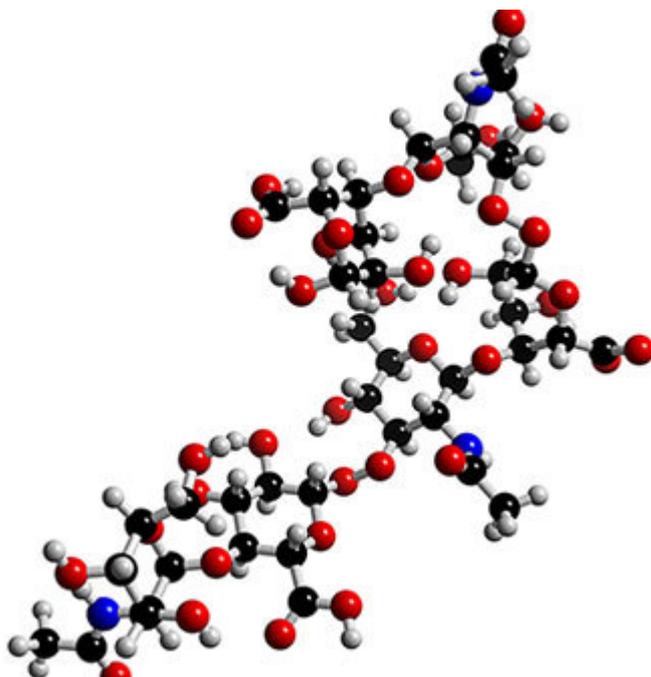


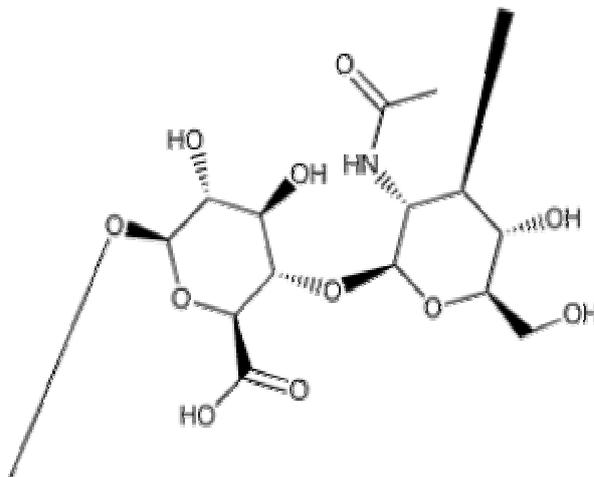
THE KILLER BEE

The Chemistry you hate:

Following a bee sting the normal reaction would be burning pain, redness irritation and itching. After you have been stung by a bee once, you may become allergic to the bees venom. There is a 60% risk of Anaphylaxis upon re-sting. In an anaphylactic reaction the area around the bite may swell, you may develop hives, breathing difficulties, a dry cough, abdominal pain and vomiting. In severe reactions the throat may swell blocking the airway and the heart may stop. A shot of adrenaline (epinephrin) is needed and in severe cases cardiovascular resuscitation or an emergency tracheotomy may need to be performed.



The allergic reaction is usually the result of a previous sting. In the majority of cases the patient has a specific anti venom IgE antibody which reacts with one or more insect venom's. IgE attaches to circulating basophils and to mast cells in the skin, respiratory mucosa and other tissues. When a specific venom antigen interacts with it's specific antibody, the basophils or the mast cells release histamine and other mediators which eventually result in the allergic symptoms.



Therefore bees would seem to deserve the title "Killer" and some certainly more than others. It may take 19 stings per kilogram of body weight for a bee to kill a normal person but one certain type of bee still seems vicious enough to be able to deliver this:

Isn't it funny how a bear likes honey?

Buzz, buzz, buzz

I wonder why he does.

If he'd met an Africanised honey bee

He'd fear for his yellow fuzz

Africanised honey bees are slowly colonizing the Southern states of America and with them they bring fear and panic. Moving slowly north from Brazil since the 1950s the bees cannot be cleared from an area once colonies form as they become integrated into the ecosystem. They are much more aggressive than their European counterparts, roused to attack by nearby loud vibrations such as lawnmowers or barking dogs. Africanised honey bees swarm out of their nests on attack and can chase for up to a quarter of a mile, often targeting furry pet dogs which resemble their enemies the skunk and the bear. For those who come into contact with these insects these are killer bees.

THE BEE YOUR FRIEND

The Chemistry you love:

Apitherapy, the medicinal use of honey bee products, has been practiced since ancient times. In the modern world honey bee venom has found wide uses in treating arthritis and other inflammatory and degenerative diseases. The world scientific literature contains more than 1500 articles on bee venom. The French and Russian equivalents of the N.I.H. Have been involved in clinical studies of honey bee venom, and in the US the Army has looked extensively at the chemical compounds in bee venom.

Honey bee venom contains at least 18 active substances by simply looking at the uses of one of these chemicals, hyaluronidase, we hope to show just how useful bees can be. Hyaluronidase is involved in the inflammatory response of venom, with the softening of tissue and the facilitation of flow of the other substances. It causes the following reaction to occur to hyaluronic acid in the body:

Hyaluronic acid -----> Acetylglucosamine

Hyaluronic acid is ubiquitous in humans, with the highest concentration found in soft connective tissue. It plays an important role for both mechanical and transport purposes; e.g. it gives elasticity to the joints and rigidity to the vertebrate disks, and it is also a constituent of major importance in the vitreous body of the eye. It is a linear polysaccharide (long-chain biological polymer) formed by repeating disaccharide units consisting of D-glucuronic acid and N-acetyl-D-glucosamine linked by $\beta(1 \rightarrow 3)$ and $\beta(1 \rightarrow 4)$ glycosidic linkages. HA is distinguished from the other glycosaminoglycans as it is free from covalent links to protein and sulphuric groups. This glycosaminoglycan has been demonstrated to be important to tissue functions such as tissue hydration, lubrication, solute transport, cell migration, cell function and differentiation. It is a polymer (shown above) made up of monomer units as shown.

Bee Venom therapy can be useful in a wide variety of medical situations. Charles Mraz, a beekeeper in Middlebury, Vermont who has popularized bee venom therapy for the past 60 years, says that it is reasonable to try bee venom therapy in any clinical situation where nothing else works.

However, there are four situations which are most frequent:

- Arthritis and other systemic inflammations. Bee venom therapy can be useful in both rheumatoid and osteoarthritis, helping with both pain and swelling. In the case of rheumatoid arthritis, rheumatoid nodules can lessen in size. Other connective tissue diseases such as scleroderma have been (anecdotally) helped by BVT. Even systemic inflammations not related to joints, such as ulcerative colitis or even asthma, may warrant a trial of bee venom. This is presumably due to stimulation of endogenous cortisol through the hypothalamus-pituitary-adrenal axis.
- Acute and chronic injuries. Bursitis, tendonitis and other areas of injury respond well to bee venom therapy. In this case, the effect is probably a local anti-inflammatory effect, involving the humoral and cellular immune responses to a foreign protein. Chronic back and neck pain may respond, as can other aches and pains.
- Scar tissue. Keloids and other scar tissue are broken down and softened by the substances in the venom, and can flatten out and fade in color. Internal scar tissue, such as adhesions from previous surgery, may respond to treatment over the area.
- Multiple Sclerosis. This use of bee venom is poorly understood, and needs to be studied further. Recently, the MS Association of America awarded a grant to an immunologist, Dr. John Santilli, to prepare the venom in extract form to study its effect on MS patients. Hundreds of patients with MS currently seek out bee venom therapists and beekeepers. The treatment is prolonged and not for the squeamish, but the common responses are increased stability, less fatigue, and less spasm.