

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

Author: Mr. Dawid Przystupski
Wroclaw Medical University, Poland, dawid.przystupski@gmail.com

Ms. Agata Górska
University of Wrocław(UWr), Poland, agata.gorska2@uwr.edu.pl

Dr. Olga Michel
Wroclaw Medical University, Poland, michel.olga.maria@gmail.com

Dr. Agnieszka Podwin
Wroclaw University of Science and Technology, Poland, agnieszka.podwin@pwr.edu.pl

Dr. Patrycja Śniadek
Wroclaw University of Science and Technology, Poland, patrycja.sniadek@pwr.edu.pl

Mr. Radosław Łapczyński
Poland, r.lapczynski@satrevolution.com

Prof. Jolanta Sączko
Wroclaw Medical University, Poland, jolanta.saczko@umw.edu.pl

Prof. Julita Kulbacka
Wroclaw Medical University, Poland, julita.kulbacka@umw.edu.pl

TESTING LAB-ON-A-CHIP TECHNOLOGY FOR CULTURING HUMAN CANCER CELLS UNDER
SIMULATED MICROGRAVITY

Abstract

The dynamic development of the space industry makes space flights more accessible and opens up new opportunities for biological research to better understand cell physiology under real microgravity. Whereas specialized studies in space remain out of our reach, preliminary experiments can be performed on Earth under simulated microgravity (sg). Based on this concept, we used a 3D-clinostat (3D-C) to analyze the effect of short exposure to sg on human keratinocytes HaCaT and melanoma cells A375 cultured on all-glass Lab-on-a-Chip (LOC). Our preliminary studies included viability evaluation, mitochondrial and caspase activity, and proliferation assay, enabling us to determine the effect of sg on human cells. By comparing the results concerning cells cultured on LOCs and standard culture dishes, we were able to confirm the biocompatibility of all-glass LOCs and their potential application in microgravity research on selected human cell lines. Our studies revealed that human melanoma and ovarian cancer cells are susceptible to simulated microgravity; however, we observed an increased caspase activity and a decrease of proliferation in cancer cells cultured on LOCs in comparison to standard cell cultures. These results are an excellent basis to conduct further research on the possible application of LOCs systems in cancer research in space.