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**Select a Discipline:**

Plants

**Are you an Undergraduate or Graduate Student?:**

Neither

**Abstract Title:**

“Moss tolerance of deep space-like ionizing radiation, singular or combined with spaceflight microgravity- preparation for the BRIC-27 experiment to the ISS”.

**Abstract:**

Understanding how terrestrial life perceives and tolerates deep space environments is essential to advancing human space exploration missions and searching for life beyond our solar system. Throughout evolution moss adapted to living in extreme environments from the edge of habitability. Moss inhabits areas with high UVB/UVC photon levels such as polar regions subject to ozone holes, high elevation mountain environments, and sites with elevated ionizing particle levels such as those found at nuclear plant accident sites, atomic bomb test sites or radioactive element-rich regions. We investigate if moss tolerance of ionizing radiation encounter terrestrially extends to resistance to deep space ionizing radiation. We exposed moss to high energy ion beams simulating Galactic Cosmic Ray (GCRSim) and Solar Particle Event (SPESim) (NSRL, BNL) that permeate deep space, and moss was unharmed. We also exposed moss to high doses of gamma rays as released in astrophysical events, and moss survived absorption of extremely high doses. Next, we ask if moss tolerance of deep space-like ionizing radiation observed terrestrially differs from that in other deep space environments. In the upcoming BRIC-27 spaceflight experiment we will sequentially expose Antarctic moss *C.purpureus* to GCRSim and SPESim followed by exposure to spaceflight microgravity and compare gene expression profiles in deep space-like ionizing radiation, singular or combined with spaceflight microgravity. Additionally, we will compare gene expression profiles in spaceflight microgravity, singular or combined with deep space-like ionizing radiation. Hence, BRIC-27 will advance our understanding of the combined effects of both deep space ionizing radiation and microgravity, which may have different and more profound effects on plant physiology and performance than each condition separately.

**Presentation Type Preference:**

Oral

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