ACCSCIENCE PUBLISHING

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RESEARCH ARTICLE

Development and characterization of graphene derivative–GelMA hybrid bioinks for the generation of bioartificial tissue substitutes via 3D bioprinting

Supplementary file

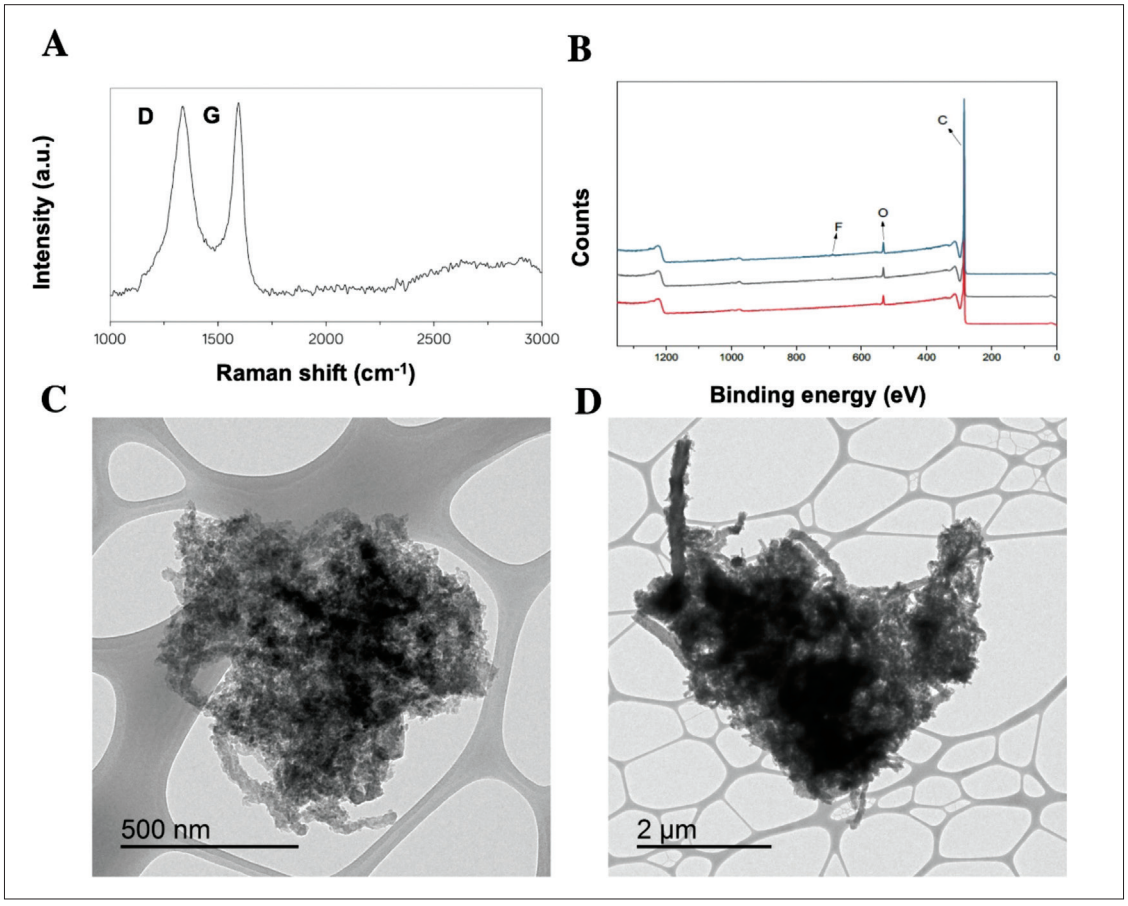

Figure S1. Biograph characterization. (A) Raman analysis (D and G bands are indicated). (B) X-ray photoelectron spectroscopy. (C, D) Representative image from transmission electron microscopy. Additional characteristics of BioGraph can be found in other papers (see refs.[40,41] in the main paper). Abbreviations: BioGraph, graphene derivative; GelMA, gelatin methacryloyl.

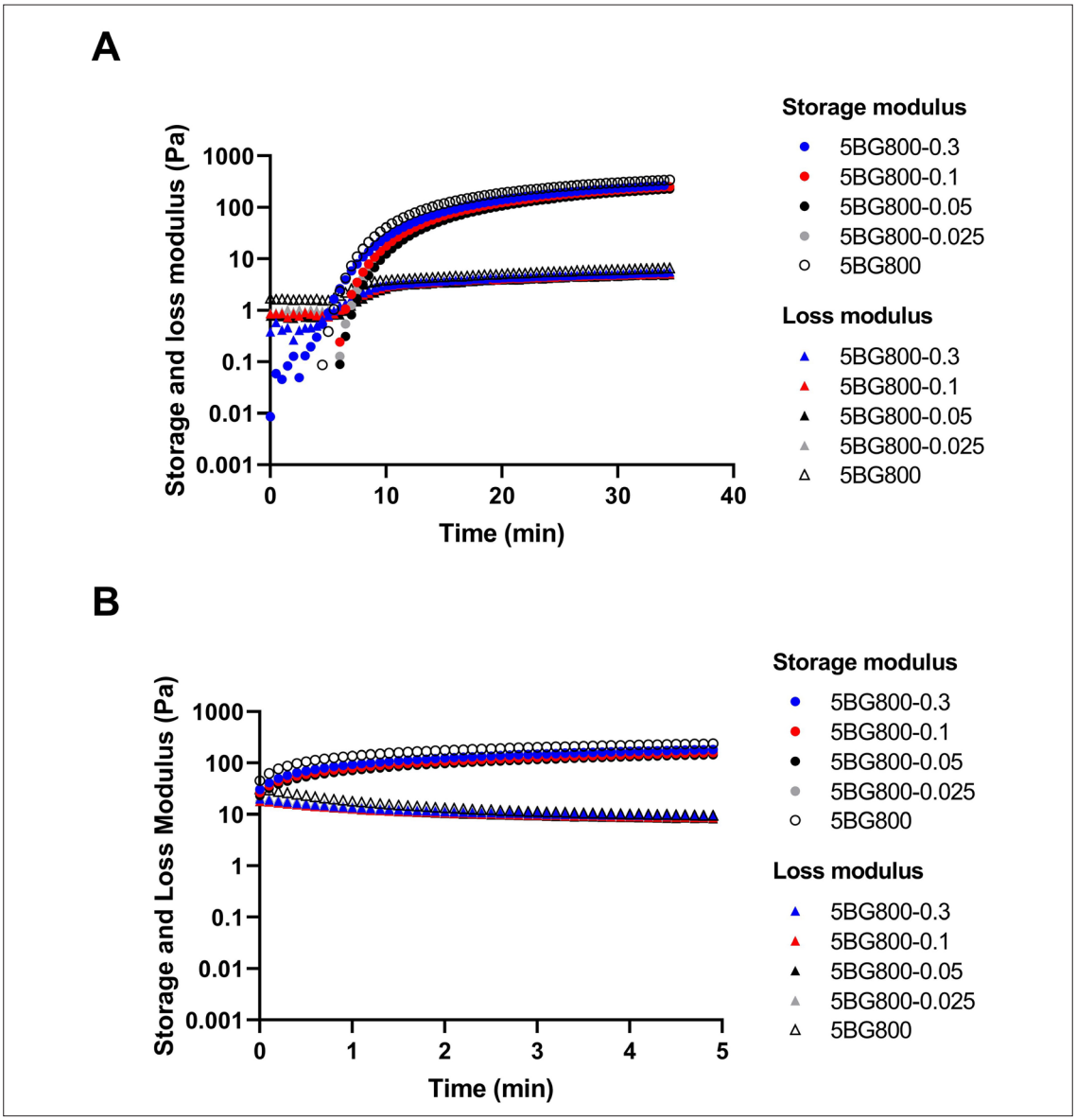

Figure S2. Time-dependent oscillatory intervals obtained for 5% BG800-Biograph hybrid hydrogels. (A) Measurements of storage modulus (G') and loss modulus (G'') were conducted on hydrogels initially in a melted state at 37°C, exposed to a temperature of 15 °C for 35 min. (B) G' and G'' data collection for 5 min, following the interval data presented in Figure S2A, with the additional application of shear stress at a rate of 1000 s^{-1} for a duration of 30 s. Abbreviation: BioGraph, graphene derivative.

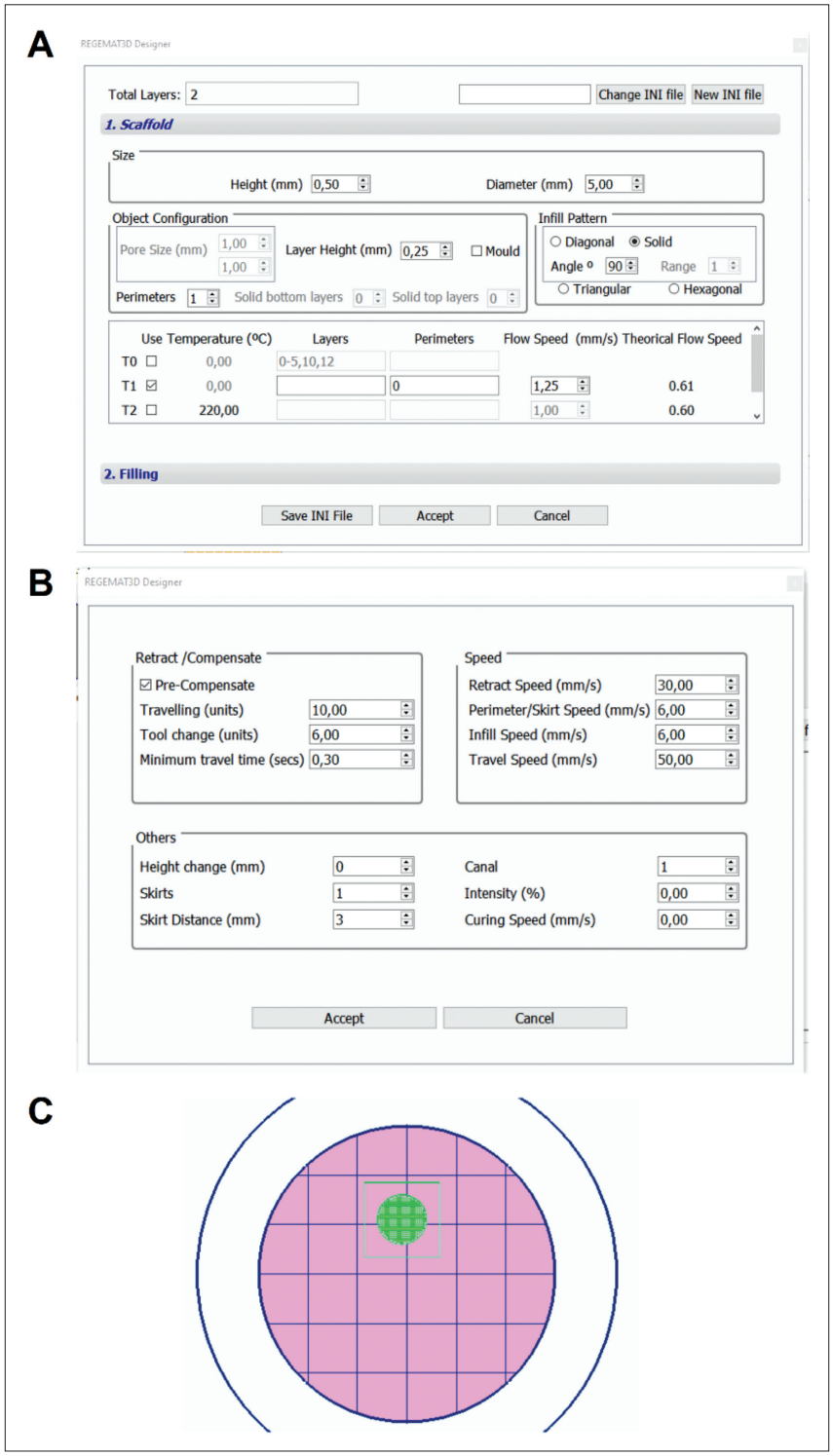

Figure S3. Optimized bioprinting parameters. The figure shows object (A) and extra configurations (B), as captured from the Regemat 3D Design Software, for the production of cell-laden cylindrical scaffolds (C) used for the *in vitro* determination of the viability and proliferation of r-AMSCs cells, as well as for SEM characterization of acellular scaffolds. Abbreviations: r-AMSCs, rat adipose-derived mesenchymal stem cells; SEM, scanning electron microscope.