

Life-saving venom? How deadly compounds can be used as medications

Scientists estimate that there are more than [220,000 venomous species](#), ranging from jellyfish to mammals. That's 15 percent of Earth's animal diversity.

That astonishing biodiversity is paralleled by chemical diversity, too. Venom isn't a single molecule. It's a complex cocktail of peptides and enzymes that disrupt the physiology of another organism, says Helena Safavi, a biochemist at the University of Utah and the University of Copenhagen. Some of the most complex venoms in spiders and cone snails can have [thousands of components](#).

You would probably never use an entire venomous mixture in medicine, Safavi says. "But because it's such a complex mixture of things, we can go and look at the individual components that, when they're given as an individual entity, they can be therapeutic."

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Perhaps one of the most out-of-the-box ways to use venom in medicine is to treat cancer. Blazing the trail for venom-based cancer treatments is Mandë Holford, a marine chemical biologist based at the City University of New York Hunter College and Graduate Center and the American Museum of Natural History.

The logic is this: Cancer cells [overexpress some cellular channels](#). Holford's team identified a compound in the venom of auger snails, a close relative to cone snails, that [blocks one of these channels](#). When it's injected into tumor-bearing mice, it [inhibits liver cancer proliferation and tumor size](#). For the most part, the treatment spares non-cancerous cells, so it could even alleviate the slate of side effects of traditional chemotherapy, according to Holford.

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