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Food Allergy

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Much confusion has been caused by the unqualified use of the word allergy. As originally defined by von Pirquet (1906) allergy is 'any acquired specific alteration in the capacity to react which occurs in living organisms or tissues upon exposure to certain living or inanimate agents or substances'. This definition includes not only hypersensitive reactions, but also reactions involving decreased sensitivity such as immunity. For the purpose of this discussion the term allergy will be used to indicate only the hypersensitive type of reaction.

Immunological basis. In order to discuss food allergy it is necessary to consider first certain basic facts concerning allergic reactions, and the immunological basis of allergy. When an antigen first enters the body it stimulates the formation of specific antibodies. Some of these antibodies tend to persist in their free state in the circulating blood (circulating antibodies) and this would appear to constitute immunity. Others become incorporated into the substance of cells and become 'sessile' antibodies or fixed antibodies and so the allergic state is established. For example, a person given an injection of killed typhoid bacilli develops circulating antibodies in his blood stream which give him a relative immunity to typhoid fever. Further injection of typhoid bacilli tends to enhance the degree of immunity. Another person may ingest a foreign protein (e.g. egg white) inducing antibodies which eventually become sessile on the smooth muscle of his bronchial tree. Further exposure to egg white results in an attack of asthma. Why some people develop sessile antibodies and thus become hypersensitive is completely unknown.

In the example quoted above, the smooth muscle of the bronchus was mentioned as the site of fixation of the antibody. Various other sites may be affected, e.g. the nasal mucosa and conjunctiva, or the skin; tissues so affected are known as 'shock organs'. What actually takes place when a tissue containing sessile antibodies comes in contact with its specific antigen is not known. There is considerable experimental and clinical evidence to suggest that histamine or a closely related substance is released and that this release gives rise to the clinical picture. It is important to

realize that the nature of the antigen bears no relation to the clinical picture, e.g. asthma may be caused by pollen, horse hair, egg white or chocolate.

Clinical picture of food allergy. Allergy to food may give rise to very varied clinical syndromes although it must be emphasized that the underlying mechanism is the same. In the space available it is possible to list only the most important of these: bronchial asthma, infantile and atopic eczema, urticaria, gastro-intestinal disorders that may mimic any gastro-intestinal disease, purpura.

Diagnosis. Proof of the existence of food allergy depends on the demonstration of a cause-and-effect relationship between the ingestion of a given food and the production or accentuation of the patient's symptoms. Thus at least a presumptive diagnosis may often be made by taking a careful clinical history. The use of skin tests, either by the scratch or intradermal technique with concentrated extracts of foods, may occasionally be of help, although on the whole the results tend to be disappointing. One reason for the poor results with food extracts is that in many instances it is not the actual food that acts as the antigen, but a partially digested food or a fraction of it, e.g. it is fairly common for a patient to complain of urticaria from 2 to 4 h after the ingestion of chocolate, yet skin testing with extracts of chocolate are invariably negative. The condition can easily be cured by refraining from eating chocolate. If it were possible to test the patient with an extract of digested chocolate a positive skin test would in all probability be obtained. Again, if a patient suffers from bronchial asthma as the result of eating egg, the shock organ is the bronchial musculature. It is therefore unreasonable to expect the skin, which is not affected, to show a reaction.

Fortunately many persons with food allergy, as well as having sessile antibodies, have also some circulating antibodies. This allows us to use the reaction of Prausnitz & Küstner (1921) for diagnostic purposes. This test consists of injecting a small quantity of the patient's serum into the skin of a normal individual. After 24 h the suspected food is exhibited to the prepared normal individual. A positive reaction is indicated by itching and whealing at the site of injection of the serum. Another method which may be used is Rowe's (1931) elimination diet. In this, after a day's starvation, one food is added daily until the symptoms complained of occur. In this way the offending food may be identified.

Mechanism of production. It is well known that small quantities of undenatured protein of high molecular weight may pass through the intestinal mucosa. This is particularly liable to occur in young infants, or when the intestinal mucosa is inflamed and therefore more permeable. Fish, egg, milk and the proteins in some fruits are liable to incite a hypersensitive state in this way. Other foods such as chocolate would appear to pass through in a partially digested state. Once these proteins enter the blood stream they act as antigens and stimulate the formation of their specific antibodies.

Foods that cause allergic states. Almost any food may, if the circumstances be favourable, act as an allergen. The commonest, however, are cereals, egg, milk, fish, and fruits.

It is important to remember that a person sensitive to egg, may, if the degree of

sensitivity be high, exhibit symptoms on ingestion of any food containing even traces of egg. Indeed, patients with an extreme degree of sensitivity may not be able to eat hens, but may freely eat roosters.

Treatment. The ideal treatment is, of course, the avoidance of the offending food, if this be known. Should it not be possible to eliminate the food, recourse to other forms of therapy may be necessary.

Drugs of various kinds have been used, but it is only fair to remember that these patients probably have an abnormally permeable gastro-intestinal tract and one may induce an added drug sensitivity instead of achieving a therapeutic result. The most widely used drugs at present are the antihistamines, and the results with them, other than in papular urticaria in children, are rather disappointing. Cortisone and ACTH have been used with good results, although the symptoms tend to recur with increased severity once the drug is withdrawn. Attempts at desensitization by parenteral injection of specific food extracts have not met with success. Non-specific measures such as protein shock by means of peptones or typhoid vaccine may produce temporary benefit in some cases.

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