

The first gene-encoded amphibian toxin isolated

August 17 2009



Tree frog *Hyla annectans*, from which the novel anntoxin was isolated. Credit: Lai Ren

Researchers in China have discovered the first protein-based toxin in an amphibian - a 60 amino acid neurotoxin found in the skin of a Chinese tree frog. This finding may help shed more light into both the evolution of amphibians and the evolution of poison.

While gene-encoded [protein](#) toxins have been identified in many vertebrate animals, including fish, reptiles and mammals, none have yet been found in amphibians or birds. In the case of poisonous amphibians, like the tropical poison dart frogs, their toxins are usually small chemicals like alkaloids that are extracted from insects and secreted onto the animal's skin.

Therefore, Ren Lai and colleagues were surprised to find a protein toxin while examining the secretions of the [tree frog](#) *Hyla annectans*. They then purified and characterized this new toxin, which they called anntoxin.

In protein sequence and structure, anntoxin was very similar to dendrotoxins (the venoms found in cobras and other mamba snakes) and cone snail toxins, though anntoxin only has two disulfide bridges (a strong link that helps keep proteins folded) compared to three in the other types. The slight differences may account for why anntoxin does not block [potassium channels](#) as the other venoms do, but rather [sodium channels](#) important for signaling in sensory nerves.

Like these other venoms, though, anntoxin is fast-acting and potent; the researchers found it could produce rapid convulsions, paralysis and respiratory distress in several would-be predators like snakes and birds.

The similarities and differences make anntoxin a very valuable protein for further study, considering amphibians' special niche as the animals bridging the evolutionary land-water gap.

More information: [Journal of Biological Chemistry](#), "The first gene-encoded [amphibian](#) neurotoxin" by Dewen You, Jing Hong, Mingqiang Rong, Haining Yu, Songping Liang, Yufang Ma, Hailong Yang, Jing Wu, Donghai Lin and Ren Lai;
www.jbc.org/cgi/content/abstract/284/33/22079

Source: American Society for Biochemistry and Molecular Biology

Citation: The first gene-encoded amphibian toxin isolated (2009, August 17) retrieved 10 April 2024 from <https://phys.org/news/2009-08-gene-encoded-amphibian-toxin-isolated.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.