



## Allergies: When the Immune System Backfires

### Video Transcript

#### Allergies: a box with various compartments

Jenny, a sportive 22-year-old student, loves jogging. Recently in spring, she ate a piece of bread and went running in the woods. She suddenly felt an itch and noticed wheals all over her body. Then she became short of breath and dizzy. She sat down and took an antihistamine tablet she carried with her. After 30 minutes, her symptoms subsided and she walked home slowly. In the evening, she still felt unusually exhausted and tired, and decided to see her family doctor the next day. For the interpretation of an allergy, it is important to consider the allergic history of a patient. As a baby, Jenny had a bout of eczema. Because of a mild hay fever she has had for years in summer, her doctor prescribed her antihistamine tablets that she took upon demand only. So far, she has had no food allergy, but remembered similar symptoms some weeks ago while she was dancing at a party. Recently, she reported an oozing eczema when wearing cheap ear clips and after the contact with jeans buttons. Her family doctor knew that she was from an allergic family. Her mother has had hay fever until she was 30 years old, and her older brother suffered from asthma caused by house dust mites.

The family doctor considered the following issues. First, a family history and a known hay fever indicating an atopic background. Second, a suspected food allergy to an ingredient in bread. And third, an allergy to nickel in jewelry and metal buttons. He prescribed her anti-allergic medication and referred her to an allergist for further evaluation. After taking a thorough look at Jenny's allergic history and doing skin prick tests with pollen and food, the allergist gave her the following information. First, Jenny had indeed an atopic background, like her mother and brother with an immediate reaction to grass pollen, resulting in a mild hay fever upon exposure to grass pollen. Second, that the skin test for wheat turned out positive might explain Jenny's immediate allergic reaction to bread. The allergist wanted to confirm this in a next step by measuring specific IgE antibodies to wheat proteins in her blood. Third, she has also developed a sensitization to white metals, such as nickel and cheap metal objects. Skin contact results in a local allergic contact dermatitis within one to two days. In this case, not fast acting antibodies, but the slower acting T lymphocytes are responsible. Because of its slower evolution, it is a so-called delayed type allergy. This allergy type could be tested by patch tests. Jenny quickly considered the information from her allergist. She was afraid that she had to quit jogging, but her allergist assured her that she could keep up jogging, but should make sure that she would not eat wheat containing food within up to four hours before exercising. At rest, however, eating bread should not pose a risk, since for this food allergy to wheat, a co-factor – in Jenny's case exercise – is required to do any harm. But for safety reasons, the allergist still prescribed her an emergency medication, consisting of anti-allergic tablets and an adrenaline injector. And to avoid the nuisance of a contact eczema, which can last several days, the allergist advised her to wear only precious metals, such as sterling silver or gold.

Jenny's case shows that there is not one form of allergy, but many different types of allergic reactions. In fact, she suffers from two different forms. The two most common are the immediate and delayed allergic reactions. The immediate reactions are mediated by IgE antibodies on mast cells occurring within minutes to some hours after allergen contact. This is the mechanism behind hay fever, allergic asthma, or food allergy with urticaria and angioedema. Delayed allergic reactions are mediated by T lymphocytes, occurring within one to two days after allergen contact. This is the mechanism behind contact dermatitis and sometimes more widespread rashes, for example, caused by antibiotics. To confirm allergies based on these two mechanisms, differing test procedures are required in order to obtain adequate diagnosis and treatment.