

عنوان مقاله:

Available "D-printed Biomolecule-Loaded Alginate-Based Scaffolds for Cartilage Tissue Engineering Applications: A Review on Current Status and Future Prospective

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نویسندگان:

Afsaneh Jahani - Faculty of New Sciences and Technologies, Department of Biotechnology, Semnan University, Semnan, Iran

Mohammad Sadegh Nourbakhsh - Faculty of Materials and Metallurgical Engineering, Semnan University, Semnan, Iran

Mohammad H. Ebrahimzadeh - "Bone and Joint Research laboratory, Ghaem Hospital, Mashhad University of Medical Science, Mashhad, Iran & Orthopedic Research Center, Department of Orthopedic Surgery, Mashhad University of Medical Science, Mashhad, Iran

Marzieh Mohammadi - Department of Pharmaceutics, School of Pharmacy, Mashhad University of Medical Science, Mashhad, Iran

Davood Yari - Department of Clinical Biochemistry, Babol University of Medical Science, Babol, Iran

Ali Moradi PhD - F Orthopedic Research Center, Department of Orthopedic Surgery, Mashhad University of Medical Science, Mashhad, Iran- Y Clinical Research Development Unit, Ghaem Hospital, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran

خلاصه مقاله:

Osteoarthritis (OA) can arise from various factor including trauma, overuse, as well as degeneration resulting from age or disease. The specific treatment options will vary based on the severity of the condition, and the affected joints. Some common treatments for OA include lifestyle modifications, medications, physical therapy, surgery and tissue engineering (TE). For cartilage tissue engineering (CTE), three-dimension (WD) scaffolds are made of biocompatible natural polymers, which allow for the regeneration of new cartilage tissue. An ideal scaffold should possess biological and mechanical properties that closely resemble those of the cartilage tissue, and lead to improved functional of knee. These scaffolds are specifically engineered to serve as replacements for damaged and provide support to the knee joint. WD -bioprinted scaffolds are made of biocompatible materials natural polymers, which allow for the regeneration of new cartilage. The utilization of WD bioprinting method has emerged as a novel approach for fabricating scaffolds with optimal properties for CTE applications. This method enables the creation of scaffolds that closely mimic the native cartilage in terms of mechanical characteristics and biological functionality. Alginate, that has the capability to fabricate a cartilage replacement customized for each individual patient. This polymer exhibits hydrophilicity, biocompatibility, and biodegradability, along with shear -thinning properties. These unique properties enable alginate to be utilized as a bio-ink for WD bioprinting method. Furthermore, chondrogenesis is the complex process through which cartilage is formed via a series of cellular and molecular signaling. Signaling pathway is as a fundamental mechanism in cart ilage formation, enhanced by the incorporation of biomolecules and growth factors that induce the differentiation of stem cells. Accordingly, ongoing review is focusing to promote of "D bioprinting scaffolds through the utilization of advanced biomolecules-loading of alginate-based that has the capability to fabricate a cartilage replacement tailored specifically to each patient's unique needs and anatomical requirements. Level of evidence: III

کلمات کلیدی:

PD-bioprinted, Alginate, Biomolecule, Cartilage Tissue Engineering, Scaffolds

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