

Low temperature increases risk of DNA damage from UV radiation

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Ultraviolet (UV) radiation exposure can cause DNA damage and may be one of the contributing factors in the global amphibian extinction crisis. New research from Prof Craig Franklin and a team of researchers from The University of Queensland, Australia shows how tadpoles living at low temperatures are more at risk of DNA damage than previously thought.

"We found that [low temperatures](#) hinder the effectiveness of the DNA repair mechanisms," says Prof Franklin, "this may explain why frogs that live at high altitudes and cooler temperatures appear to be more susceptible to the harmful effects of UV radiation."

"High energy UV-B radiation 'attacks' DNA and causes lesions between base pairs," explains Prof Franklin, "if these lesions are not repaired, they can interrupt replication of the DNA and result in mutations or cell death."

Amphibians are currently facing a global crisis with many threats to their survival, including increasing exposure to harmful UV-B radiation. When DNA is damaged by UV-B radiation, dedicated enzymes will attempt to repair the damage. However, it was previously unclear how temperature might affect the ability of these enzymes to repair the DNA damage caused by UV radiation.

In a controlled laboratory setting, Prof Franklin and his team simulated the environmental conditions during summer to investigate the

interacting relationship between temperature and UV-B radiation on the ability of the frogs to repair their DNA.

The species examined in the study, the common striped marsh frog, is a common resident in Brisbane, Australia. "We had shown with previous studies that this species is very susceptible to UV-B radiation," says Prof Franklin, "we work on the larvae as they are active during the day and live mostly in shallow water, exposing them to more sunlight than the adults."

Prof Franklin adds that amphibian populations living at high-altitude and cooler temperatures are most at risk from UV-related DNA damage: "These are some of the environments where we have seen some of the big declines in frog populations since the formation of the ozone hole in the early 1980s."

Prof Franklin believes that identifying the causal factors of [amphibian declines](#), especially those driven by human activity, is the first step to protecting them. For holidaying humans however, Prof Franklin suggests a simpler solution for preventing DNA damage: "keep out of the direct sun during summer!"

Provided by Society for Experimental Biology

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