

Quirky circling behavior in mice informs research on humans in space

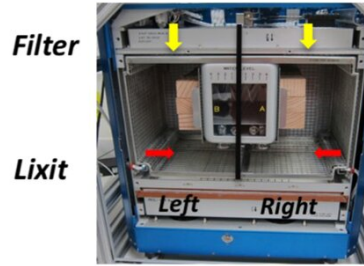
June 12 2024, by Elizabeth E. Keller

a

Rodent Habitat



Dual Housing Areas and Camera Positions



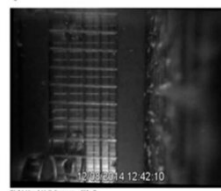
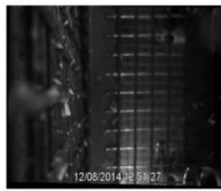
b

Camera Views

Filter



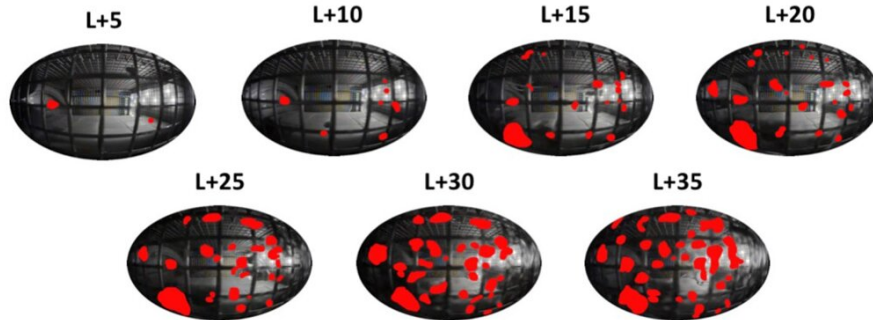
Lixit



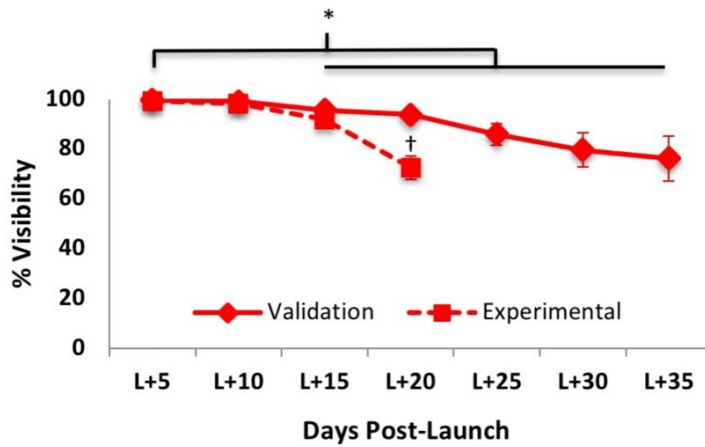
Left

Right

c



d



Rodent habitat (RH), camera views and field visibility. (a) Left. RH unit with two access ports on top. Right. Dual housing areas with two camera positions per compartment shown in 1 g orientation. Each RH is bisected by a grate (depicted by the black vertical line) yielding left and right caging compartments housing five mice per side. Within each compartment, one camera was mounted in close proximity to the waste filter (yellow arrows depict 'Filter' camera), and the other camera in close proximity to the Lixit tubes (red arrows depict 'Lixit' camera) mounted on the water reservoir. (b) Images acquired from corresponding left and right camera locations. (c) Digitized images captured at 5-day intervals beginning on Launch (L) + 5 (first full ISS mission flight day) derived from the right filter view (Validation cohort). Obscured areas colorized in red (Adobe Photoshop CC 2014) represent debris accumulation on the camera lens. Binary images were created, then proportions of obscured versus non-obscured pixels calculated using Image J (<http://rsb.info.nih.gov/ij/>). (d) Percent (mean \pm se) in visibility over time was calculated using Image J (<http://rsb.info.nih.gov/ij/>). On L + 20, the final mission day for Experimental mice, camera visibility for Validation and Experimental mice did not differ statistically from one another, although a trend toward poorer visibility of Experimental relative to Validation mice was observed. Credit: NASA

During the Rodent Research-1 (RR-1) mission flown to the ISS in 2014, videos that were taken to observe the mice revealed an unusual behavior that researchers are still working to understand. Young (16-week-old) but not old (32-week-old) mice engaged in a high level of "running" behavior beginning within two weeks of launch, according to [research](#) in *Scientific Reports* in 2019.

Some alternate interpretations of the running behavior of [mice](#) in orbit include significant scientific literature on the rewarding effects of

physical exercise, as seen in footage of Astronaut Alan Bean on Space Lab. A multi-investigator collaborative team of scientists is conducting follow-up studies on the ground as well as in space on the upcoming Rodent Research-26 [mission](#) to understand more about what could be driving this behavior. Comprehensive and in-depth molecular biology studies will be looking at potential indicators of stress (maladaptive coping) or whether the running [behavior](#) is a beneficial adaptation to the weightlessness of space.

More information: April E. Ronca et al, Behavior of mice aboard the International Space Station, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-40789-y](#)

Provided by NASA

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