

## Gluten allergy

The small intestine has 'villi', which are tiny finger-like projections, visible under the microscope. They provide a large surface area, over which we absorb nutrients, such as vitamins, folic acid, iron and calcium. In celiac disease these villi are attacked by the immune system and are eventually destroyed. This results in food going down the gut without nutrients being absorbed (malabsorption), leading to vitamin and mineral deficiencies, anemia, and osteoporosis.

When gluten comes into contact with the lining of the small intestine, a reaction occurs, where the immune system mistakenly attacks the lining of the bowel as if it was a 'foreign' organism.

Gluten is a mixture of two proteins, gliadin and glutenin. When mixed with water, it becomes sticky and so forms the familiar texture of dough made from wheat and rye flour.

Gluten is found in wheat, barley, and rye. That means a gluten-free diet cannot include bread, biscuits, cakes and pastries, pasta, common breakfast cereals, and many manufactured soups and sauces. Gluten is also hidden in some foods such as chips and similar snacks, as well as chips in restaurants. Stay away from 'modified food starch' too.

Cooking oil (or mixed vegetable oil) can contain wheat-germ oil. Malt vinegar, soya sauce, mustard and mayonnaise contain gluten. Beer and whisky are made from grain containing gluten, but other alcoholic drinks, such as wine or cider are gluten-free. Most specialists now consider all distilled forms of alcohol safe to drink, provided no colorings or other additives have been added, as they might include gluten ingredients. Wine, sherry, port, cider, rum, tequila, bourbon and vermouth are all probably safe. Liqueurs and pre-mixed drinks should be examined carefully for gluten-derived ingredients.

Special care must be taken when checking ingredients lists as gluten may come in forms such as vegetable proteins and starch, modified

food starch (when derived from wheat instead of maize), maltodextrin, malt flavoring, and glucose syrup. Many common ingredients contain wheat or barley derivatives.

Some medicines contain gluten, so you must check with your doctor or read the packing slip properly.

The suitability of oats in the gluten-free diet is still somewhat controversial. Some research suggests that oats in themselves are gluten free, but that they are virtually always contaminated by other grains during distribution or processing (most oats are milled and stored in the same mills as wheat and are probably contaminated with gluten).

However, recent research indicated that a protein naturally found in oats (avenin) possessed peptide sequences closely resembling wheat gluten and caused mucosal inflammation in significant numbers of celiac disease sufferers. Some examination results show that oats are very dangerous to certain celiacs, while not very harmful to others. Given such conflicting results, excluding oats is the only risk-free choice for celiac disease sufferers.

### *Gluten-free food*

Of course, many foods do not contain gluten, including all fruits and vegetables, rice, maize, sweet corn, nuts, potatoes, red meat, chicken, fish, eggs, and dairy products. Although a lot of patients with gluten allergies also react poorly to dairy, so if a gluten-free diet does not improve your symptoms, we should look at a dairy-free diet too.

Several grains and starch sources are considered acceptable for a gluten-free diet. The most frequently used are maize (corn), potatoes, rice, and tapioca (derived from cassava).

Other grains and starch sources generally considered suitable for gluten-free diets include amaranth, arrowroot, millet, sorghum (jowar), sweet potato, and yam. Various types of bean, soyabean, and

nut flours are sometimes used in gluten-free products to add protein and dietary fiber. In spite of its name, buckwheat is not related to wheat; pure buckwheat is considered acceptable for a gluten-free diet, although many commercial buckwheat products are actually mixtures of wheat and buckwheat flours, and thus not acceptable.