Supplementary file

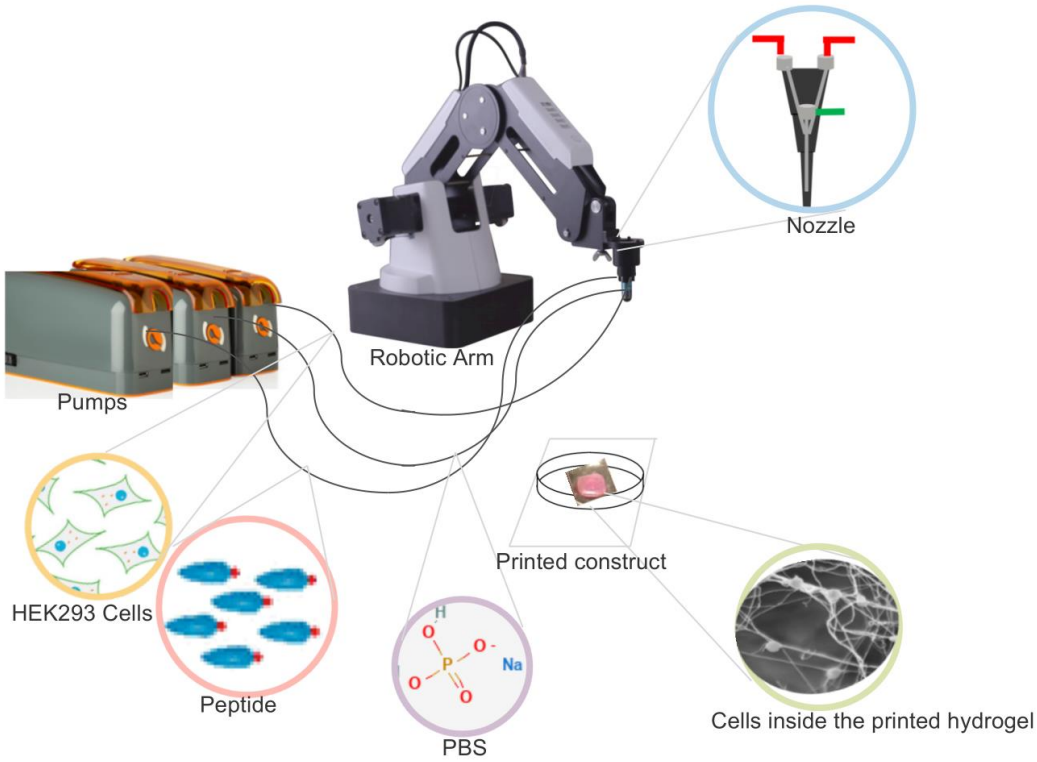

Figure S1. Schematic illustration of the 3D bioprinting process.

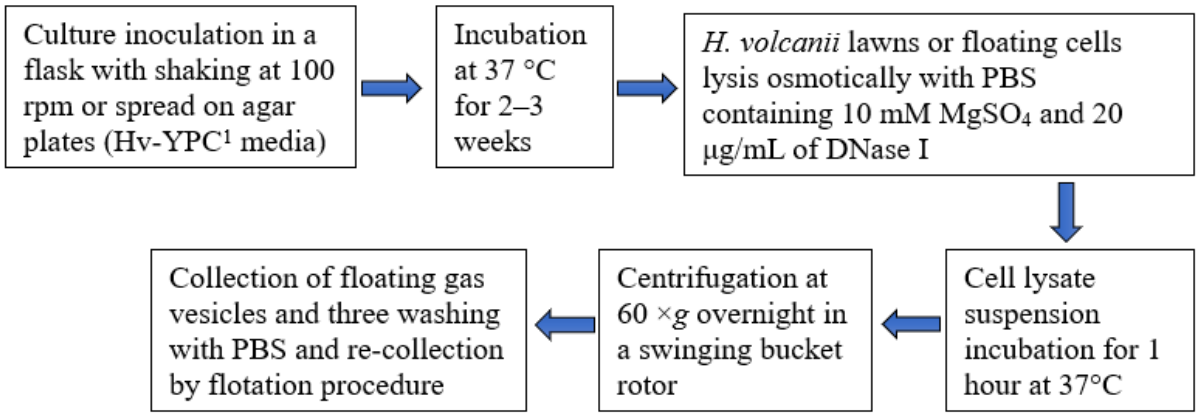

Figure S2. The process of gas vesicles production

Handling of gas vesicles nanoparticles (GVNPs)

To avoid the collapsing of gas vesicles, ensure the slow agitation of culture (about 100 rpm) and avoid pressurization of tubes containing the pure gas vesicles while opening and closing. Avoid excessive washing with PBS during the GVNPs purification; otherwise, GvpC and sfGFP may be washed off, and gas vesicles will lose the fluorescence. Pure GVNPs are stable at room temperature and elevated temperature, up to 50°C, for several months. Still, to avoid any bacterial growth in the GVNPs suspension, store them at 4°C. Also, avoid freezing; otherwise, GVNPs will collapse.

1 Grötzinger, S. W. *et al.* Identification and experimental characterization of an extremophilic brine pool alcohol dehydrogenase from single amplified genomes. *ACS chemical biology* **13**, 161-170 (2018).

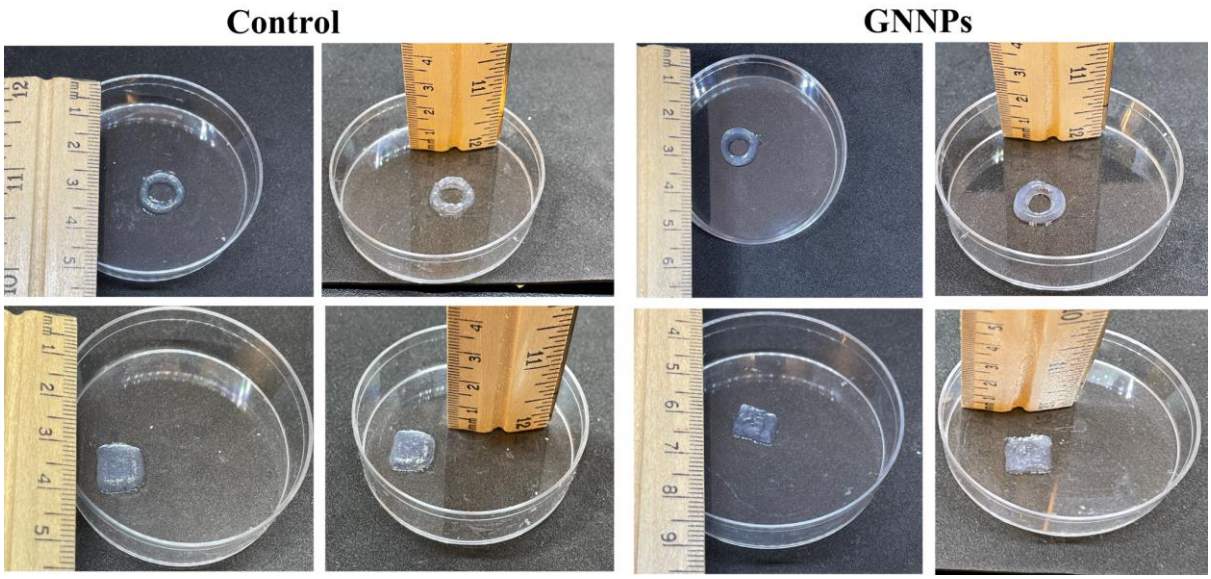

Figure S3. Printed structures of IK6 hydrogel with about 750 µg/ml final concentration of GVNPs (right) and without GVNPs (left).

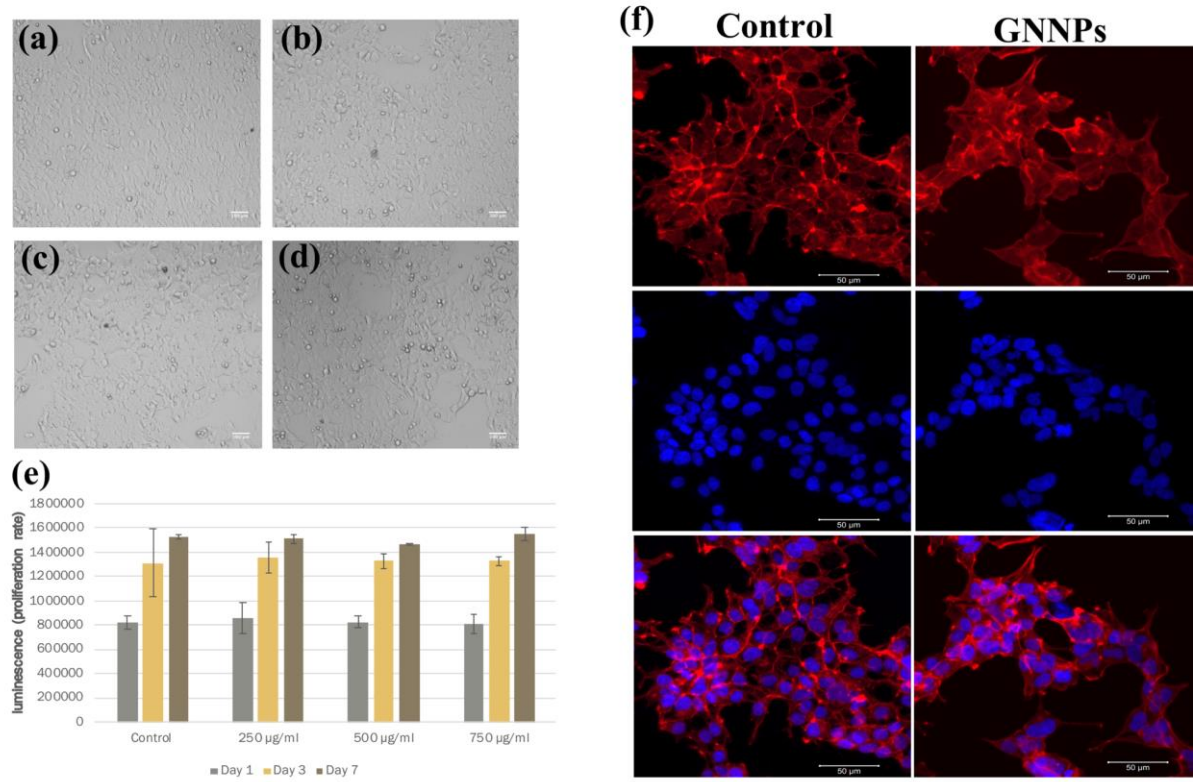

Figure S4. Cell toxicity and proliferation in 2D culture. (a-d) Bright field microscopy images of HEK cells in 2D culture after one day of culture at varying GVNP concentrations (a: control, b: 250 µg/mL, c: 500 µg/mL, d: 750 µg/mL). (e) Cell proliferation rate of HEK cells in 2D culture after different time points. (f) Cell morphology of HEK cells in 2D showing actin in red and nucleus in blue for cells with 750 µg/mL of GVNPs and without GVNPs.