



Allergies: When the Immune System Backfires

Video Transcript

Rose fever

[Andreas J. Bircher]: In ancient times, allergic diseases did certainly occur, but were rarely recognised as such. While early descriptions on asthma with its characteristic symptoms date back to 2600 before Christ, first literature on allergic diseases appeared much later. This video describes some of the earliest documentations of allergic reactions, how medicine labelled and treated them, and how through evolving concepts of medicine one arrived at today's understanding of allergies.

The Greek physician Hippocrates is widely regarded as the father of medicine. Central to his understanding of health and disease was the theory of the four humours, the blood or sanguis, the yellow bile or chole, the black bile or melanchole, and the mucus or phlegm. According to Hippocrates, a healthy organism has to be in balance or eucrasy. In a diseased state, we speak of an imbalance or dyscrasy, one of the four humours prevails over the others. The earliest term relating to allergic phenomena in medical history might be the term idiosyncrasy. Hippocrates described it as a strange mix of the four humours, causing untoward reactions to food, such as an intolerance to milk.

In our modern understanding of allergic diseases, an imbalance of certain juices, we call them cytokines or inflammatory mediators, is still thought to be crucial. In that sense Hippocrates' theory on bodily humours would represent today's humoral components of the immune system. Hippocrates also believed that the corruption of air or pestilential air was the cause of pestilence. The idea that bad air may cause diseases was accepted for a long time, and concepts on allergies coming up during the Middle Ages, including the term rose fever, were still based on this belief.

Indeed, the red rose has always been a highly estimated and symbolic flower. In the Middle Ages, roses served as a remedy for various ailments, lung pain, edema, and bleeding. The white rose became the symbol of the Virgin Maria, and an important symbol in Christianity. Therefore, roses were frequently cultivated in the closed gardens of monasteries and courts. In the 10th century, Rhazes, a famous Persian physician and astute observer, described a disease affecting the nose that was worse in spring when the odour of roses was prevailing. This appears to be the first description of a seasonal affection of the nose and eyes caused by a plant.

In the 16th century, Paracelsus was among the first in Europe who stated that diseases were not only caused from the inside by a wrong mixture of humours, but could also be triggered by external factors. According to Paracelsus, roses can cause severe sickness and unconsciousness by an invisible evil. In the 16th and 17th century, several physicians, including Leonardo Botallo and Johannes Binninger reported single patients that had eye or nasal symptoms from the odour of roses. This condition was called rose fever, rose coryza, or catharrus.

In the 18th century, it was still believed that bad odours played a central role in infections. In 1717, Giovanni Lancisi for the first time used the Greek term miasma, meaning pollution, to describe this invisible elicitor. And in 1701, for example, malaria was derived from the Italian, mala aria, or bad air. In 1819, John Bostock reported one patient – himself – suffering from a periodical affection of the eyes and chest, a disease he called catarrhus aestivus, meaning summer cold. It took him 10 years to find another 20 patients. He thought that miasmas or odours from freshly cut grass were the cause of this affection.



In 1873, Charles Blackley, a Scottish physician, was the first who conducted controlled experiments on grass pollen allergy. He demonstrated with skin tests and nasal exposure in winter that not odours, but grass pollen grains were the responsible culprit. He further stated that also exposure to animals, such as cats or Guinea pigs, could cause similar symptoms. In 1879, Paul Ehrlich developed a simple dyeing technique for cells that led to the discovery of the white blood cells, including the lymphocytes and mast cells. He was also a pioneer establishing the concept of antibodies.

The undoubtedly more poetic explanation that odours from roses were causing allergic rhinitis was now disproved. However, in terms of some skin disorders, roses survived. Examples are rosacea, a disease of sebaceous glands, roseola infantum, a children's infectious disease, and the second stage of syphilis with a widespread rash called roseola.