Venomous: How Earth's Deadliest Creatures Mastered Biochemistry

Christie Wilcox

Venomous: How Earth's Deadliest Creatures Mastered Biochemistry

Christie Wilcox

Venomous: How Earth's Deadliest Creatures Mastered Biochemistry Christie Wilcox
A thrilling tale of encounters with nature's masters of biochemistry

From the coasts of Indonesia to the rainforests of Peru, venomous animals are everywhere—and often lurking out of sight. Humans have feared them for centuries, long considering them the assassins and pariahs of the natural world.

Now, in *Venomous*, the biologist Christie Wilcox investigates and illuminates the animals of our nightmares, arguing that they hold the keys to a deeper understanding of evolution, adaptation, and immunity. She reveals just how venoms function and what they do to the human body. With Wilcox as our guide, we encounter a jellyfish with tentacles covered in stinging cells that can kill humans in minutes; a two-inch caterpillar with toxic bristles that trigger hemorrhaging; and a stunning blue-ringed octopus capable of inducing total paralysis. How do these animals go about their deadly work? How did they develop such intricate, potent toxins? Wilcox takes us around the world and down to the cellular level to find out.

Throughout her journey, Wilcox meets the intrepid scientists who risk their lives studying these lethal beasts, as well as "self-immunizers" who deliberately expose themselves to snakebites. Along the way, she puts her own life on the line, narrowly avoiding being envenomated herself. Drawing on her own research, Wilcox explains how venom scientists are untangling the mechanisms of some of our most devastating diseases, and reports on pharmacologists who are already exploiting venoms to produce lifesaving drugs. We discover that venomous creatures are in fact keystone species that play crucial roles in their ecosystems and ours—and for this alone, they ought to be protected and appreciated.

Thrilling and surprising at every turn, *Venomous* will change everything you thought you knew about the planet's most dangerous animals.

Venomous: How Earth's Deadliest Creatures Mastered Biochemistry Details

Date	:	Published August 9th 2016 by Scientific American / Farrar, Straus and Giroux
ISBN	:	9780374712211
Author	:	Christie Wilcox
Format	:	ebook 256 pages
Genre	:	Science, Nonfiction, Biology, Animals, Environment, Nature, Chemistry

Christie Wilcox

From Reader Review Venomous: How Earth's Deadliest Creatures Mastered Biochemistry for online ebook

Jennifer says

This is a great idea for a book, and it has almost everything - cool animals, solid science, anecdotes of all-too-close encounters, plenty of enthusiasm. The main thing **Venomous** is missing is good writing.

Christie Wilcox, whose PhD is in lionfish venom evolution, is probably a better scientist than writer. A good editor might have been able to prevent the crimes against adjectives (limbs are both "rotten and gangrenous," said flesh "falls from the bone in putrified, zombified chunks,") and lack of concision (a full paragraph is needed to preface the author's run in with a sea urchin). It's not a long book at 191 pages, but it often feels long because the language is irritatingly imprecise.

The best writing in the book is quoted from the entomologist James Schmidt, who writes like a connoisseur of his experiences being envenomated: the bullet ant's sting is "Pure, intense, brilliant pain. Like walking over flaming charcoal with a three-inch nail in your heel." I've added Schmidt's book The Sting of the Wild to my to-read list, not least because I was stung by a wasp for the first time while reading **Venomous** and am now very curious how Schmidt would describe it. (My own response was much less elegant and more along the lines of, "OWWW. What the f***?!")

Part of my difficulty with **Venomous** is that I like my non-fiction with some sort of underlying, continuous narrative thread. It's certainly not Christie Wilcox's fault that venom has evolved and been lost many times in different animal lineages; that story isn't linear to start with. But while there's no shortage of interesting stories and facts about vipers and caterpillars and blue-ringed octopuses, the book reads more like a collection of facts and studies than a cohesive, forward-moving story.

I didn't have a problem with the science in this book; Wilcox definitely knows more biochemistry than I do, but doesn't delve super deeply into any of it. She doesn't cut out all the jargon, however, which may be annoying if you don't have a basic background in biology. (I was thrilled to revisit my old friend, sphingomyelinase D from the brown recluse, whose mechanism I struggled to understand for one particularly nerve-wracking organic chemistry presentation.) The science in here is totally solid (one of the pluses of a scientist-turned-writer), meticulously cited, and often really cool, whether Wilcox is thinking about evolutionary arms races, the weirdly anachronistic production of antivenins, potential medicinal uses of venom, or the mystery of how Komodo dragons kill.

I find Wilcox most eloquent in the final paragraphs of the book in which she argues for conservation, writing, "Every species on this planet tells a story, an evolutionary novel packed with generations upon generations of knowledge. Letting those species disappear is like setting fire to every library on earth." But I disagree that usefulness to humans should be our main impetus to conserve the remarkable biodiversity of our planet; as a fellow biologist, I'd argue that the organisms of this planet have an intrinsic value and right not to be squeezed out by our runaway population growth and resource usage. Then again, I'm a misanthrope.

I might keep my copy of **Venomous**, as it goes with other books on my shelf - what, you don't have a poison-themed book collection? - but I can't quite shake the feeling that it could have been so much better than it actually was.

Paul says

I didn't plan for this to be a Halloween read, but Christie Wilcox's lively, engaging study of venomous animals gave me the creeps a time or two. Wilcox is an excellent science writer, able to cogently distill complicated concepts for the lay reader while passing along her obvious love for the often unlovable snakes, spiders, wasps, ants, caterpillars, octopuses and platypuses that defend and/or feed themselves through venoms that can make flesh rot, turn insects into zombies or kill a human in minutes.

Most important, however, Wilcox details how scientists have begun learning how venom can be turned into medicine, potentially to fight cancer, AIDS and other currently incurable diseases. She makes a compelling argument that even the unloveliest of animals stores within its DNA millions of years of data that we mere humans could not learn on our own, and that the extent to which we allow our fear to drive these animals to extinction is the extent to which we impoverish our own ability to learn and benefit from their remarkable adaptations.

Eric Jackson says

If you are not a biological scientist fascinated by the biochemical tricks produced by and from cool venomous creatures then you will not rate this book as high as I did. For me, it was the perfect amount of science, exploration, interesting anecdotes and inspiring speculation.

Rosey Waters says

I LOVE LEARNING ABOUT SUBSTANCES THAT CHANGE US.

Man I loved this book, but I’m pretty sure it’s a very me book: aka someone who stayed in school an extra year to learn more about this stuff. Also known as I’m a nerd.

Allie says

This rating/review is based on an ARC from the publisher sent to my work (the public library).

Mary Roach this is not. There is definitely some really interesting and fun stuff in here, but also a ton of hard to follow stuff. I think this book could really benefit from a non-science editor to help clarify (dumb down) some of the content. I wish there were footnotes instead of endnotes, and some of the figures used were unexplained and totally way above the scientific understanding of the intended readership. The parts that worked best were the personal stories and investigations of the author, the stuff that didn't work was the in-depth talk of proteins and cascade reactions. That kind of specificity is interesting, but really hinders the readability and flow. Obviously I didn't read the final published book, but I don't imagine I will nor will I recommend it to library patrons. I also left the ARC in the Madrid Metro because I felt bad just recycling it.

Victoria Sullivan says

Fascinating read synergistic words and diagrams paint vivid pictures

This book is scientifically stimulating but, perhaps more importantly, it is vibrant and hopeful for humans and venomous creatures as well. The biochemistry is artfully engaging and easy to follow. The author uses a deft hand blending breakthroughs and personal experiences to create an accessible and engaging story. It was literally better than many novels I have read in terms of entertainment.

Gendou says

This is a fun and educational read. It covers a wide variety of animals, and goes into a lot of detail about the venom they produce, its effects on pray and would-be predators, how such adaptations are thought to have evolved, etc. The author is quirky and funny, which wasn't obnoxious to me, but this may turn off some readers.

The author presents an overly credulous description of the practice of venom "self-immunization". She repeats some of the practitioners' dubious claims of increased health from repeated exposure to snake and bee venom. Snake venom is not a panacea. Its use as a drug in India also sounds grossly exaggerated. The author seems not to know quite enough about how the immune system actually works. She even says, "allergies are a mystery" which is pretty much untrue.

There's also discussion of the so-called "toxin hypothesis" of allergies. This is what I would call a "fringe" scientific theory and appears to come from a single paper published by a single individual. This has been given more press than it deserves, in my opinion. Its inclusion as apparent scientific fact in this book for a lay audience is inappropriate. It should be qualified as preliminary if not fringe science and its (numerous and severe) flaws explained clearly. Or left out altogether.

Andrea Pozzi says

Amazing book! A real travel through venom biology. Highly recommended!

Jim says

Several reviews said Wilcox was no Mary Roach. I agree that she's not quite as funny, but she is entertaining & interesting. I was more worried that I might get lost because of too many scientific terms, but didn't find this to be a problem most of the time. The next to the last chapter got somewhat confusing, but the rest was very much at my level & I'm no scientist. Most of the technical terms were used to make a point more precise, such as how a venom uses a specific enzyme to trick out nerve cells into thinking we are being burned. If I don't exactly understand the process, it's certainly not bewildering & the point is well made - it's very specific & yet works on a wide range of organisms from reptiles to mammals. Very cool! They're incredible biochemical wonders.

She starts out with a much needed (at least for me) explanation of the difference between poisonous &

venomous. We eat the first & have the second injected into us. Venom can be offensive (the better to control & digest prey), defensive (don't tread on me!), or used for both. It varies in potency & how it works widely depending on its main purpose. Generally, defensive venom is very fast acting on nerves since its primary purpose is to make predators go away quickly.

Why some animals are venomous is fascinating & full of mystery. Related species often aren't, but genetic research has found that a common ancestor probably was & that most of the genes are available in all. Some don't use it because it isn't required & venom comes at a high metabolic cost. Rebuilding a supply can take as much or more energy as being pregnant for several days, although it varies widely among species. The duck-billed platypus uses it primarily for fighting other males during breeding season - another area where it is weird.

How venomous animals drive the evolution of other species, including our own , along with what the deadliest venom is, are both very interesting discussions & not simple at all. We may owe something to snakes for our own mental & visual evolution. While they tend to scare us the most, many other animals have far deadlier venom & the most venomous often don't have the highest kill ratio per year. I won't spoil her answers. They're an eye-opener & need her discussion to make it both understandable & believable.

How & why do some species develop an immunity to other species? Why do related species not have it or did they lose it? It's amazing how little research has been done in all these areas. Her discussion of how antivenom is made points this out through how primitive it is. They inject horses with venom, collect their blood, & pull out the antivenom -- still?!!! Yes, when they can. They often can't or don't because they can't get enough of the toxin. Seriously?!!! Definitely an area where we are lagging far behind. This lack is hardest on the poorest areas since antitoxin is expensive & won't sit on the shelf forever. We have tailored bacteria to produce insulin & it's past time we started doing the same for the antitoxins, BUT there isn't a compelling economic reason nor do we understand venoms well enough. They're very complex.

The discussion on hematophagous (blood feeding) animals is fantastic. I never knew just how complex & well developed their toxins were, but it makes sense. Instead of delivering the pain of a defensive toxin, they trick the host into not feeling their invasion & stop the blood from clotting, all at the same time. More, their toxins have been copied & several are very important drugs approved by the FDA often used by doctors to control blood clotting & pressure.

This is a new book, just published 2 months ago (August 2016), & that really helps. I cringed a bit as she started in on the Komodo Dragons & their venomous bite since I'd just read an article that dispelled the long standing belief they killed by having so much bacteria in their mouths. They don't & she explains this well. The example of a snail that continually evolves its toxins was incredible. It not only makes sense, but shows a variability in evolution that I've never heard about before. How multiple toxins can work together to become more toxic was also an eye-opener.

Just how important venomous animals are to the drug industry is really just becoming apparent since we haven't had the tools to really break apart their toxins properly. They're so subtle & complex, often fixing conditions - if we know what causes the condition & can align it with a specific toxin. She goes into some detail about the long road from discovery to possible medicine which is interesting & shows why pharmaceutical companies need big profits from successful drugs, although she doesn't say so in so many words. She also comments on how important it is that we don't destroy these species just because they seem like a danger. They can also be saviors.

I wonder if there is a database generally available to researchers on toxins & their effects that is aligned with one of conditions & what would fix them? While she gives several examples of toxins fixing conditions such as bee stings curing Lyme disease, her examples often seem serendipitous.

A very good book. I wish I could have afforded the text along with the audio book. That would have helped, but both are expensive & they didn't come together. Still, I'd highly recommend this in either format.

Renay says

This was fascinating but it's not a book for someone without a basic grasp of biological terms. On the other hand, if you're okay with skipping all the technical language and examples, it's great!

Sookie says

I was surprised how engaging this book was. There is a lot to learn here, obviously, but Wilcox plays this "friendly scientist" trope that works in her favor. In some instances the reading is slowed down with sudden influx of jargon, but the pacing picks up once we overcome those hurdles.

PS: I think this book makes a good present to teens.

Kristin says

This is a wonderful narrative non-fiction book for anyone who loves science journalism. Wilcox's writing does more than just describe venomous animals, she paints a picture of the environment, people, and animals that transports you to an underwater cave or or a beach in Hawaii.

She provides a nice balance of scientific facts and storytelling. If you are a fan of natural history and some of the world's most unusual animals, then this is the book for you.

Andrew says

Venomous: How Earth's Deadliest Creatures Mastered Biochemistry by Christie Wilcox, is a brief and interesting look at various venomous species of animals, how they operate, and how they interact with the human world. Wilcox has written an interesting book examining many different and surprising species of deadly animal, from the Platypus, with its barbed hind legs, to snakes and jellyfish, to a caterpillar that makes one bleed to death. These animals are strange and fascinating, and indeed have always been of interest to humans throughout history. Greeks wrote texts on venomous animals, and modern scientists still work hard to create antivenom to treat snake bites and deadly stings.

This book was entertaining, light in tone, and breezy to read. Wilcox has not written an in-depth analysis of venom and its biochemical breakdown, but more a look at various venomous species, how they create poison, and how they interact with the human world. The book is separated into chapters, starting with the Platypus, and moving into different types of venoms, from more deadly, to more painful, to strange ones that affect your blood coagulation or how you think. The simplicity of the book is great for a pop-science text, and is entertaining enough for a layman like myself. I have always enjoyed books on plants and animals, and pop-science in general, and enjoyed this one just the same.

Wilcox has some interesting points to make about venomous animals. They often warn off transgressors with bright colours or hissing/rattling. Venom is extremely costly to make, both in the antivenom field, where many creatures such as spiders, are tough to milk, as well as from the animals perspective. Venom takes a lot of energy to make, for the most part. Some species use up almost as many calories creating venom as when carrying a litter of offspring. Venom's are often extremely complicated from a biochemical standpoint, and many scientists are still unable to separate the various peptides and protein-chains in their make-up with complete success. Wilcox also examines animals that have built up venom resistances biologically, such as the mongoose, and the biological and reproductive scenarios that may have led to these traits.

All in all, Venemous was a great little read on venomous creatures, and the various traits they exhibit, as well as their interactions with the human world through the fields of science. While this was not the most in-depth book one could read on the subject, it was interesting as a pop-science read for the lay-person, and was well written, full of great commentary, and overall very entertaining. Easily recommended to those looking for a quick pop-science read that is not overly grand or editorialized. A simple, fun, intelligent and interesting book.

TheSkepticalReader says

3.5 stars

The writing of this book won’t appeal to everyone. Wilcox kind of writes like she’s one of your friends who’s recounting a handful of interesting stories; there will be some anecdotal moments and some technical things where you’ll have to pause. It’s definitely a bit jarring but it worked for me because it’s legible enough to get the point across and felt rather ‘user-friendly’.

The topic at hand is what I *really* enjoyed reading about. It’s not only a new subject but one I wouldn’t have thought to look for myself if it hadn’t been for a serendipitous moment during my visit to the library yesterday. This is also (luckily) the perfect place to start when introducing yourself to learning about venomous creatures, their anatomy, and even their purpose. She tackles topics of venom research, addiction to various venoms, the evolution and future of venomous creatures, and even how humans relate to these dangerous beings.

Given the dark nature of these creatures and how they usually choose to interact with us, Wilcox kept it light and edifying. The book even ends on a strangely uplifting note with the proposal that *perhaps*, in the future, poison derived from certain venomous creatures can be a possible antidotal ingredient to battle natural human diseases such as cancer or dementia.

Bonnie says

I have a deep fascination with venomous creatures. Thus, when I located this book at the Daviess County Library, I, of course, checked it out. From the Coasts of Indonesia to the rainforests of Peru, venomous animals abound. Humans have feared them and revered them from the beginning of recorded time when people from Turkey built a temple known today as Potbelly Hill, the oldest known religious site on earth. Limestone pillars remain where devoted believers erected them more than one hundred centuries ago without aid of animals or even wheels. The ancient artists chose to decorate the pillars with venomous snakes, spiders, and scorpions. The author explains that he developed his interest when he was a boy living in Kailua, Hawaii. l and being fascinated by the blue bubbles of the Portuguese man-of-wars that would wash

up on the beaches. Biologist Christie Wilcox investigates and illuminates the animals of nightmares. Her premise is that the
hold the keys to a deeper understanding of evolution , adaptation, and immunity. She starts off with the platypus unlike any other creature when first discovered. Male platypus has a spur that juts out from the hind legs. They are terribly venomous and the poison causes excruciating pain that can last for several days. The reader learns how venom comes from the box jelly fish by relating the story of how a girl ignored warning of blobs in the water. and almost died. The stunning blue-ringed octopus capable of inducing total paralysis. She answers the question of how these animals go about developing their deadly poisons. She meets intrepid scientists who risk their lives studying these lethal creatures. Turning something bad into good, she also discusses how untangling the mechanisms of some of our most poisonous creatures can be utilized to treat illnesses. Pharmacologists are exploiting venoms to produce lifesaving drugs.