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Microgravity Experiments from Sub-Orbital to Orbital Platforms (3)

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ASSESSMENT OF THE IMMUNE CELL COUNTING OBTAINED FROM HUMAN PERIPHERAL
BLOOD AFTER A PARABOLIC FLIGHT**Abstract**

One of the biological systems that suffers a physiological de-conditioning in space is the immune system. It is the one in charge of defending the body against pathogens and other aggressions. The aim of this work is to assess if there are any relevant changes in the erythrocytes and immune cell counting and functionality after parabolic flight. This effect has been assessed ex vivo using human peripheral blood, which was drawn from radial vein (n=6 healthy volunteers) with heparin and EDTA. Blood samples were split in two aliquots and maintained in two equal thermal isolated boxes; one stayed on the ground whereas the other one was subjected to parabolic flight. The parabolic flight consisted of 15 parabolas performed with a Mudry CAP-10B acrobatic aircraft. Each parabola consists of 8 seconds of hypogravity preceded and followed by 2 seconds of hypergravity. Any of the parameters measured showed statistically significant differences although some tendencies were found. Altered gravity resulted in increased aggregation of red blood cells, as demonstrated by a decrease in the number of single cells in the condition group. No changes in haemoglobin concentration were observed between groups. Furthermore, functional alterations of the immune cells was evidenced based on a decreased phagocytic activity, whereas reactive oxygen species (ROS) production was increased even in the absence of an experimental triggering stimulus. Although these changes could be associated with hypogravity, other factors such as hypergravity cannot be ruled out. Our findings indicate that, under our experimental setup, there was no significant alteration in leukocyte immunophenotyping and function when using ex vivo blood samples.