

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Life and Physical Sciences under reduced Gravity (7)

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PLAN.A - RESEARCH ON STIMULATION EFFECT ON BONE CELL CULTURE IN THE
LONG-TERM MICROGRAVITY CONDITIONS BY UTILIZING THE LAB-ON-CHIP DEVICES**Abstract**

The Plan.A project was created as a candidate for 2020 *OrbitYouThesis!* Programme which is organized by the European Space Agency. The scientific group engages students from diverse Polish Universities. Close cooperation between Wrocław University of Science and Technology (WUST, the leader), Gdańsk University of Technology (GUT), Wrocław Medical University (WMU) and University of Zielona Góra (UZ) – the scientific units of different activity profiles, ensures implementation of multidisciplinary and innovative research. The major objective of the project is to develop a 1U rocket payload to examine the effect of microgravity on the human cell cultures of bone cell lines (osteoblasts). The main focus of the works lies in the design and fabrication, in the volume defined in the competition (*IceCube*), of a miniaturized, remotely controlled laboratory unit, basing on the use of analytical microsystem techniques. The miniaturized laboratory, so-called lab-on-chip device, will allow creating special culturing microenvironments (optimal temperature, uniform lighting, and gas/liquid flow, etc.) and conducting long-term studies (at least 11 days) of the bone cell culture lines. Additionally, data analysis of the biological sample images through the optical detection system will be conducted. On that basis, the evaluation of population development and cells' morphological characterization will be done. As it has been mentioned, the proposed experiment will cover the investigation of the microgravity influence on the osteoblasts culture. One of the research innovation here will be the use of special culture stimulants, which in the Earth conditions increase the number of osteoblasts and the secretion of non-collagen bone proteins. It is highly anticipated that these stimulants will sustain and even boost the proliferation of the osteoblasts colony in the microgravity as well. However, any other behaviour of the cells to be observed will be scientifically interesting. As the vast majority of information about the influence of microgravity on the bone cells comes from research carried out onboard the ISS, this could be a great occasion to experiment on that topic using this facility.