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Editorial

Silk Fibroin in Cartilage Tissue Engineering

TN Santhosh Kumar*, Prasanna T Y, Mohammad Furquan, Siddharth A, Ahima Kalluraya

Department of Orthopaedics, ESIC MC PGIMSR, Bengaluru, Karnataka, India

***Corresponding Author:** TN Santhosh Kumar, Department of Orthopaedics, ESIC MC PGIMSR, Bengaluru, Karnataka, India.

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Silk Fibroin in Cartilage Tissue Engineering We all heard of silk route, the China and India conflict and the pride of Mysuru Silk Lenin. The pretty Bombyx mori will sacrifice its life for the sack of human benefit. Taking into pride of this small creature will see its protein silk fibroin in cartilage regeneration.

The Leading cause of osteoartitis (OA) and disability in clinical is articular cartilage defect a common form of joint injury (Armiento., *et al*. 2018; B. J. Huang, Hu, and Athanasiou 2016). A optimized combination of growth factors, bioscaffolds and bioseeds of cartilage tissue engineering (CTE) is one of the most strategies in regeneration of articular cartilage defect. For articular cartilage repair production of cell based engineered cartilage is a significant research effort. Due to low immunogenicity property, satisfactory proliferation, multipotential differentiation ability the cells abundantly present in joint tissues (i.e. adipose tissue, synovium, synovial fluid and subchondral bone) called mesenchymal stem cells(MSCs) are investigated for cartilage regeneration (Xu., *et al*. 2022). Within the tissue engineered bioscaffolds the regulation of chondrogenic differentiation on the cell source is the focus point of many researchers (Clearly., *et al.* 2015). The addition of fibroblast growth factor (FGF) and transforming growth factor -β3 (TGF-β3) will direct the chondrogenic differentiation of MSCs to achieve favorable differentiations the main manner of CTE. To induce sufficient chondrogenic differentiation the cost of dosage of growth factor is high. (van der Kraan PM and van der Kraan 2017) osteoarthritis (OA) due to the fibrosis of hyaline cartilage by usage of growth factor TGF- β3 in CTE should be taken care (Kim and Mikos 2021). In CTE bioscaffolds to achieve long-term controlled release of growth factors remains a challenge (Dinoro., *et al*. 2019; Ghandforoushan., *et al*. 2022; Liu., *et al*. 2022; Rastogi and Kandasubramanian 2019; Trucco., *et al*. 2021). Hyaluronic acid, alginate, polylactic acid, gelatin, sulfated polysaccharide etc. are chondrogenic inducing biomaterials from which growth factor free CTE bioscaffolds are made, (Cao., *et al*. 2017) by functional-group-modification (-CH3, -OH) chondrogenic inducing property can be further enhanced, (Carthew., *et al*. 2021) and constructing patterned surface topology. Physico-chemical plasticity, sufficient mechanical property, suitable degradation, biocompatibility restrict the usage of this kind of CTE bioscaffolds.

(Sahoo., *et al*. 2023) Food and Drug Administration (FDA) approved natural protein silk fibroin(SF) is extracted from Bombyx mori silkworm cocoon, which displays controllable formability, feasible modification, excellent mechanical properties, in vivo biodegradation, (Z. Zhou., *et al*. 2022) coatings, particles, hydrogels, variety forms of sponges are widely employed in CTE (He., *et al*. 2022; Yao, Wang, and Ding 2021). Changes made in certain substrate topographic structure polydi-methylsiloxane (PDMS) which is micro-surface morphology pattern molds revealed the enhancement of chondrogenic differentiation of MSCs.

The effects of topologic design on the chondroegenic differentiation, proliferation and adhesion of human adiposederived stem cells (hADSCs) are checked by modification of SF films based on P280-P7000 type specification sandpapers with gradient microscopic surface patterns. The cell sized convex dots with diameter 3-50 μm will be on SF films. hADSCs represents distinct cellular morphology on the surface of SF films were found to adhere and proliferate well. hADSCs had different differentiation tendency on transcriptomics analysis on the SF films, higher expression of chondrogenic markers Sox-9 and Col-II, with activated yes 2X are seen in which hADSCs on P1000 SF films.