by Daniela Weil, art by Jeff Harter

Poison or Medicine?

"All things are poisons, and nothing is without poison. Whether it's a poison or a remedy depends on the dose."
—Paracelsus, 16th century doctor

Can poisons also be medicines? And can medicine poison us? It all depends on how much you take—and who you are.

We all know that poisons are bad news, right? If you eat something poisonous, it will make you sick or even kill you. Some stuff is poisonous, like snake venom and deadly nightshade. Some stuff is not, like carrots.

But the truth is not quite so simple. What's poison and what's not often depends on how much you eat, and who you are. Some deadly toxins, in very small amounts, can actually cure sick people. And some things that are good for you can be harmful, if you take too much.

Can Poisons Heal?

Poisons cause harm by interfering with the normal way the body works. Chemicals in the poisons might block

nerve signals, or cause cells to break. Each poison and venom works a little differently.

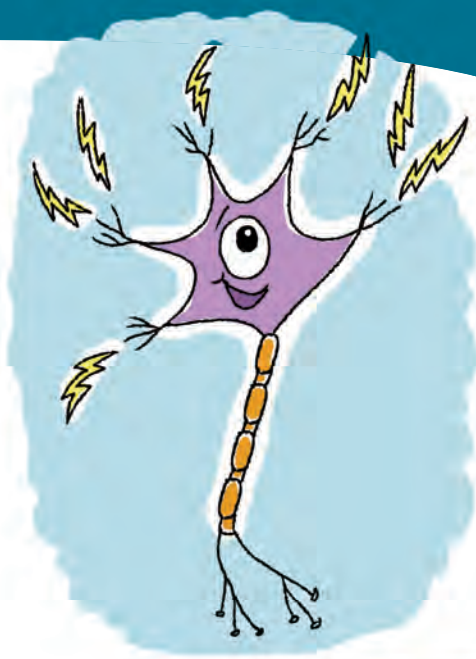
Sometimes, doctors can use these same chemicals to help bodies heal.

Botulinum is a powerful poison that can also be a powerful medicine. It's made by one kind of bacteria. The toxin blocks nerve signals to muscles. When that happens, muscles (including heart and lungs) stop moving, so the victim can't breathe. Without an antidote, this poison is deadly.

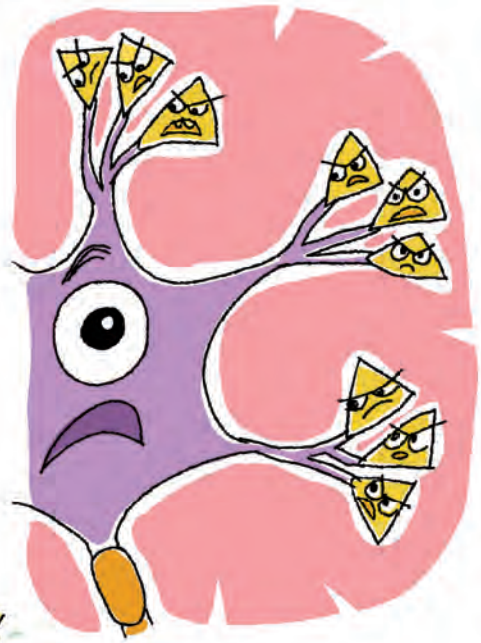
But some people suffer from diseases that make their muscles twitch or freeze. For them, quieting nerve signals might help. In the 1960s, doctors tried it. They injected a very tiny amount of botulinum into the eye muscles of cross-eyed patients. The toxin caused the eye muscles to relax and straighten out. Now botulinum is used to treat problems like migraine headaches and twitchy muscles.

Another useful poison is called digitalis. It comes from the flowers of the foxglove plant. This poison targets the heart. It can make the heart slow down or beat more quickly, depending on the dose (how much you take).

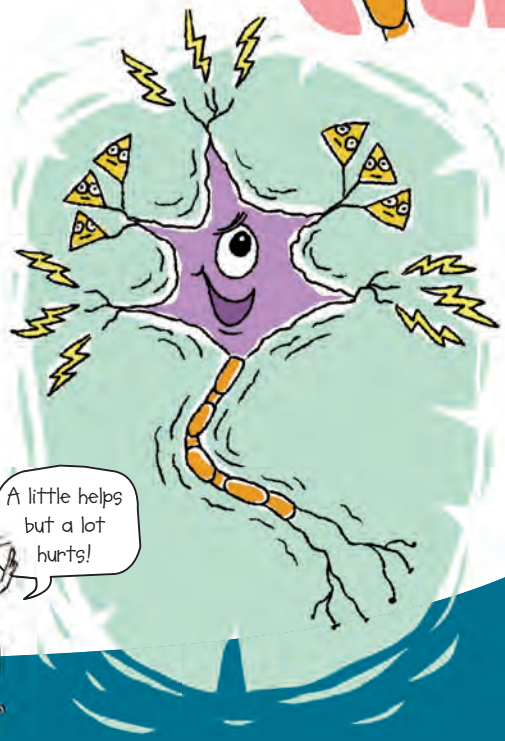
About 240 years ago, doctors began to test tiny doses of digitalis to treat people with heart problems. They wondered if a chemical that changed the heart beat could help. It did! Digitalis is now a widely used heart medicine. This poison has saved thousands of lives.



Nerve cells signal between your body and brain. They sense signals from other cells. Then they release little bursts of chemicals and electricity to send the message on.



Some poisons work by sticking in the little gates that nerves use to sense and send signals. That shuts the nerve down, so it can't do its job.



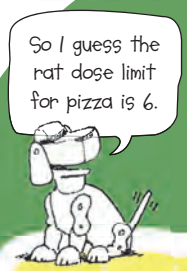
Sometimes, sick nerves get over-excited and signal too much. Then, just a little bit of poison can help them calm down.

Too Much of a Good Thing

In very small doses, some poisons can be medicines. But in large doses, good medicines and even ordinary food can be dangerous. A little caffeine from soda can perk you up. But if you drink gallons, it can make your heart race and you could wind up in the hospital. This is true of almost everything you eat or drink, and all medicines—the right amount is good for you, but too much can turn bad. That's why medicine bottles always list exactly how much to take. That much is good—more might poison you.

As Sick as a Dog

When it comes to poisons, dose matters. But so does WHO eats it. Some foods that animals enjoy are poison to humans. And some foods that humans like are poison to other animals. That's because chemicals in food affect each species differently. So, just because a bird eats a berry doesn't mean it's safe for you! And however much you love chocolate, never share it with a dog or cat. To cats and dogs, it's pure poison.



Poisonous to dogs and cats:

Alcohol
Avocados
Chocolate
Coffee, caffeine
Grapes and raisins
Lemons and oranges
Macadamia nuts
Sugar-free gum or candy
Onions, garlic, chives
Yeast