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Eating can be a real pain in the gut

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ABSTRACT

Suffering from abdominal pain after eating, a common feature of patients with irritable bowel syndrome, is common yet difficult to treat. It is often underestimated, even by physicians, and the underlying causes are not fully understood. We found that an infection in the gut can cause the body to develop an immune response to specific foods. This means that you can develop an intolerance to certain foods causing abdominal pain after meals.

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Although we need to eat to stay alive, sometimes certain foods can cause big problems and make our guts complain. In an age of misinformation, a bunch of new diets have bombarded us all with advice about what we should or shouldn't eat. From gluten to dairy products, the popularity of certain diet books has spread the idea that some food items can be the cause of all (or the majority of) gastrointestinal symptoms, that is, problems with our digestion.

While this is far from the truth, for some people eating can represent a real nightmare. Researchers believe that food allergies, sensitivities, and food intolerances have become more common over the last years. Nowadays, up to 20% of the worldwide population suffers from gastrointestinal symptoms following a meal. This is particularly the case for people suffering from Irritable Bowel Syndrome (or IBS), who commonly associate their gastrointestinal symptoms with the intake of some foods. In the absence of more serious conditions such as inflammatory bowel disease, celiac disease, or food allergies, IBS is characterized by chronic abdominal pain and abnormal bowel movements. This condition affects around 10% of the Western population and is a common reason for consultation in primary care and gastrointestinal specialists.

The mechanisms underlying the development of symptoms in IBS patients are not well understood. The majority of researchers agree that diet, and in

particular certain foods – such as dairy, gluten products, or foods with certain carbohydrates that are difficult to absorb in our intestines – are the main cause of the symptoms. Therefore, many patients believe they suffer from some kind of allergy or intolerance, despite conventional tests failing to detect this. Since IBS diagnosis is based on the presence of certain symptoms, and not on any clinical or lab test, many people think these individuals may be simply imagining it, or have too much stress. Moreover, there is unfortunately no effective treatment for IBS. Although certain drugs can relieve altered bowel movements (diarrhea or constipation), the treatment of abdominal pain is rather disappointing. Some physicians say it may be best to relax and avoid stressful situations, but this usually does not help either.

We found and characterized a biological mechanism which explains the development of abdominal pain after eating. We showed that an intestinal infection in mice, or toxins produced by certain bacteria, can trigger an immune response towards certain foods. This means these foods are recognized as being harmful and the gut starts producing antibodies against them. As a result, tolerance to these specific foods is lost, evoking the activation of immune cells and leading to the development of abdominal pain the next time these foods are taken.

This may explain one of the best-defined subgroups of IBS patients: post-infectious IBS. Around 10% of people develop chronic gut symptoms after an intestinal infection – which are the most prevalent infections only behind those affecting the throat. We therefore suggest that eating certain foods during the course of a gastrointestinal infection could result in the development of abdominal pain when eating these same foods in the future. As we cannot (and should not) stop eating when we suffer from a gut infection, the ailment is hard to prevent. Nevertheless, understanding the underlying mechanisms will help for the development of proper therapies.

In fact, the development of such an immune response to food may sound somewhat similar to an allergy, right? Well… it's actually a bit different. In an allergy, we find antibodies circulating through the blood. These antibodies erroneously detect food – or pollen, or dust mites, etc. – as harmful, and alert the immune system to attack them, causing an allergic reaction. We found, however, that the immune response towards the food was confined to the intestine, and not to the rest of the body. Next, we wanted to evaluate if what we saw in our mouse model, also happens in humans. Thus, we recruited patients with IBS and evaluated the immune response triggered towards common foods – such as wheat, gluten, soy, and milk. After excluding food allergy, we found that injection of these foods into the colon of patients with IBS led to the development of an immune reaction, similar to what we observed in the experiments with mice.

In conclusion, the origin of the intestinal problems of these patients is not in their minds, but in the biology of their guts. This study creates novel possibilities for the treatment of abdominal pain after eating, and sheds light on an old problem that is still unsolved: the source and treatment of abdominal pain in subjects with IBS.