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Killer Animals, Live-Saving Cures: Why Venom Is Good For You

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You wouldn't want a deathstalker scorpion in your boot. But it could save your life. Tarantula venom may seem frightful. But medically speaking, it's awesome. And gila monster spit? Great stuff, if you have diabetes.

They're just a few examples of a fascinating area of research using the venom from the most dangerous creatures around. Step on one and it could kill you, but synthesize those toxins in the lab, and they could be used to save your life.

The University of Washington recently announced the latest breakthrough in this field, explaining how scorpion venom can be useful in treating brain cancer. Researchers found that *chlorotoxin*, an amino acid found in deathstalker scorpions, can slow the cancer's spread by blocking narrow channels in the brain through which malignant, shape-shifting cells can migrate.

But it's only the latest in a long line of scientific studies:

* Apitherapy -- the use of honey bee products -- has been used in treating multiple sclerosis patients. Controlled stinging around the spine brought back sensation and immune response, where numbing and desensitization had previously been crippling.

* Byetta, a drug for diabetics, synthesizes an enzyme found in Gila monster spit. The venomous lizard's output can produce insulin in the pancreas in response to raised blood sugar during slow digestion.

* According to biophysicists at the University of Buffalo, tarantula venom, which contains the protein GSMTx4, may replace morphine for pain relief from muscular dystrophy.

* And snake venom? Don't get started on snake venom. The **Natural Toxins Research Center** at Texas A&M University has had an active venom research program for 30 years (and a computer-controlled serpentarium!) dedicated to discovering medically important toxins in venom from such snakes as cottonmouths, copperheads and rattlesnakes.

Plus, of course, there's Botulinum toxin A -- the bacterium behind one of the most deadly neurotoxins we know, and the source of the botox injections that make us oh-so-pretty.

Botox essentially paralyzes facial muscles that would otherwise cause the appearance of wrinkles, and is feared as a potential bioweapon -- in far greater doses, of course, than doctors would ever administer.

In 2006, Botox met its match in the topical cream Syn-ake. It contains a synthetic compound that imitates a chemical found in Temple Viper venom, and works in a similar way, inhibiting muscles.

Vipers, toxins and venoms, oh my!



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Never fear: The University of Washington's scientists aren't working directly with those deathstalker scorpions.

"We don't extract venom or [chlorotoxin] from scorpions at UW, and never deal with any live scorpions," **Miqin Zhang**, lead researcher from the University of Washington's department of materials science and engineering, told FoxNews.com. Her lab purchases the chemical from commercial companies or synthesizes it in the labs via recombinant DNA technology, she explained.

Zhang settled on scorpion chlorotoxin when researchers discovered it can enter cells and target certain cancerous brain tumors, called *gliomas*. This means it's good for gene therapy (the process of replacing absent or faulty genes) -- and less invasive to benign cells.

She said chlorotoxin is so successful because of its interaction with MMP-2, a common enzyme in humans notably associated with the body's response to infections. Highly invasive cancers often increase MMP-2's prevalence, she explained.

"We believe that many types of cancer actually express MMP-2," Zhang told FoxNews.com, causing the body to react and those gliomas to develop. "Chlorotoxin blocks MMP-2 or the expression of MMP-2, and thus blocks the foundation of the glioma," Zhang told FoxNews.com.

While a clinical trial is not yet in the works, her lab's findings have renewed interest in the 15-year-old field of research into scorpion venom. "Ninety-eight percent of brain tumors have the MMP-2 receptor," Zhang said. "The mechanisms are not completely understood yet, but a brain tumor has several hundred types of cancer, and chlorotoxin can target a lot of them."

And the applications could reach beyond brain cancer. "We found that chlorotoxin also targets prostate cancer and melanoma," she said.

The irony of medically useful predators is not limited to the venomous animal kingdom; just look to traditional Chinese medicine. With products ranging from the well-known malaria treatment drug Artemisinin and the now-banned weight loss drug Ephedra, and even the sale of animal parts from endangered species like the Sumatran Tiger, Chinese doctors have mined a variety of animal parts.

According to the **World Wildlife Federation**, traditional Chinese medicines include the use of tiger bone for arthritis, rhino bones for fever, convulsions, and delirium, and bear gall bladder bile for inflammation and bacterial infections. These 3,000-year-old medical practices abated during the tiger conservation crisis of the '80s and '90s, when the tiger population was estimated at 5,000 to 7,000.

Despite their endangerment, tigers are still killed for their alleged cure-all parts: whiskers, teeth, blood, skin, stomach, eyes, noses, tails, and testes apparently treat everything from tuberculosis and rheumatism to laziness and impotence.

The next time you stumble across a rattlesnake in your scrub brush or a black widow in your bushes, give a care. That killer may someday prove a savior.

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