PROCEEDINGS

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PROSPECTS IN MECHANICAL ENGINEERING

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53rd Internationales Wissenschaftliches Kolloquium
Technische Universität Ilmenau
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H. Witte / M. Hoffmann / K. Liefeith / M. Schnabelrauch / K. Jandt

ECM Analogous Biointerfaces for Biomedical and Biophysical Applications

THURINGIAN RESEARCH FOCUS

Since 2007, the Thuringian government supports a scientific network in the field of new approaches for functionalized biointerfaces, where structural elements of technical 3D environments will be combined with bioactive material properties. The main focus is directed to the adaptation of these ECM analogous biointerfaces to specific functions as well as to structural and biomechanical properties of natural extracellular matrices. (Project ID: B514-06016)

SCIENTIFIC BACKGROUND

The cultivation of cell populations within three-dimensional environments similar to natural tissue conditions represents one of the most important aspects to preserve cell specific responses during in vitro applications in cell culture testing, biofunctional research or tissue engineering. The structure of the extracellular matrix (ECM) in natural tissues is of prime importance for cell growth and cell differentiation. The engineering of suitable three-dimensional biointerfaces which mimic ECM analogous interfaces lacks freely eligible parameters like geometric microdimensions, 3D structure elements and material properties.

INDIVIDUAL PROJECTS

The spectrum of necessary topics in the development and application-oriented testing of ECM analogous biointerfaces will be covered by four research projects of partners with complementary research activities and expertise:

Institute for Bioprocessing and Analytical Measurement Techniques (iba), Heiligenstadt: Development of ECM analogous 3D biointerfaces for biological and medical applications by laser micro- and nanostructuring using two-photon polymerisation (2PP)

INNOVENT Jena: Synthesis and evaluation of photochemically polymerisable biomaterials for manufacturing of ECM analogous matrices by laser structuring

Friedrich-Schiller University, Jena: Biological functionalization of titanium surfaces to promote the bone growth at implant interfaces

Technical University, Ilmenau: Standardized technical micro environments for the characterization of 3D ECM analogous biointerfaces

The poster presents an overview of the single projects including detailed project goals, research approaches and some preliminary results. Synergetic effects between the expertise of the research partners will establish a powerful cooperation network in Thuringia.
BIOMEMS are of increasing scientific and economic interest as well as an interesting means to demonstrate integrative design in student teaching.

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