

Immunotherapy for food allergies

Immunotherapy for food allergies was first attempted more than 100 years ago but it is only in the last 10-15 years that it has really become a possible treatment option. The idea is that your immune system can be trained to tolerate the food you're allergic to, so it no longer causes reactions. Here we look at the different types of immunotherapies available for food allergies.

What is immunotherapy?

Until recent years, the only way to manage a food allergy was to carefully avoid the food you're allergic to and to carry adrenaline. This is still the main way that most food allergies are managed but immunotherapy now offers an alternative.

Immunotherapy is a medical treatment that aims to desensitise your immune system to the food you are allergic to, meaning you're less likely to have a reaction. It does this by gradually exposing you to small amounts of that food under careful supervision, slowly building up the amounts over the weeks and months.

The main goal of immunotherapy is to stop you having an allergic reaction if you accidentally come into contact with the food you are allergic to. It is not a cure for allergy, but in some cases, treatment can be so successful that you can go on to freely eat the food. It's important to discuss the goal of your treatment with your allergy specialist before starting treatment so you can have realistic expectations.

Until recently, all types of immunotherapies for food allergy were considered experimental and were only available in clinical trials and some private clinics. Now, some are becoming more widely available. For example, a treatment for peanut allergy called Palforzia is now fully licenced and approved for use in children.

What are the different types of immunotherapy for food allergy?

There are three main types of immunotherapy for food allergy:

- Oral immunotherapy (OIT), where you eat or drink the food you're allergic to.
- Sublingual immunotherapy (SLIT), where you hold the allergen under your tongue for a short time, but don't swallow it.
- Epicutaneous immunotherapy (EPIT), where you are given the allergen through the skin using a skin patch.

What is oral immunotherapy (OIT)?

Oral immunotherapy (OIT) involves eating or drinking a tiny amount of the food or drink you are allergic to and slowly building up the amount you can safely have. This usually takes place over a period of weeks or months. The amounts and timeframes will vary depending on your diagnosis and what you're allergic to.

You may be given the food as a powder or liquid which is carefully measured into another food or drink, such as yogurt or fruit juice. The amount will be increased every day or every few days, as long as you don't have an allergic reaction. This process of increasing the amount is called 'dose escalation'.

Once you have reached the highest amount you can tolerate without having an allergic reaction (called your 'maintenance dose'), you will need to keep eating this amount every day for a period of time – from several months to a year or more – as the effects are temporary. If you don't eat the food regularly the effect of the treatment could wear off. Eventually, it may be possible to eat the food less often, such as three times a week, and still keep the benefits.

Does oral immunotherapy work?

Studies have shown that OIT can work well. It seems to work best in younger children and becomes less effective as children get older, although some studies have shown it can work in adults too.

Most studies have looked at OIT for peanut, cow's milk and egg allergies. More research is needed to find out how well it works for other foods such as tree nuts, sesame and seafood but, in theory, there is no reason why it wouldn't work just as well and the studies done so far suggest that it does.

It's not certain how long the benefit of treatment lasts if you stop eating the food regularly but in most cases, especially in older children, the effect will be lost if they don't eat it regularly. It's likely you will need to keep including the food in your diet for the rest of your life to keep the benefits.

Oral immunotherapy for peanut allergy

Peanut allergy usually starts in childhood and only about 1 in 5 children with peanut allergy will outgrow it.

OIT is the most studied immunotherapy treatment for peanut allergy. After many research studies showing it works, specialists in the USA and Europe started to offer it. In the past, some UK families opted to travel to clinics abroad as it had not been widely available in the UK. Now, one option called Palforzia is available on the NHS and others are available at private clinics or as part of clinical trials.

Palforzia

Palforzia is the only oral immunotherapy treatment approved for peanut allergy available on the NHS. It was approved for NHS use in 2021 to treat children aged 4 to 17.

Palforzia comes as capsules of peanut powder that are measured into precise tiny amounts

that are slowly increased over time.

The treatment is only available in a few specialist allergy centres in the UK and children must meet certain criteria, including having a confirmed peanut allergy diagnosis and being willing to stick to the strict treatment plan.

Other types of peanut products

Different types of peanut products have been explored for oral immunotherapy in research studies, such as raw peanuts, peanut flour and boiled peanuts.

Some studies have shown that boiling peanuts for several hours can reduce their 'allergenicity' meaning they are less likely to cause an allergic reaction. This means they can be used for oral immunotherapy without causing as many side effects or reactions as raw peanuts.

These options are still considered experimental in the UK and the only way to access them is through clinical trials or at specialist private allergy clinics.

Oral immunotherapy for cow's milk and hen's egg allergies

Cow's milk and hen's egg allergies are very common in young children. Most children outgrow milk and egg allergies by the age of 5 but they can sometimes last longer.

A milk or egg ladder for milder allergies

A type of oral immunotherapy has been used in allergy clinics for many years to help children with mild to moderate allergies to outgrow their allergies more quickly. The treatment is also known as 'desensitization' and uses a structured approach called a 'milk ladder' or 'egg ladder'.

A milk or egg ladder involves:

- giving the child foods that contain a small amount of cooked milk or egg
- building up the amount

- then moving on to foods with uncooked milk or egg.

Parents and children can usually follow the milk or egg ladder at home with support from a specialist dietitian or allergy consultant. There is usually no need to be in a clinic or hospital.

Oral immunotherapy for serious or persistent allergies

Some specialist NHS allergy clinics now offer oral immunotherapy for more serious or persistent milk and egg allergies. These are usually for older children who haven't outgrown their allergy.

Starting with a tiny amount, children are given an increasing amount of milk or egg over several weeks. The idea is to build up their tolerance so that they can have larger amounts of milk or egg without having any symptoms. They must keep having milk or eggs every day after finishing treatment to keep the effects.

Treatment for more serious allergies must always be carried out with an allergy specialist. This usually means frequent visits to the clinic or hospital when doses are increased to make sure emergency treatment is available in case of a serious reaction.

Not all children with more serious allergies will be able to have treatment. Some studies have shown that in children who are very sensitive to tiny amounts of milk or egg, treatment is less likely to be successful and side effects are more likely.

Oral immunotherapy for other common food allergies

Treatment for other food allergies is unlikely to be offered in NHS allergy clinics until there has been more research to show that it is safe and works well for them. Some private clinics in the UK are beginning to offer oral immunotherapy for allergy to sesame, tree nuts and wheat. Like all oral immunotherapy, this should only be done with guidance from a specialist allergy consultant due to the risk of a reaction.

What are the side effects, risks, and disadvantages of oral immunotherapy?

It's common to have mild side effects during oral immunotherapy, especially when the dose of the food is being increased, including:

- itching or tingling in the mouth or throat
- feeling sick
- stomach pain.

Sometimes the dose of the food may need to be adjusted or built up at a slower rate. Your allergy specialist may also recommend certain medicines such as antihistamines to help with any side effects.

The main risk from oral immunotherapy is that it might cause an allergic reaction. Serious reactions, including anaphylaxis, are rare, but they can happen, and will need to be treated with adrenaline. This is why treatment is often given in allergy clinics.

You or your child will need to avoid exercise before and after treatment doses. This is because activities that raise the heart rate can affect how your immune system reacts to your allergen and could make an allergic reaction more likely. It's important to consider the impact this may have on your lifestyle before committing to treatment.

Most people need to keep carrying their adrenaline during and after treatment, but this will depend on how well the treatment has worked and will be reviewed by your specialist team.

If you feel too uncomfortable risking allergic reactions, or feel that the lifestyle impact is too great, oral immunotherapy may not be the right choice for you or your child.

You may prefer to continue to keep carefully avoiding the food instead. It is important to discuss the risks and benefits of treatment with your allergy specialist so you can make the right choice for you and your family.



A brighter future for people with serious allergies

How to find out more

If you are not already being treated at a specialist allergy clinic, see your GP who can refer you to one. They can find a clinic in your area from the [British Society for Allergy and Clinical Immunology \(BSACI\)](#).

What is sublingual immunotherapy (SLIT)

Sublingual immunotherapy has been offered for many years for environmental allergies such as hay fever, dust mite and animal allergies, and it can work well.

Sublingual immunotherapy for food allergies is similar to oral immunotherapy, except you hold the food you're allergic to under your tongue, rather than swallowing it. It usually comes as a liquid but trials using tablets are under way too.

Special cells in the mucous lining of your mouth take up the allergen – the proteins in the food that cause the reaction. Your immune system recognizes the allergen, leading to changes that make you less likely to react to the food in the future.

Several studies have looked at sublingual immunotherapy for food allergies. Most have been for peanut allergy, but others have looked at hazelnut, peach, apple and milk.

Sublingual immunotherapy seems to be safer than oral immunotherapy, causing fewer side effects and allergic reactions. Another key benefit is that you don't have to avoid exercise around the time of your treatment doses.

Some researchers have looked at whether it could be used as a pre-treatment before oral immunotherapy if your allergy is too serious to start oral treatment straight away.

Does sublingual immunotherapy work?

Sublingual immunotherapy has been shown to work well in clinical trials.

For peanut allergy, at least three recent studies have shown that it could raise your tolerance of peanuts enough that you wouldn't have a reaction if you were exposed to them by accident.

For hazelnut, milk and peach allergies, studies have shown that treatment can increase the amount of allergen you could tolerate by up to 10 times.

In studies comparing sublingual immunotherapy with oral immunotherapy, oral treatment seems to build higher levels of tolerance and can work faster, but sublingual treatment has a much lower risk of side effects or allergic reactions.

Most studies have looked at how well treatment works in children and teenagers up to the age of 18. The treatment seems to work best in the youngest children, becoming less effective with age.

There isn't enough research yet to work out standard doses and timescales for the treatment.

Who can have sublingual immunotherapy?

Sublingual immunotherapy is still an experimental treatment so it's only available as part of clinical trials in the UK. It could be a potential treatment option in the future for people who can't have oral immunotherapy because their allergy is too serious, or they have had too many serious reactions to oral treatment.

What are the side effects of sublingual immunotherapy?

The most common side effects are mild, such as:

- itching of the mouth
- nausea
- upset stomach.

Side effects are much less common than with oral treatment. One study found that only about 4 in 100 people having sublingual immunotherapy had mild side effects, compared to 4 in 10 having oral immunotherapy.

It is very unusual to have a serious allergic reaction with sublingual immunotherapy.

What is epicutaneous immunotherapy (EPIT)?

Epicutaneous immunotherapy uses stick-on skin patches to reduce your sensitivity to your food allergen. The patch contains the proteins that cause the reactions. These enter the body through the skin and activate the immune system. Over time, your body stops seeing the allergen as a threat, so you don't have an allergic reaction if you accidentally eat the food you're allergic to.

You will need to stick a patch to your upper back every day, in a different spot each day. You'll need to wear it for a few hours a day to start with and build up to wearing it for 24 hours.

This type of immunotherapy has been studied for several years, mainly for peanut, milk and egg allergy. There is hope that it will become a licenced treatment for peanut allergy within the next few years.

Does epicutaneous immunotherapy work?

Clinical trials have shown that epicutaneous immunotherapy can work well for peanut allergy. It can increase the amount of peanut you can eat without having an allergic reaction, but not as much as with oral immunotherapy. It also takes longer to work. One study showed it took a year to protect you from accidental peanut exposure, compared to 6 months with oral immunotherapy.

Most studies have looked at how EPIT works in children and teenagers up to the age of 18. Like other immunotherapies, the treatment seems to be more effective in the youngest children, becoming less effective with age.

Some adults have been involved in trials of EPIT but it's not clear yet whether it could work for adults.

Who can have epicutaneous immunotherapy?

EPIT is still an experimental treatment and is only available as part of clinical trials in the UK. It could be a potential treatment option in the future for people who can't have oral immunotherapy because their allergy is too serious, or they have had too many serious reactions to oral treatment. It will also be a good option if you don't want to take your allergen by mouth.

What are the side effects of epicutaneous immunotherapy?

For most people, treatment is safe, and it's not common to have serious reactions. Most people will have skin reactions to start with such as:

- itching
- redness

- swelling at the site of the patch.

These types of reactions usually get better on their own within a few days but sometimes need treating with steroid creams and/or antihistamines.

Other treatments being studied

Many researchers are looking into new ways to improve immunotherapy for food allergies, mainly for peanut, milk and egg. Newer ideas include:

- Peptide immunotherapy – where the proteins that cause reactions are changed so they don't cause allergic reactions, but still help your immune system become more tolerant of your allergen.
- Oral mucosal immunotherapy (OMIT) – a type of sublingual immunotherapy that uses a toothpaste to carry the allergen to the area of the mouth where there are more of the cells that can take up the allergen.
- Medicines called monoclonal antibodies which can be used alongside oral immunotherapy to reduce the risk of side effects.

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Sources

All the information we produce is evidence based or follows expert opinion and is checked by our clinical and research reviewers. If you wish to know the sources we used in producing any of our information products, please contact info@anaphylaxis.org.uk and we will gladly supply details.

Reviewer



A brighter future for people with serious allergies

The content of this factsheet has been peer-reviewed by Professor Adam Fox, Consultant Paediatric Allergist, Evelina London Children's Hospital.

Disclosures

We are not aware of any conflicts of interest in relation to the review of this factsheet.

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About Anaphylaxis UK

Anaphylaxis UK is the only UK-wide charity solely focused on supporting people at risk of serious, life-threatening allergic reactions. We provide information and support to people living with allergies through our free national helpline. We also fundraise to achieve our ultimate aim, to create a safer environment for all people at risk of serious allergies. Visit our website www.anaphylaxis.org.uk and follow us to keep up-to-date with our latest news. We're on Facebook @anaphylaxisUK, LinkedIn, Instagram @anaphylaxisUK, Twitter @AnaphylaxisUK and YouTube.