Lead-resistant lizards in New Orleans could hold clues to combating lead poisoning

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Tulane researchers found brown anole lizards in New Orleans have record-high blood-lead levels, yet tests of balance, speed and endurance revealed no impairments typically caused by lead exposure. (Photo by Wayne Wang)

New research from Tulane University found that brown anole lizards in New Orleans carry the highest blood-lead levels ever recorded in a vertebrate — amounts that would be lethal to most other animals — yet they appear unaffected.

The study, published this month in *Environmental Research*, found that the lizards' blood lead levels exceeded all previously reported values for fish, amphibians, birds, reptiles and mammals.

"What's astonishing is that these lizards aren't just surviving, they're thriving with lead burden that would be catastrophic for most other animals," said study author Alex Gunderson, assistant professor of ecology and evolutionary biology in Tulane's School of Science and Engineering.

Lead is a pervasive environmental pollutant with severe health impacts, especially in urban settings. The research underscores the lingering legacy of lead contamination in New Orleans and the complex ways organisms adapt — or fail to adapt — to polluted environments.

The brown anoles are an invasive species originally from the Caribbean. They've been in New Orleans since at least the 1990s, but their population has increased over the last 20 years, and they are now more common than the green anole, which is a native species.

PhD student Annelise Blanchette and Gunderson led the study and discovered that the lizards could withstand lead levels about 10 times higher than the already extreme concentrations found in the field before showing any decline in performance.

Tests measured traits such as balance, sprint speed and endurance — abilities commonly impaired by lead exposure.

"These animals are performing at full capacity despite record-setting lead levels, making them one of the most, if not the most, lead-tolerant animals known to science," Blanchette said.

Transcriptomic analyses of the animals' brain and liver tissue showed only minor effects from lead exposure, although several altered genes were linked to metal ion regulation and oxygen transport.

The findings raise new questions about how the reptiles survive such toxic exposure and whether those mechanisms could someday inform treatments for humans and other wildlife.

“We need to reevaluate what we know about toxicity thresholds in vertebrates,” Gunderson said. “If we can figure out what’s protecting them, we might uncover strategies that could help mitigate heavy metal poisoning in people and other species.”

While this study does not suggest humans can develop the same resistance as these lizards, the discovery of such extreme lead levels in a vertebrate highlights the persistent presence of lead in the environment and the urgent need to reduce exposure in people, particularly in communities where contamination remains widespread.

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