

Weightlessness influences the cytoskeleton and ROS level in SH-SY5Y neuroblastoma cells

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During Spaceflight the nerve system of astronauts was obviously influenced. To investigate how gravity effects nerve system, the SH-SY5Y neuroblastoma cells were taken as research object. By utilizing clinostat and parabolic flight for the model of gravity changing, the level of reactive oxygen species was assayed in different time under simulated microgravity; the cytomorphology and cytoskeleton of SH-SY5Y neuroblastoma cells were also observed after parabolic flight and clinostat by the conventional and the confocal laser scanning microscope. The data showed that ROS level was enhanced and the cytoskeleton was damaged which microfilaments and microtubules were highly disorganized, the cell shape was deteriorated under simulated microgravity, indicating the relativity between the ROS level fluctuating and cytoskeleton changing. It illuminates signal transduction disturbed by oxidative stress also regulates the cytoskeleton changing in SH-SY5Y cells. The results suggest the cytoskeleton which is the receptor for sensing gravity was also regulated by cellular redox state, which clues on the complexity of cell for self-adjusting to gravity changing.