

2018 IEEE EMBS Conference on Biomedical Engineering and Sciences, IECBES 2018 - Proceedings
24 January 2019, Article number 08626712, Pages 500-504
2018 IEEE EMBS Conference on Biomedical Engineering and Sciences, IECBES 2018; Borneo Convention Centre KuchingDemak-Isthmus Bridge, Jalan Keruing, SejingkatKuching; Malaysia; 3 December 2018 through 6 December 2018; Category numberCFP1826K-ART; Code 144644

Evaluation of cartilaginous extracellular matrix production in in vitro “cell-scaffold” construct (Conference Paper)

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Abstract

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This study aims to evaluate the cartilaginous extracellular matrix (ECM) production in in vitro poly(lactic-co-glycolic acid) PLGA-based scaffolds seeded with rabbit chondrocytes. Scaffolds with the size of 7mm (diameter) × 3mm (height) using ratio of 65:35 were formed using solvent-casting and salt leaching method. The scaffolds were divided into four respective groups, 1) PLGA- atelocollagen-fibrin (PAF), 2) PLGA- atelocollagen (PA), 3) PLGA-fibrin (PF), and 4) PLGA (control). Gross morphology of the scaffold was observed for 3 weeks. Microscopy evaluation and histological staining was done using Haematoxylin and Eosin (H&E), Safranin O, Alcian Blue, Toluidine Blue for week 1, 2 and 3, respectively. The production of sulphated glycosaminoglycan (sGAG) was evaluated using Alcian Blue assay. The PAF group presented better cartilaginous appearance compared to other groups. The hybrid scaffold groups showed more ECM secretion indicated by the presence of web-like fibers network substance on the surface as visualized using scanning electron microscope (SEM). The presence of proteoglycan-rich matrix and glycosaminoglycan has been detected in both histological staining and sGAG assay. Based on the findings of this study, PLGA-based hybrid scaffold promoted better cartilaginous tissue formation in vitro. © 2018 IEEE.

SciVal Topic Prominence

Topic: Chondrocytes | Cartilage | tissue-engineered cartilage

Prominence percentile: 82.170

Author keywords

Atelocollagen Chondrocytes Extracellular matrix Fibrin PLGA Tissue engineering

Indexed keywords

Engineering controlled terms: Body fluids Organic polymers Scanning electron microscopy Tissue Tissue engineering

Engineering uncontrolled terms: Atelocollagen Chondrocytes Extracellular matrices Fibrin PLGA

Engineering main heading: Scaffolds (biology)

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ISBN: 978-153862471-5

Source Type: Conference Proceeding

Original language: English

DOI: 10.1109/IECBES.2018.08626712

Document Type: Conference Paper

Sponsors: Physiological Measurement, Sarawak Convention Bureau

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