

# Exploring how a scorpion toxin might help treat heart attacks

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Scientists are discovering potential life-saving medicines from an unlikely source: the venom of creatures like snakes, spiders and scorpions. Scorpion venom, in particular, contains a peptide that has

beneficial effects on the cardiovascular system of rats with high blood pressure. Now, researchers reporting in *ACS' Journal of Proteome Research* say they know a little more about how that happens.

Scorpion venom is a complex mixture of biologically active molecules, including neurotoxins, vasodilators and [antimicrobial compounds](#), among many others. Although the venom is painful for those unlucky enough to be stung by a scorpion, individual venom compounds, if isolated and administered at the proper dose, could have surprising health benefits. One promising compound is the tripeptide KPP (Lys-Pro-Pro), which is a piece of a larger scorpion toxin. KPP was shown to cause blood vessels to dilate and blood pressure to decline in hypertensive rats. Thiago Verano-Braga, Adriano Pimenta and colleagues wanted to find out what exactly KPP does to [heart muscle cells](#). The answer could explain the peptide's beneficial effects.

The researchers treated mouse cardiac muscle cells in a [petri dish](#) with KPP and measured the levels of proteins expressed by the cells at different times using mass spectrometry. They found that KPP regulated proteins associated with cell death, energy production, muscle contraction and protein turnover. In addition, the scorpion peptide triggered the phosphorylation of a mouse protein called AKT, which activated it and another protein involved in the production of nitric oxide, a vasodilator. KPP treatment, however, caused dephosphorylation of a protein called phospholamban, leading to reduced contraction of cardiac muscle cells. Both AKT and phospholamban are already known to protect cardiac tissue from injuries caused by lack of oxygen. These results suggest that KPP should be further investigated as a drug lead for heart attacks and other cardiovascular problems, the researchers say.

**More information:** Diana P. Gómez-Mendoza et al. Moving Pieces in a Cellular Puzzle: A Cryptic Peptide from the Scorpion Toxin Ts14 Activates AKT and ERK Signaling and Decreases Cardiac Myocyte

Contractility via Dephosphorylation of Phospholamban, *Journal of Proteome Research* (2020). [DOI: 10.1021/acs.jproteome.0c00290](https://doi.org/10.1021/acs.jproteome.0c00290)

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