Bio-ink properties and printability for extrusion printing living cells

Johnson H.Y Chung[a], Sina Naficy[a], Zhilian Yue[a], Robert Kapsa[a,b], Anita Quigley[a,b], Simon E. Moulton*[a] and Gordon G. Wallace*[a]

[a] *ARC Centre of Excellence for Electromaterials Science, Intelligent Polymer Research Institute, University of Wollongong, Wollongong, NSW 2522, Australia. Tel: +61 2 4221 3127; Fax: +61 2 4221 3114. Email: gordon_wallace@uow.edu.au*

[a] *ARC Centre of Excellence for Electromaterials Science, Intelligent Polymer Research Institute, University of Wollongong, Wollongong, NSW 2522, Australia. Tel: +61 2 4298 1443; Fax: +61 2 4221 3114. Email: smoulton@uow.edu.au*

[b] *Centre for Clinical Neuroscience and Neurology Research and Department of Medicine, The University of Melbourne, St. Vincent's Hospital, Fitzroy, Victoria 3065, Australia*

The setup for ink consistency measurement is shown in Fig. S1, where the ink solutions were loaded into a syringe with the plunger connected to the upper clamp of a mechanical tester. The measurements were performed in compression mode while the nozzle end of the syringe was held perpendicularly in position by a plastic rack.

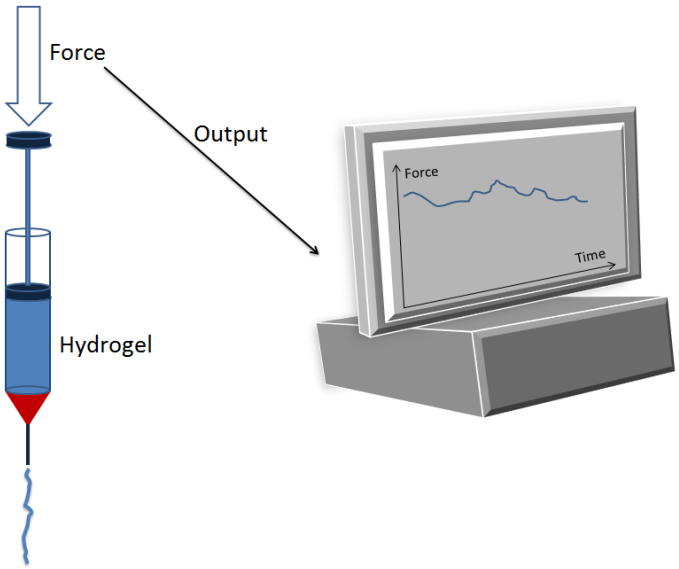

Fig. S1 Schematic diagram for ink consistency measurement.

The rheological behaviour of ink solutions was analysed using an AR-G2 rheometer (TA Instruments, DE) equipped with a Peltier plate thermal controller and a cone-plate set up (Fig. S2).

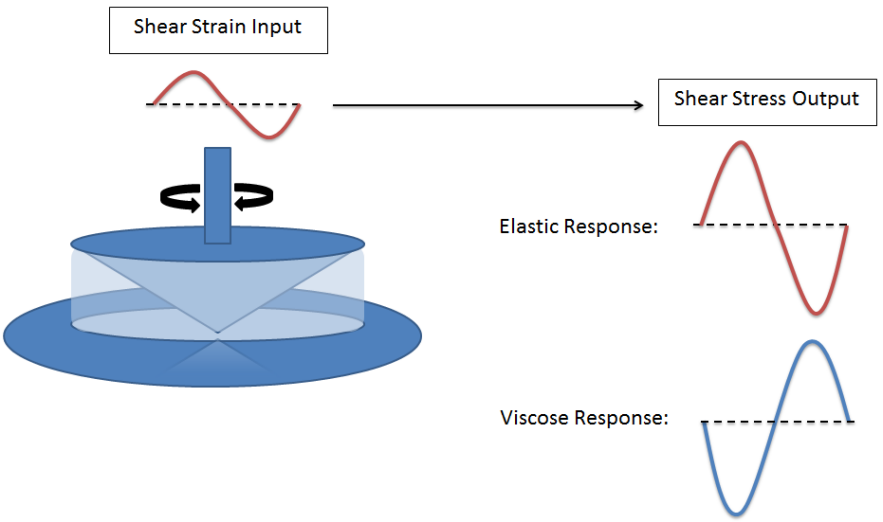

Fig. S2 Schematic diagram for rheology measurements.

The modulus of samples was determined using both compression and indentation tests. The experimental set up for indentation tests is shown in Fig S3.

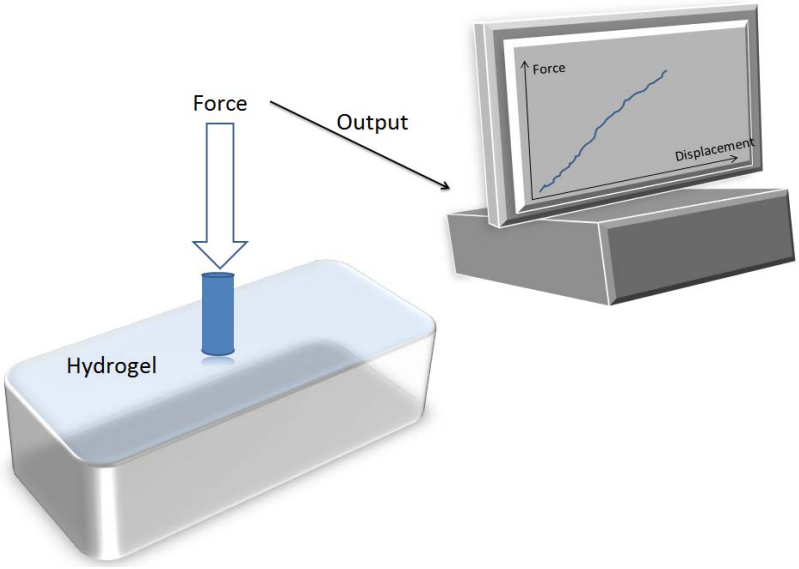

Fig. S3 Schematic diagram of mechanical testing of hydrogels using indentation mode.