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

Author: Ms. Eleonora Vestito
Sapienza University of Rome, Italy, vestitoeleonora@gmail.com

Mr. Giorgio Bagolan
Sapienza University of Rome, Italy, giorgio.bagolan@gmail.com
Mr. Gianluca Cocirla
Sapienza University of Rome, Italy, g.cocirla@outlook.it
Ms. Federica Del Prete
Sapienza University of Rome, Italy, federica_delprete@outlook.it
Mr. Angelo Fabbrizi
Sapienza University of Rome, Italy, angelo.fabbrizi@yahoo.it
Mr. Pierluigi Federici
Sapienza University of Rome, Italy, pigifed@gmail.com
Mr. Emanuele Neri
Sapienza University of Rome, Italy, emanueleneri@live.it
Ms. Maria Giulia Pancalli
Sapienza University of Rome, Italy, mgpancalli@gmail.com
Mr. Alessio Piergiacomo
University of Rome "La Sapienza", Italy, piergiacomo.1694024@studenti.uniroma1.it
Mr. Maurizio Renda
Sapienza University of Rome, Italy, mauriziorenda92@gmail.com
Mr. Federico Curianò
Sapienza University of Rome, Italy, fcuriano@gmail.com
Mr. Paolo Marzioli
Sapienza University of Rome, Italy, paolo.marzioli@uniroma1.it
Dr. Barbara Bellei
Italy, barbara.bellei@ifo.gov.it
Dr. Daniela Kovacs
Italy, daniela.kovacs@ifo.gov.it
Dr. Mauro Picardo
Italy, mauro.picardo@ifo.gov.it
Prof. Fabio Santoni
Sapienza University of Rome, Italy, fabio.santoni@uniroma1.it

EXPERIMENTAL INVESTIGATION ON THE EFFECT OF MICROGRAVITY AND IMMUNOTHERAPY IN MELANOMA CELLS: MARGE EXPERIMENT

Abstract

MARGE (Melanoma Apoptosis Reduced Gravity Experiment) is an experiment proposed for an orbital platform that aims at testing the combined effect of microgravity and target therapies on melanoma cells. The experiment is based on recent studies that prove that microgravity can induce apoptosis in

cancerous cells. MARGE aims at testing melanoma cells in microgravity conditions in combination with pharmacological treatment using check point inhibitors to evaluate the mechanisms underlying the biological modifications of the cells to identify adjunctive therapeutic targets. The experiment is structured as an autonomous small-scale cell culture laboratory containing the samples suspended in culture inside flasks. It will be internally divided by an insulation panel in order to maintain two different temperatures for the whole duration of the experiment in orbit: one set to guarantee the optimal growth of the cells (37C) and one to preserve the drugs (4C). The samples will be maintained in culture by providing nutrients, oxygen and regulating PH, temperature and humidity through a hydraulic and heating system. The cellular growth will be monitored through a turbidimetric analysis performed by a portable spectrometer. The experiment will be replicated on ground in normal gravity conditions. After the retrieval of the samples a post flight analysis will be conducted to compare the results achieved in orbit with the ones on ground. The facility will be compliant to Ice Cubes requirements and will be approximately the size of a 6U CubeSat. The idea has been conceived in late 2019 by a group of Aerospace Engineering and Medicine students from Sapienza University of Rome, supported by the S5Lab (Space Systems and Space Surveillance Laboratory) and the Laboratory of Cutaneous Physiopathology of the San Gallicano Dermatological Institute (IFO), in Rome, Italy. In this paper the features of the MARGE experiment will be described through the mission objectives, the outline of the on-board system, together with an analysis on the compliance of the system with the launcher and hosting facility requirements. The expected results and outcome from the experiment will be discussed together with the future perspectives.