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MICROGRAVITY EFFECTS ON BRAIN

Abstract

Microgravity induces inflammatory response and also modulates immune functions, which may increase oxidative stress. Exposure to the microgravity environment induces adverse neurological effects. However, there is little research exploring the etiology of neurological effects of exposure to this environment. To explore this area we evaluated changes in Nuclear Factor kappa B, Activator Protein 1, MAPP kinase and N terminal c-Jun kinase in mouse brain exposed to a simulated microgravity environment using the hindlimb unloading model. BALB/c male mice were randomly assigned to hindlimb unloading group (n=12) and control group (n=12) to simulate a microgravity environment, for 7 days. Changes observed in NF-kB, AP-1 DNA binding, MAPKK and N terminal c-Jun kinase were measured using electrophoretic mobility shift assay (EMSA) and western blot analysis and compared to unexposed brain regions. Hindlimb unloading exposed mice showed significant increases in generated NF-kB, AP-1, MAPKK and Kinase in all regions of the brain exposed to hindlimb unloading as compared to the control brain regions. Results suggest that exposure to simulated microgravity can induce expression of certain transcription factors and protein kinases. This work was supported by funding from NASA URC grant.