

INSECT STING SENSITIVITY

A number of insects can either bite or sting and cause reactions in humans. Serious reactions that require a medical evaluation are almost always due to an insect sting. The “biting insects” such as mosquitoes, black flies and deer flies cause local reactions (described below) that are believed to be due to insect saliva.

Reactions to biting insects can at times be very disabling but they rarely cause severe or life threatening reactions and will not be further described here.

What kind of insects sting and how do they sting?

There are four major classes of insects that can sting: the bees (honey and bumble bees), the wasps (paper and mud wasps), the vespids (yellow jackets, white faced hornets, yellow hornets) and the ants (fire ants). Stinging ants are a problem in the southern states only and will not be described further here. All stinging insects have a stinger on the posterior part of their abdomen and when agitated or threatened will land on your skin and insert a stinger into your skin. The stinger is attached to a venom sack which contracts and discharges a variable amount of venom into your skin depending on how long the stinger is in place. Honeybees occasionally leave their stinger and venom sack in place after the sting. This is the basis of the advice frequently given to look for the stinger after a sting and remove it. Practically speaking a stinger is almost never seen and after a few seconds all of the venom is injected. Insect venom is a very complicated substance and will always produce a reaction in the skin. Large numbers of stings at one time (more than 100) can produce very serious reactions even in people who are not allergic. Because this is very rare it will not be discussed here. Yellow jackets account for most of the stings in this part of the country. They have colonies in the ground and vibration of the ground during activities such as gardening will cause them to attack. Yellow jackets are also attracted to food at picnics. Hornets make large conical nests in trees and the eaves of houses. If a hornet nest or individual hornets are disturbed they will sting. Wasps have small colonies under the eaves of houses, in crevices or in the ground and will sting if directly disturbed. Honey and bumble bees are not generally aggressive but will sting if they or their hives are directly disturbed.

What kind of reactions to stings can I have and how do I become allergic?

Reactions can be divided into 1) local reactions and 2) systemic reactions.

1. Local reactions. This consists of a burning itchy swelling that occurs within minutes of the sting. This can vary in size and generally subsides within an hour. All people get this kind of reaction and the size is probably related to the amount of venom that is injected per sting. Some people will also get a delayed swelling that can start soon after the sting but generally peaks at 12 to 24 hours. The delayed swelling can vary in size and occasionally be very large, bothersome and occasionally disabling. The delayed swelling extends from the area of the sting and can be associated with skin eruptions at times. Delayed reactions are sometimes mistaken for infections of the skin and sometimes antibiotics are unnecessarily given. Local reactions are not dangerous reactions and are usually treated with antihistamines and local application of ice packs. More severe local reactions may require intensive medical treatment.

2. Systemic reactions. With few exceptions these occur within an hour of the sting and the more severe reactions usually start within minutes. They are not related to the size or extent of the local reaction described above. Severe systemic reactions can be associated with almost no local reaction and sometimes the person is not even aware of being stung! Symptoms of a systemic reaction include dizziness and light headedness (due to a drop in blood pressure) sometimes progressing to loss of consciousness, flushing of the skin and hives over the entire body, swelling of the throat with difficulty swallowing, wheezing, chest tightness and shortness of breath. These reactions are a medical emergency and need immediate attention! The most severe phase of a systemic reaction occurs in the first hour and if promptly treated severe symptoms do not usually recur after that. Local and systemic reactions are both excessive reactions of the immune system; they differ in the nature of the immune reaction involved. The systemic reaction is better understood and is caused by an abnormal type of antibody (IgE) circulating in your blood. This antibody is attached to certain cells in your body (mast cells in your respiratory tract and basophiles in your blood stream). When an insect stings an allergic person, a small amount of the venom protein interacts with your mast cells and basophiles and cause them to release substances that produce the allergic reaction. Theoretically the first sting that a person gets will not produce a systemic reaction. After the first sting some people become sensitized and make large quantities of IgE antibody and become allergic and

susceptible to severe reactions. We do not know why some people become allergic but it is likely that genetic factors play a role. Age and other factors may also be important. It is common for a person who has had many stings in the past without problem to suddenly have an allergic reaction and the exact reason will probably never be known. Once a person is allergic the allergy can persist for many years.

How are insect stings treated?

- 1. Prevention.** You should avoid digging in the ground especially in unfamiliar areas. Off trail hiking is also somewhat hazardous. During a picnic avoid spending time around food that is attracting yellow jackets. Be vigilant to look for nests of yellow jackets and wasps on the sides of houses and on trees.
- 2. Treatment of a sting reaction.** If you have a history of systemic reactions to insect stings you should have medication always available in high-risk situations during warm times of the year. This consists of an adrenaline injector such as EpiPen and rapidly acting antihistamine such as Benadryl. Because the type of insect that stings you is uncertain and the amount of venom injected with each sting is variable the occurrence and severity of a systemic reaction cannot be predicted with precision. Most severe reactions occur within minutes. If you think you are starting to have a systemic reaction, then you should take rapidly acting Benadryl immediately (such as four children's chewable tablets at 12.5mg per tablet). Early systemic reactions are often first evident by a feeling of dizziness, flushing, tingling of the lips or hands, itching in the throat, chest tightness or shortness of breath. If you are dizzy or short of breath or having difficulty swallowing, then the best thing is to give yourself a shot of adrenaline in the front of the thigh. It is always best to head for a hospital if a reaction is in progress even if you are not seen just in case it worsens.
- 3. Desensitization.** This is a procedure that involves giving you shots over a period of time in gradually increasing dosage to make you less sensitive to insect venoms. Medical trials show that desensitization is effective and will prevent serious reactions in the majority of people. It requires gradually increasing doses at weekly intervals for approximately 12 weeks followed by maintenance doses at monthly or longer intervals. Maintenance doses are usually kept up for 3 to 5 years and then it is likely that they can be stopped. Recent studies indicate that the severe sensitivity rarely recurs after a course of desensitization. Desensitization is particularly indicated if you are commonly in high-risk situations or if you frequent areas in the summer time where medical attention is not readily available. The pros and cons of this therapy will be discussed with you.

How is insect sting sensitivity diagnosed?

The skin test is still the best diagnostic test. A blood test or "RAST" can be done additionally. You will be given various concentrations of insect venom into your skin to define which insect venoms are causing an allergic reaction. If you have been stung by one insect, you may be also reactive to other insect venoms because they share some common allergens. If you have had systemic reactions, you are potentially vulnerable to any venom to which you show a positive skin test.

There are some things about the skin test that are frequently misunderstood. A positive skin test reaction means that you have developed an immune response to the insect venom but not that you will develop a dangerous reaction to an insect sting. Your risk of getting a systemic reaction cannot be precisely estimated by the size of your skin test reaction to venoms. Some individuals have a positive skin test and never get a systemic reaction. The susceptibility of your body to stings is dependent on factors in addition to a positive skin test. The occurrence of a systemic reaction along with a positive skin test establishes the diagnosis. This is why it is not appropriate to skin test everyone to determine if they are allergic to insects.