CONDITION

Allergies to insect stings

Learn how insect-sting allergies differ from normal swelling, how to recognize anaphylaxis, and how testing, epinephrine, and venom immunotherapy can help.

WHAT IT IS
Immune reaction to insect venom

BODY SYSTEM
Immune system

MAIN SYMPTOMS
Widespread hives, throat swelling, breathing difficulty, dizziness or fainting

WHAT CAUSES IT
Immune sensitization to insect venom

HOW IT IS DIAGNOSED
Reaction history and venom allergy testing

MAIN TREATMENT
Epinephrine and venom immunotherapy

CAN IT BE CURED?
No, treatment reduces future reaction risk

IS IT AN EMERGENCY?
Sometimes, with breathing trouble or faintness

LONG-TERM OUTLOOK
Future reactions unpredictable but immunotherapy highly effective

Overview

An insect-sting allergy is an immune system reaction to venom injected during a sting. The immune system mistakes proteins in the venom for a serious threat and releases chemicals that can affect the skin, breathing, digestion, heart, and blood vessels.

Most insect stings cause pain, redness, itching, and mild swelling near the sting. These local reactions are uncomfortable but are not the same as an allergy affecting the whole body.

A systemic allergic reaction causes symptoms away from the sting site. The most serious form is anaphylaxis , a rapid allergic reaction that may interfere with breathing or blood circulation. Anaphylaxis requires immediate treatment with epinephrine and emergency medical care.

Insects that commonly cause venom allergies include:

Mosquitoes, fleas, and some other insects bite rather than sting. Their bites can cause local allergic reactions, but they are evaluated differently from venom allergies.

Insect-sting allergy matters because a future reaction can be unpredictable. People who have had symptoms beyond the sting site should discuss the event with a healthcare professional. An allergist can assess the reaction, arrange appropriate testing, and determine whether an epinephrine auto-injector or venom immunotherapy may help.

- Honeybees
- Yellow jackets
- Hornets
- Paper wasps and other wasps
- Fire ants

Symptoms

A normal local reaction develops around the sting. It may include immediate pain, a small area of redness, itching, warmth, and swelling. These symptoms usually improve with basic care.

A large local reaction causes swelling that extends well beyond the sting site. For example, a sting on one finger may cause much of the hand or arm to swell. The swelling often increases over the next day or two before gradually improving. Large local reactions can be painful, but they usually do not become anaphylaxis.

A systemic allergic reaction may involve one or more parts of the body:

Anaphylaxis can occur without hives or other visible skin symptoms.

Use epinephrine immediately and call emergency services if a sting is followed by trouble breathing, throat or tongue swelling, faintness, collapse, or symptoms affecting more than one body system. If an epinephrine auto-injector is available, use it according to the device instructions and the person's emergency plan. Do not wait to see whether symptoms improve.

Antihistamines like cetirizine or loratadine may reduce itching or hives, but they do not treat breathing problems or low blood pressure and must not delay epinephrine.

- Widespread hives, flushing, or itching
- Swelling of the lips, tongue, face, or throat
- A hoarse voice or trouble swallowing
- Coughing, wheezing, chest tightness, or shortness of breath

- Stomach cramps, vomiting, or diarrhea
- Dizziness, confusion, fainting, or a sudden feeling of weakness
- A rapid deterioration or a sense that something is seriously wrong

Causes and risk factors

Venom allergy develops after the immune system becomes sensitized to an insect's venom. During a later sting, venom-specific antibodies can trigger the release of histamine and other chemicals. This process may cause swelling, airway narrowing, or a fall in blood pressure.

A previous systemic reaction is the most important reason to seek an allergy assessment. However, the severity of a future reaction cannot be predicted with certainty from symptoms alone.

Factors that may increase exposure or affect the seriousness of a reaction include:

Do not stop a beta blocker like metoprolol or propranolol , an ACE inhibitor, or another prescribed medicine because of a sting reaction without speaking with the prescriber. A clinician can weigh the medicine's benefits against any concerns and coordinate care with an allergist.

A large local reaction does not automatically mean that the next sting will cause anaphylaxis. Likewise, family history alone does not establish venom allergy. Testing is interpreted together with the person's own reaction history.

- Outdoor work or hobbies, such as gardening, farming, landscaping, or beekeeping
- Living or working near nests or areas with fire ants
- A previous reaction involving breathing, blood pressure, or several body systems
- Mastocytosis or another mast cell disorder, in which certain immune cells are abnormal or overly active
- An elevated baseline tryptase level, which can be a sign of increased mast cell activity
- Older age or significant heart or lung disease
- Some medicines used for heart disease or high blood pressure

Diagnosis

Diagnosis begins with a detailed description of the sting and the symptoms that followed.

Helpful details include the suspected insect, where the sting occurred, whether a stinger remained in the skin, how quickly symptoms started, which parts of the body were affected, and what treatment was given.

An allergist may use skin testing or a blood test for venom-specific immunoglobulin E, often called venom-specific IgE. These tests look for allergic sensitization to particular venoms. A positive result does not prove that every future sting will cause a serious reaction, so the result must match the clinical history.

Testing performed soon after a sting can sometimes be negative even when the history strongly suggests an allergic reaction. The allergist may recommend repeat testing later. Routine venom testing is generally not useful for people who have never had a systemic reaction because positive sensitization tests can occur without clinically important allergy.

A baseline tryptase blood test may be recommended after a severe reaction, especially one involving low blood pressure, fainting, or limited skin symptoms. Tryptase is an enzyme associated with mast cells. An elevated level may lead to further evaluation for a mast cell condition.

Large local swelling can resemble a skin infection. Swelling that begins soon after a sting and peaks over the next day or two is often inflammatory rather than infectious. Fever, pus, worsening tenderness, or redness that continues to spread may need medical evaluation.

Treatment and management

For a bee sting, remove a visible stinger as quickly as possible. It can be brushed, scraped, or pulled out; rapid removal is more important than the method. Wasps, hornets, and yellow jackets usually do not leave a stinger behind.

Wash the area with soap and water. A cold pack wrapped in cloth can reduce pain and swelling. Elevating an affected arm or leg may also help. A pharmacist or clinician can advise whether an oral antihistamine, pain reliever, or topical treatment is appropriate based on age, health conditions, pregnancy, and other medicines. Severe large local reactions sometimes need prescription treatment.

Anaphylaxis is treated first with epinephrine , usually through an auto-injector placed against the outer thigh. After using it, call emergency services. A person who feels faint should generally lie flat with the legs raised, unless breathing difficulty or vomiting makes another position necessary. Avoid suddenly standing or walking.

Symptoms can persist or return after the first injection. Follow the emergency plan and the product instructions about using an additional auto-injector while waiting for emergency help.

Hospital observation may be needed based on the reaction and response to treatment.

After a systemic reaction, a clinician may prescribe epinephrine auto-injectors and explain:

People with a confirmed venom allergy may be offered venom immunotherapy . This treatment gives carefully controlled amounts of the relevant venom under medical supervision. The dose is increased over time to make the immune system less likely to react severely to a future sting.

Venom immunotherapy is highly effective at reducing the risk of future systemic reactions, but it is not appropriate for every local reaction. The decision depends on the reaction history, test results, likely exposure, other medical conditions, and personal preferences. Treatment often continues for several years. Some people with ongoing high-risk features may need a longer course.

Reducing exposure can also help. Wear closed shoes outdoors, use caution around flowering plants and open drink containers, keep food covered, and arrange professional removal of nests near living areas. Avoid swatting at stinging insects. If one approaches, move away calmly.

- When and how to use them
- How many devices to keep available
- Where to store them
- How to check expiration dates and solution appearance
- How family members, caregivers, or coworkers can assist

Complications

The main complication is anaphylaxis, which can progress quickly. A second wave of symptoms, called a biphasic reaction , can sometimes occur after initial improvement. This is one reason emergency assessment is important after epinephrine is used.

Multiple simultaneous stings can cause a toxic venom reaction even in someone without an allergy. Large venom exposure may damage muscles, kidneys, blood cells, or other organs. Anyone who has received many stings, has significant symptoms, or is medically vulnerable should receive urgent medical advice.

Other possible complications include injury from falling during a reaction, anxiety about outdoor activity, and reduced quality of life. Venom immunotherapy and a clear emergency plan can help some people feel safer while maintaining normal activities.

Skin infection after a sting is uncommon but possible. Increasing pain, pus, fever, or redness that continues to worsen rather than gradually improve should be assessed by a healthcare professional.

Follow up

Arrange routine follow-up with a healthcare professional after any reaction that caused widespread hives, swelling away from the sting, breathing symptoms, vomiting, dizziness, or fainting. Ask whether referral to an allergist is appropriate.

People prescribed epinephrine should review their technique regularly and replace devices before they expire. Bring auto-injectors to appointments so a clinician or pharmacist can check the device and demonstrate its use. Schools, workplaces, and caregivers may also need a written emergency plan.

People receiving venom immunotherapy need scheduled injections and monitoring in a medical setting. Tell the allergy team about reactions after injections, new medical conditions, pregnancy, or changes in heart and blood pressure medicines.

Seek prompt medical care for swelling that is severe, continues to worsen, affects function, or may be infected.

Use epinephrine and call emergency services for trouble breathing, throat or tongue swelling, faintness, collapse, or rapidly developing symptoms in more than one body system. Emergency care should not be replaced by a routine clinic appointment.

Sources

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