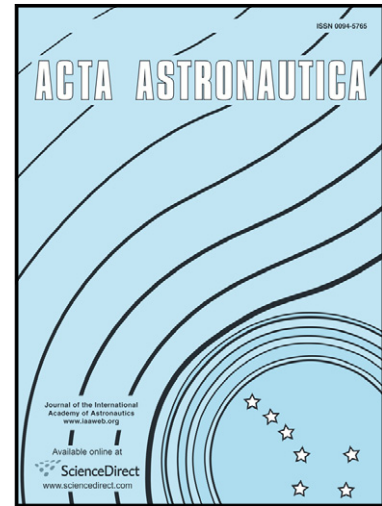


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## Response and Adaptation of Bone Cells to Simulated Microgravity

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### Abstract

Bone loss induced by microgravity during space flight is one of the most deleterious factors on astronaut's health and is mainly attributed to an unbalance in the process of bone remodeling. Studies from the space microgravity have demonstrated that the disruption of bone remodeling is associated with the changes of four main functional bone cells, including osteoblast, osteoclast, osteocyte, and mesenchymal stem cells. For the limited availability, expensive costs and confined experiment conditions for conducting space microgravity studies, the mechanism of bone cells response and adaptation to microgravity is still unclear. Therefore, some ground-based simulated microgravity methods have been developed to investigate the bioeffects of microgravity and the mechanisms. Here, based on our studies and others, we review how bone cells (osteoblasts, osteoclasts, osteocytes and mesenchymal stem cells) respond and adapt to simulated microgravity.

**Key words:** Bone loss; simulated microgravity; bone cells; mechanical sensitive molecules; signaling pathways

### 1. Introduction

All living organisms, including humans, evolve and live on Earth by adapting to Earth normal 1 g gravity environment. Therefore, gravity plays a key role in keeping human normal physiology functions.

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