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Going against the grain: Gluten or gluten-free?

The protein gluten is a component of cereal crops such as wheat, barley and rye and is commonly found in bread, biscuits, pastries and cakes. These foods typically contain gluten and in certain individuals, eating them can cause a variety of symptoms ranging from stomach pain and diarrhoea to anaemia, fatigue and weight loss. One of the most severe forms of sensitivity to gluten is the disease known as coeliac disease, a chronic autoimmune disorder in which the body is intolerant to gliadin, one of the main components of gluten. In patients with this disease, the immune system reacts to the gluten resulting in injury to the lining of the gut (Figure 1). Under the microscope, this damage commonly takes the form of blunted or atrophic villi as a result of shrinking and flattening of them in response to repeated exposure to gluten (Figure 2).

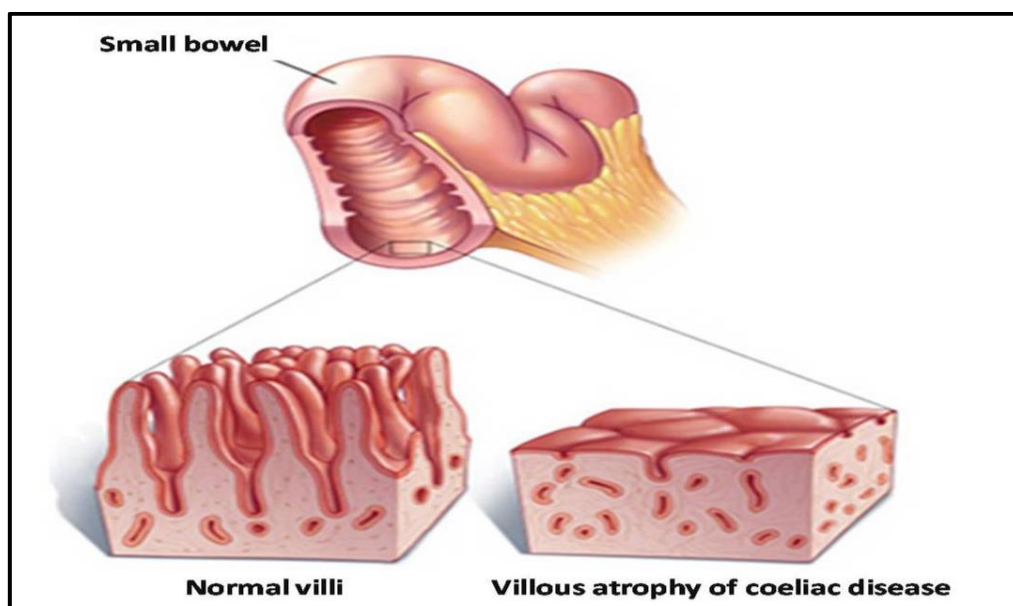


Figure 1. Diagram showing the structure of normal small bowel mucosa (bottom left) and the damaged villi of coeliac disease as a consequence of repeated exposure to gluten (bottom right)

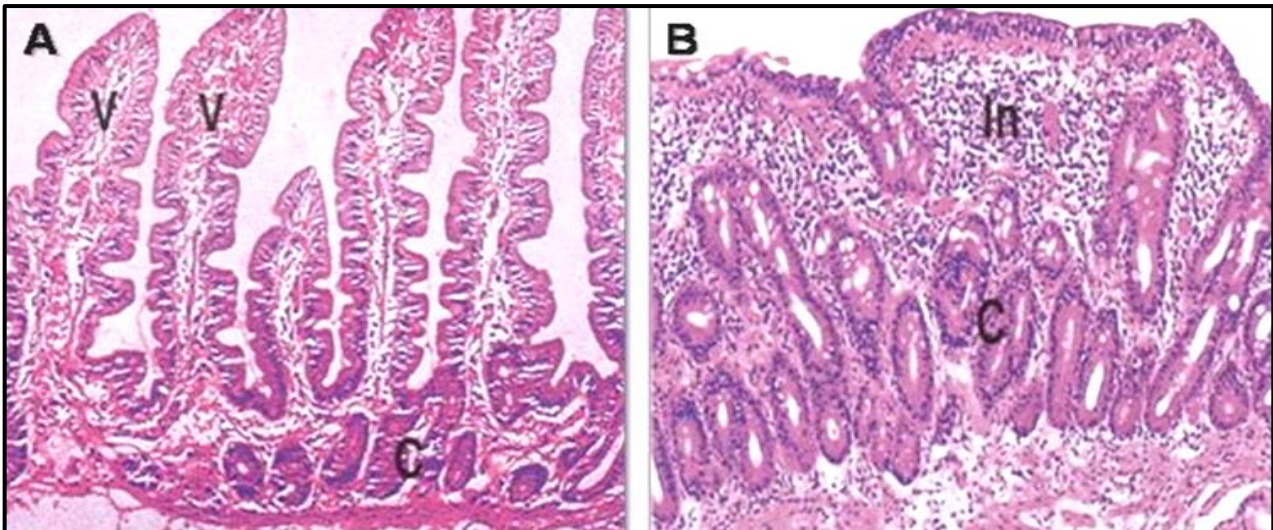


Figure 2. Small bowel showing (A) normal jejunum containing villi (V) and short crypts (C). The coeliac jejunum in (B) shows villous atrophy, elongation of crypts (C) and intraepithelial lymphocytes (In)

Patients with coeliac disease often make antibodies that attack transglutaminase, an enzyme that is involved in damage repair within the body. As a result, measurement of high blood levels of anti-tissue transglutaminase is one of the preferred tests for the screening of both coeliac disease and dermatitis herpetiformis (DH), a severe skin rash that develops in response to an immune reaction to dietary gluten. Additionally, measurement of endomysial antibodies (connective tissue components that surround smooth muscle) are often carried out in the laboratory as a specific and sensitive marker for both coeliac disease and DH.

There exists a clinical entity with symptoms similar to those of coeliac disease that improve when gluten is eliminated from the diet. Termed non-coeliac gluten sensitivity (NCGS), patients who have been diagnosed with non-coeliac gluten intolerance do not exhibit the anti-transglutaminase antibodies or the villous atrophy in the small intestine that are associated with coeliac disease. However, there has been much debate around whether the sensitivity and intolerance to gluten is solely responsible for these conditions. Defenders of NCGS generally acknowledge that other dietary components other than gluten may often be responsible. Cereal crops such as wheat and barley also contain components such as amylase trypsin inhibitors which are known to aggravate immune cells. In addition, gluten-containing ingredients such as fermentable oligo-di-monosaccharides and polyols (FODMAPs) are also removed when the diet becomes gluten free. The sugar combination of FODMAPs are found not only in a variety of fruit and vegetables but are also

present in wheat. When taken in excess, these sugars can cause bloating when they ferment in the gut. Although a gluten-free diet is the only treatment for patients with coeliac disease, abstaining from gluten has become a common trend for much of the population (Figure 3).

Over the past decade, a myriad of gluten-free products has appeared on the shelves of supermarkets, local stores and restaurant menus. As a result, the 'free-from' market in the UK alone is forecast to grow to around £700 million over the next few years. Although it is fair to say that certain people feel significantly better within a few days of commencing a gluten-free diet, others may only see a gradual or perhaps no improvement in their symptoms.

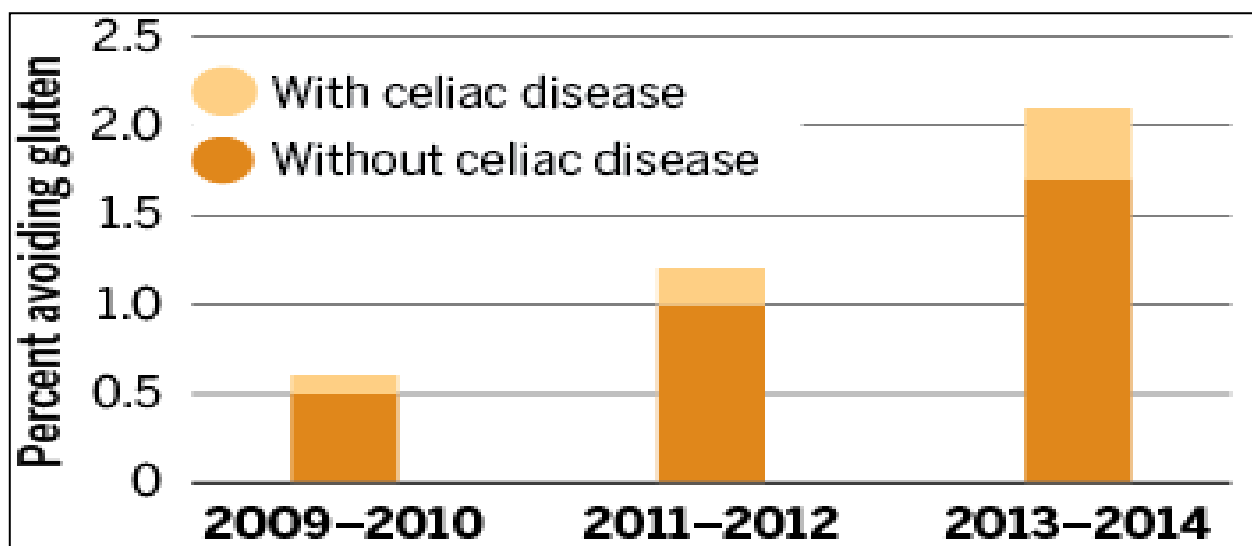


Figure 3. Data from the National Health and Nutrition Examination Survey shows the rising tide of gluten avoidance by people without coeliac disease

Wherever you may be on your gluten-free journey, there is currently so much scientific confusion that it has bred uncertainty toward those who, for whatever reason, are avoiding gluten from their diet (Figure 4). For those individuals who do not have coeliac disease, the decision to remove gluten from their diet may be in response to NCGS or perhaps because it's the trendy thing to do. With this self-diagnostic approach, the fact of the matter is that there is very little evidence available to support that going gluten-free is healthier for those who do not have coeliac disease. The Gluten Freevolution developed by Coeliac UK is beginning to help change things for the better and should be the first port of call for anyone who is contemplating jumping on the gluten-free bandwagon.

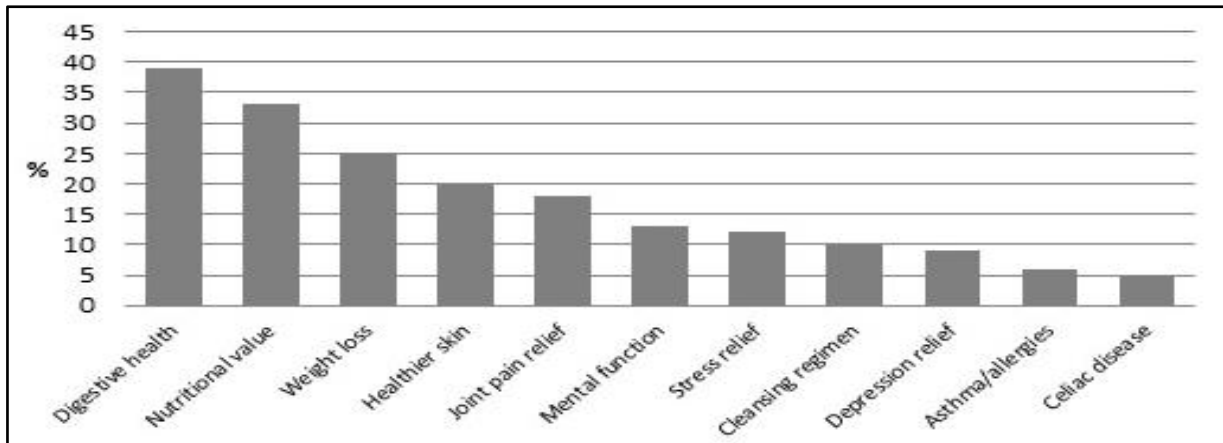


Figure 4. A Canadian study of 2013 showing the motives for going gluten-free

Further reading

1. Coeliac UK: <https://www.coeliac.org.uk/home/>
2. Is it coeliac disease?: <https://isitcoeliacdisease.org.uk/overview>
3. The war on gluten: <https://www.sciencemag.org/news/2018/05/what-s-really-behind-gluten-sensitivity>

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