

Exploration Biology on the Edge of Space

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After decades of space biology research, much is known about how life can physiologically adapt to sustained microgravity, however, what is still unknown is how life makes the transition from the unit gravity in which it evolved to the novel environment of microgravity and spaceflight. To study those transitions in suborbital vehicles, the exploration tools that were developed for evaluating the effect of orbital spaceflight on biological organisms are being adapted to capture plant molecular responses in the earliest stages of microgravity perception. Preliminary data from drop towers and parabolic flights suggest that signaling molecules are engaged almost immediately, and that a cascade of changes in gene expression likely follows within minutes of the transition to spaceflight. Initial suborbital experiments will lay the foundations for these analyses.