IET Nanobiotechnology

Hindawi

Special Issue on

Applications of Biodegradable Polymeric Nanocomposites in Tissue Engineering

CALL FOR PAPERS

Tissue engineering (TE) focuses on creating biological substitutes that restore, maintain, or improve tissue function using a fundamental understanding of structure-function correlations in normal and sick tissues. TE involves cells grown on scaffolds with bioactive agents to produce three-dimensional live tissues in the laboratory, where the scaffold serves as a house for cellular growth and a supporting structure for the production of new tissue. However, the fabrication of scaffolds with desired physicochemical and biological qualities is the most essential concern in TE. Scaffolds should have biocompatible surfaces with good mechanical characteristics that trigger specific cell responses at the molecular level and elicit specific cell interactions, directing cell attachment, proliferation, differentiation, extracellular matrix synthesis, and organization.

Therefore, selecting biomaterials for the fabrication of the desired scaffolds is critical to the success of TE practice. Conventional single-component polymer materials cannot meet these conditions. Although different polymeric materials are available and have been studied for TE, no single biodegradable polymer can meet all scaffold requirements. As a result, designing and preparing multi-component polymer systems is a promising technique for developing new multifunctional nanocomposite biomaterials (scaffolds) for TE, which includes the use of natural and synthetic biodegradable polymers combined with metal nanoparticles, carbon-based nanostructures, and hydroxyapatite particles as filler materials. The incorporation of nanocomposites could result in superior mechanical characteristics, more predictable degradation rates, and exceptional biocompatible properties, dramatically increasing cell adhesion, proliferation, and differentiation.

The core functional subunits of cells and tissues are defined at the nanoscale. As a result, the convergence of nanotechnology and biology can address various biological issues while revolutionizing healthcare and medicine. However, large-scale commercial production of polymeric nanocomposites is a key problem because of the complicated construction procedures required. In addition to manufacturing complexity, the selection of an appropriate fabrication technique must also be considered. Therefore, this Special Issue will focus on amalgamation of various techniques comprising polymeric nanocomposites and TE approaches. We invite authors to contribute original articles or comprehensive reviews.

Potential topics include but are not limited to the following:

- Polymer matrices for bionanocomposites
- Fabrication technology for bionanocomposites
- Characterization of biodegradable nanobiocomposites for TE applications
- Functionalization of scaffolding biomaterials with natural substances/bio-extracts
- Stem cell–bionanocomposite interactions and tissue regeneration
- Nanobiocomposites in drug delivery systems
- Polymeric nanocomposite for bone regeneration
- Polymeric nanocomposite for cartilage regeneration
- Polymeric nanocomposite for wound healing applications
- Polymeric nanocomposite for muscle regeneration
- Polymeric nanocomposite for nerve regeneration

Authors can submit their manuscripts through the Manuscript Tracking System at https://review.wiley.com/submit?specialIssue=406907.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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