

Iron metabolism regulation in females and males exposed to simulated microgravity: results from the randomized trial AGBRESA

Mathieu Horeau^{1,2}, Martine Ropert^{2,3}, Edwin Mulder⁴, Jens Tank⁴, Petra Frings-Meuthen⁴, Gabriele Armbrrecht⁵, Olivier Loréal^{2#}, Frédéric Derbré^{1#}

¹Laboratory "Movement Sport and Health Sciences" EA7470, University of Rennes/ENS Rennes, France

²INSERM, University of Rennes, INRAE, UMR 1241, and AEM2 platform, Nutrition Metabolisms and Cancer (NuMeCan) institute, Rennes, France

³Department of Biochemistry, CHU Rennes, France

⁴Institute of Aerospace Medicine, German Aerospace Center (DLR), Cologne, Germany.

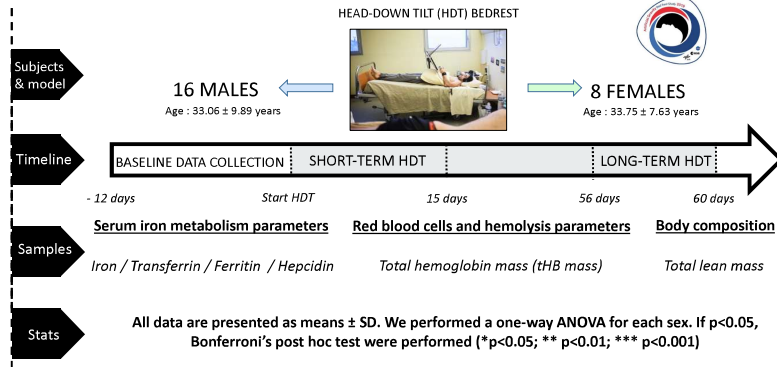
⁵Charité - Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Institute of Radiology, Berlin, Germany.

INTRODUCTION

In **microgravity**, astronauts experience extreme physical inactivity that favors muscle **atrophy**, osteoporosis, and **anemia**. Iron metabolism imbalance could contribute to this physical deconditioning due to its essential role in energy metabolism, cellular respiration, and oxygen transport.

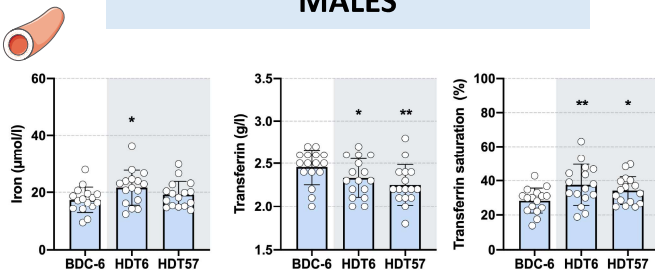
In this clinical study, we aim to determine whether simulated microgravity modulated iron metabolism in male and female healthy participants. We exposed them during **60 days** to head-down tilt (HDT) bed rest, the reference model to explore the effects of extreme physical inactivity and microgravity. We also study **red blood cell** indices and **body lean mass**, erythrocytes, and skeletal muscle fibers containing $\approx 90\%$ body iron store.

MATERIAL AND METHODS



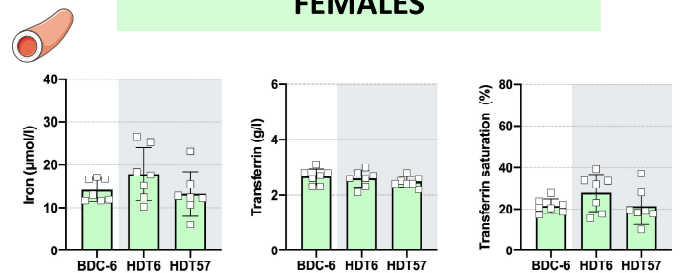
RESULTS AND DISCUSSION

MALES

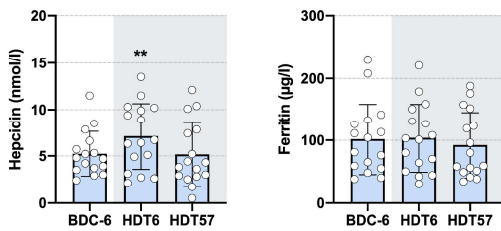


Serum iron availability increases in males after short- and long-term bedrest

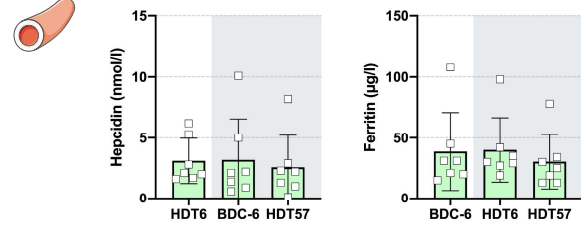
FEMALES



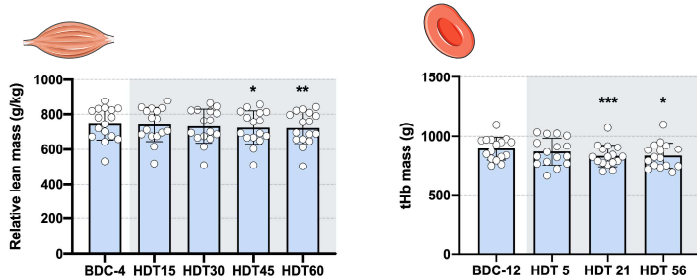
Serum iron availability trends to increase – but not significantly – in females after short-term bedrest



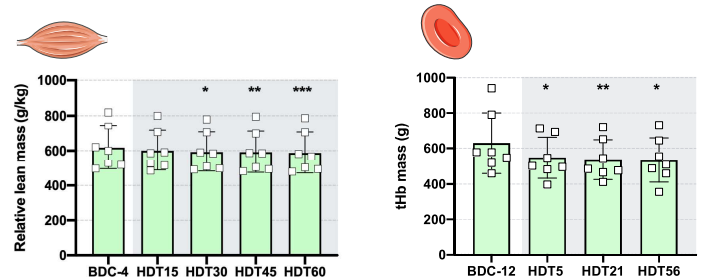
Serum hepcidin level increases after one week of bed rest, and return to baseline values after 2 months. The modulation of iron concentration in serum could be involved.



Bedrest does not affect serum hepcidin levels in females.



Iron released by atrophied skeletal muscle and recycled erythrocytes could contribute to the serum iron availability increase.



Noteworthy, in females, early skeletal muscle atrophy and reduction in total Hb mass are not associated to significant changes in serum iron availability

TAKE HOME MESSAGES

Iron availability in serum increases in males after short- and long-term exposure to simulated microgravity

Skeletal muscle atrophy and reduction in total hemoglobin mass may contribute to iron misdistribution under simulated microgravity

On contrary, females do not exhibit change of iron availability in serum, despite early decrease in muscle and Hb masses

This work was supported by:

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