To be presented at the 30th Annual Meeting of the Society for Neuroscience, Nov. 4-9, 2000, New Orleans, LA.

EFFECTS OF SPACEFLIGHT ON THE MODULATION OF SHOCK WAVE TRANSMISSION TO THE HEAD DURING LOCOMOTION Ajitkumar P. Mulavara[1], P. Vernon McDonald[1], Helen Cohen*[2], Inessa Kozlovskaya[3], Jacob J. Bloomberg[4] [1]Wyle Life Sciences Inc., Houston, TX, [2]Baylor College of Medicine, Houston, TX, [3]Institute for Biomedical Problems, Moscow, Russia, [4]Life Sciences Research Laboratories, NASA, Johnson Space Center, Houston, TX.

The ability to maintain gaze stability during locomotion requires the normal function and integration of the vestibulo-ocular reflex, vestibulo and cervico-colic reflexes with effective coordination between the trunk and lower limb segments. One hypothesized constraint on the coordination between segments during locomotion is the regulation of energy flow or shock wave transmissions through the body at high impact phases with the support surface. Allowing these excessive transmissions of energy to the head may result in compromised gaze stability during locomotion. The aim of this study was to determine the effects of microgravity adaptation on the transmissibility of shock wave to the head during locomotion. Before and after spaceflight (3-6 months) six subjects walked (6.4 km/h) on a motorized treadmill while fixating their gaze on a centrally located earth-fixed target. Triaxial accelerometers mounted on the shank and the head measured the shock wave transmission through the body during locomotion. During postflight locomotion the peak shock at the shank and the head were significantly reduced, however, the ratio of peak head to shank shock was significantly increased. These results indicate that exposure to spaceflight causes adaptive modifications in the short-latency vestibulospinal head stabilization responses required to compensate for the rapid shocks transmitted to the head during locomotion. *This study was supported by NASA.*