

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Virtual Presentations - IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (VP)

Author: Ms. Anisha Saha
R V College of Engineering, Bengaluru, India

Mr. A Avinash Prabhu
R V College of Engineering, Bengaluru, India

EFFECTS OF SIMULATED MICROGRAVITY ON MAMMALIAN FERTILIZATION AND
EMBRYONIC STEM CELLS**Abstract**

Spaceflights have adverse effects on mammals such as bone loss, skeletal muscle atrophy, cardiovascular problems, immune system dysregulation, alteration of sleep etc. Most of these above mentioned problems are due to effects of microgravity at cellular level. Studies have revealed that mammalian cells are sensitive to microgravity environment. If the embryonic development itself is carried out in microgravity, or if the stem cells are cultured in microgravity, then what are the differences in these circumstances, is the aim of our study. This paper deals with the study of effects of simulated microgravity (SMG) on mammalian (example- mouse) fertilization and in-vitro preimplantation embryonic development. The objective is to investigate whether gravity is required for in-vitro fertilization or not. The morphology of embryos cultured was assessed in different conditions. The fertilized numbers in this case and embryonic numbers at morula and blastocyst stages was recorded. The other objective of this paper is to study various effects (including cell proliferation, cell differentiation, cell adhesion, and apoptosis) of SMG on mouse embryonic stem (mES) cells. Mouse ES cells cultured under SMG reduced the total cell number compared with cells cultured under 1 g gravity (1G) condition. This paper compares significant differences between SMG and 1G culture conditions in all the above mentioned effects. This study will help in coming up with the idea of cryopreservation of the stem cells, the male and female gametes before fusion during long spaceflights so that the fusion of gametes and further studies on stem cells and its development in space can be carried out safely.