

## Benefits of Venomous Snakes

Our topics for this week are:

- **Recognition of venomous snakes**
- **Medical uses of snake venoms**

Snakes are our friends, as long as you do not invade their personal space. Some species, if they are captive bred, tolerate gentle handling pretty well. That is never true of poisonous snakes.

Make a note to yourself: do not handle a poisonous snake if you have not been trained by an experienced poisonous snake handler and have an educational or scientific reason to do so. That sounds easy, but what if you think it is non-poisonous but it is not? If you plan to do any snake handling, you need to be able to identify poisonous snakes to prevent a disaster.

### Identifying U.S. Poisonous Snakes

There are about 600 venomous snake species in the world. The most lethal is the Inland Taipan of Australia. It kills more people than any other snake in the world. Australia has 20 of the 25 most poisonous snakes in the world.

For those of us who live in the United States, there are only 4 types of indigenous poisonous snakes: rattlesnakes, cottonmouths, copperheads, and coral snakes. One of the ways to identify a poisonous snake is by its behavior and habitat. One of the most well-known behavior traits can be observed in the rattlesnake. When threatened, rattlesnakes create a rattle sound as a warning to potential predators. Often, harmless snakes will make a rattling sound by wagging their tail in dry leaves. The common black rat snake is one of these.

Cottonmouths live in or near water. Thus, if there is a pond and/or swamp nearby, cottonmouths could be observed in the area. Cottonmouths (or Water Moccasins) and harmless water snakes act differently from one another when they swim. A harmless water snake will swim through the water with just its head poking above the surface. A venomous snake, however, will let its entire buoyant body float along the water. Copperheads live in wetland areas near cliffs, forests, and rivers.

While there are only four types of venomous snakes in the U.S., each type contains many subspecies with mottled color variations that helps them blend in with their environments. Solid colored snakes in the U.S. are not venomous. However, venomous coral snakes and non-venomous scarlet king snakes both have a banded pattern of yellow, brown and black on their scales. The difference between the two types is that the red bands touch the yellow bands on a coral snake whereas red bands touch the black bands on scarlet king snakes.

Except for the Coral snake, all venomous snakes in the U.S. are pit vipers. While non-pit vipers have a rounded head, pit-viper snakes have a more triangular-shaped head. The shape of a

pit viper's head may deter predators since it is recognizable at a distance. A pit-viper will have a bulbous head with a skinny neck because of the position of the snake's venom sacks underneath its jaw.

Pit-viper snakes have thin, vertical pupils surrounded by a yellow-green eyeball while non-venomous snakes have rounded pupils. They also have a hole, a pit, that is a heat sensor on each side of their head between their eye and nostril. Distinctive pupils and pits are not visible at distance without binoculars. If a potentially venomous snake seems dead, do not attempt to pick its body up to exam the head. Recently dead snake can bite by reflex and if venomous, can inject its venom.

### **Rattlesnake:**

The Rattlesnake is the most widely recognized venomous snake in the U.S. Rattlesnakes can strike out to 2/3 their body length to reach their prey and deliver a venomous bite. A rattlesnake's hemotoxic venom destroys tissue at the bite wound, prevents clotting, degenerates organs, and induces intense pain.

### **Copperhead:**

The Copperhead is one of the most common venomous snakes in the eastern United States. Its bite causes severe pain which can last anywhere from 2-4 weeks. Although a pit viper like the rattlesnake, the Copperhead is less toxic and rarely fatal. Copperheads are generally nocturnal creatures, but are excellent at camouflage during the day. If a Copperhead is caught off guard, instead of fleeing it will freeze in place.

### **Cottonmouth:**

The Cottonmouth will also freeze to camouflage itself when caught off guard, but the Cottonmouth is more aggressive than a copperhead, and its bite is more dangerous. A Cottonmouth's bite can easily be fatal.

### **Coral Snake:**

Unlike other U.S. venomous snakes, coral snakes don't have triangular heads, heat sensors, or elliptical pupils. To help you remember how to identify it, remember this mnemonic device: "red next to yellow is a dangerous fellow; red on black, safe from attack." Although smaller than the pit vipers, the coral snake is the most toxic species found in the U.S. The coral snake has powerful neurotoxin venom that can cause death. Coral snakes are typically isolated creatures that inhabit unpopulated areas. Only biting as a last resort, these snakes will first and foremost attempt to flee. Their fangs are short. To be more effective in delivering venom, they usually bite and hold on and chew.

## **Early History**

Snake venoms have been used in traditional medicine for many thousands of years. In the first century AD, theriac was developed, a mixture containing snake venom, that continued to be used until the 18th century as a cure-all.

The first true medical use of snake venom was to create antibodies in animals to be used as an antivenom to treat venomous snakebite victims. Other uses have since been found and thousands more are possible. For example, Cobra venom is among the most powerful analgesics known in minute doses, but is non-addictive, unlike morphine.

Most current investigations are because of cell surface receptors being major druggable targets, and because of the known bioactivity of many compounds in venom.

The first drug derived from snake venom was captopril. It was discovered from the Brazilian arrowhead viper. Captopril is an inhibitor of the angiotensin-converting enzyme, which catalyzes the conversion of angiotensin I to angiotensin II. Enalapril followed, These are used to treat hypertension and cardiovascular disease, renal disease in diabetic patients and post-myocardial infarction heart failure.

Two other antiplatelet drugs have since been developed from snake venoms. They are Tirofiban and Eptifibatide. They are used to treat clots caused by cardiovascular disease.

Another drug called Defibrase or Reptilase is commercially approved outside the USA. With thrombin-like activity, it converts fibrinogen into fibrin and is used extensively in China to treat stroke, pulmonary embolism, myocardial infarction and bleeding at the time of or following surgery.

Hemocoagulase from snake venom is being used to treat post-surgical bleeding in plastic surgery, abdominal surgery and eye surgery.

Fibrin adhesives, which are good alternatives to sutures, have been developed using animal components and a serine proteinase from snake venom. Cobratide, from cobra venom, is used to suppress moderate to severe pain.

If you have comments or you're interested in particular subjects contact us at [CBC@BetterAnimalHandling.com](mailto:CBC@BetterAnimalHandling.com)

Now let's recap the key points to remember from today's episode:

- 1. Venomous snakes should be handled only by specially trained handlers.**
- 2. All handlers of snakes need to be able to correctly and safely identify venomous snakes.**
- 3. Snake venom has and will be the source of valuable new drugs.**

More information on animal handling is available in my book, *Animal Handling and Physical Restraint*, published by CRC Press and available on Amazon and from many other fine book supply sources. A new spiral-bound handbook, *Concise Handbook of Small Animal Handling* is now also available.

Additional information is available at: [www.betteranimalhandling.com](http://www.betteranimalhandling.com) This website has more than 100 past podcasts with notes on handling of dogs, cats, other small mammals, rodents, birds, reptiles, horses, cattle, small ruminants, swine, and poultry.

Don't forget, serious injury or death can result from handling and restraining some animals. Safe and effective handling and restraint requires experience and continual practice. Acquisition of the needed skills should be under the supervision of an experienced animal handler.