

RESEARCH ARTICLE

3D-printed biodegradable hydrogel microrobots for controlled therapeutic delivery

Supplementary file

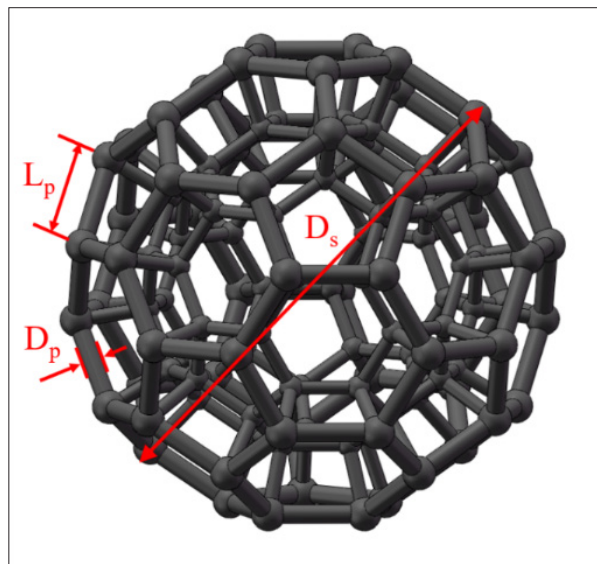


Figure S1. Schematic illustration of the magnetic skeleton. D_s represents the diameter of the magnetic skeleton, while L_p and D_p denote the length and diameter of the polygon, respectively. The diameter (D_s) of the magnetic skeleton was $50\ \mu\text{m}$, and the length (L_p) and diameter (D_p) of each polygon were $8\ \mu\text{m}$ and $2\ \mu\text{m}$, respectively.

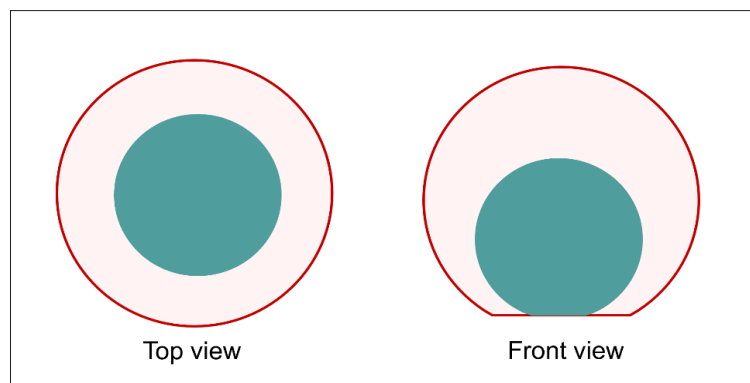


Figure S2. Schematic design of the dual-layer GelMA microstructure. Abbreviation: GelMA: Gelatin methacryloyl.

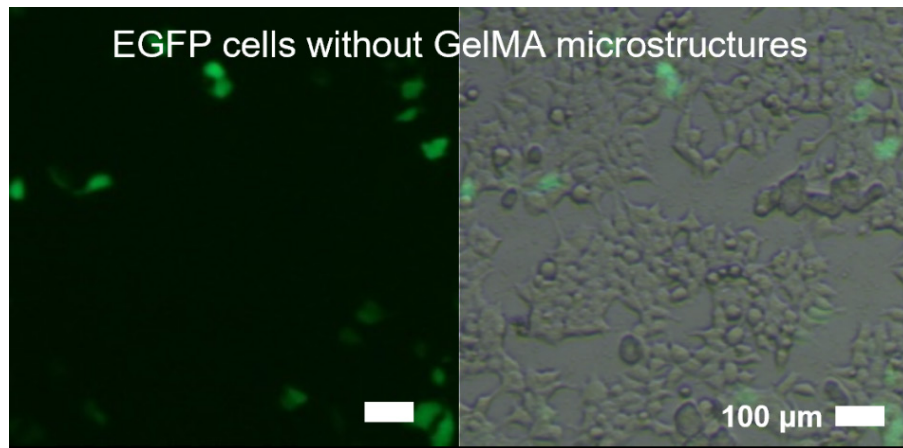


Figure S3. Fluorescent microscopy image of EGFP cells after 48 hours of culture without GelMA microstructures. Abbreviations: EGFP: Enhanced green fluorescent protein; GelMA: Gelatin methacryloyl.

Supplementary Videos

Video S1. Detachment process of the 3D-printed microrobots with an embedded magnetic skeleton from the substrate.

Video S2. Detachment process of the 3D-printed gelatin methacryloyl (GelMA) microstructures without a magnetic skeleton from the substrate.

Video S3. Magnetically actuated locomotion of the 3D-printed microrobots under an external magnetic field.