Title of thematic issue: REGENERATIVE MEDICINE AND TISSUE ENGINEERING

Aim and Scope

Currently, the transplant crisis is one of the biggest concerns in the healthcare systems worldwide, the lack of organs and donors being reported as a critical problem in the past decades. Therefore, there is an urgent need of in-vitro development of functional tissues and organs to be implanted in the host which has gained a lot of attention in the regenerative medicine field.

Thus, tissue engineering has remarkably evolved in the last years, different approaches being investigated at both soft and hard tissue levels in order to produce tissues and organs which can uptake the critical transplant crisis and treat various diseases, including cancer. One aspect which must be considered in the development process is the improvement at structural level. Therefore, many biomaterials have been exploited in different combinations in order to direct the differentiation of stems cells into a specific phenotype or to promote the proliferation and spread of a specific cellular type (for instance osteoblasts, fibroblasts etc.). Moreover, it has been demonstrated by various scientists that the production method is very important in controlling the cellular behavior.

Therefore, additive manufacturing techniques (3D printing) are now used in designing and manufacturing a proper scaffold because of its advantages such as the strict control of sizes, shapes, rugosity, porosity or other parameters and even the use of bioinks in the printing process. However, improvements can be made at the surface level as well. Physical, chemical and even biological modifications are being exploited in order to promote the mechanotransduction phenomena which aims to enrich the interactions between the material used for scaffold fabrication and integrins. Integrins are cellular receptors which sense and transfer a specific stimulus (mechanical or chemical) to the nucleus as a biological signal.

Biomimetic scaffold which can mimic the native extracellular matrices have been developed by many research groups in order to improve the cell-scaffold interactions and to reach a new level of biocompatibility. These recent developments in the tissue construction area have lead to the idea that organ fabrication can be possible by using the available production techniques in combination with cells and growth factors to restore the function of an affected organ and even to increase the transplantation rate. Combining all those parameters together with the human body’s potential to heal in a proper environment, many products can be developed in order to diagnose and treat critical diseases from an early stage and to undertake the biggest crisis reported at the moment.

The aim of this special issue is to present the latest updates in the field.

Keywords: regenerative medicine; tissue engineering, 3D printing, bioinks, scaffolds, etc.

Subtopics

1. Innovative biomaterials in bone tissue engineering; 2. Hydrogel-based scaffolds for cartilage regeneration; 3. Induced contraction of cardiomiocytes by tissue engineered products;
4. Chemical surface modification of scaffolds for different purposes; 5. Physical surface modification strategies; 6. Biological attachment of biomolecules on scaffolds for fast integration
7. Improved cellular activity without growth factors; 8. Stragetic design of scaffolds for tissue restoration; 9. 3D printing in tissue engineering.

Schedule

Manuscript submission deadline: October 1st, 2018
Peer Review Due: November 10th, 2018
Revision Due: December 10th, 2018
Announcement of acceptance by the Guest Editors: December 20th, 2018
Final manuscripts due: January 15th, 2019
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