FOOD ALLERGY — A CASE STUDY

By Pamela Mason, PhD, MRPharmS

Food allergy and intolerance are emerging as growing public concerns and pharmacists are well placed to offer advice

WHAT IS FOOD ALLERGY?

An allergic reaction to food is an inappropriate reaction by the immune system to the ingestion of a food which causes no adverse effects as a child grows older. However, this is not the case as allergy; the immune system fails to recognise a protein component of the food as safe (ie, the protein is an allergen). As a result, B cells produce immunoglobulin E (IgE) antibodies to the allergen (sensitisation), and further exposure triggers the release of histamine and other pro-inflammatory substances from mast cells. Symptoms can include abdominal pain, vomiting and diarrhoea, eczema and urticaria, rhinitis, conjunctivitis, throat swelling, asthma, itching and redness, and swelling of the lips and mouth. Anaphylaxis is a severe reaction that involves hypotension as well as any of the symptoms already mentioned. Compared with adults, infants and children are more likely to develop eczema, other skin reactions and gastrointestinal symptoms. Symptoms can develop quickly and can vary in severity. Acute anaphylaxis (“anaphylactic shock”) is life threatening. Another recognised allergy mechanism involves T lymphocytes. This type of reaction is delayed and can take hours or days to develop. The best known example of this is coeliac disease, although delayed reactions to foods such as milk and soya can also occur.

The term “food allergy” is often confused with the term “food intolerance”. The latter is a more general term used to describe a range of reproducible responses, including not only food allergy, but also adverse reactions arising from enzyme deficiencies (eg, lactose intolerance), pharmacological effects (eg, caffeine sensitivity) and non-defined idiosyncratic responses occurring when an offending food is given without a person’s knowledge (ie, intolerance includes responses that do not involve the immune system).

WHICH FOODS CAN CAUSE ALLERGIC REACTIONS?

A wide variety of foods can cause allergic reactions, including animal products, fruits, vegetables, seeds and spices. However, the most common trigger foods are cows’ milk, eggs, nuts, soya, fish, shellfish and wheat. Most manufacturers produce lists of products free from these main allergens. Some foods, such as milk and eggs, are particularly associated with reactions in early childhood, and sensitivity often disappears with age. However, their role in childhood asthma is not clear. An allergy reaction with all food allergies. Peanut allergy, for example, is generally lifelong.

WHAT IS THE PREVALENCE OF FOOD ALLERGY?

The actual size of the problem is unknown because of a lack of authoritative studies in this field. Good quality studies are made difficult by a number of factors. First, the lack of a simple, reliable test for food allergy, second, the risk of a positive response bias in individuals interviewed on the topic and third, by the presence of symptoms which are not always truly diagnostic. All these factors can lead to overestimates of true prevalence. Food allergy is estimated to affect 1–2 per cent of children and less than that 1 per cent of adults, whereas food intolerance is estimated to affect 5–8 per cent of children and 1–2 per cent of adults. Although these figures are much lower than the 20 per cent who believe themselves to have a food intolerance, they should not be thought of as insignificant. Symptoms can be severe. In addition, food intolerance can restrict food choice so potentially prejudicing nutritional status and leading to social isolation.

There is a generally held view that the prevalence of food intolerance has increased during the past 20 to 30 years, but the published literature can neither substantiate nor refute this, quite simply because there have been no good studies investigating prevalence of the problem with time. However, there is good evidence that the prevalence of atopic diseases than in previous generations and when they are infected, they tend to receive antibiotics. It has been suggested that the lack of immune system stimulation may contribute to the promotion of allergy. Changes in diet over recent decades, such as the decline in omega-3 fatty acids relative to omega-6 fatty acids and the fall in vegetable consumption (a good source of antioxidants such as carotenoids and flavonoids), may be disadvantageous. The progressive decline in breast-feeding (although this has increased again in recent years) may also be an influence.

COULD DAVID’S ASTHMA BE CAUSED BY FOOD INTOLERANCE?

Food allergy can be a factor in precipitating an asthma attack. When children attending an asthma clinic were surveyed, three quarters of them said that they could recall attacks provoked by at least one type of food, including milk, eggs, fish and nuts. After a double blind challenge test, 67 (24 per cent) of 279 children with a history of food challenge to a specific food were found to wheeze after a specific food challenge. However, a number of other factors can provoke or exacerbate asthma attacks, including respiratory tract infections, cigarette smoke, anxiety, and allergy to dustmites, pollen and pets. Food is seldom the sole factor, and although exclusion diets may help some patients, in most cases, management will require use of medication rather than simple manipulation of the diet.

Sulphites are widely used as preservatives in the food industry and can provoke asthma attacks in some patients. They are formed naturally in the production of wine and beer and are sometimes added to inhibit the growth of undesirable yeasts and to prevent secondary fermentation. Virtually all patients with asthma respond to sulpha dyes, but some patients also have an adverse reaction with bronchoconstriction when exposed to sulphur dioxide by inhalation, and some may respond in a similar way to ingestion of sulphites. In a few asthmatic patients, the reaction can be severe. Major reactions to other food additives are rare, although tartrazine (E102) has been linked with exacerbation of asthma.

SHOULD PEGGY STOP DAVID EATING EGGS?

Excluding a food that appears likely to be causing symptoms is commonly used as a means of diagnosing food allergy. If symptoms disappear, it is likely that the identified food is responsible, but symptom improvement can be coincidental or due to a placebo effect. Eggs are a nutritious food, providing protein, energy, B vitamins and iron, which make an important contribution to the needs of a growing child. If the family does not eat many eggs, excluding

Peggy comes into the pharmacy for a repeat prescription for asthma medication for her six-year old son David. She tells you that she has recently read an article about food allergy that has made her wonder whether David's asthma could be due to this. The idea had crossed her mind several months ago when David had an asthma attack after eating a scrambled egg for lunch.

Dr Mason is a pharmacist and a freelance pharmaceutical journalist, with a special interest in nutrition

For personal use only. Not to be reproduced without permission of the editor (permissions@pharmj.org.uk)
them from David’s diet is unlikely to prejudice his nutrient intake overall. However, if Peggy suspected milk or wheat to be possible culprits, foods which are normally a major component of the diet, avoidance of these foods could have a harmful influence on David’s diet. It is not advisable for parents to self-manage possible food allergies by excluding items from the diet. Proper diagnosis and dietetic advice and support are essential to ensure that the diet remains nutritionally adequate and that any excluded foods are replaced by alternative nutritious, palatable and affordable substitutes.

Peggy returns to the pharmacy a week later. She remains concerned that David may be allergic to eggs and she asks you where he might go for an allergy test. She also tells you that she has looked for food allergy tests on the internet and she wants to know what you think of them.

**WHAT ADVICE WOULD YOU GIVE ABOUT ALLERGY TESTING?**

You can of course perform food allergy testing in your pharmacy. Some of us already offer this service (see “Medicines, Ethics and Practice” for standards on diagnostic testing). Otherwise, you may refer Peggy to her GP. Usually, the GP will refer the patient to a specialist team that will confirm diagnosis in a stepwise process. It would be a good idea to advise Peggy to start a food diary for David so that she can provide the GP or specialist with good information on the first consultation. The diary should record everything that David eats for a period of one or two weeks, any symptoms he experiences, their severity and the time between ingestion and presentation of symptoms.

A proper diagnosis depends mainly on making a full assessment of the symptoms, and taking careful accounts of dietary history, family history of atopy and medical history. The suspect food or foods are removed from the diet for a specified period to see if symptoms improve. This is followed by a series of food challenges to reproduce the original reaction and prove the diagnosis. The double-blind, placebo-controlled food challenge is the gold standard for diagnosis. Because of the risk of a severe reaction, such tests should only be conducted under medical supervision and these tests are unsuitable for patients with a history of anaphylaxis.

If an IgE antibody-mediated disorder is suspected, skin prick tests or a radioallergosorbent test (RAST) may be used. The skin prick test looks at the weal and flare reaction to an allergen on the skin of the inner forearm or back. This is compared to a positive histamine control and a negative saline control. However, positive reactions typically have 50–60 per cent accuracy and a patient reacting positively to an allergen might not experience an allergic reaction to that food. Although rare, anaphylaxis can also be induced by skin prick tests and a RAST is more suitable for extremely sensitive patients. This is a blood test to measure the amount of allergen specific IgE antibodies in serum. RAST is also a good alternative for people with eczema or other skin conditions where skin prick tests would not be appropriate. Accuracy varies with the type of allergen and the patient’s symptoms and age. Positive results in both types of test only indicate the need for further assessment. Furthermore, dietary history and skin prick tests or RAST are rarely on their own sufficient to diagnose delayed reactions to food in individuals. Other tests of proven value include endoscopy with or without biopsy and intestinal permeability tests.

**ALLERGY TESTS NOT SUPPORTED BY EVIDENCE**

Sadly, the NHS has not always taken food intolerance seriously and this has meant that diagnosis and treatment often became the domain of unqualified people and bogus clinics, leading to incidents of misdiagnosis and the imposition of unnecessarily restrictive exclusion diets. The value of many tests offered to the public through magazines and the internet is unproven and they cannot be recommended. Such tests include electro acupuncture (VEGA testing), applied kinesiology, hair analysis and the use of urine collected from a sensitive subject injected into the same individual. Dietary advice based on diagnosis arising from these tests is often inappropriate and if significant components of the diet are excluded for long periods, this can compromise health, particularly in children.

After some months, Peggy comes to the pharmacy one morning for a pregnancy test. This proves to be positive. In the meantime, it has been confirmed that David is allergic to egg. Peggy asks you whether she should avoid egg now that she is pregnant in the hope that this might prevent allergy in her next child.

**CAN PEGGY PREVENT ALLERGIES DEVELOPING IN HER UNBORN CHILD?**

Genetic predisposition plays an important part in determining susceptibility to allergies in general, but there is little published evidence to suggest that changing the diet during pregnancy will have any influence. Although it is possible that antigen-antibody complexes can pass from mother to foetus, the question of in utero sensitisation is speculative. However, Peggy can be advised to avoid peanuts during pregnancy. In 1997, a report by the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment recommended that where the mother, father or any sibling of an unborn child is atopic, the mother might wish to avoid eating peanuts or peanut products during pregnancy. The main reason for this is that peanut-sensitive children often react on their first observed exposure, suggesting that sensitisation has occurred previously.

**WHAT INFORMATION MIGHT YOU GIVE PEGGY ABOUT FEEDING THE NEWBORN BABY?**

Breast feeding should be encouraged for all infants up to the age of three to four months for a range of reasons, and there is also evidence that it reduces the risk of atopic disease. Breast feeding up to the age of six months may be particularly important for infants at high risk. Although protein components of foods can appear in breast milk, there is no consensus that this is harmful and there is little evidence to support the exclusion of potentially allergenic foods from the mother’s diet during lactation. Early introduction of solids (ie, before the age of four months) should be discouraged because this may increase the risk of atopic disease in infants with a family history of atopy. If an infant at high risk of atopy is to be bottle fed, there is some evidence to suggest that exclusive use of hydrolysed infant formulas for the first five to six months may be beneficial.

**REFERENCES**