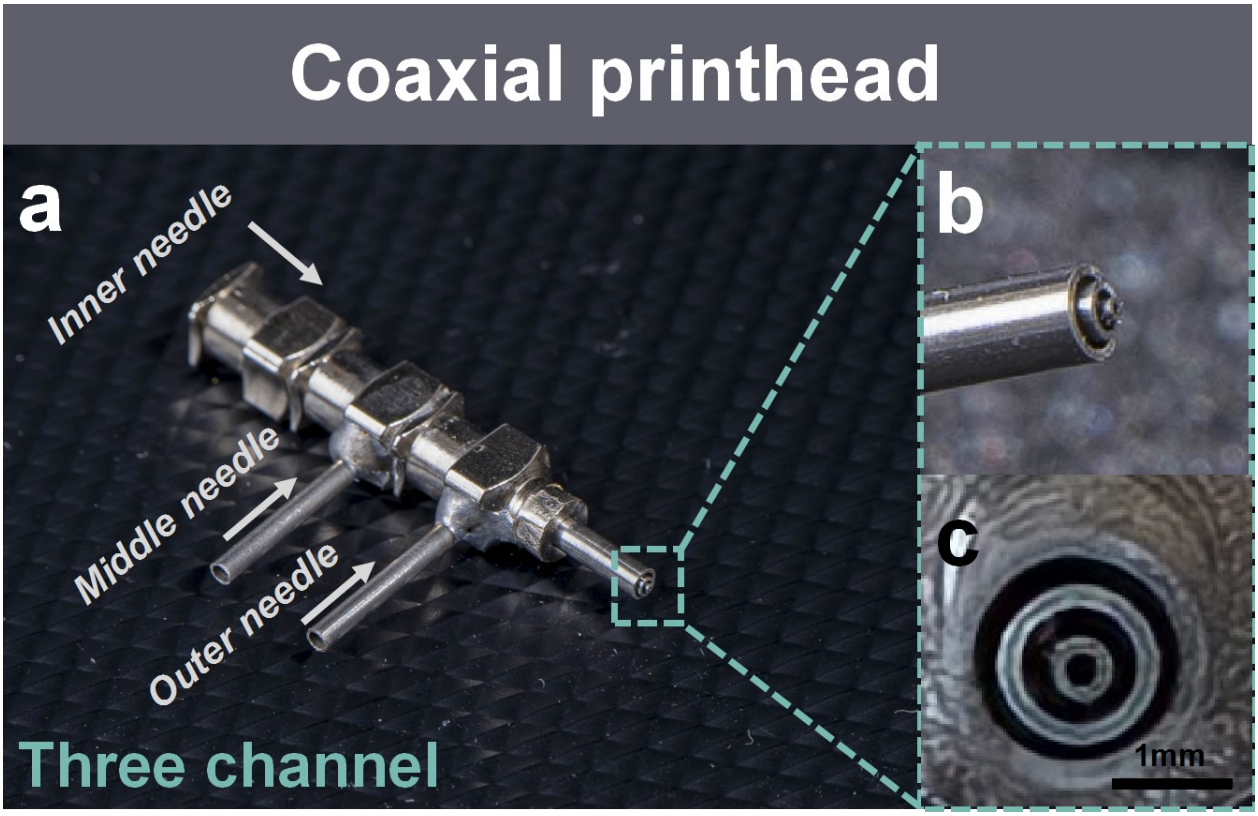

Fig. S2 Coaxial biological 3D printing coaxial printhead. (a) Photograph of the three-channel printhead. Magnified photographs of the (b) side view and (c) front view of the nozzle.

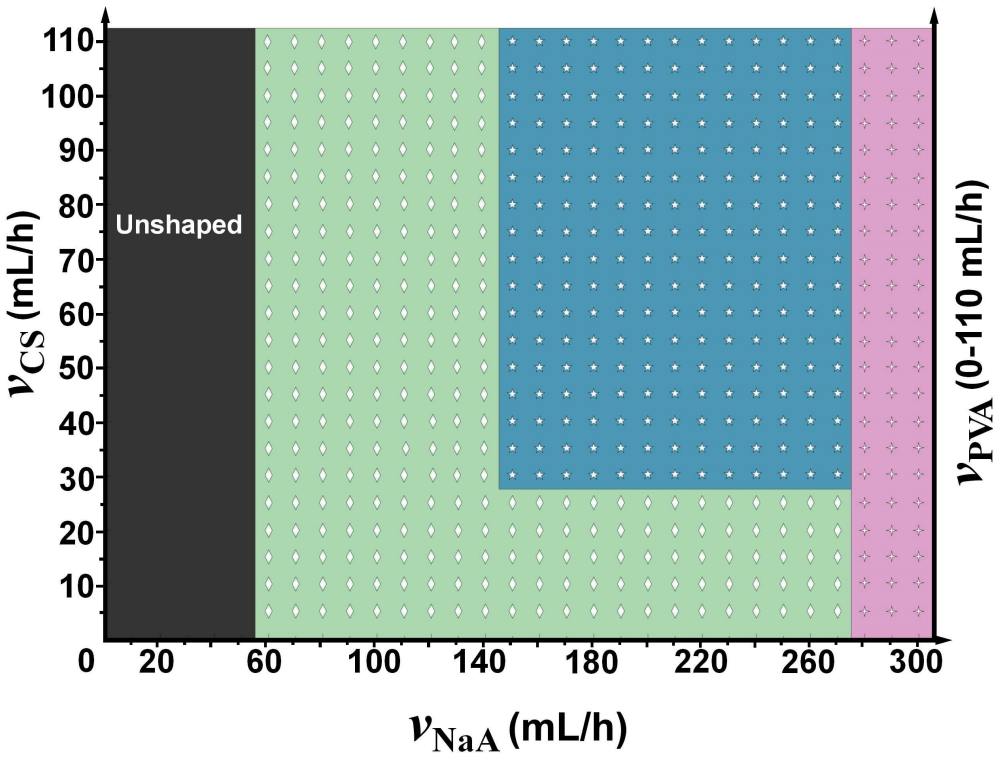

Fig. S3 Parameter diagram for the flow velocities used to fabricate the multifunction core–shell hydrogel fibers *via* coaxial biological 3D printing. Black: unshaped area; blue: flow velocity area; green: spinnable area; pink: non-microfluidic 3D printing area.

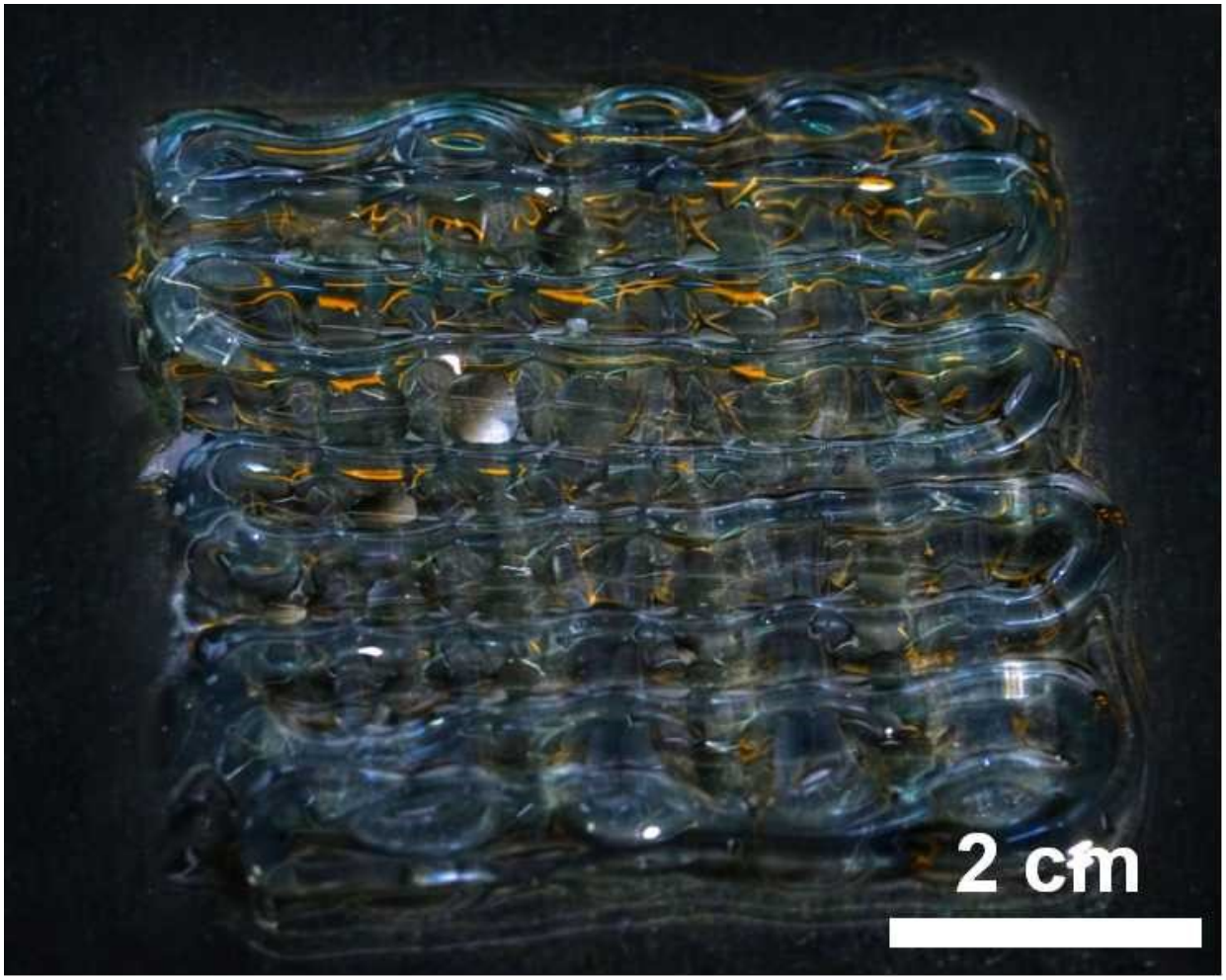

Fig. S4 Representative photograph of a hydrogel fiber MF dressing.

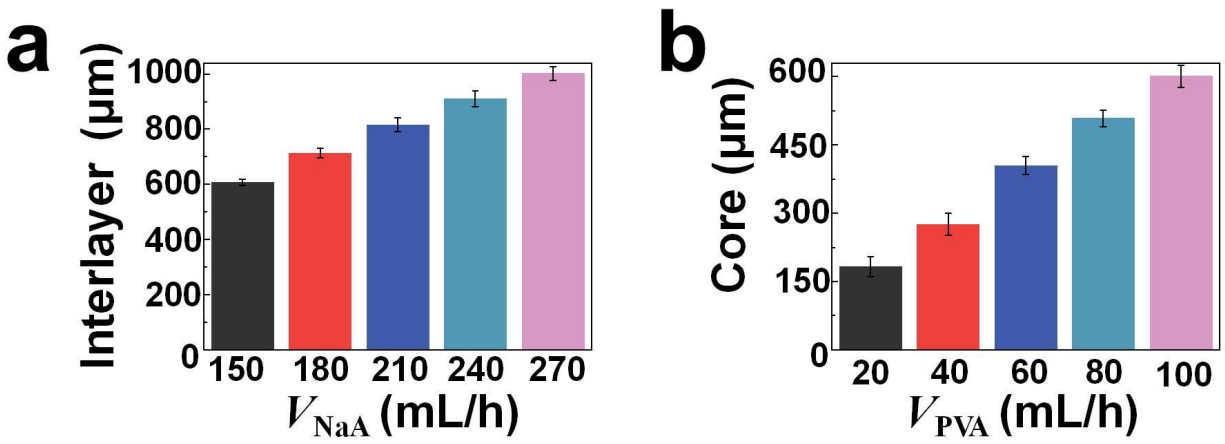

Fig. S5 Effect of (a) core flow velocity (v_{NaA}) and (b) sample flow velocity (v_{PVA}) on the thickness of the middle layer and core layer, respectively, of CNP core–shell hydrogel fibers.

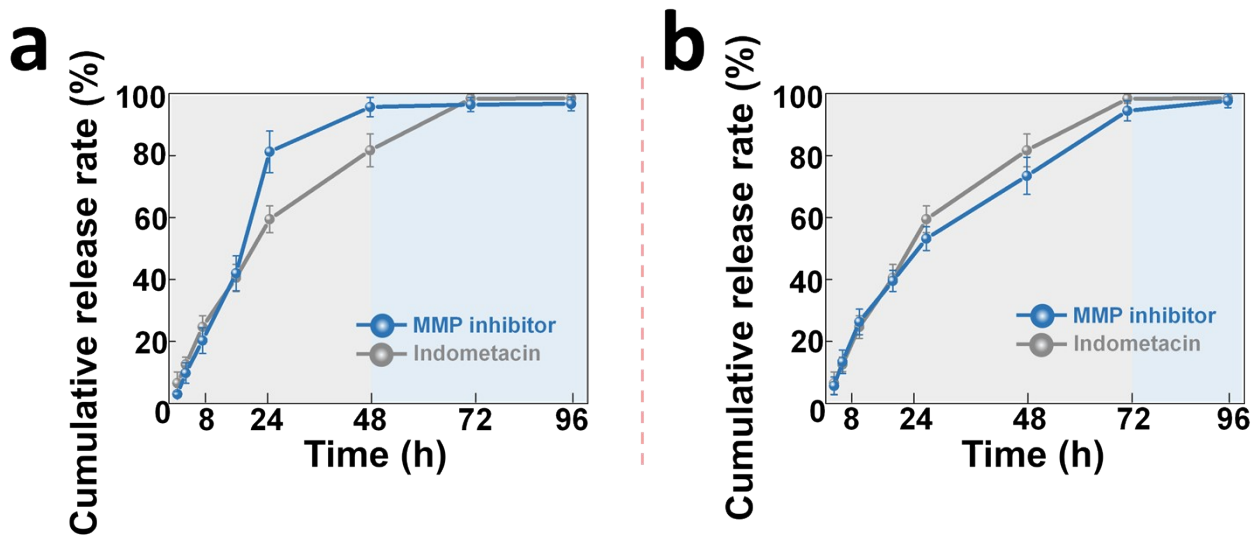

Fig. S6 Controllable drug release. (a) Cumulative release rate of the MMP inhibitor loaded in the NaA middle layer and indomethacin loaded in the PVA core layer over time; (b) Cumulative release rate of the drugs simultaneously loaded in the PVA core layer.

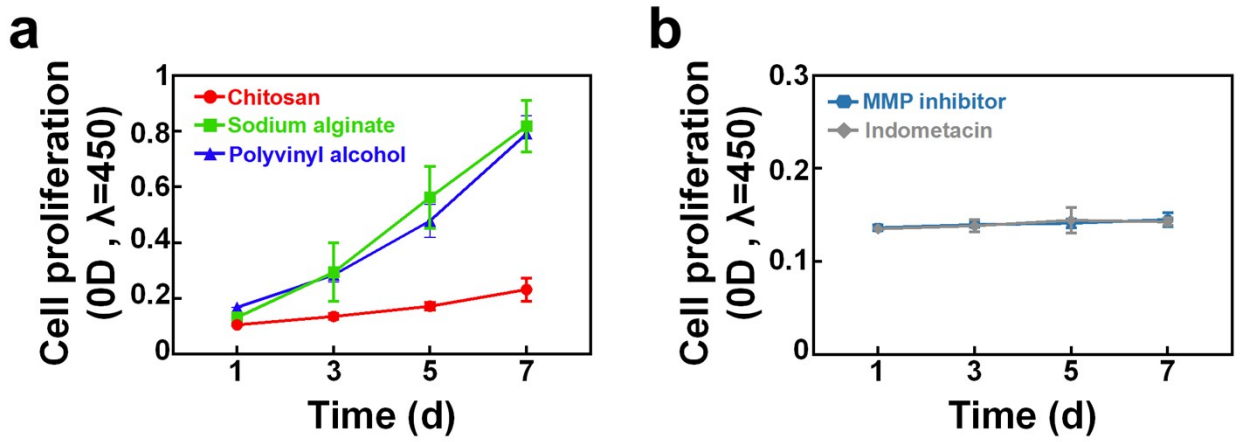

Fig. S7 Cytotoxicity testing of individual components of the MF dressing. (a) Cytotoxicity of chitosan, sodium alginate and polyvinyl alcohol; (b) Cytotoxicity of MMP inhibitor and indometacin.

Table. S1 Design parameters of the printhead used in the experiments. OD: outer diameter; ID: inner diameter.

Nozzle type	Inner channel (OD/ID)	Middle channel (OD/ID)	Outer channel (OD/ID)
Three-layered coaxial 3D printing printhead	500/260 μm	1250/850 μm	2100/1750 μm