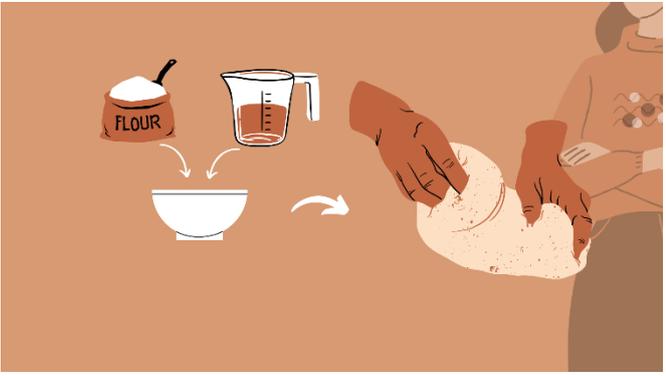
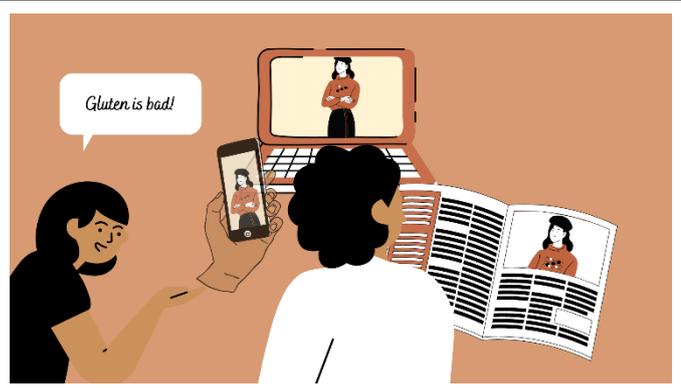


## Diary of a Misunderstood Pro(teen) by Marlow Englbrecht

Card text	Visual Notes
<p>Card 1</p> <p>Meet Gluten.</p> <p>Gluten is a protein that is found in grains such as wheat, rye and barley.</p>	 An illustration of a woman with dark hair, wearing a brown sweater with a graphic of wheat stalks on the chest. She has her arms crossed and a neutral expression. The background is a solid brown color.
<p>Card 2</p> <p>When you mix flour and water, it is Gluten that creates a glue-like consistency creating that sticky network.</p>	 An illustration showing the process of mixing flour and water. On the left, a small brown container labeled 'FLOUR' and a measuring cup containing liquid are shown. Arrows point from both to a white bowl. An arrow then points from the bowl to a pair of hands kneading a ball of dough. The background is a solid brown color.
<p>Card 3</p> <p>Gluten makes dough elastic and gives bread the ability to rise when it's baking.</p> <p>You could say that Gluten is the glue that keeps everything together.</p>	 An illustration of the same woman from the first card, looking towards a brown oven. The oven's window shows a loaf of bread rising with steam coming out. The background is a solid brown color.

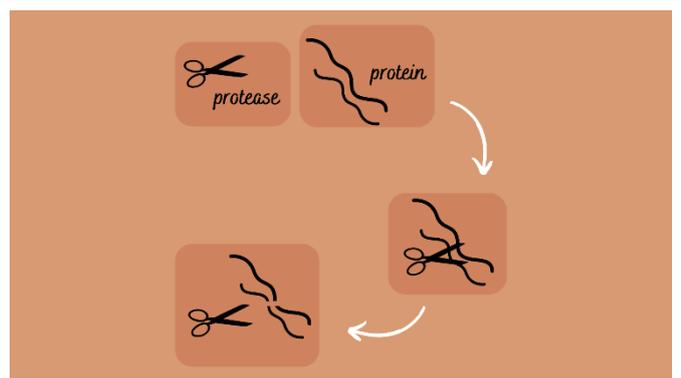
Card 4

Unfortunately, Gluten is misunderstood sometimes and gets a bad reputation, because it can cause havoc in some humans.



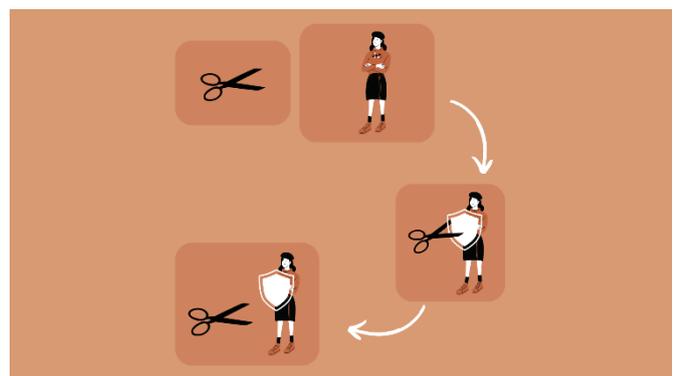
Card 5

Enzymes are proteins that break down substances in the human body. Protease is the enzyme that helps our bodies process proteins.



Card 6

However, and this is where the problem can come in, protease cannot completely break Gluten down because of the high prolamine and glutamine content.



Card 7

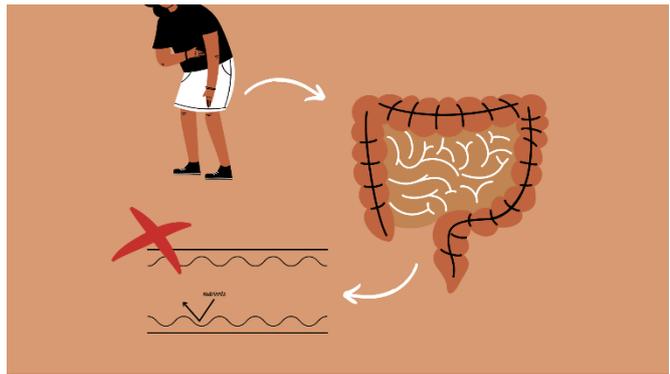
The undigested Gluten then moves to the small intestine and even though most people can handle it, Gluten can still be harmful to some.



Card 8

For instance, an autoimmune reaction can be triggered when a person with **celiac disease** ingests gluten.

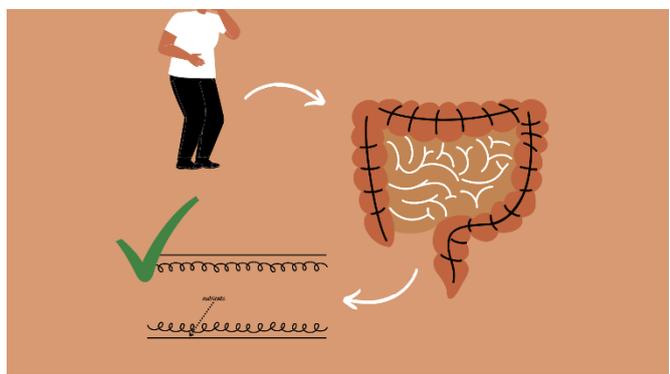
The gluten causes harm to the small intestine and prevents the absorption of nutrients.



Card 9

Where celiac disease is an autoimmune condition, **gluten intolerance** is a sensitivity.

Gluten still causes irritation in the digestive system of these people, but there are no full negative impacts like celiac disease.



Card 10

In a person with a **wheat allergy**, gluten can be **one of the many proteins found in wheat** that can trigger the reaction.

A common misconception is that this is a gluten allergy, but it is a misleading term.



Card 11

Wheat, barley and rye all contain gluten, so the gluten in food can come from either (or all) of these grains.



Card 12

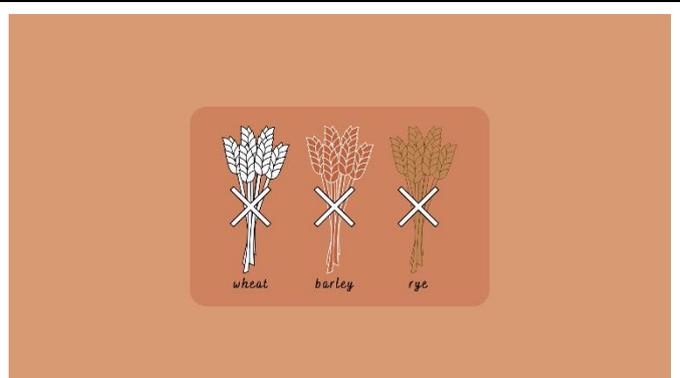
Therefore, wheat and gluten are present in many of the same foods; but they are not identical.

All gluten-free foods are wheat-free, but not all wheat-free foods are gluten-free.



Card 13

If a person has a gluten sensitivity or celiac disease, that person must avoid all types of **gluten-containing grains** (wheat, barley and rye).



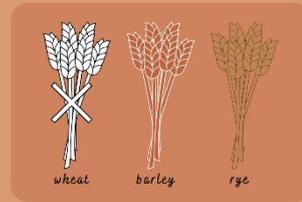
Card 14

It's important to remember that "wheat-free" labelled food may not be suitable for these people, because those foods may still contain gluten from barley or rye.



Card 15

On the other hand, if a person has a wheat allergy, that person only needs to avoid **wheat-containing foods**.



Card 16

In rare cases, the ingestion of gluten can cause your body to attack parts of the brain. This is a neurological autoimmune disorder called **gluten ataxia**.



Card 17

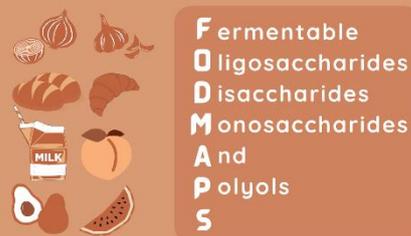
Many people experience bloating, diarrhea, headaches and skin rashes after consuming these grains, but it is important to remember that they can be caused by poorly digested carbs and not necessarily gluten.



Card 18

FODMAPS are a collection of carbohydrates (sugars) that are also not properly absorbed in the gut.

This can cause these symptoms mentioned in the previous slide.



Card 19

Wheat, barley and rye all contain **gluten and FODMAPS**, so a gluten-free diet will decrease intake of the protein in these grains, while a low FODMAP diet will reduce the carbs in these grains.

Gluten is not a FODMAP, but many gluten-containing foods can be sources.



Card 20

**Recap:**

Gluten is a protein that is found in wheat, barley and rye. The ingestion of these grains can cause bloating, diarrhea, headaches, skin rashes, etc.

Protease is an enzyme in the human body that breaks proteins down, but cannot break gluten down completely. This causes problems in people with either celiac disease, gluten sensitivity or gluten ataxia.

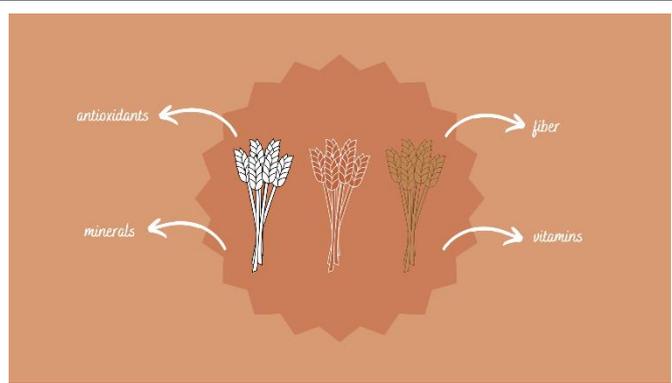
A wheat allergy has a slightly different story. The gluten protein does not necessarily cause the allergic reaction. There are many proteins found in wheat that can cause the reaction, gluten being one of them.

Additionally, it is important to know that these symptoms might not be because of the gluten though, and can be caused by the undigested carbohydrates (FODMAPs).

Card 21

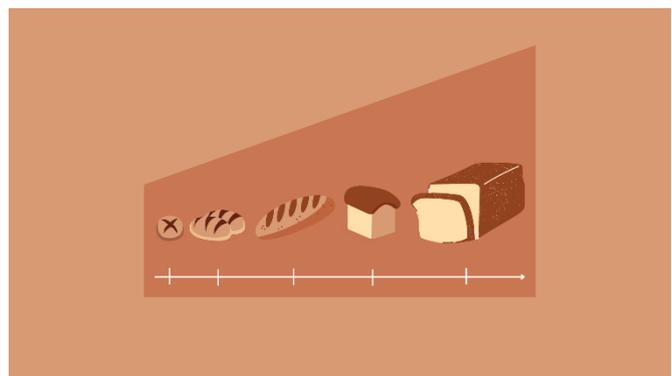
Gluten is not bad for healthy people who can tolerate it and the actual wheat plant is highly nutritious.

Whole grains have been providing people with protein, soluble fiber and nutrients for ages.



Card 22

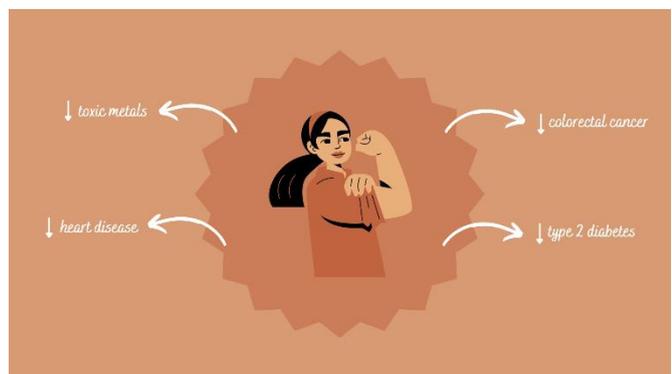
Humans have consumed gluten for as long as people have been making bread.



Card 23

In fact, studies have shown that whole grains have many health benefits, such as:

- Reducing the risk of exposure to toxic metals,
- Lowered risk for developing type 2 diabetes,
- Decreased risk for heart disease and colorectal cancer



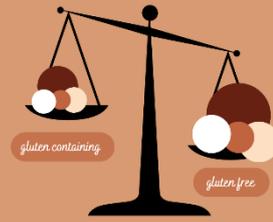
Card 24

In a study from 2017, researchers explored the nutritional compositions of over 600 food products in a gluten-free diet and those in a normal gluten-containing diet.



Card 25

Interestingly, the gluten-free foods had significantly more calories, protein content, saturated fatty acids and sometimes sugar.



Card 26

Studies have also shown that many gluten-free diet followers still eat processed foods, thus still experiencing weight gain, increased blood sugar levels and other health issues.



Card 27

This proves that the gluten in these foods isn't causing their health issues but rather the sodium, sugar and other additives.



Card 28

So, contrary to popular belief, there is no reason to avoid gluten (if your body can tolerate it).

Having a normal gluten-containing diet can be healthy and actually help avoid excess calorie intake.



Card 29

**Summary:**

For healthy humans, gluten does not have to be bad. With the right knowledge, gluten (especially from whole grains) can be highly nutritious and have several benefits.

This includes avoiding excess calorie intake from non-nutrient, processed foods (and even some gluten-free foods).

By knowing that gluten is found in wheat, barley, rye (and sometimes oats), we as consumers can know which foods to avoid. Wheat-free doesn't mean gluten-free and not all gluten-free foods are necessarily the healthier option.

Individuals that should avoid gluten are people with either celiac disease, gluten ataxia or gluten sensitivity.

It is vital for these individuals to know the difference between wheat-free and gluten-free foods, because a product free from wheat can still contain gluten (from barley or rye).

Someone with a wheat allergy will have to avoid food containing wheat and not necessarily gluten. The gluten protein can be a trigger for an allergic reaction, but so can many other proteins that are present in wheat.

Another thing to remember is that the symptoms commonly associated with gluten (such a bloating, vomiting, diarrhea, etc.) isn't always caused by it. It is important to know that these symptoms can also be caused by the undigested carbohydrates (FODMAPs) and not undigested gluten.

Card 30

Activity:

Give this short quiz a go to test your knowledge on what you've just learned (answers are on the next slide):

- 1. Protease completely breaks down gluten.**  
True/False
  
- 2. The group of poorly digested carbohydrates are called:**
  - a) FOPMADS
  - b) FODMAPS
  - c) FOOPAHS
  
- 3. Gluten can be found in the following grains:**
  - a) Wheat
  - b) Rye
  - c) Barley
  - d) All of the above
  
- 4. Following a gluten-free diet means avoiding only 'wheat-free' products?**  
True/False

Card 31

Answers:

1. False

2. b
3. d
4. False

Card 32

About the author:

Marlouw has a Master of Science degree in Medical Physiology, but she has a passion for bringing science and creativity together.

