



Allergies: When the Immune System Backfires

Video Transcript

Atopic disorders on the rise

[Andreas J. Bircher]: Towards the end of the 19th century, Charles Blackley was the first to prove that pollen were the cause of the so-called hay fever. Since its discovery, the prevalence of this distinctive disease seemed to increase. In Switzerland, allergic eye and nasal symptoms in the adult population increased from 0.8% in 1920 to 5% in 1958 to 10% in 1985, to a plateau around 15% to 20% from the 1990s on. This could partially be explained by the fact that patients and physicians now better knew and recognised the disease. On the other hand, several observations pointed towards an influence of environmental factors causing this rise. For example, at that time, industrialization was brought forward. Rhinitis during train travel through fields was called railway fever or railway sniffles, and attributed to smoke, high velocity, draft, and vibrations. Others believed that sunlight and heat were the culprits. Moreover, many physicians proposed that higher social classes and nobility were more often affected.

With the increasing prevalence of allergies during the 20th century, also the interest in finding a treatment or cure was raising. First, mechanically irritation from pollen and dust particles were thought to be responsible, then toxins from pollen and in analogy to infections were thought to cause hay fever. Since it was already known that some toxins could be neutralised by so-called antitoxins, the same approach was proposed by William Dunbar for the treatment of hay fever. He produced an antitoxin called 'Pollantin' by injecting pollen extracts into horses and rabbits.

After the description of anaphylaxis in 1902 by Richet and Portier and the coining of the term allergy in 1906 by von Pirquet, it became clear that hay fever or pollinosis belong to the group of allergic disorders too. It was shown that not toxins but innocuous proteins induced sensitization in predisposed individuals. Leonard Noon and John Freeman experimentally demonstrated that the injection of pollen extracts or inoculation, how they called it, could reduce symptoms in patients. Depicting a great step forward this procedure was called hyposensitisation or desensitisation, and was the first effective treatment against allergies.

Besides the observation that there was an overall increase in allergy diagnosis, it was further noticed that some patients seem to have a certain predisposition for allergies. In 1921, Arthur Coca and Robert Cook reported a group of patients with unusually sensitive skin and who had childhood eczema, hay fever, and asthma. Most of these patients also had family members with eczema, hay fever, and asthma. Because apparently something was out of place in these patients, the Greek term, 'atopy', for a meaning not and topos, meaning place, was coined. Today, this term is still used to describe the three entities, allergic rhinoconjunctivitis, allergic asthma, and atopic dermatitis, that all have a strong genetic background.

Summing up, the epidemic of atopic allergies had started to take its course in the 20th century, several environmental changes were present at that time which were thought to underlie this rise in allergies. Industrialisation grew, motorised traffic increased, and air pollution became problematic. At the same time, lifestyles, housing, heating, and nutrition habits changed. On the other hand, some infectious diseases became less frequent. During the past century, numerous scientists have tried to find explanations and ways to decrease the burden of allergic diseases. Do you have any suggestions why particularly atopic diseases became so common within the last 100 years?