Cone snails have multiple venoms, research shows

27 March 2014

Cone snails change " weapons " depending on whether they are hunting or defending themselves, University of Queensland researchers have discovered.

The discovery provides insight into the evolution of venomous animals and could lead to new treatments for chronic pain in humans.

UQ Institute for Molecular Bioscience (IMB) lead researcher Professor Richard Lewis said his team found cone snails could rapidly switch between distinct venoms depending on how they were stimulated.

" Most venomous animals are thought to inject the same combination of venom toxins for both hunting prey and defending themselves from predators, " Professor Lewis said.

" The species *Conus geographus*, commonly known as the geography cone, is a common but deadly cone snail with high levels of paralytic toxins that can block muscle nerves and potentially kill humans.

" We found that the geography cone only injects this lethal venom when it feels threatened and acts in defence.

" However, when hunting prey such as fish, they inject a less powerful and complex venom that isn ' t toxic to humans, effectively switching weapons to match the situation. "

The team made the discovery by encouraging geography cones to hunt and sting prey such as a fish in a low-level threat environment, and also by imitating a predator in a threatening environment to encourage it to release a defensive sting.

In both cases, the researchers were able to collect the resulting venom for investigation.

The venoms were then analysed using advanced mass spectrometry techniques, which revealed that the defensive and predatory venoms were quite distinct and were produced in different regions of the snail ' s venom gland.

Professor Lewis said it was the first time anyone had been able to prove a venomous animal used different venoms for hunting prey and defending themselves from predators.

" It ' s a remarkable adaptation that we found was widely evolved across fish and mollusc-hunting cone snails, and even ancient worm-hunting cone snails, but whether this finding extends to other venomous animals such as snakes and spiders remains to be seen, " Professor Lewis said.

" In a practical sense, it provides a route to search for new venom toxins that act on human nerves and could be developed into treatments for chronic pain.

" We can now start to investigate how these predatory and defensive venoms are produced and regulated, and use these findings to target those toxins with direct therapeutic potential. "

The study is published in the scientific journal *Nature Communications* and was supported by the National Health and Medical Research Council, the Australian Research Council, The University of Queensland and the Institute for Molecular Bioscience.

Contact: Gemma Ward, IMB Communications, g.ward1@uq.edu.au, +61 7 3346 2155, 0439 651 107.

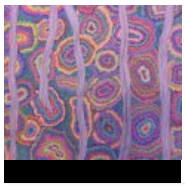
SCIENCE

Supersized black hole found in ultra small galaxy 18 September 2014

South east Australia most prone to tsunami threats along eastern coast 27 August 2014

Climate change not so global 4 August 2014

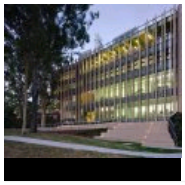
ARTS + SOCIETY, SCIENCE



Art meets science in the Queensland outback 17 September 2014

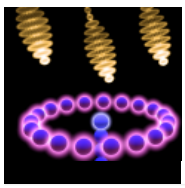
HEALTH + MEDICINE, SCIENCE

Research helps identify memory molecules 2 September 2014



UQ ’s Centre for Advanced Imaging officially opened 21 August 2014

ENGINEERING + TECHNOLOGY, RESOURCES + ENERGY, SCIENCE



Physicists pursue the power of light 22 August 2014

ENVIRONMENT + SUSTAINABILITY, RESEARCH, SCIENCE

Prickly prediction issue plagues Great Barrier Reef 15 August 2014

AGRICULTURE + FOOD, SCIENCE, EVENTS

Science meets beer and barbecues for Queensland launch 11 August 2014

RECENT HEADLINES

- UQ ’s social science strengths recognised 19 September 2014

- UQ researchers scoop Scopus awards 19 September 2014
-  Bird brains more precise than humans ’ 19 September 2014
-  Supersized black hole found in ultra small galaxy 18 September 2014

More headlines

Ghosts of 2003: US, Australia and allies face tough choices in Iraq
9 September 2014

Intelligence inheritance – three genes that add to your IQ score
9 September 2014

Does Singld Out, a gene-based dating service, pass the sniff test?
9 September 2014

Three misguided beliefs of the Group of Eight universities
12 September 2014

Soap: a sexy night on the tiles at the Brisbane Festival
15 September 2014

Read more UQ articles on The Conversation

Brisbane St Lucia, QLD 4072
+61 7 3365 1111
Other Campuses: UQ Ipswich, UQ Gatton, UQ Herston
Maps and Directions

A MEMBER OF

Authorised by: Director, Office of Marketing and Communications
ABN: 63 942 912 684
CRICOS Provider No: 00025B

QUICK LINKS
- For Media
- Emergency Contact

SOCIAL MEDIA

NEED HELP?

EMERGENCY
3365 3333

EXPLORE
- Giving to UQ
- Faculties & Divisions
- UQ Jobs
- UQ Contacts
- Services & Facilities
- Login