

Fabricating Multi-Compartmental Hydrogel Microparticles for Biochemical Applications

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The multi-compartmentalized hydrogel microparticle has got interest in many research areas, possessing multi-functionality in the one single particle. Compartmentalized particles have been predominantly fabricated by microfluidic or electrohydrodynamic processes which require complex instrument. Here, we fabricated compartmentalized hydrogel microparticle by simple method with well-defined region by combining electrospinning and hydrogel photopatterning. The shapes of the hydrogel microparticles and sizes of each compartment were independently controlled by photomask shape and electrospinning time. Concept experiments were done including sequential protein release and protein binding assay. Microparticle with capacity of independently releasing two growth factors, bFGF and BMP-2 was obtained utilizing nanofibers with different degradation time. Anti-IgG and anti-IgM were bound to IgG and IgM which attached on nanofiber inside hydrogel, demonstrated by fluorescence.