INSTITUTE OF TECHNICAL SCIENCES OF SASA
MATERIALS RESEARCH SOCIETY OF SERBIA

Programme and the Book of Abstracts

TWENTIETH YOUNG RESEARCHERS' CONFERENCE MATERIALS SCIENCE AND ENGINEERING

Belgrade, November 30 – December 2, 2022

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Aim of the Conference

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

Topics

Biomaterials
Environmental science
Materials for high-technology applications
Materials for new generation solar cells
Nanostructured materials
New synthesis and processing methods
Theoretical modelling of materials

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Results of the Conference

Beside printed «Programme and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal "Tehnika – Novi Materijali". The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2023.

Sponsors

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Cellular self-assembly in a 3D osteosarcoma culture model based on alginate scaffolds and perfusion bioreactor

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Osteosarcoma is an aggressive bone malignant disease with a high tendency for metastases. Stagnation in the patient survival rate in the last decades correlates to the lack of innovative solutions in anticancer drug development, which is still based on the use of cell monolayers and animal models. Intending to address this issue, our approach is to develop a physiologically relevant 3D*in vitro*osteosarcoma model that would truthfully reflect*in vivo*osteosarcoma cell microenvironment. Our model starts from single cell suspensions seeded onto improved macroporous composite alginate scaffolds (2 wt% alginate, 2 wt% hydroxyapatite) followed by cultivation in a perfusion bioreactor system. Murine osteosarcoma cells (K7M2-wt) were seeded at the density of $15x10^6$ cells per cm^3 of scaffold volume and cultivated for 7 days in perfusion bioreactors (3D Perfuse, Innovation Center of the Faculty of Technology and Metallurgy, Belgrade, Serbia) at the superficial medium velocity of 40 μm/s, while static cultures served as a control. Medium perfusion increased metabolic activity of the cells thus confirming beneficial effects of the enhanced mass transfer in the bioreactors. Additionally, histological analysis of scaffold cross-sections indicated that individual cells spontaneously formed spheroids during the cultivation under both static and perfusion conditions. Still, the spheroids formed in the latter case were more compact with increased amounts of extracellular matrix. Thus, the obtained results indicate potentials of the utilized 3D culture model to mimic the *in vivo* osteosarcoma cell microenvironment and potentially provide a tool for investigation of osteosarcoma cellular self-assembly and tumor development.