

## What are Allergies and how do we test for them?

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An Allergy is a **hypersensitivity disorder of the immune system**. Allergic reactions occur when a person's immune system reacts to normally harmless substances in the environment. A substance that causes a reaction is called an **allergen**. These reactions are acquired, predictable, and rapid.

Allergic reactions are distinctive because of excessive activation of certain white blood cells called **mast cells** and basophils by a type of **antibody called Immunoglobulin E (IgE)**. This reaction results in an inflammatory response which can range from uncomfortable to dangerous.

Mild allergies like hay fever are very common in the human population and cause symptoms such as red eyes, itchiness, and runny nose, eczema, hives, hay fever, or an asthma attack. Allergies can play a major role in conditions such as asthma. In some people, severe allergies to environmental or dietary allergens or to medication may result in life-threatening reactions called **anaphylaxis**. Food allergies, and reactions to the venom of stinging insects such as wasps and bees are often associated with these severe reactions.

Many allergens such as dust or pollen are airborne particles. In these cases, symptoms arise in areas in contact with air, such as eyes, nose, and lungs. For instance, allergic rhinitis, also known as hay fever, causes irritation of the nose, sneezing, itching, and redness of the eyes.

Inhaled allergens can also lead to asthmatic symptoms, caused by narrowing of the airways and increased production of mucus in the lungs, shortness of breath, coughing and wheezing.

Allergic reactions can result from foods, insect stings, and reactions to medications like aspirin and antibiotics such as penicillin.

Symptoms of food allergy include abdominal pain, bloating, vomiting, diarrhea, itchy skin, and swelling of the skin during hives.

Insect stings, antibiotics, and certain medicines produce a **systemic allergic response** that is also called **anaphylaxis**; multiple organ systems can be affected, including the digestive system, the respiratory system, and the circulatory system.

This type of reaction can be triggered suddenly, or the onset can be delayed. The severity of this type of allergic response often requires injections of epinephrine, sometimes through a device known as the *EpiPen*.

Substances that come into contact with the skin, such as latex, are also common causes of allergic reactions, known as contact dermatitis or eczema.

A variety of tests exist to diagnose allergic conditions. These include placing possible allergens on the skin and looking for a reaction such as swelling. Blood tests can also be done to look for an allergen-specific IgE.

**Skin testing** is also known as "puncture testing" and "prick testing" due to the series of tiny puncture or pricks made into the patient's skin. Small amounts of suspected allergens and/or their extracts (pollen, grass, mite proteins, peanut extract, etc.) are introduced to sites on the skin marked with pen or dye.

Sometimes, the allergens are injected "intradermally" into the patient's skin, with a needle and syringe. If the patient is allergic to the substance, then a visible inflammatory reaction will usually occur within 30 minutes. This response will range from slight reddening of the skin to a full-blown hive (called "wheal and flare") in more sensitive patients similar to a mosquito bite. Skin tests may not be an option if the patient has widespread skin disease or has taken antihistamines sometime the last several days.

An **allergy blood test** is quick and simple and can be ordered by a licensed health care provider e.g. an allergy specialist, GP or PED. Unlike skin-prick testing, a blood test can be performed irrespective of age, skin condition, medication, symptom, disease activity and pregnancy. Adults and children of any age can take an allergy blood test.

Allergy blood tests are very safe, since you are not exposed to any allergens during the testing procedure.

Treatments for allergies include

- avoiding known allergens,
- use of medications such as anti-histamines that specifically prevent allergic reactions, steroids that modify the immune system in general, and
- medications such as decongestants that reduce the symptoms. Many of these medications are taken by mouth, though epinephrine, which is used to treat anaphylactic reactions, is injected. Immunotherapy uses injected allergens to desensitize the body's response, and targeted therapy