

The Effect of Short-and Long-Term Simulated Microgravity on Immune Cells

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Abstract: Long-term space flight will be a major mission for International Space Administration. However, it has been shown that exposure to space flight result in immune system dysfunction. Therefore, understand the mechanism of immune response under microgravity condition is a key topic. Macrophage is one of the most important immune cells in human body, playing key roles in both innate and adaptive immune systems. In this research, we used mouse macrophages (RAW264.7) and collected samples at short-term (8 hour), mediate-term (24 hour) and long-term (48 hour) microgravity treatment. We measured cell proliferation, phagocytosis function and used next-generation sequencing (NGS) to obtain differentially expressed genes (DEG) at each time point and then compared DEG. Both cell proliferation and phagocytosis showed a decline under microgravity condition. The RNA-seq results discovered that the number of DEG was 308 (8h), 49 (24h) and 897 (48h). Through cluster analysis, PCA analysis and comparison between DEG, it revealed that the short-term and long-term microgravity effects on immune cells were different.

Keywords: Microgravity; macrophage; rna-seq; differentially expressed genes; immune function

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