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HOW POISON CAN HEAL YOU



Scientists are developing a drug to treat brain cancer based on scorpion venom

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Tuesday August 31, 2010

By Tim Brady

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WHEN you're ill and need something to make you better, taking a potentially killer poison may not seem the most sensible option. Yet modern medicine is littered with drugs and therapies derived from some of the most lethal toxins known to man.

Scientists searching for new ways of treating sickness often turn to the natural defences of potentially deadly plants and creatures for inspiration. In the wild,

potent poisons can help ensure survival by warding off predators.

However, in medicine they can often ease pain, boost ailing hearts and according to some research, maybe even help to fight cancer. Who would have thought the snake venom Cleopatra used to take her own life would one day become a life-saving agent, capable of treating heart attacks and stroke?

Probably one of the best-known poisonous remedies is botulinum toxin, better known as Botox. It's reputed to be one of the most powerful poisons in the world. Just one gram of pure toxin is enough to kill more than one million human beings.

Yet every year in Britain, thousands of people have minute quantities of the powerful muscle relaxant injected to banish wrinkles and defy the ageing process. However, Botox is not just for cosmetic use. It's regularly used to ease spasms in patients left disabled by stroke, can get rid of urinary incontinence and even helps children affected by cerebral palsy. Meanwhile, warfarin, one of the most commonly used blood-thinning drugs, first gained a reputation as a form of rat poison.

Here we look at how some of nature's deadliest creatures and plants are providing toxins that, instead of claiming lives, are helping to save them.

Scorpions

Used to treat: Brain cancer.

Scientists are currently developing a drug to treat brain cancer based on scorpion venom.

Experts at the University of Alabama have discovered the giant Israeli scorpion, a poisonous creature that grows to five inches long, produces a venom rich in certain proteins that seem to treat cancer of the glial cells in the brain. There is no treatment for this form of brain cancer.

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Tests show that proteins found in the scorpion venom bind to and destroy malignant cells while leaving healthy cells alone.

Rattlesnakes

Used to treat: Heart attacks.

You would expect rattlesnakes to be more likely to trigger a heart attack than prevent one.

However, Integrilin, a drug developed in the Nineties that is based on chemicals found in the venom of the south eastern pygmy rattlesnake, does just that.

One strike from the 2ft snake, native to Florida and other south eastern US states, can cause pain and swelling but does not usually kill.

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The same toxins, however, also help to reduce the risk of blood clotting, protecting against heart attacks.

Poisonous plants

Used to treat: Heart failure.

Digitalis is a drug that has been used for more than 200 years to combat heart failure and irregular heartbeats.

In the right doses it can improve the heart's ability to contract and therefore pump oxygen-rich blood around the body, despite being derived from foxglove, one of the most poisonous plants. The purple-flowering shrub may look attractive in full bloom but the flowers, leaves and seeds can be fatal to humans and many animals if eaten, by causing the heart to stop beating.

Bee stings

Used to treat: Arthritis.

Although not endorsed by doctors, bee sting therapy has been used for years to ease the pain of arthritis.

Deliberate exposure to bee venom appears to work by prompting the body to produce more of the stress hormone cortisol, which dampens down pain signals.

Now a New Zealand company has developed a honey that contains added venom milked from bees as a remedy for arthritis pain. It claims two teaspoons a day can keep the pain at bay.

Tarantulas

Used to treat: Muscular dystrophy.

University at Buffalo scientists in the US have found that a protein in tarantula venom shows promise as a pain-relief therapy for muscular dystrophy, an incurable disease that causes the muscles to weaken and waste away.

The protein, called GsMTx4, works by stopping nerve pain. Experts believe it could be used as an alternative to morphine because it appears to have no side effects.

After tests on mice showed it increased muscle strength, clinical trials are taking place, with hopes of approval for human use within two years.

Killer gas

Used to treat: Transplant patients.

Carbon monoxide is the lethal, odourless gas that most of us associate with faulty boilers and gas fires.

However, doctors have discovered that in minute quantities, the killer fumes can have a powerful effect on a transplant patient's chances of survival.

That is because the gas helps to widen blood vessels and reduce inflammation, boosting a donated organ's chances of working properly.

Spider venom

Used to treat: Impotence.

Scientists at the Medical College of Georgia in the US are developing a drug for impotence based on the venom of the Brazilian spider *Phoneutria nigriventer*.

They began investigating following anecdotal reports that men bitten by the highly-venomous spider became aroused for several hours. Laboratory tests revealed the venom contained the toxin Tx2-6, which seemed to trigger the response.

Research is ongoing but experts believe the spider venom drug could be used alongside other impotence drugs such as Viagra for maximum effect.

Deadly snails

Used to treat: Pain.

A tiny snail found mainly on Australia's Great Barrier Reef was used in the development of a painkilling drug in 2004.

The cone shell snail hunts fish with a venom-tipped harpoon that resembles an extendable tooth. The venom contains 20 toxins that paralyse its prey.

Now those poisons have been synthesised into the injectable drug ziconotide, which zaps pain by acting on specific receptors in the brain and with very few side effects being recorded.

Lizard saliva

Used to treat: Type 2 diabetes.

The 2ft pink and grey Gila monster, one of the only two venomous lizards in the world, has proved an unlikely ally in the battle to control diabetes.

In its saliva, scientists have isolated the chemical exendin-4, similar to a human hormone that helps regulate blood sugar. The lizard, which is native to the desert areas of the US and Mexico, eats only three or four times a year and exendin-4 produced by the salivary glands helps it digest these meals very slowly.

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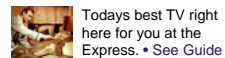
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A three-year study of diabetics by the University of North Carolina found a synthetic form of the chemical called exenatide helped to control sugar levels and aided weight loss. It is manufactured under the brand name Byetta.

Malayan pit vipers

Used to treat: Stroke.

An enzyme derived from snake poison could increase the recovery chances of stroke patients, according to new research.

Strokes are caused by a blood clot that interrupts the supply of oxygen and nutrients to the brain.

Ancrod, which comes from the Malayan pit viper, breaks down the clot and normalises the blood supply by lowering levels of the blood-clotting protein, fibrinogen.

Unlike other treatments, which must be taken within three hours of a stroke to prevent irreversible consequences, such as loss of mobility or even death occurring, Ancrod can be taken up to six hours afterwards.



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