

GLUTEN SENSITIVITY

Fact or fad?



By Nicole Osinga, RD

Everyone is talking about it. An increasingly larger percentage of the general population is reporting problems caused by gluten ingestion, whether it is due to Celiac Disease or gluten intolerance. What is the cause of this? Experts believe that human modification to wheat has made it a better, more robust crop. Could this modification be accountable for the rise in gluten intolerance? How are restaurants and grocery stores responding to an increased demand for gluten-free products? What nutritional impact does a gluten-free diet bring?

CELIAC DISEASE VS NON-CELIAC GLUTEN SENSITIVITY

Let us differentiate between Celiac Disease (CD) and gluten intolerance (technically known as Non-Celiac Gluten Sensitivity or NCGS). Celiac Disease is an auto-immune disorder that damages the small intestine and is triggered when food containing gluten is ingested. Being autoimmune in nature means that gluten doesn't cause the damage directly. Instead, the immune system's reaction to the gluten protein spurs white blood cells to mistakenly attack the small intestinal lining.

Gluten is the main structural pro-

tein in wheat and other cereals (such as barley, rye and spelt). CD impacts the gastrointestinal system, but it can also bring on anemia, nutrient deficiencies and osteoporosis. It is diagnosed by a blood test then confirmed by an intestinal biopsy.

These tests will not identify NCGS. In fact, there are no laboratory or histological tests that can diagnose NCGS. It involves a different immune system reaction than CD. NCGS is a non-specific immune response that is clinically less severe than CD. It does minimal intestinal damage and does not appear to be genetically based. Symptoms are similar to CD, however non-intestinal symptoms often dominate. Little research has been done on the causes, symptoms and effects of NCGS. It currently impacts about six per cent of the North American population, (celiac disease impacts one per cent of the population).

INCREASING PREVALENCE

Until about a decade ago, CD was believed to be quite rare, affecting one per several thousand people. In North Africa, almost six per cent of the population is said to suffer from it. This increase could be due to better diagnostic testing, but consensus is that

the incidence of CD has increased: 11-fold between 1998 and 2007 among Canadian children, 4-fold in U.S. adult men between 1948 and 2006 and 2-fold between 1980 and 2000 among Finnish adults (men and women) over the age of 30.

NCGS is also likely increasing. The recent increase in the market for gluten-free products in North America largely exceeds the foreseeable consumption of the CD patient population. This suggests that an undefined proportion of the general population consider themselves to be suffering from problems caused by wheat and/or gluten ingestion, even if they do not have CD. It is important to remember that there are no histological or laboratory tests for NCGS, therefore, we cannot be sure of its exact prevalence. With evidence that CD is on the rise and that more people are reporting NCGS, one theory suggests that the change in gluten-rich products throughout time is the chief culprit.

HOW WHEAT HAS CHANGED

Humans have only been exposed to wheat for the last 10,000 years - the time in which man evolved from hunter-gatherer to farmer. The two world wars caused a food shortage in

the first half of the 20th Century. This, along with an exponential growth in the world's population, pushed many agronomists and geneticists to create new varieties of wheat that were stronger and richer in gluten.

Modern agriculture also tried to increase wheat yield by creating new strains, crossbreeding different wheat and grass species and generating new genetic varieties in the lab. This produced thousands of new strains of modern wheat, the most high-yielding of which have since been adopted worldwide. The new strains of wheat are high-yielding because they grow large seed heads that are abundant in nutrients. They've been further modified to become shorter and stockier so that the plants are able to maintain erect posture, despite their large seed head, and still be harvested cost-effectively.

This has resulted in dramatic changes to the structure and biology of the modern wheat plant, compared with the historic wheat plant. This change is seen specifically in the protein content and epitope (antigenic determinant) content. Indeed, analyses of the proteins expressed by a wheat hybrid compared to its parents

have shown that more than five per cent of the proteins expressed in the offspring are unique and found in neither parent. In other words, the hybridization process seems to create new proteins in the offspring.

Can we infer from this that the structural differences between modern and ancient grains account for the population wide increase in CD and NCGS? Not necessarily. However, this question does have major implications, as dramatic changes in the epidemiology of CD and outbreaks of new NCGS syndromes have taken place during the same period of time in which thousands of new wheat hybrids were introduced into human foods.

With the structural changes of modern wheat, there is a potential that celiac-triggering gluten proteins are expressed to higher levels in modern wheat while non-triggering proteins are expressed less. For the moment, however, scientific evidence is lacking that this is indeed the case. This is a critical issue and more clinical studies are urgently needed. We do know for a fact that wheat has changed and it is true that the bread we eat today is definitely not the bread that our grandparents ate.

THE INDUSTRY RESPONDS

Following a gluten-free diet for CD used to occur only under a doctor's supervision. This restrictive diet was largely unknown in popular culture, and anyone eliminating gluten earlier than a few years ago struggled to find suitable foods or maintain regular social activities. It was nearly impossible for a person with CD to eat at a restaurant and enjoy a sufficient three-course gluten-free meal. This has radically changed.

As of January 2013, 30 per cent of U.S. adults report reducing or eliminating gluten in their diets. Retail sales of gluten-free products have grown almost 28 per cent in the last 10 years – a large market that continues to increase.

Sales of gluten-free products have risen from \$100 million in 2003 to \$1.31 billion by 2011 to a projected \$1.68 billion by 2015. This wider availability of gluten-free products is great news for people with a diagnosed medical need to eliminate gluten. However, with one-third of the population decreasing or eliminating gluten, it is apparent that that we have adopted the tendency to rely on self-diagnosis (hypersensitivity) and

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subsequent therapy (eliminating gluten). This can be seen by a 4598:1 ratio of Google to PubMed citations for the keywords “non-celiac gluten sensitivity” as well as several papers expressing skepticism or simple caution.

Despite how popular and readily available are gluten-free products in recent times, it is important to be aware of the nutrition considerations of a gluten-free diet.

NUTRITIONAL CONCERNS

Those following a gluten-free diet may be at risk for certain vitamin and mineral deficiencies. Most gluten-free grain products aren't fortified with vitamins and minerals in the manner of conventional grain products and, because of this, people following the gluten-free diet may not reach the recommended daily intakes for certain nutrients.

- Iron: Iron is easy to get if you eat meat – beef and turkey contain plenty. In terms of vegetable sources, look for soybeans and legumes;
- Folate: Many gluten products have been fortified with extra folate, in part, to prevent birth defects. To boost your folate levels, turn to spinach, as-

paragus and brussels sprouts, green peas and broccoli;

- Vitamin B6: Found in chickpeas, tuna, salmon, chicken and turkey;
- Vitamin B12: most conventional gluten-containing breakfast cereals are fortified with 100 per cent of your daily vitamin B12 requirements. Meat, fish and dairy products tend to be the best sources of vitamin B12, however, milk and cheese also contain B12; and
- Thiamine, riboflavin and niacin: All three typically are added to conventional fortified gluten-based cereals and bread. Look to beans for good sources of thiamin, milk or nuts for riboflavin and poultry, fish or dairy for niacin.

CONCLUSION

There has been an increase in Celiac Disease among the population, but this is not the sole reason for the larger demand for gluten-free products. The relatively new and poorly defined medical condition of non-celiac gluten sensitivity accounts for some of this demand, along with our increased tendency to rely on self-diagnosis and eliminate gluten from our diets.

Modern agriculture has caused structural and biological changes to

occur in wheat through hybridization, which could account for the increased prevalence of intolerance to gluten. For the moment, however, scientific evidence is lacking that this is the case. We must accept, for now, that this remains a hotly-contested theory.



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