Medical Xpress

Spider venom strikes a blow against childhood epilepsy

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A devastating form of childhood epilepsy that is resistant to traditional drugs may have met its match in spider venom.

Researchers from The University of Queensland and the Florey Institute of Neuroscience and Mental Health discovered that a peptide in spider venom can restore the neural deficiencies that trigger seizures associated with Dravet syndrome.

UQ Institute for Molecular Bioscience (IMB) Professor Glenn King said the study in mice could be an important step towards better therapeutic strategies for the rare and life-threatening type of epilepsy developed by children in their first year of life.

"About 80 per cent of Dravet syndrome cases are caused by a mutation in a gene called SCN1A," Professor King said.

"When this gene doesn't work as it should, sodium channels in the brain which regulate brain activity do not function correctly.

"In our studies, the peptide from spider venom was able to target the specific channels affected by Dravet, restoring the function of the brain neurons and eliminating seizures."

Professor King said the discovery, made in collaboration with The Florey's Professor Steven Petrou, was the latest to demonstrate the unique effectiveness of spider venom in treating nervous system disorders.

"Spiders kill their prey through venom compounds that target the nervous system, unlike snakes for example, whose venom targets the cardiovascular system," he said.

"Millions of years of evolution have refined spider venom to specifically target certain ion channels, without causing side effects on others, and drugs derived from spider venoms retain this accuracy."

"This latest finding may help develop precision medicines for treatment of Dravet syndrome epilepsy, which has been difficult to treat effectively with existing seizure medication."

The research, published in the *Proceedings of the National Academy of Sciences* of the United States of America, was supported by organisations including Citizens United for Research in Epilepsy, the Australian Research Council and the National Health and Medical Research Council.

Research in Professor King's lab at UQ is focused on development of venom-derived pharmaceuticals to treat epilepsy, chronic pain and stroke.

His lab maintains the most extensive collection of venoms in the world, which includes venoms from more than 600 species of venomous spiders, scorpions, centipedes and assassin bugs.

More information: Kay L. Richards et al. Selective NaV1.1 activation rescues Dravet syndrome mice from seizures and premature death, *Proceedings of the National Academy of Sciences* (2018). DOI: 10.1073/pnas.1804764115

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