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Self-Regenerating, Vascularizing Hybrid Scaffold-Hydrogel For Bone Tissue Engineering

Authors : Alisha Gupta

Abstract : Osteoarthritis (OA) is the most common form of arthritis which is a degenerative joint disease causing joints to begin to break down and underlying bones to change. This “wear and tear” most frequently affects hands, hips, and knees. This is important because OA pain is considered to be a leading cause of mobility impairment in older adults, with hip and knee OA ranked 11th highest contributors to global disability. Bone tissue engineering utilizing polymer scaffolds and hydrogels is an emerging field for treating osteoarthritis. Polymer scaffolds provide a three-dimensional structure for tissue growth, and hydrogels can be used to deliver drugs and growth factors. The combination of the two materials creates a hybrid structure that can better withstand physiological and mechanical demands while also providing a more controlled environment for drug and nutrient delivery. I think using bone tissue engineering for making scaffold-hydrogel composites that are self-regenerating and vascularizing might be useful in solving this problem. Successful implementation can reconstruct healthy, simulated bone tissue on deficient applicants.

Keywords : tissue engineering, regenerative medicine, scaffold-hydrogel composites, osteoarthritis
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