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Zwitterionic Starch-Based Hydrogel for the Expansion and “Stemness” Maintenance of Brown Adipose Derived Stem Cells

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ABSTRACT: Brown adipose derived stem cells (BADSCs) have become a promising stem cell treatment candidate for myocardial infarction because of their efficiently spontaneous differentiation capacity towards cardiomyocytes. The lack of existing cell passage protocols motivates us to develop a neotype 3D cell expansion technique for BADSCs. In this study, “clickable” zwitterionic starch based hydrogels are developed using methacrylate modified sulfobetaine derived starch with dithiol-functionalized poly (ethylene glycol) as crosslinker *via* the “thiol-ene” Michael addition reaction. Moreover, CGRGDS peptide is immobilized into the hydrogel via a similar “clickable” approach. Their Young’s moduli range from 22.28 to 74.81 kPa depending on the concentration of precursor solutions. Excellent anti-fouling property is also presented owing to the introduction of zwitterionic moieties. BADSCs are homogeneously encapsulated in the hydrogels and then routinely cultured for 10 days. Results suggest a capacious

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