Build Your Resilient Gut
MICROBIOME & BEYOND

By Kiran Krishnan
Microbiologist & Microbiome Expert

Common GI Problems & Solutions:

Pancreatic-Digestive Enzyme Insufficiency

Video Transcript:

Enzyme insufficiency is basically your body's not producing enough digestive enzymes. These are pancreatic enzymes and brush border enzymes, so these are enzymes that's released in the small bowel in order to try to break down the food and assimilate it. So things like fats are broken down by lipids... sorry, by lipase. Protease breaks down proteins, amylase breaks on carbohydrates, and there's a couple other digestive enzymes as well that are important, but generally it means you don't have the enzymatic activity to break down the food. And then the brush border enzymes are the enzymes that are sitting there at the border of the microvilli which are really important in order to prepare certain molecules of food for being absorbed and utilized properly. So lactase is an important example of that.

Now, when you have lactose, which is sugar from milk and dairy, if you don't have an adequate lactase at the lining of the intestines, the lactose can create an inflammatory response in the lining, which causes a lot of diarrhea and stool urgency or movement, bowel movement urgency. And this is why people who are lactose intolerant are lactose intolerant because they don't have adequate lactase enzyme at the brush border.

You have also a microbiome-produced enzymes. So there are microbes that produce

things like beta-glucuronidase and then more amylases, more proteases and so on to help break down complex food structures in your gut. You want to have a good, healthy, diverse microbiome in order to do that, and you want to have more gram-positive bacteria in your small bowel and gram-negative bacteria in order to produce enough of these enzymes to help break down your food. So enzymatic insufficiency is a very common thing. And after you turn 30, your pancreatic enzymes just start to decline and your brush border enzymes start to do so as well.

Generally, the symptoms are very similar to other things: bloating, gas, undigested food in stool, oily/floating stool, nutrient deficiencies, fatigue and weight loss. The brush border, you're going to have issues with lactose intolerance and specific carbohydrate malabsorptions. And then overall, the consequences are malabsorption of fat, proteins, and carbohydrates, which can lead to nutrient deficiency and energy issues. Gut dysbiosis, it can drive further dysbiosis as the undigested food may ferment in the wrong place, promoting the overgrowth of harmful bacteria and the recruitment of the immune system, which may start to kill lots of things in that area.

And then undigested food particles can actually trigger excessive immune responses. That's one of the key problems with gluten is that the peptides in gluten, once the bigger structure of gluten gets broken down into these smaller peptides, those peptides can promote immune responses in the gut, which is one of the ways in which gluten can create leaky gut and turmoil in the gut, if you will. So it's a really important thing to keep in mind that if you can't break down your food, especially proteins, it'll get broken down into these peptides, and then those peptides can be very inflammatory.

In fact, there are studies in autism spectrum disorder kids that tend to have a big issue with digesting protein, and what they find is that these little peptides of proteins that are instead supposed to be broken down to its individual amino acids, but these little peptides with 10 to 11 amino

There's individual amino acids, but these little peptides with 10 to 11 amino acids in a row, or sometimes even bigger, ends up in the large intestine where it's not supposed

to because it's all supposed to be broken down and absorbed in the small intestine. But now you're getting these peptides or these smaller chains of amino acids entering into the large bowel, and in the large bowel, they can become putrefied. Because the large bowel is not designed to breakdown protein any further, there are no enzymes that are doing the same. There's no hydrochloric acid. We don't have the same tools in our large bowel to deal with proteins. And so, they can sit there and get putrefied.

So that's actually one of the symptom drivers of spectrum disorders in terms of cognitive function is that, in the case of those kids, they were able to show that they tend to get a high degree of putrefying proteins in their large bowel because they have insufficiencies in enzyme production in their small bowel. Then that putrefied protein creates toxigenic and gas effect that increases inflammation, which increases leaky gut and more dysfunctions, especially gut-brain inflammation in this case.

So enzyme insufficiencies, the driving forces of them are chronic inflammation, aging ... As I mentioned, as you age, your enzymatic production goes down ... low stomach acid, poor diet quality, and nutrient deficiencies. On the pancreatic side, pancreatic disease or overconsumption of processed foods and low bile flow as well.

Then brush border. The brush border enzymes typically are compromised when you have gut inflammation or injury to the small intestinal lining. So things like celiac or severe gluten intolerance or just poor diet in general that has led to endotoxemia or leaky gut, and certainly infections in the lining of the bowel have a huge impact. The microbiome produced issue will lead to dysbiosis and typically from antibiotic use, and low fiber intake as well.

Solutions for this from a lifestyle perspective is, again, meal hygiene, mindful eating, enzymes, proper enzyme release. Then you can think about supplementation as well, chewing food thoroughly, and then improving the vagal nerve tone. You can use one of those devices or do humming, or just Google a number of ways of activating the vagus nerve after a meal.

From a diet perspective, reduce exposure to foods that the individual's not tolerant to, cook foods thoroughly so it's easier to break down and assimilate, and then avoid highly processed foods, eat nutrient-dense real foods. So same advice as before.

The enzyme that we're talking about here is **Holozyme**. It's a broad spectrum enzyme. It supports all forms of enzyme deficiencies. Lipase and ox bile are also supportive supplements that you can take.

I really like the idea of ox bile for people that have issues that seem like gastroparesis or bile acid insufficiencies or gallbladder issue. Ox bile can be very supportive, and lipase is an enzyme that breaks down fat. So that can be also really supportive for not only enzyme insufficiency, but other issues that we talked about earlier.

HCL Guard supports optimal stomach acid levels and triggers enzyme release. Then microbiome foundations are going to be **MegaSporeBiotic**, **MegaPre**, and **Tributyrin-X**, again to make sure that you're getting adequate levels of some of the key components within the gut, like short-chain fatty acid production, keystone species increase activating goblet cells to produce mucus, modulating immune response and so on.

Then in addition to that, ginger and digestive bitters can also be very important. They can stimulate natural enzyme release and enhance motility.

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