BioMed Research International

Special Issue on

The Genomic Effects of Microgravity on Living Systems

CALL FOR PAPERS

The new genomics revolution, led by next-generation sequencing technologies, is transforming biological research. Researchers around the world are using next-generation sequencing systems to drive genetic analysis at a rate never before possible. Data quality is increasing exponentially, as costs decrease exponentially. Space scientists can capture, curate, store, search, share, transfer, analyze, and visualize spaceflight data sets on an unprecedented scale. By studying the genomics of life sciences in space and ground based microgravity simulations, we seek to answer the most basic questions about life on Earth and help keep astronauts safe as they undergo long-duration spaceflight. The question is not whether there are changes in space. Space induces well-documented changes such as radiation damage, bone and muscle loss, immunity changes, and vestibular effects. The question is whether there is a specific unique genomic pattern which can be characterized during spaceflight or its ground based simulations using biological systems from single cells, cell aggregates, simple multicellular organisms, plants, tissues, and vertebrates. Can understanding basic metabolic processes induced by spaceflight and their underlying mechanisms guide the development of new therapeutic products and materials back on Earth?

This special issue aims to define the current basis for a unique genomic signature in space and the role of genomics in translational applications of space based biomedical investigations. This includes flight derived data and data from ground based microgravity simulations

Potential topics include, but are not limited to:

- Can currently available ground based genomic databases provide comparators to identify unique genomic signatures in space?
- Given the multifactorial stimuli in space, what are the best controls to utilize?
- Are the tradeoffs of genomic sampling to optimize statistical power different in the space based environment?
- Which earth-bound responses are mimicked when organisms respond to stimuli in space, or are there unique sets of space based genomic pathways?
- Transcriptional patterns and molecular signaling networks change as biology responds to spaceflight; will this lead to new products, materials, and therapeutics?
- How is the microbiome altered during spaceflight?
- How does real or simulated microgravity affect bacteria, viruses, fungi, and plants? (biological systems to be emphasized include *Salmonella typhimurium, Staphylococcus aureus, Klebsiella pneumonia, Candida albicans, Enterococcus faecalis, Escherichia coli, Proteus mirabilis, Pseudomonas aeruginosa*, *Varicella,* EB virus, HIV, hepatitis, *Caenorhabditis elegans, Camellia sinensis, Arabidopsis thaliana, and Saccharomyces cerevisiae*; cell studies include osteocytes, fibroblasts, hepatocytes, renal cells, pancreatic Islets, both skeletal and cardiac myocytes, and neurons)
- Can findings from spaceflight and its ground based simulations translate to terrestrial commercial activity?

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/bmri/genetics/gmls/.

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