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The Stress Response of Microbes to Altered Gravity Conditions: the case of *Pseudomonas aeruginosa*

Spaceflight induces many changes in both human immune response and microbial virulence. *Pseudomonas aeruginosa* is an opportunistic pathogen that astronauts could encounter in the microgravity environment of spaceflight. Studying *P. aeruginosa* in a modeled microgravity environment will elucidate the underpinnings of the microbial virulence shift seen by other investigators and provide clues as to how organisms adapt to a low shear, microgravity environment. The HARV (high aspect ratio vessel) is a spaceflight-analogue system designed by NASA to create a low shear environment that models microgravity. Rotating the vessel perpendicular to the gravity vector creates the low shear modeled microgravity environment (LSMMG). In previous studies with *P. aeruginosa* and other organisms, it has been shown that bacteria grown under LSMMG have an increased virulence phenotype. Samples were taken from the HARV in both gravity orientations and subjected to 60 minutes of various stressors, including heat shock, acid, ethanol and salt. Bacteria were assessed for stress responses during and after stressed conditions. In addition, qPCR was performed to verify altered gene expression of stress-related genes between the two gravity orientations in order to complement the phenotypic studies. These findings will aid in directing research for the prevention of *P. aeruginosa* infections in astronauts.