EuroSciCon

EuroSciCon Joint Events on

Plant Science, Tissue Engineering and Parasitology

December 03-04, 2018
Amsterdam, Netherlands

Tomas Riedel et al., Int J Appl Sci Res Rev 2018, Volume: 5
DOI: 10.21767/2394-9988-C2-005

BIOACTIVE FIBRIN COATINGS FOR CARDIOVASCULAR TISSUE ENGINEERING

Tomas Riedel, Johanka Kucerova, Zuzana Riedelova and Eduard Brynda

Institute of Macromolecular Chemistry-Czech Academy of Sciences, Czech Republic

Fibrin is a versatile biopolymer that can be used in various tissue engineering applications for its biocompatibility and biodegradability (e.g. bone, cartilage, skin, vascular, nervous, muscle tissue engineering etc.). Here, we present a method of cardiovascular scaffold surface modification with fibrin nanostructures, prepared using a technique based on the catalytic effect of fibrin-bound thrombin. This technique enables surface-attached thin fibrin networks to form with precisely regulated morphology without the development of fibrin gel in bulk solution. This technique can be applied on virtually any substrate. In addition, these fibrin networks were post-functionalized with various bioactive molecules (such as fibronectin, laminin, collagen, VEGF, and bFGF). Biofunctionalization of fibrin with extracellular matrix proteins and growth factors increased attachment, proliferation and differentiation of endothelial cells seeded on the fibrin surface and lead to formation of homogenous endothelial monolayer. Furthermore, covalent attachment of heparin to the fibrin nanostructures reduced thrombogenicity of the fibrin coating. It is envisioned that these nanostructures can be used for surface modification of various artificial biomaterials designed for different biomedical applications (e.g. artificial vessels, stents, hear valves, bone and cartilage constructs, skin grafts, etc.) in order to promote the therapeutic outcome.

Biography

Tomas Riedel has completed his PhD in Biochemistry from the Institute of Hematology and Blood Transfusion in Prague in 2011. Currently, he works as a Research Fellow at the Institute of Macromolecular Chemistry. His research focuses on the interactions at the interface between synthetic materials and blood. The results of his work are being applied in biomaterial coating (e.g. for cardiovascular surgery) and label-free sensing of biomarkers of clinical interest in blood plasma and serum. He has published more than 52 papers in impacted international journals.

riedel@imc.cas.cz