

# Snakes and ladders - Taipan venom in the fight against heart failure

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A venom compound from the world's deadliest snake, the Taipan, is being developed by Brisbane biotechnology company ElaCor, as a new drug to treat heart failure.

Congestive heart failure (CHF) claims the lives of over 3,000 Australians each year with a further 300,000 people affected by the disease.

The project's principal researcher, University of Queensland's Institute for Molecular Bioscience's Professor Paul Alewood, said current treatments for CHF had serious side effects and rarely combated the progression of the disease.

"The team has isolated a unique set of active molecules from Taipan venom and research shows they are extremely effective at easing the heart's workload," he said.

"Not only are these molecules very effective, tests have shown that they are also extremely stable, which is an attractive feature for new drugs.

"The human body naturally produces similar types of molecules in response to heart failure but these break down too quickly to have a lasting effect, making them inappropriate as a long term treatment," he said.

CHF is an often-fatal disease in which the heart is weakened and lacks the strength to adequately pump blood around the body.

ElaCor was recently awarded a \$250,000 AusIndustry Biotechnology Innovation Fund Grant enabling optimisation of the molecules to develop a superior drug candidate to treat the multiple symptoms of CHF.

Established by IMBcom, the commercialisation company for UQ's IMB, in collaboration with the Baker Heart Research Institute (BHRI) in Melbourne, ElaCor is the result of an extensive research collaboration between Professor Alewood and Associate Professor Geoff Head from the BHRI.

The BHRI's Head of Commercialisation Ms Tina Rankovic said ElaCor provided a unique opportunity to leverage the skills and synergies of two prestigious Australian research organisations.

“By combining the research expertise from these groups we hope to advance discovery in one of medicine's greatest remaining challenges – preventing heart failure.”

IMBcom CEO Dr Peter Isdale said he was extremely pleased with the development of ElaCor and was gratified the Australian Government remained committed to the development and excellence of Australian science and innovation, by supporting the science of today for the business of tomorrow.

## **FAST FACTS**

### **Congestive Heart Failure (CHF)**

Congestive Heart Failure is currently responsible for at least 3,000 deaths per year in Australia. In America, nearly 5 million people are living with heart failure, and 550,000 new cases are diagnosed each year. This looks set to increase to epidemic proportions due to the aging of

populations in developed countries and the manifestation of the detrimental effects of our sedentary lifestyle.

The term "heart failure" refers to the heart not pumping as well as it should be. Usually the heart has been weakened over time by an underlying problem, such as clogged arteries, high blood pressure, a defect in its muscular walls or valves, or some other medical condition.

The human body depends on the heart's pumping action to deliver oxygen - and nutrient-rich blood. That supplies all the body's cells with nourishment so the body can function normally. In people with heart failure, the body doesn't get enough blood. As a result, they tend to feel weak, fatigued or short of breath. Everyday activities such as walking, climbing stairs, carrying groceries and doing yard work can become quite difficult.

## **The Taipan**

Taipans are, at least in theory, amongst the most deadly snakes in the world, combining very potent venom, large amounts of venom and long fangs with an accurate strike. The common taipan may exceed 2.5m in length and is found in mixed habitats in North Queensland and the Northern Territory. The common taipan may have fangs >1cm in length, capable of penetrating a leather boot! This, coupled with the large quantity of venom produced, has helped fuel the fearsome reputation of these snakes.

In a single strike, a taipan can inject 60mg of venom - enough to quickly paralyse a small marsupial but also more than enough to wipe out several human adults.

Taipan venom is overwhelmingly neurotoxic, including pre and post-synaptic neurotoxins, as well as powerful procoagulants and myolysins.

Source: University of Queensland

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