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Author: Ms. Varshini GS
R V College of Engineering, Bengaluru, India, gsvarshini.bt21@rvce.edu.in

Ms. Parvathi D Bhat
R V College of Engineering, Bengaluru, India, parvathidbhat.bt21@rvce.edu.in
Ms. Yashvi Tripathi
R V College of Engineering, Bengaluru, India, yashvitripathi.bt21@rvce.edu.in
Mr. Eeshaan Kashid
R V College of Engineering, Bengaluru, India, kashideeshaan@gmail.com
Ms. Sinchana P Kumar
R V College of Engineering, Bengaluru, India, sinchanapkumar.bt20@rvce.edu.in

REGULATION OF LEPTIN SECRETION THROUGH SPACE FOOD OR ORAL AIDS(DRUGS)

Abstract

The microgravity, radiation, ninety-minute light/dark cycles, and other elements of the space environment can cause adaptation reactions in nearly all physiological systems of the human body. These include loss of bone density, electrolyte imbalance, intestinal microecological disorder, muscular atrophy, cardiovascular dysfunction, etc. While exercise and medical support can help with some of these concerns, customized nutrition could help with in-flight adaptation and contribute to overall improved health of astronauts in space. Several studies have found a positive correlation between leptin levels and bone density in both men and women, although the exact nature of this relationship remains unclear. Different studies conducted have revealed that microgravity conditions could also play a major role in the regulation of leptin. Studies done on male rats subjected to hindlimb/tail suspension-unloading(simulated microgravity) along with restricted food conditions showed significant decrease in serum leptin levels. Combined effects of microgravity and decreased food intake during spaceflight can lead to significant decrease in leptin levels in humans as well. The overall mechanism of leptin production, distribution and metabolism under microgravity or similar conditions have not yet been fully understood. Leptin interacts with other factors such as inflammation, insulin resistance, and oxidative stress, which are also known to affect bone metabolism. It has been hypothesized that it could lead to bone loss and have an effect on bone metabolism, which may be among the reasons why astronauts experience a loss in bone density in space. The metabolism of leptin, its receptor mechanism, and its connections to bone metabolism will all be thoroughly researched in this work. The study will assess and analyze the space-related data that is currently available. Regulations to stop osteoclast activity or changes to the signaling pathways will be developed and included into food or oral supplements based on the amounts of leptin secretion.

Thus, the objective of this paper is to study the metabolic pathway of the hormone Leptin and its correlation with bone strength, density, and turnover under microgravity and to combat the pressing issue of reduction in bone mass density by regulating leptin through specialized diets or oral aids(drugs).