THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Venom vital to stroke survival

Faster action to protect stroke patients from brain death and damage

Every year, stroke claims six million lives worldwide. Five million survivors are left with a permanent disability.

In Australia a stroke happens every nine minutes.

In each victim, two million neurons die every minute once the stroke starts.

Four-and-a-half hours is the current window to give the only available stroke drug. In this time, the patient must get to a hospital, be scanned and be with a specialist ready to administer it.

For most Australians living in remote locations, the chances of making this window are slim.

The numbers are scary. Right now, there are no drugs available to first-responders that will protect the brain from stroke-induced injury.

The accidental discovery by Professor Glenn King that the world's most dangerous spider could quickly halt brain cell death is now the most promising hope in stroke treatment.

Transforming the treatment of stroke to minimise its impact

Scientists from UQ's Institute for Molecular Bioscience and Monash University's Biomedicine Discovery Institute are developing a compound from a molecule found in deadly funnel web spider venom.

Unlike lizards and snakes, spider venom attacks the nervous system to disable its prey, rather than the cardiovascular system. Funnel-web venom has more than 3,000 components, making it the most complex chemical arsenal in the natural world.

Professor King's team discovered the molecule by chance while sequencing the DNA encoding toxins in *Hadronyche infensa* spider venom.

They noticed its appearance to be similar to another brain cell-protecting chemical.

The molecule (Hi1a) was so intriguing they synthesised the compound to test its powers. What the researchers then discovered was that a single dose of Hi1a administered two hours after stroke reduced brain damage by 80 per cent. After eight hours, damage was still reduced by about 65 per cent.

Impact and outcomes

The most promising aspect of this potential drug is the speed with which it could slow the degradation of brain cells. If it could be administered in an ambulance without the need of a brain scan, fatality rates would fall and survivors of stroke would experience far better outcomes because of minimised brain damage.

We aim to develop a fast treatment for stroke patients that limits the brain damage and disability caused by this devastating injury.

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Researcher profile

Professor Glenn King

NHMRC Principal Research Fellow Professor Glenn King is a biochemist and structural biologist whose primary focus is on developing drugs to treat three pervasive nervous system disorders: chronic pain, epilepsy, and stroke.

In particular, he translates venom-derived peptides into human drugs and bioinsecticides. His lab maintains the most extensive collection of venoms in the world, from more than 650 species of spiders, scorpions, centipedes and assassin bugs.

He was initially interested in cancer, but his fascination with venom began when he was asked to analyse a toxin found in the venom of Australia's lethal funnel-web spider. The work led to elucidation of the toxin's function and eventually changed his research focus.

Although Professor King won't claim to having a favourite source of venom, he does admit to a soft spot for the Australian funnel-web spider, because it has repeatedly shown potential to yield eco-friendly insecticides and human therapeutics.

Your opportunity to support game changing research at IMB

Together, our greatest days lie ahead.

Here are just a few ways that giving to UQ's Institute for Molecular Bioscience research can support our drive to develop this life-saving stroke treatment.

$2,500	Supplies vital scientific materials for continuing investigations into the therapeutic potential of venoms.
$10,000	Contributes to production of enough venom peptide to run the next stage of preclinical trials.
$50,000	Funds further research to ascertain if the compound could work in all cases of stroke, including those caused by haemorrhage as well as by arterial clots.
$100,000	Fast-tracks this promising stroke therapy towards clinical trials and its availability to first-responders.

We welcome your suggestions for other ways to support IMB's research and help accelerate the translation of discoveries into hope for stroke survivors and their families.

For more information contact:

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"Imagine watching every second, of every minute, of every hour tick by in the back of an ambulance on a dusty outback road to the nearest major hospital.

Imagine knowing that your loved one's brain function—their memories of you, your family, your life—and their ability to breathe and move is slipping away.

So many Australian families have been impacted by stroke, including my own. Having a drug that could be administered in rural locations and protect the brain would be life-changing."

Professor Glenn King

Institute for Molecular Bioscience

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