# Overview of celiac disease and gluten 

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WHAT'S IN YOUR WHEAT? BY AISHA ADIL

Percolating deep into the abyss of gluten-related research studies, opinions and perspectives, and several news outlets, it is starting to seem that, despite the hype, gluten-free diets (GFD) may not necessarily be the answer to a healthy lifestyle. Although these diets are the only current nutritional treatment for gluten-sensitive patients, other treatment options are being speculated. But even outside of the scope of disease, the prominence of gluten-free diets in the general population is raising question marks about how " hazardous" gluten really is. It has only been about 10, 000 years since wheat was introduced but it is only now that being " gluten-free" is apparently the path to a healthy life.

Hence, questioning what is in your wheat invites the inquiry of gluten: what caused it to gain so much prominence and subsequently a downgrade in the past years? What else is involved besides gluten? It is surprising to realize that many gluten-sensitive individuals are subject to a combination of factors, rather than gluten alone, that give rise to their sensitivity. Many researchers are investigating other complex carbohydrates present in wheat with some even suggesting that these carbohydrates have a higher likelihood in causing intestinal distress than gluten. With several angles of research being conducted on the role of gluten in our lives, it is imperative that we evaluate the history of gluten over the years and our current knowledge to assess a question that is very simply-put but difficult to answer: is a gluten-free diet a healthy choice?

## The Underpinning of Civilizations and Celiac

The discovery of seeds and domestication of crops cradled the development and flourishment of civilizations at the cost of celiac disease (CD), an illness triggered by the ingestion of gluten. Clinically, the existence of celiac disease dates back to 1888 but it was only a little less than a hundred years later in the 1950's that the consumption of wheat, barley, and rye were speculated as the cause of intestinal lesions. Gluten, the storage proteins that comprise much of our common sources of carbohydrates such as wheat, barley, and rye, was found to be at the center of inducing CD and later in time, nonceliac gluten sensitivity. While the latter disorder is a controversial matter in even being considered a medical condition, celiac disease patients show a hypersensitive reaction to gluten consumption. This autoimmune ailment, otherwise described as a condition that causes our body's immune system to attack our own tissues, detracts individuals from proper nutrient absorption and subjects them to abdominal pain, diarrhea, and swollen bellies. It can even reach the extent of destroying our intestinal villi, the brush-like surfaces of our small intestine. Recently, it has been found that CD arises when individuals, along with being exposed to gluten, have a genetic predisposition to CD, and, per Fasano and his colleagues' nine years of research, a " leaky gut"; an unusually permeable intestinal membrane, that permits the entry of gliadins, undigested fragments of gluten.

The " immunology" of Celiac Disease

Delving further into the pathophysiology of $C D$, the mechanisms underlying CD are more complicated than one might expect. CD patients harbor an inherited set of gene variants called histocompatibility leukocyte antigens (HLAs) that give rise to the hypersensitive reaction against gluten. 95\% of
celiac patients possess HLA-DQ2 and/or HLA-DQ8, proteins required for the primary establishment of CD. These proteins aid in developing an immune response in the face of microbial attacks. However, CD patients' bodies secrete the tissue transglutaminase (TTG) that responds to and modifies ingested gluten proteins in a way that binds them with DQ2/8 proteins and initiates an immune response. Though this immune response should be protective, it unfortunately harms the intestinal cells and hinders the absorption of nutrients.
" We are not engineered to eat wheat.... gluten only came into the picture 10 000 years ago, with the advent of agriculture" - Alessio Fasano, University of Maryland School of Medicine

The recent introduction of gluten perhaps explains why our body mounts an immune response against it - it perceives gluten as a foreign invader such as a virus or a bacterium and activates the same defense as it does when an infection attacks our body. It therefore becomes tempting to propose that gluten should be eliminated from our diets completely but " not so fast", says Fasano. Fasano's discovery of zonulin, a protein activated by gliadin in gluten and a capability of modifying the gut's permeability, is seemingly a ray of hope. This protein is predictably what allows a " leaky gut" to occur, creating a loss of control as our intestine can no longer create a barrier against unwanted particles. However, zonulin is a controversial solution as clinical research and evidence on zonulin is scant. It is nonetheless suggested that zonulin modifies antigen traffic and may be involved in not only CD but in other, various immune diseases.

## Who knew gluten could cause controversy?

Having gluten within the diet and experiencing gluten-sensitivity outside the context of celiac has also sparked controversies worldwide. This has been the case with Non-Celiac Gluten Sensitivity (NCGS), another syndrome in the spectrum of gluten-induced disorders that results in both extraintestinal and gastrointestinal symptoms due to gluten-withdrawal. This syndrome is however not new as reports dating back to the 1970s and 1980s provide evidence of patients experiencing wheat or gluten withdrawal in the absence of CD. NCGS' main controversy today lies within its unavailable etiologic background or evidence such as biomarkers or histological abnormalities to support its existence. Another issue is that NCGS patients also report symptoms similar to those found in Irritable Bowel Syndrome patients (IBS).


#### Abstract

" This is an area where personal experience and anecdote really trumps the medical evidence that's emerged" - Dr. Jason Tye-Din, gastroenterologist at Walter and Eliza Hall Institute of Medical Research, Australia.


Although this condition is raising conflicts between personal beliefs and medical advice, further research proposes that NCGS patients may be intolerant to other components of wheat such as FODMAPS and fructans rather than just gluten. FODMAPS, a group of sugars that are either poorly absorbed by the small intestine or completely indigestible, can be found in foods high in fructose such as apples and mangoes, dairy products, and fructans such as onions and garlic. Several studies such as Peter Gibson's and Biesikeierski and colleagues', in 2011, suggested that gluten is the culprit after all. Both well-designed studies subjected IBS patients to a gluten
restriction challenge followed by a reintroduction of gluten. The results suggested that IBS patients do have NCGS given that they experienced stomach ailments when treated with gluten. These studies were however, criticized for their small numbers of participants and limited statistical evidence. Further well-designed and more detail-oriented studies in 2013 revealed that NCGS patients did not experience symptoms from gluten but rather with a FODMAPs diet.

Accordingly, it seems that a FODMAPs-free diet is more effective but also more complicated than a gluten-free diet. Studies from 2011 have also convinced millions of people that being gluten-free makes them feel better. Research on FODMAPs however, does not have enough data to provide a definitive answer either; most of it is unclear or preliminary. Many studies are currently underway and will require time before a conclusive answer is available.

## Going Gluten-Free

Conversely, with an increasingly growing belief that gluten-free diets are healthier, there is an increased consumption and demand for gluten-free foods in the market. Food companies are using the common perceptions that gluten-free products are healthier to advertise their products as such and that too, at an elevated price. These products may even be nutrient-poor and miscellaneous about their sugar, salt, and saturated fat composition. Economic markets respond to meet the growing demand hence it is no surprise to Catherine Cross, a writer of the Canadian Medical Association Journal, that " gluten-free" stamps are appearing more frequently on both
healthy and unhealthy products. This therefore leads us to question whether the gluten-free products we buy are actually healthy. Besides our deep percolation of the pathogenesis and underlying mechanisms of wheat components and their effects on gluten-induced disorders, answering this question involves additional enquiry into the market's expansion of glutenfree products.

After investigating and comparing the nutritional quality of 3213 gluten-free and non-gluten free products across 10 food categories, Wu and his colleagues in 2015 deduced that gluten-free products have, on average, lower protein levels, and an overall poor quality due to a high composition of sugar, salt, and saturated fats. Cross delved further into this matter suggesting that conventional gluten-free flours such as potato, rice, tapioca, and sorghum contain more calories and carbohydrates, and are also unfortified, an absence of intentionally increased essential micronutrients. Put differently, there is a large body of evidence suggesting that being gluten-free is not always healthier given the substitution of fat and sugar to compensate for the absence of gluten.

However, further insight into whether this gluten-free diet is a better option can be better understood from CD patients bound to this diet. Groups of researchers including Lee and colleagues, and Singh \& Whelan all present similar data and conclusions of the limited availability of gluten-free products in parts of the US and in London, UK as well as their increased price compared to standard counterparts. Furthermore, Nascimento and colleagues in 2014 percolated consumer perceptions and suggestions of celiac consumers in Brazil's Santa Catarina, and found that along with low https://assignbuster.com/overview-of-celiac-disease-and-gluten/
availability and high prices, individuals experienced poor palatability and social life restrictions leading to hindrances in adhering to the gluten-free diet, and overall dissatisfaction with employing the diet. Other studies, such as Hallert and colleagues' also suggest higher levels of nutritional deficiencies, especially of fibre and B vitamins. Conclusively, these studies and observations provide a greater set of limitations than advantages in employing a gluten-free diet which raises the ultimate question: how do we stay healthy?

Fasano suggests that it depends on how one wants to become gluten-free. If one employs a natural gluten-free diet without substitutes and consume only fresh fruits, vegetables, and meats, it may be beneficial and may alleviate their symptoms of gluten-sensitivity. But a gluten-free diet with gluten-free pasta or cakes may result in adverse effects. Alexandra Anca, a Toronto dietitian, also suggests that if one desires a healthy-eating lifestyle, it is better to get " back to the basics". While celiac patients are bound to glutenfree diets but nonetheless are on their way to alternative treatments, those who seek healthy lifestyles should focus on whole and less-processed foods, says Melanie McGrice, an Australian dietician.

Overall, employing a healthy lifestyle is complicated given the interplay of the food market's increasingly diverse production of gluten-free products and the less well-known facts and studies about CD and NCGS. Embarking on this journey nonetheless requires a careful consideration of how you want to become healthy - will you go old-school with the fresh fruits and vegetables?

