

New venom discovery from deadly cone snails

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Adult *Conus magus* cone snail eating fish. Credit: Institute for Molecular Bioscience, University of Queensland

University of Queensland researchers have reared deadly cone snails in a laboratory aquarium for the first time, uncovering a potential treasure trove of new venoms for drug development. The findings are published in the journal *Nature Communications*.

Professor Richard Lewis, Dr. Aymeric Rogalski and Dr. Himaya

Siddhihalu Wickrama Hewage from UQ's Institute for Molecular Bioscience study venoms as therapeutics, and discovered crucial differences across the lifecycle of the tiny carnivorous marine species.

Professor Lewis said they found variations in the *Conus magus* diet, behavior and toxicity. "Juvenile cone snails use a different cocktail of venoms than adult snails to kill their prey," Professor Lewis said.

"This is a rich and unexplored group of molecules that we can now examine as potential leads for drugs.

"A lot of our success with venom molecules has been in developing pain medications, but depending on the pharmacology we'll see if it has therapeutic potential for any of the disease classes."

The researchers were also surprised to find juvenile cone snails didn't feed on fish like the adults of the species.

"The [juveniles](#) would only eat polychaete worms, which they catch using a specific hunting technique we named 'sting and stalk,'" Professor Lewis said.

"They jab the worm with a harpoon-like structure before injecting it with venom to subdue it.

"The juvenile snail then slowly stalks the worm and sucks it up, like a small piece of spaghetti."

During the larvae stage, cone snails feed on a type of microalgae, with their diet changing after their metamorphosis into half-millimeter-long juveniles.

Professor Lewis said researchers around the world have studied adult

marine cone snails and their deadly [venom](#), but little had been known about their early life stages.

"This is because their eggs, larvae and juveniles are so hard to find and difficult to rear in an aquarium," he said.

"Dr. Rogalski took up the challenge during his Ph.D., establishing very elaborate aquaculture studies to find out how and what each stage of the snail ate."

The researchers now have a sustainable system in which they can rear [cone snails](#) in a [controlled environment](#), enabling studies of the life cycle and venoms of the juveniles.

More information: Aymeric Rogalski et al, Coordinated adaptations define the ontogenetic shift from worm- to fish-hunting in a venomous cone snail, *Nature Communications* (2023). [DOI: 10.1038/s41467-023-38924-5](#)

Provided by University of Queensland

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