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Title of presentation: The effects of microgravity on the neuronal cytoskeleton

Abstract

During outer space expeditions crew members are exposed to very weak gravitational forces (microgravity). Microgravity induces physiological dysfunction such as cognitive impairment, bone loss, and decreased motor control. However, the cellular mechanisms of microgravity-induced neuronal dysfunction are largely unknown. In neurons, intracellular transport is required for axon outgrowth and synapse formation and maintenance. Transport disruption leads to a decrease in synaptic transmission, along with the inability to clear toxic proteins, causing synaptic loss and neuron death. I hypothesize that in microgravity, intracellular transport is perturbed, leading to neuronal dysfunction. To address this question, I will assess cytoskeletal changes in SH-SY5Y neuronal cells using immunocytochemistry and quantitative image analyses comparing cells that have travelled to the International Space Station with that of ground controls. These experiments are important as they may help identify cellular mechanisms of nervous system dysfunction during extended time in outer space.