

How Water Bears Survive the Void

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Tardigrades, the microscopic invertebrates commonly called water bears, endure near-total desiccation by entering a dormant state called cryptobiosis; when the loss of water drives it, biologists specifically call it anhydrobiosis.

As a water bear dries, it loses roughly 97 percent of its body water and pulls its legs in to form a shrunken, barrel-shaped "tun".

To survive, it floods its cells with the sugar trehalose and with tardigrade-specific intrinsically disordered proteins (TDPs), which vitrify - turn glassy - as the animal dries, cradling proteins and membranes so they do not shatter.

In 2007, in an experiment known as TARDIS aboard the European FOTON-M3 satellite, tardigrades were carried into low Earth orbit and exposed directly to the vacuum of space and the Sun's unfiltered ultraviolet radiation; some survived the vacuum, and a number of those also survived the radiation and went on to reproduce after returning to Earth.

A dried tun can wait for years, and rehydration revives it within minutes to hours.

-- Continued reporting in the Meridian Gazette science desk.