

GOOD NEWS WORLDWIDE

1 - Life-saving Treatment for Heart Attacks Discovered Inside Protein of Deadly Spider Venom

A drug candidate developed from a molecule found in the venom of the Fraser Island (K'gari) funnel web spider can prevent damage caused by a heart attack, as well as extend the life of donor hearts for organ transplants.

The discovery was made by a team led by Professor Peter Macdonald from the Victor Chang Cardiac Research Institute in Australia and colleagues at The University of Queensland.

Macdonald said this incredible result had been decades in the making:

“This will not only help the hundreds of thousands of people who have a heart attack every year, it could also increase the number and quality of donor hearts, which will give hope to those waiting on the transplant list.”

Dr Palpant, from UQ's Institute for Molecular Bioscience (IMB), said the drug candidate worked by stopping a 'death signal' sent from the heart in the wake of an attack.

“After a heart attack, blood flow to the heart is reduced, resulting in a lack of oxygen to heart muscle. The lack of oxygen causes the cell environment to become acidic, which combine to send a message for heart cells to die.”

“Despite decades of research, no one has been able to develop a drug that stops this death signal in heart cells, which is one of the reasons why heart disease continues to be the leading cause of death in the world.”

Dr. Palpant tested the drug candidate, a protein called Hi1a, using beating human heart cells exposed to heart attack stresses to see if the drug improved their survival.

“The Hi1a protein from spider venom blocks acid-sensing ion channels in the heart, so the death message is blocked, cell death is reduced, and we see improved heart cell survival.”

There are currently no drugs in clinical use that prevent the damage caused by heart attacks.

“The survival of heart cells is vital in heart transplants—treating hearts with Hi1a and reducing cell death will increase how far the heart can be transported and improve the likelihood of a successful transplant,” said Macdonald.

“Usually, if the donor heart has stopped beating for more than 30 minutes before retrieval, the heart can’t be used – even if we can buy an extra 10 minutes, that could make the difference between someone having a heart and someone missing out. For people who are literally on death’s door, this could be life-changing.”

The small protein in the venom of this spider was shown to markedly improve recovery from stroke, “amazingly reducing damage to the brain even when it is given up to eight hours after stroke onset,” said UQ Professor Glenn King.

“For heart attack victims, our vision for the future is that Hi1a could be administered by first responders in the ambulance, which would really change the health outcomes of heart disease.”

This would be particularly important in rural and remote areas where patients are far from hospitals—when every second counts.

This could also allow donor hearts to be transported over longer distances and therefore increasing the network of available donors and recipients.

Dr. Sarah Scheuer says their research, published [in the journal Circulation](#), initially just looked just at the effect of venom but moved down a whole new path of discovery when they identified a specific pathway that played a key role in damaging the heart tissue after oxygen loss.

“We found that an acid-sensing ion channel played a significant role in causing injury to the heart. By blocking that channel, we were able to prevent some of the injury that usually occurs.”

The protein has been tested in human heart cells, and the team is aiming for human clinical trials, for both stroke and heart disease, to begin within two to three years, possibly leading to a new way of reversing the damage from heart attacks by using a potent, spider-derived antidote.

2 - Scorpion Venom May Provide the Next Breast Cancer Breakthrough

Scientists in Brazil are currently testing to see if the venom of an Amazonian scorpion could be used to poison breast cancer tumors.

Researchers at the University of São Paulo's Preto School of Pharmaceutical Sciences (FCFRP-USP) have long worked to clone and express proteins from rattlesnake and scorpion venom with hopes of transforming these powerful compounds into medicines.

Recently, their work identified that venom of the scorpion *Brotheas amazonicus* appears to attack breast cancer cells in a way similar to a widely used chemotherapy medication.

These early findings were generated through a collaboration with scientists from the National Institute for Amazonian Research (INPA) and the Amazonas State University (UEA).

“Through bioprospecting, we were able to identify a molecule in the species of this Amazonian scorpion that is similar to that found in the venoms of other scorpions and that acts against breast cancer cells,” [said](#) Eliane Candiani Arantes, a professor at FCFRP-USP and the coordinator of the project.

Arantes and her team identified two neurotoxins in scorpion venom with immunosuppressive effects. Working with collaborators at INPA and UEA, they found a peptide named BamazScplp1 in the venom of *Brotheas amazonicus* that appears to have anti-tumor potential.

Laboratory tests showed that the peptide's impact on breast cancer cells was comparable to paclitaxel, a commonly prescribed chemotherapy treatment. It primarily

triggers necrosis, a form of cell death previously associated with molecules from other scorpion species.

Arantes and her team have isolated other components of venoms from scorpions and from snakes that have been used to help develop other clinical applications, including an internal wound sealant that mimics the body's natural clotting and scaffolding processes. It's undergoing trials for use in nerve repair, bone healing, and restoring movement following spinal cord injury.

Next time you see a scorpion, and think it a nasty creepy crawly that will send you to the hospital, show a bit of grace; they might help save a woman's life some day.