

# Allergen Immunotherapy: Types and its Side Effects

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## DESCRIPTION

Allergen immunotherapy, also known as desensitization or hypo-sensitization, is a treatment for environmental allergies, such as insect bites, and asthma. Immunotherapy involves exposing people to larger and larger amounts of an allergen in an attempt to alter the immune system's response.

A meta-analysis has found that subcutaneous injections of allergens are effective in treating pediatric rhinitis and asthma. The benefits can last for years after treatment is stopped. It is generally safe and effective in treating rhinitis, allergic conjunctivitis, types of allergies and asthma, and stinging insects. Evidence also supports the use of sublingual immunotherapy against rhinitis and asthma, but it is less powerful. In this form the allergen is given under the tongue and people often prefer it to injections. Immunotherapy is not recommended as the sole treatment for asthma.

## Types

**Subcutaneous:** Subcutaneous Immunotherapy (SCIT), also known as an allergy shot, is a historical method of treatment and consists of injections of extracted allergens, which must be performed by a medical professional. Subcutaneous immunotherapy protocols typically involve weekly injections during the build-up phase, followed by a monthly maintenance phase consisting of injections for a period of 3-5 years. The build-up phase involves the patient receiving injections containing an increasing amount of allergens about once or twice a week [1]. The length of the build-up phase depends on how often the injections are used, but usually ranges from three to six months. After the effective capacity is reached, a maintenance phase is implemented, which varies depending on how the individual responds to the build phase.

When taking into account the age of the person, the type of allergen, and the severity of the allergy, it is more likely that subcutaneous allergen immunotherapy may provide greater clinical and immune responses than sublingual allergen immunotherapy. Compared to sublingual allergen immunotherapy, no significant difference was observed in quality of life [2].

It is possible, but rare (1/2.5 million), that people who undergo subcutaneous allergen immunotherapy may experience a fatal anaphylactic event. The adverse events of subcutaneous allergen immunotherapy vary depending on the different allergen extracts and the use of different allergen immunotherapy schedules.

Allergen immunotherapy schedules include a "bunch" method, which includes administering several doses in a row in one day; the "standard" method, which involves increasing the dose at about 15 weeks; and the "rush" method, which involves drinking increasing doses at intervals of 15-60 minutes over 1-3 days.

It is challenging to conduct an adequate risk assessment of the use of subcutaneous allergen immunotherapy compared to other forms of allergen immunotherapy administration due to the diversity of immunotherapy schedules and further research is needed.

**Sublingual:** Sublingual immunotherapy involves placing drops or tablets of an allergen extracted under the tongue, and then absorbed through the oral mucosa. Sublingual immunotherapy has been shown to be effective against rhino conjunctivitis and asthma symptoms. This function, however, varies depending on the type of allergen. The strongest evidence for the effectiveness of sublingual immunotherapy comes from studies that used grass allergens or mite allergens to relieve symptoms of allergic rhinitis; evidence shows modest improvement [3].

Sublingual immunotherapy is used to treat allergic rhinitis, usually from seasonal allergies, and is usually given in several doses over a 12-week period. It works best if given 12 weeks before the start of the pollination season. The first dose is given by the doctor to monitor for any unusual reaction or anaphylaxis. The following doses can be taken at home making this a suitable alternative to subcutaneous immunotherapy [4].

Although many side effects have been associated with sublingual immunotherapy, serious side effects are very rare (about 1.4/100000 doses), and no deaths have been reported. There have been a small number of reports of anaphylaxis. Most side effects are 'local' and usually resolve within a few days. They include swelling of the mouth, tongue or lips, throat irritation, nausea, stomach pain, vomiting, diarrhea, heartburn, and uvular

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edema. It is not yet clear whether there are risk factors that may increase a person's susceptibility to these side effects. Sublingual immunotherapy appears to be better tolerated than subcutaneous immunotherapy and causes fewer side effects. The safety of sublingual immunotherapy has not been extensively studied in people with chronic immunodeficiency or autoimmune disorders.

**Oral:** Oral Immunotherapy (OIT) involves feeding the patient increased amounts of the allergen to increase the threshold that triggers the reaction. Long-term, many study participants still experience mild allergic reactions or need to use an allergen to maintain sensitivity. Additionally, oral immunotherapy is known to have an increased risk of requiring epinephrine in patients taking it [5].

**Transdermal:** Transdermal Immunotherapy (TDIT) involves skin-induced Epicutaneous (EC) application of antigen in order to raise the threshold which triggers a reaction [6].

Side effects during sublingual immunotherapy are usually local and mild and can be eliminated by adjusting the dose. Anaphylaxis during sublingual immunotherapy occurs rarely. Potential side effects associated with subcutaneous immunotherapy for asthma and allergic rhino conjunctivitis

includes mild or moderate skin or respiratory reactions. Serious side effects such as anaphylaxis during subcutaneous immunotherapy are rare.

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