

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Biology in Space (7)

Author: Dr. Chantal Cappelletti
G.A.U.S.S. Srl, Italy, chantal.cappelletti@gmail.com

Dr. Angelo Notarangelo
Servizi di Genetica Medica , Italy, a.notarangelo@operapadrepio.it
Dr. Darrin De Moss
Morehead State University, United States, da.demoss@moreheadstate.edu

STUDY OF GLIOBLASTOMA CANCER CELLS BEHAVIOUR INSIDE SPACE SHUTTLE

Abstract

Space biology is a pretty new discipline, which deals with the reactions of living organisms to the usual conditions of a space flight, namely microgravity and cosmic radiations exposition. Different space research centers and institutions spend a lot of efforts to investigate the effects of the ionizing radiation on the crews and it is known that an high level of ionizing radiations increases the incidence of cancer and birth of anomalies. Since 2009 GAUSS group is involved in a joint collaboration with Morehead State University (MSU) Space Science Center and Istituto di Genetica Medica Casa Sollievo della Sofferenza (ICRSS) with the aim to design a biomedical project to investigate if the combined effects of microgravity conditions and ionizing radiation increase or decrease the survival rate of cancer cells. The biological sample consists of Glioblastoma cancer cells, a kind of cancer that can be treated after surgery only by radiotherapy using ionizing radiation. This treatment, anyway, results in a very low survival rate. This project uses different university space platforms: a CubeLab, named GlioLab, on board the International Space Station and the university microsatellite UniSat-5 designed by GAUSS. A GlioLab/GlioSat precursor experiment has already flown two times with the Space Shuttle during the missions STS-134 and STS-135. The phase 0 or the precursor of GlioLab uses a COTS system, named Liquid Mixing Apparatus (LMA), to board the biological samples inside the Space Shuttle for thirty days . The LMA allows to board liquids inside a vial but is not equipped with environment control system. After landing the samples were investigated by researchers at IRCSS in Italy and at MSU in Kentucky. This paper deals with the results obtained during the STS-134 and STS-135 missions and with the new evidences on the behavior of this kind of cancer. In particular the results obtained on the DNA analysis give a confirmation of the original idea of GLioLab/Gliosat project justifying the development of the two systems.