

# Leech has a remarkably high tolerance to freezing and thawing

March 3 2014, by Aaron L. Gronstal

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Stereoscopic micrograph of *Ozobranchus jantseanus* (dorsal view). *O. jantseanus* is a parasitic leech of freshwater turtles. Credit: Suzuki et al. 2014

Imagine you're a leech, happily making a living on a turtle in some quiet, freshwater pond. What do you do when winter comes and temperatures

in your warm little habitat begins to dip below freezing?

In a recent study, a team of researchers discovered that the leech, *Ozobranchus jantseanus*, has a remarkably high tolerance to freezing and thawing. Scientists once thought that it would be difficult for organisms to survive at temperatures below freezing because the water inside cells and tissues forms ice crystals, and this can ultimately damage the cells beyond repair.

In the new study, *O. jantseanus* survived after being stored for 24 hours in [liquid nitrogen](#) at temperatures of  $-196^{\circ}\text{C}$ . The leech also recovered after being stored for 32 months at  $-90^{\circ}\text{C}$ , and repeated freeze-thaw cycles at temperatures that fluctuated between from  $20^{\circ}\text{C}$  to  $-100^{\circ}\text{C}$ .

*O. jantseanus* has shown incredible adaptability, and its unique mechanisms for dealing with the cold allows it to survive in a much wider range of temperatures than previously documented in other organisms.

According to the paper by Suzuki et al., "All of the individuals had been active before initiating the experiments, indicating that this cryoresistance ability is always present in *O. jantseanus*."

Studying how life adapts to adverse conditions, such as high and low [temperature](#) environments, is an important aspect of astrobiology research. If life survives on planets and moons like Mars and Europa, organisms will have to cope with environmental conditions that are often far more extreme than those found in habitats on Earth. Cryobiosis is a term used to describe adaptations or tolerance of [freezing](#), and could be an important survival strategy for potential life in cold environments, such as beneath the icy shell of Jupiter's moon Europa.

**More information:** Suzuki D, Miyamoto T, Kikawada T, Watanabe

M, Suzuki T (2014) "A Leech Capable of Surviving Exposure to Extremely Low Temperatures." *PLoS ONE* 9(1): e86807. [DOI: 10.1371/journal.pone.0086807](https://doi.org/10.1371/journal.pone.0086807)

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