Investigation of cartilage tissue engineering and influential growth factors in its reconstruction procedure

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Abstract

Aim: To fabricate mature cartilages provided for implantation, developmental biological processes and proteins should be known and employed.

Methods: A systems biology study on all protein-coding genes participating in cartilage regeneration resulted in a network graph with 11 nodes and 28 edges. Gene ontology and centrality analysis were performed based on the degree index.

Results: The four most crucial biological processes along with the seven most interactive proteins involved in cartilage regeneration, were identified. Some proteins, which are under severe discussion in cartilage developmental or disease processes, are included in regeneration.

Conclusion: Findings positively correlate with the literature, approving the use of the four most impressive proteins as growth factors applicable to cartilage tissue engineering, including COL2A1, SOX9, CTGF, and TGFβ1.

Keywords

Cartilage tissue engineering, Systems biology, Chondrocyte growth factor, PPI network, Regenerative medicine.