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Special Species

One Dollar Snakebite Antidote — Courtesy of This Misunderstood Marsupial

Many people don't like the looks of these critters, especially their tails, but in the future, they could save you from a deadly snake bite. And possibly save you a ton of money too, as an alternative to other costly antidotes.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- A study led by researchers at San Jose State University suggests that opossums may possess an antidote for venomous snakebites in humans
- Poisonous snakebites are a serious problem around the globe, with estimates as high as 1.8 million bites and 94,000 deaths each year
- Opossums are known for their immunity to most snake venom, and the researchers isolated a protein in their blood that has potential as an antivenom
- The antidote is manufactured using E. coli bacteria, making it very cost effective to produce. The researchers estimate it could cost less than $1 a dose vs. other antivenoms on the market costing $100 to $150 per dose
- The antivenom protected mice in the study against the U.S. Western Diamondback rattlesnake and the deadly Russell's viper. More research is needed to determine if the antidote also protects humans

Editor's Note: This article is a reprint. It was originally published April 21, 2015.

According to emerging research, the opossum may provide humankind with an effective, inexpensive antidote for snakebites.

Opossums are known for their ability to withstand the bite of almost any kind of snake, and now a team of scientists from San Jose State University has managed to isolate a protein from the blood of the little critters that shows promise as an antivenom.

Snakebites Are a Global Problem and Expensive to Treat

Poisonous snakebites are a significant problem worldwide, especially in developing countries. According to the World Health Organization (WHO), estimates suggest that over 420,000 venomous bites and 20,000 deaths from snakebite occur each year.

However, WHO warns that those numbers could be as high as over 1.8 million and 94,000, respectively, with the highest number of snakebites occurring in South Asia, Southeast Asia, and sub-Saharan Africa.[1]

Snakebite treatment is costly and many people simply don't have access to it. Most antivenoms are created by injecting dilute venom into a mammal, which results in an immune response. The animal's blood serum is then processed and made injectable for snakebite victims.

The injected serum scavenges toxic molecules in the bite victim's blood. These treatments typically run $100 to $150 per dose, which is more than many people in developing countries can afford.

It's Not yet Known Exactly How the Opossum Protein Defends Against Snake Venom

In the San Jose State experiment, venom-exposed mice given the opossum peptide showed no ill effects from the poison, whereas untreated mice died within a matter of hours.

According to Claire Komives, study leader, "Basically, the venom was completely neutralized."[2]

The mechanism by which the opossum peptide acts against snake venom is not fully understood. Most snake venom contains more than one toxin, so it seems unlikely the peptide works by binding to a single toxin. Komives theorizes the venom protein may bind to the opossum protein, rendering it no longer toxic.

Newly Discovered Antidote Could Cost Just $1 Per Dose

To create the antidote, the researchers had the protein chemically synthesized. They programmed E. coli bacteria to manufacture the first 11 amino acids of the protein that are known to keep opossums immune to snake venom. Use of E. coli bacteria will also make the antidote inexpensive to produce in large quantities.

The researchers discovered that their antidote protected mice from the venom of the U.S. Western Diamondback rattlesnake, and also the deadly Russell's viper native to Pakistan.

More research is needed to determine if the antivenom will work in humans, and the process will have to be refined before the antidote becomes commercially available. But the researchers estimate each dose will cost $1 or less, which is a significant savings over other antivenoms.

Sources and References

MedicineNet.com March 22, 2015 (Archived)

Popular Science March 30, 2015 (Archived)

[1] World Health Organization (Archived)

[2] Chemistry World March 24, 2015 (Archived)