NINETEENTH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING

December 1-3, 2021, Belgrade, Serbia

Program and the Book of Abstracts

Materials Research Society of Serbia
&
Institute of Technical Sciences of SASA

2021

Book title:
Nineteenth Young Researchers' Conference - Materials Science and Engineering: Program and the Book of Abstracts

Publisher:
Institute of Technical Sciences of SASA
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Tel: +381-11-2636994, 2185263, http://www.itn.sanu.ac.rs

Conference organizers:
Materials Research Society of Serbia, Belgrade, Serbia
Institute of Technical Sciences of SASA, Belgrade, Serbia

Editor:
Dr. Smilja Marković

Technical Editor:
Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić
Cover: Milica Ševkušić

Printing:
Gama digital centar
Autoput No. 6, 11070 Belgrade, Serbia
Tel: +381-11-6306992, 6306962
http://www.gdc.rs

Publication year: 2021

Print-run:
120 copies

CIP - Каталогизација у публикацији

Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers Conference Materials Sciences and Engineering (19 ; 2021 ; Beograd)
Program ; and the Book of abstracts / Nineteenth Young Researchers' Conference Materials Science and Engineering, December 1-3, 2021, Belgrade, Serbia ; [organized by] Materials Research Society of Serbia & Institute of Technical Sciences of SASA ; [editor Smilja Marković]. - Belgrade : Institute of Technical Sciences of SASA, 2021 (Belgrade : Gama digital centar). - XVIII, 86 str. : ilustr. ; 23 cm

Tiraž 120. - Registar.

ISBN 978-86-80321-36-3

а) Наука о материјалима -- Апстракти б) Технички материјали – Апстракти

COBISS.SR-ID 51231241

2-1

Development of a physiologically relevant 3D *in vitro* model for osteosarcoma cell cultivation comprising alginate composite scaffolds and a perfusion bioreactor system

Ivana Banićević[1], Mia Radonjić[1], Marija Pavlović[1], Milena Milivojević[2], Milena Stevanović[2,3,4], Jasmina Stojkovska[1,5], Bojana Obradović[1]

[1]Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia [2]Institute of Molecular Genetics and Genetic Engineering, University of Belgrade, Belgrade, Serbia, [3]Faculty of Biology, University of Belgrade, Belgrade, Serbia, [4]Serbian Academy of Sciences and Arts, Belgrade, Serbia, [5]InnovationCenter of the Faculty of Technology and Metallurgy, Belgrade, Serbia

Osteosarcoma is the most common type of bone cancer, which affects both children and adults. Treatment of osteosarcoma exhibits slow progress due to inadequacy of both *in vivo* animal models and 2D *in vitro* models regularly used for antitumor drug testing. Our approach is to create a physiologically relevant 3D *in vitro* model for osteosarcoma cell cultivation, which has the potential to overcome inherent weaknesses of 2D *in vitro* and animal models. In order to imitate native osteosarcoma microenvironment, macroporous alginate scaffolds with incorporated hydroxyapatite/β-tricalcium phosphate (HAp/β-TCP) powder were produced with two compositions: 1 wt% alginate, 1 wt% powder and 2 wt.% alginate, 2 wt% powder. Bioactivity and stability of the scaffolds were investigated under biomimetic conditions of continuous flow of the culture medium in perfusion bioreactor at the superficial medium velocity of 400 μm/s, which was reported in literature to be beneficial for osteogenesis. Scaffolds with the higher alginate concentration was shown to be more stable in the culture medium, since the scaffolds with the lower alginate concentration disintegrated after 5-7 days under flow conditions. Biocompatibility of the obtained scaffolds was investigated in short-term cultivation studies of murine osteosarcoma cells K7M2-wt seeded onto the scaffolds. The scaffolds were cultivated in perfusion bioreactors at the superficial flow velocity of 15 μm/s, while static cultures served as a control. After cultivation, osteosarcoma cells remained adhered to the scaffold surface, expressed metabolic activity and retained their initial proliferation ability while the flow was shown to positively affect the cultivated cells.