

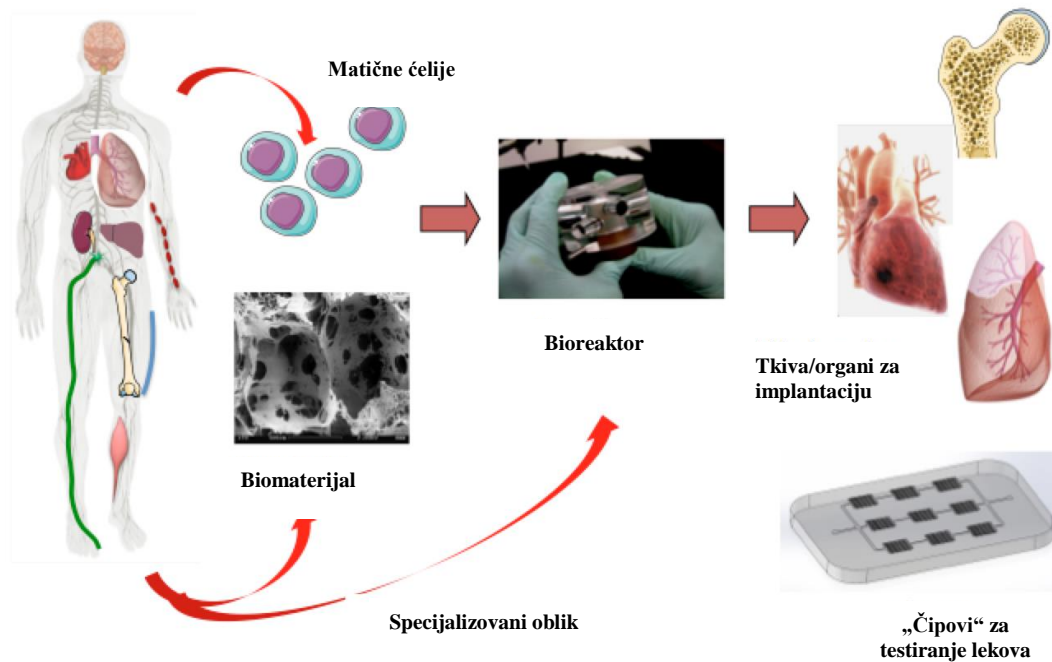
University of Novi Sad
DOCTOR HONORIS CAUSA OF THE UNIVERSITY OF NOVI SAD

Inauguration Speech
TISSUE ENGINEERING FOR MEDICAL APPLICATIONS

- Abstract -

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We live longer and better than ever before in the history of humankind. The needs for regenerating our tissues and organs lost to injury or disease, and for personalized treatment options for the patients in need are constantly growing. Tissue engineering provides replacements of native tissues grown from the patient's own stem cells, with the precise anatomical shape, structure and functionality of the parent tissue.



This talk will focus on recent developments in tissue engineering, an area of interest for my laboratory for over 25 years, that has great potential for medicine. The fundamental principle of tissue engineering, depicted above, is quite simple. Adult stem cells isolated from a small sample of the patient's blood are cultured in a biomaterial scaffold designed to recapitulate the shape, structure, composition and functionality of the native tissue matrix, in a bioreactor designed to provide environmental control and tissue-specific signaling. This way, the stem cells are induced to perform their normal biological functions, in laboratory as in our body. Engineered tissues are tailored to serve the needs of transplantation and regenerative medicine. Alternatively, micro-scaled tissue constructs are connected by vascular perfusion in "organs on a chip" platforms used in disease modeling and drug testing. The application of tissue engineering in these two key areas will be illustrated by a set of examples. Professor Vunjak-Novaković will also talk about her students from Serbia and America. Finally, Professor Vunjak-Novaković will talk about the patents and entrepreneurship, and the challenges we encounter when translating the scientific discovery into the clinical practice.