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Do jellyfish have the deadliest venom in the world?

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Marine Life Image Gallery Their bodies may be nearly invisible, but the scars they can cause are anything but. See more pictures of marine life.
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Do jellyfish have the deadliest venom in the world?

Most people have been on the receiving end of an animal's animosity at one time or another. Some of these encounters are relatively harmless, like a bug bite, but other animal meetings can be painful or even deadly. We've all heard stories of violent bear maulings and gruesome shark attacks, but other animals strike in a much stealthier way with the help of potent toxins.

There are actually two kinds of toxic animals: poisonous and venomous creatures. While the two terms are often used interchangeably, in the scientific realm, they have different meanings. The difference lies in the way the animal transfers its toxins. Whereas **poison** is transmitted passively through ingestion or absorption, **venom** is actively injected. As a general rule, poison is used primarily for defensive purposes (by prey), and venom is used for offensive purposes (by predators). In addition, most venomous animals can produce their own deadly concoction, whereas poisonous creatures usually acquire their toxicity through their diet.

A poisonous animal can only transfer its toxins if another animal comes into physical contact with it or eats it (a sort of posthumous revenge). Poison dart frogs, for instance, secrete a toxic substance from their skin which is potentially fatal to predators that venture too close. Venomous animals, on the other hand, have a device to actively deliver their lethal cocktail. For example, snakes and spiders have fangs, wasps use stingers and scorpions strike with their tails.

In this article, we're not interested in those poisonous creatures that just wait around for something exciting to happen; we're focused on the venom-producing go-getters. Some venomous animals are well known -- black widows, rattlesnakes and fire ants all come to mind; others tend to lead a more private life. In fact, one of the world's most venomous animals is one you may never even see -- even if it bites you on the nose. Actually, in the case of this particular animal, "bite" isn't quite the right word; the more appropriate term is "sting."

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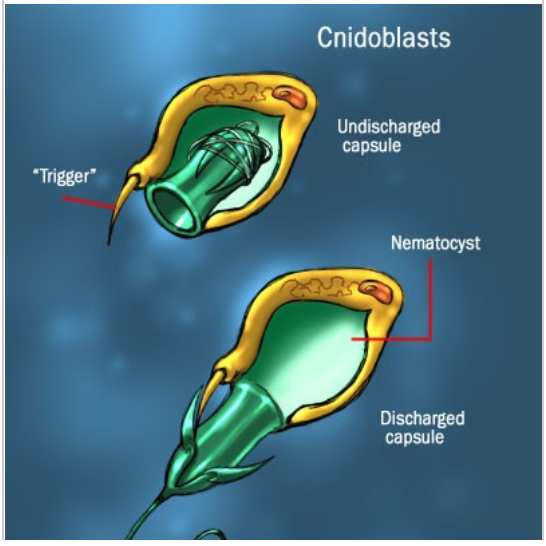

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You may have been stung by a jellyfish on a trip to the beach or a dip in the ocean. But, while most jellyfish stings do little more than annoy you, the sting of the **box jellyfish** can literally scar you for life -- if it doesn't kill you first.

The venom of this pale blue, almost transparent, invertebrate is among the most deadly in the world, capable of killing a human in under five minutes [source: Thompson]. This animal has enough venom to take out 60 adults [source: Bartalucci]. Also called sea wasp and marine stinger, the box jellyfish injects its venom by way of the many tentacles dangling from its **bell**, or body. (The box jelly gets its name from the boxy shape of its bell.) Each tentacle contains about 5,000 stinging **nematocysts,** housed in cells called **cnidoblasts**. Nematocysts are like little stinging darts that fire whenever the tentacle comes in contact with chemicals on the surface of its prey. (You can learn more about various species of jellyfish by reading How Jellyfish Work.)

With up to 15 tentacles growing from each corner of the jelly's bell, and each one reaching a possible 10 feet (3 meters), that's a lot of miniharpoons ready to deliver venom into a victim's body. A single encounter can leave you with thousands of stings, and the powerful venom doesn't waste any time getting to work. Many victims stung at sea go into shock or die of heart failure before they can even reach the shore [source: National Geographic].

Not only is the box jellyfish venom damaging to the heart and nervous system, it's also

dermonecrotic, meaning it's capable of killing skin cells and underlying tissue, leaving you with dead, blackened skin and potentially permanent scarring. To make matters worse, your initial instinct to shake the offending stingers off makes the tentacles contract and stick tighter to your skin, possibly releasing even more stingers into your already burning flesh.

Thankfully, there's somewhat of a cure if you can get to it fast enough. **Acetic acid** solutions like vinegar have been shown to render the stinging cells harmless, preventing them from firing more toxins into your body. (Antivenin is also available.) Or you could just do what some savvy Aussies do and wear women's pantyhose when you head out to the beach. Apparently nylon prevents the jellies from stinging since they can't detect the chemicals on your skin.

Australians have quite a bit of experience dealing with deadly creatures. Many of the world's most venomous offenders live Down Under. Along with the box jelly, which lives mainly off the coast of Northern Australia and throughout the Indo-Pacific region, the island continent lays claim to several other specimens vying for the grand prize of most venomous animal. Find out which one claims that top spot on the next page.

A cone snail swallows a fish that it caught with the help of its paralyzing venom.
Alex Kerstich/Visuals Unlimited/Getty Images

Testing Venom's Potency

Actually, the grand prize winner of most venomous animal may never be found. Due to the somewhat flimsy nature of testing venom's potency, there's some disagreement about which animal comes out on top.

A common method of measuring the toxicity of a substance is **LD50**, expressed as the dose that kills half of the test animals the substance is used on. LD50 usually is represented by the amount of venom (or other chemical) given for every 100 grams or 1 kilogram of the test animal's body weight [source: Canadian Centre for Occupational Health and Safety]. The "LD" stands for "lethal dose," and "50" represents 50 percent of test subjects -- the lower the value, the more potent the chemical. The LD50 of a box jellyfish is 0.04, while the LD50 of a coral snake is 1.3 [source: Lee, Fry]. Researchers are starting to phase out LD50 in favor of alternative methods that reduce the deaths of test animals.

While this standardized measure is a good baseline for comparing the relative strength of different venoms, a number of things can alter the value. For one thing, the test animals -- usually rats or mice but sometimes rabbits, hamsters and guinea pigs -- don't necessarily have the same response to the venom that other animals, like humans, would. Even when the test animal's weight is taken into consideration, one species can have a totally different reaction from another. Other things that can affect the LD50 value include the way the chemical is administered and the age, size and geographic origin of the animal that provided the test venom [source: Kimball, Venom Supplies].

That being said, there are definitely several venomous villains that stand out above the crowd. High on the list is another marine animal and Australian native, the **geographic cone snail**. Found along the coral reefs of the Indo-Pacific, these intricately patterned, brown-and-white shelled gastropods have especially potent venom that paralyzes their prey almost instantly. When a tasty fish or snail wanders by, these attractive, harmless-looking shells extend a tubelike organ outfitted with what resembles a minispear. This weapon injects prey with a venom so powerful that victims may die before they even realize that they've been bitten [source: PBS].

Another deadly Australian animal is the **inland taipan**, which produces the most toxic venom of any snake in the world. A venomous bite from this predator is powerful enough to kill 15,000 mice [source: California Academy of Sciences]. Before the antivenin was created, few people lived to tell about their encounter with this reptile.

The world's deadliest spider, the Sydney **funnel-web spider**, also lives in Australia. Its venom acts on the body's nervous system and can kill in under 15 minutes [source: California Academy of Sciences]. Named for their uniquely shaped webs, these notoriously aggressive spiders may cause you to develop a severe case of arachnophobia.

For more on venom and the interesting creatures that wield it, peruse the links on the following page at your own risk.

VENOMOUS VACCINES
As frightening as they may seem, some venomous creatures could end up saving your life. Scientists have found that many of the chemicals found in venom are also useful in creating drugs for treating a range of illnesses. A component of the cone shell's venom has been developed into a drug targeting chronic pain that's thought to be 10,000 times stronger than morphine, and an ingredient in copperhead venom is being used to fight cancer [source: PBS, National Geographic].

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- 19 Home Remedies for Bites and Stings
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More Great Links

- Australian Venom Research Unit
- California Academy of Sciences: Venoms 101

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