Harmful substances impacting tiger snakes across Perth, study finds

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Credit: Damian Lettoof

New research has found tiger snakes in Perth's urban wetlands are accumulating high levels of chemical substances from ingesting PFAS (per- and polyfluoroalkyl substances), impacting the venomous reptiles' overall health.

The research, jointly led by Curtin University, Australia's National

Science Agency CSIRO and the Department of Water and Environmental Regulation, tested tiger snake livers to better understand the impact of PFAS, which is commonly found in non-stick cookware, food packaging and firefighting foam.

They found that the muscle function, body tone and energy levels of tiger snakes were impacted. The study is published in the journal *Science of The Total Environment*.

Lead researcher Dr. Damian Lettoof, from Curtin's School of Molecular and Life Sciences and CSIRO's Environmental Systems Biology Team, said the study was one of the first to investigate the impact of PFAS on wild snakes across the globe.

"Our findings suggest that tiger snakes in Perth's urban wetlands, including Herdsman Lake and Lake Joondalup, are ingesting these harmful chemicals and are noticeably skinnier and appear sickly, compared to healthy tiger snakes. They are also experiencing poor muscle and body tone, as well as decreased energy levels," Dr. Lettoof said.

"As a top predator, tiger snakes get most of their pollution exposure from the animals they eat, which means that frogs, birds and lizards in these wetlands may also be accumulating PFAS and need to be tested.

"Further research is needed to fully assess if PFAS exposure on these tiger snakes is affecting their survival, but this research has given us an insight into how these harmful chemicals could be impacting the snakes bodies' normal pathways and energy level functions."

Most people in Australia—and in many other countries—are likely to have very low levels of PFAS in their bodies, through exposure to everyday household items like carpet and upholstery protective sprays,

cosmetics, sunscreens, and some non-stick cookware.

Dr. Lettoof said the findings may be useful for local and state governments to help improve the regulation of these products and limit their exposure on Western Australian wildlife.

"Concerns about the health impacts of PFAS exposure have led to some governments regulating or banning PFAS, and some companies phasing out these chemicals from their products," Dr. Lettoof said.

"The most common PFAS chemical we found in tiger snakes was PFOS, or perfluorooctanesulfonic acid, which was used in firefighting foam until it was banned in the early 2000s. However, PFAS remain present in many products and are very resistant to degrading in the environment, where they can persist for decades and accumulate in animals.

"While previous studies on animals and humans have shown adverse effects of chronic PFAS exposure on the liver, immune function and thyroid hormones, further research is needed to understand the full impact of this and if reptiles respond the same way."

More information: D.C. Lettoof et al, Bioaccumulation and metabolic impact of environmental PFAS residue on wild-caught urban wetland tiger snakes (Notechis scutatus), *Science of The Total Environment* (2023). DOI: 10.1016/j.scitotenv.2023.165260

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