

## **Summary of: Increasing the number of unloading/reambulation cycles does not adversely impact body composition and lumbar bone mineral density but reduces tissue sen.pdf**

The research paper investigates the impact of multiple cycles of hindlimb unloading (HLU) and reambulation (RA) on body composition and bone mineral density (BMD) in adult male C57BL/6 mice. Here is a comprehensive summary based on the key findings and results:

**\*\*Methodology:\*\*** - Mice were assigned to control, 1x-HLU, 2x-HLU, and 3x-HLU groups. - Each group underwent HLU for 2 weeks followed by RA for 4 weeks, repeated over 18 weeks. - The final RA period was 4 weeks before sacrifice.

**\*\*Results:\*\*** 1. **\*\*Body Mass:\*\*** - Unloading significantly reduced body mass compared to controls. - The magnitude of this loss diminished with each additional HLU cycle. - Body mass recovered during the final RA period.

2. **\*\*Tissue Composition:\*\*** - Unloading significantly altered abdominal adipose tissue and lean tissue volumes. - Multiple HLU cycles resulted in less change in tissue composition during the final RA period. - The proportion of subcutaneous fat increased relative to controls, but this trend was not significant.

3. **\*\*Muscle Mass:\*\*** - Unloading significantly reduced upper hindlimb muscle cross-sectional area (MCSA). - This reduction was not significantly different from controls during the final RA period.

4. **\*\*Bone Mineral Density (BMD):\*\*** - Unloading significantly reduced lumbar vertebral apparent BMD (vBMD). - Multiple HLU cycles resulted in smaller losses in vBMD. - vBMD recovered after the final RA period.

5. **\*\*Adipose Tissue:\*\*** - Unloading caused significant loss of adipose tissue. - Multiple HLU cycles resulted in less adipose tissue loss during the final RA period. - The relationship between adipose tissue area at the start of HLU and subsequent loss was strongly predictive of adipose tissue changes ( $R^2 = 0.84$ ,  $p < 0.05$ ).

6. **\*\*Lean Tissue:\*\*** - Unloading increased the percentage of lean tissue in the abdomen. - Multiple HLU cycles resulted in smaller increases in abdominal lean tissue ( $R^2 = 0.34$ ,  $p < 0.05$ ).

7. **\*\*Muscle Cross-Sectional Area:\*\*** - Unloading reduced upper hindlimb muscle cross-sectional area.

8. **\*\*Bone Recovery:\*\*** - vBMD recovered after the final RA period, irrespective of the number of HLU/RA cycles.

**\*\*Conclusions:\*\*** - Multiple HLU cycles attenuate the response of fat, muscle, and bone to subsequent loading cycles. - The abdominal region is more resilient to multiple bouts of

unloading and more amenable to recovery during reambulation than peripheral musculoskeletal system. - The magnitude of bone loss diminished during the second and third HLU cycles. - The response of abdominal adipose tissue to HLU was more resilient compared to peripheral lean tissue.