

# **Bio-composite Material for Tissue Engineering-Challenges and Prospects**

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## **ABSTRACT**

The developments of 3D scaffold from a wide variety of biopolymers have been considered as an important and key challenge in tissue engineering field. The bioactivity of these materials can be improved through the modification of their structure and changing the composition. This change in bioactivity modulates cell behaviour with respect to shape movement, proliferation and differentiation of cells seeded on the scaffold. Therefore efforts are being given to prepare nanoporous and nanofibrous composite constructs for tissue repair and regeneration. However, the detail study is required to assess the influence of various composite matrices on cell morphology, differentiation and function to make scaffold suitable for a particular tissue engineering application. The composite biopolymers should be characterised based on the cross-linking between polymers, ultra structure, overall matrix integrity and mechanical benefits. The use of filler is another significant factor in the design of scaffold which required to be investigated. The main function of the fillers is to increase the elastic constants, mechanical strength and structural integrity of the scaffold. There is also need to address the influence of circulating hydraulic fluids used to evaluate the composite cell scaffold construct under fluid force and their rate of biodegradation.

The keynote lecture will address the above issues including the various types of ideal biopolymers available and their desired characteristics for the development of biocomposite materials (nonporous and nanofibers) for scaffolds, improvement of bioactivity by the surface modification, change of composition and addition of fillers and the influence of fluid flow on the cell-scaffold constructs. The various fabrication techniques for designing composite scaffold such as phase separation, electro spinning and SFF will also be presented.

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