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# Allergy testing

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## **Introduction**

Before appreciating what allergy testing is and what it means, we must first consider the questions which are asked by many sufferers, their families and carers.

## **What is Allergy?**

The term allergy is used to describe a response, within the body, to a substance, which is not necessarily harmful in itself, but results in an immune response and a reaction that causes symptoms and disease in a predisposed person, which in turn can cause inconvenience, or a great deal of misery.

Allergy is extremely widespread and affects approximately one in four of the population in the UK at some time in their life. Each year the numbers are increasing by 5% with as many as half of all sufferers being children.

## **What do we mean by a 'predisposed individuals'**

Predisposed individuals have a condition known as ATOPY (this is a derivation of the Greek word "Atopos" (which means out of place). Atopy is not an illness but an inherited feature, which in turn makes individuals more likely to develop an allergic disorder. Atopy tends to run in families.

The reason why atopic people have a tendency to develop allergic disorders is because they have the ability to produce the allergy antibody called "Immunoglobulin E" or "IgE" when they come into contact with a particular substance.

However, not everyone who has inherited the tendency to be atopic will necessarily go on to develop an allergic disorder, which could include:

- **Asthma**
- **Eczema**
- **Seasonal rhinitis** (hayfever)
- **Perennial rhinitis** (all year round symptoms like hayfever)
- **Urticaria** (hives or nettle rash)
- **Acute Urticaria** - short lived / chronic urticaria lasting six weeks or more - not necessarily on a daily basis. The majority of chronic urticarias are not IgE mediated.

Nevertheless, this inherited tendency or disposition could result in the development of symptoms later in life. We can conclude by stating that people who do not have allergies normally have only small amounts of "IgE".

## What is the difference between Allergy, Intolerance, and Sensitivity?

Although the word “**Allergy**” is commonly used to describe any unpleasant reaction to a drug, food, insect sting, or chemical, this can be misleading. The word should only really be used to describe a reaction produced when the body meets a normally harmless substance, which has been “remembered” from a previous exposure and subsequently produces the “IgE” antibody.

“**Sensitivity**” is a reaction to a substance, which is an exaggeration of a normal side effect produced by that substance. For example, reliever inhalers used in asthma, if given at too high a dose in a particular individual may cause them to “shake”.

“**Intolerance**” happens when unpleasant symptoms occur after eating a substance, which your body cannot handle because the digestive system does not produce sufficient quantities of a particular enzyme/chemical, which is needed to break down the food and aid digestion. The causes of symptoms need to be correctly diagnosed so that the management and treatment for either allergy, sensitivity or intolerance can be appropriately taken.

## What is an Allergen?

We have talked about an allergic response to a substance. The substance is known as an allergen, which contains protein. Almost anything can be an allergen for someone, the most common being house dust mites, pollen from trees and grasses, cats, dogs, insects such as wasps and bees, milk, eggs, peanuts. Less common allergens include tree nuts, fruit, and latex. Protein is often regarded as just something that we eat. It is, in fact, an organic compound containing hydrogen, oxygen, and nitrogen, which form an important part of living organisms. There are, however, some non-protein allergens which include penicillin and some other drugs. For these to cause an allergic response, they need to be bound to a protein once they are in the body. A person’s immune system believes that the invading allergens are damaging and in response the body produces an antibody (“IgE”) to attack them. This in turn leads to other cells (i.e. mast cells) to release further chemicals which together cause irritation, inflammation, and the symptoms of an allergic response. Some of the conditions or diseases themselves have already been listed but it should be understood that all the mentioned diseases can be caused by factors other than allergy.

Here are some of the most common symptoms associated with the conditions:

Sneezing; Swelling; Wheezing; Sinus pain; Shortness of breath;  
Itchy eyes, ears, lips, throat & palate (roof of mouth); Runny nose; Coughing;  
Sickness, vomiting and diarrhoea; Increase in secretions; Nettle rash/hives;

## How do you know you have an allergy?

You may have experienced some of the above symptoms, in which case you should seek your GP or Practice Nurse's advice.

It will be helpful if you can state whether the symptoms:

- Occur at any particular time of the day or year and how often
- Which part of your body is affected
- How severe the symptoms are
- Family history
- Self help remedies which seem to help
- Triggers i.e. whether or not there is anything in particular, which makes your symptoms worse
- Do you improve when you are away from the place where your symptoms occur, i.e. home or work environment?

Answering these questions is part of the process of taking a "history" and often the history can help towards identifying the allergens. Even if you know what is causing your allergic reaction, you may still need to have confirmation of the offending allergen. This is especially important if you have had a severe reaction and if there is any confusion as to whether your symptoms are caused by a true allergy (involving the production of IgE) or whether some other process is involved. Allergy testing can help clear any doubts.

As stated at the beginning, (1 in 3) 33% of the population will at some time in their life see a doctor because of an allergy, as a consequence and frequency of these problems allergy testing is becoming increasingly sophisticated. However, there is no point in having an allergy test if either the sufferer or the doctor is not prepared to act on the results. If the results from the tests are positive and correlate with a clear and precise history then one should gain benefit from appropriate allergy medication not only to relieve the symptoms, but also in the use of prevention medication and not least appropriate avoidance measures.

## **What Allergy Tests are available?**

The type of test to be carried out will depend upon your symptoms or condition of your skin and are described as follows:

### **Skin Prick Testing**

This is a test, which measures specific IgE attached to cells in the skin important in allergies called "mast" cells. This is probably the most commonly used allergy test and is appropriate for inhaled and ingested (eaten) allergies.

- it is usually carried out on the inner forearm (palm uppermost)
- If the patient has bad eczema on the area under the test then the test can be performed on the back
- Ideally the allergens to be selected should be in accordance with the patient's history
- As few as 3 or 4 or up to about 25 allergens can be tested
- The arm is coded with a marker pen for the allergens to be tested

- A drop of the allergen (extract) solution is placed by each code
- The skin is then pricked through the drop using the tip of a lancet - this can feel a little uncomfortable but should not be painful

### **POSITIVE REACTION**

The skin becomes itchy within a few minutes and then becomes red and swollen with a "weal" in the centre (very much like the reaction to a nettle sting). The weal has a raised edge, which slowly expands to reach its maximum size in about 15-20 minutes, clearing for most people within an hour. The size of the weal varies with the average being 3-5 mm in diameter. It should be noted the size of the weal does not indicate the severity of symptoms. The test tells us that a level of antibodies are / or are not present which may be causing your symptoms.

#### ***Also included in skin testing is a negative and positive control:***

The negative control is a saline (salt-water) solution, to which a response is not expected. If however a patient reacts to a negative control, then this will indicate that the skin is, for whatever reason, extremely sensitive and that the results from the allergen challenge needs to be interpreted with the utmost care.

The positive control solution contains histamine, to which everyone is expected to react. Failure to do so could mean that medicines the sufferer is taking could block the response to the histamine and allergens. Patients will be asked to avoid taking antihistamines, cough medicine and some anti depressants (Tricyclic) for about 5-6 days prior to the test.

The skin prick test introduces such a tiny amount of allergen into the skin that testing is quite safe and almost any age group can be tested. However, where there has been a clear anaphylactic (shock) reaction to a specific allergen ingested then skin testing may not be appropriate. These tests can be carried out on all age groups including babies although the response will be considerably smaller than in an adult. Skin prick testing is usually the first test recommended when an allergy is suspected. The advantages are that it is a simple, quick and inexpensive form of testing. It can give useful information in all forms of allergy and provides results within 15-20 minutes. This must be carried out within a hospital environment by specially trained nurses or doctors where there are resuscitation facilities available.

### **Blood Tests**

Blood tests measure the amount of IgE circulating in the blood, which the immune system has produced against a suspected allergen. The test is carried out on a small sample of blood, which is usually taken from a vein in the arm, using a fine needle and a small syringe, causing minimal discomfort. The sample is then sent to a hospital laboratory and the results are available in 7 to 14 days.

**The blood sample can be taken at the GP surgery or at a hospital.**

#### ***These tests are particularly useful when:***

- The patient has a risk of an anaphylactic (shock) reaction, which would make skin prick testing too risky.

- When extensive eczema makes skin prick testing impractical.
- When antihistamine medication cannot be stopped because of severe symptoms.
- No skin prick testing facilities are available.
- Where unusual and rare allergens are suspected.

## Positive Tests

A positive test is reported in classes of 0 to 6 where increasing classes indicate increasing sensitivity to an Allergen.

### Class

- 0 = Negative**
- 1 = Low**
- 2 = Moderate**
- 3 = High**
- 4-6 = Extremely High**

### Readings

A number of laboratories have now switched to recording specific IgE results different from the previous Grade or Class system shown above to reporting the actual level as shown on the right. This change has taken place to increase the accuracy and to potentially allow levels lower than Grade 1 to be reported. The increased accuracy may allow a change in specific IgE to be measured following a treatment or intervention. To the right is a guide to compare the new results alongside the Grade or Class system (1 to 6)

Old      New

Class	IgE Levels KU <sub>A</sub> /L
<b>0</b>	<b>&lt;0.35</b>
<b>1</b>	<b>0.35 - 0.69</b>
<b>2</b>	<b>0.7 - 3.4</b>
<b>3</b>	<b>3.5 - 17.4</b>
<b>4</b>	<b>17.5 - 49.9</b>
<b>5</b>	<b>50 - 99</b>
<b>6</b>	<b>&gt;100</b>

## Patch Testing

This test is performed in cases of contact dermatitis (Eczema) where allergy is suspected. The allergens are prepared in appropriate concentrations in white soft paraffin (e.g. Vaseline) and are then spread on to discs, 1cm in diameter. The discs (which are usually made of special metal, cannot themselves provoke a reaction) are placed on the skin, usually on the back, and are kept in place by hypoallergenic tape.

The skin is coded appropriately and the patient is asked to keep the skin dry. The patches are left in place for 48 hours. After which time the discs are removed, the skin is examined and any redness or swelling is noted. The skin is re-examined after a further 48 hours for any remaining local redness or swelling.

The interpretation of this form of testing is not as simple as it sounds and tends to be carried out by dermatology departments in hospitals. The symptoms of contact dermatitis need to be brought under control before patch testing can be carried out, otherwise the results will be unreliable. Steroid creams need to be stopped for 3-4 weeks before testing as they may suppress the test response.

Any professional interpreting skin, blood or patch tests must first interpret the results in the light of the patient's history. No test should be read in isolation.

## Can we test for Food Intolerance?

A recent clinical trial in the UK was undertaken among patients suffering from Irritable Bowel Syndrome (IBS). The trial looked at IgG blood tests (Different from the IgE allergy blood tests mentioned above) *for food intolerance or to give it its new correct medical name non-allergic food hypersensitivity*. The outcome of the trial showed excellent results in improvement of patients symptoms following avoidance of the food identified in the IgG blood test. We keenly await the evidence from further trials of such tests in the UK and other European countries.

## Other (Non-conventional) Allergy Tests

**The following tests are not regarded by conventional medical practitioners to be relevant, standardised or repeatable and are considered to have no place in the diagnosis of true allergy.**

Applied Kinesiology - measures muscle strength.

Auricular Cardiac Reflex Method - measures strongest pulse at wrist.

Hair Analysis - hair tested for medical problems.

Leukocytotoxic Tests - white blood cells mixed with suspected allergen and observed under a microscope.

Neutralisation-Provocation Testing - a specific dose of neutralised allergen drops are placed under the tongue.

Vega Testing - measures the electromagnetic fields produced by the sufferer. If in doubt, always request evidence of the results of approved clinical trials.

## What to do Next?

So now, we have reviewed allergy, allergens, tests, and no doubt you are wondering "Where do I go from here"? In order to find out who carries out conventional allergy testing in your area ask the following people for information:

- Your GP
- Your Practice Nurse
- Local Hospital
- Your Health Visitor
- School Nurse
- Your local Pharmacist
- Your local Health Advice Centre
- Your Citizens Advice Bureau
- NHS Direct

If you have difficulty in obtaining the information you require then please contact the Allergy UK Helpline on **01322 619898**

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