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Glucocorticoid: a potential role in microgravity-induced bone loss

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Abstract

Exposure of animals and humans to conditions of microgravity, including actual spaceflight and simulated microgravity, results in numerous negative alterations to bone structure and mechanical properties. Although there are abundant researches on bone loss in microgravity, the explicit mechanism is not completely understood. At present, it is widely accepted that the absence of mechanical stimulus plays a predominant role in bone homeostasis disorders in conditions of weightlessness. However, aside from mechanical unloading, nonmechanical factors such as various hormones, cytokines, dietary nutrition, etc. are important as well in microgravity induced bone loss. The stress-induced increase in endogenous glucocorticoid (GC) levels is inevitable in microgravity environments. Moreover, it is well known that GCs have a detrimental effect to bone health at excess concentrations. Therefore, GC plays a potential role in microgravity-induced bone loss. This review summarized several studies and their prospective solutions to this hypothesis.

Keywords

Microgravity; Glucocorticoid; Bone loss

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