

## Nasa Grant Proposal Abstract

One of the most common adverse health effects astronauts experience in space is significant loss in bone density, which is caused by the minimal weight that is borne on the hips and spine in zero-gravity environments (1) . It is important to determine ways in which bone density may be repaired following extensive missions in space. As study in stem cell research continues to rapidly evolve, we may apply these findings to issues such as bone reduction caused by space. The role that stem cells play in bone regeneration is crucial, as they have the ability to regenerate new osteocells for restoration. Mesenchymal stem cells are particularly important for the regrowth of osteoblasts, which are the cells responsible for contributing to bone recreation (2). An experiment will be conducted using a C57VL/6 strain of mice that will require both the control and the experimental group to be exposed to artificial zero-gravity environments. The experimental group will then receive a dose of mesenchymal stem cells intraosseously after significant bone loss is prevalent. In the following month, both the experimental and control groups' bone density will be observed and compared.

## References

- [1] Genah S, Monici M, Morbidelli L. The Effect of Space Travel on Bone Metabolism: Considerations on Today's Major Challenges and Advances in Pharmacology, *National Journal of Molecular Sciences*, 2021
- [2] Arjmand, Babak, et al. Prospect of Stem Cell Therapy and Regenerative Medicine in Osteoporosis. *Frontiers in Endocrinology*, 2020