

Leaky Gut: The GI Tract's Role

S. Seethalakshmi¹, Sofiya Princess Hema², Dr. Jayasudha³

¹Associate Professor

²Professor, HOD FON

³PhD Principal, PSG College of Nursing, Coimbatore, Tamilnadu, India

Abstract: *The intestinal barrier includes surface mucus, epithelial layer, and immune defenses. "Stress" disorders such as endurance exercise, non steroidal anti - inflammatory drugs administration, pregnancy, and surfactants (such as bile acids and dietary factors such as emulsifiers) increase permeability. Dietary factors can reverse intestinal leakiness and mucosal damage in the "stress" disorders. Whereas inflammatory or ulcerating intestinal diseases result in leaky gut, no such disease can be cured by simply normalizing intestinal barrier function. It is still unproven that restoring barrier function can ameliorate clinical manifestations in gastrointestinal or systemic diseases. We should be aware of the potential of barrier dysfunction in gastrointestinal diseases and of the barrier as a target for future therapy. Information on "healthy" or "leaky" gut in the public domain requires confirmation before endorsing dietary exclusions, replacement with non - irritating foods (such as fermented foods), or use of supplements to repair the damage.*

Keywords: permeability, mucus, tight junctions

1. Introduction

Current research is revealing an important relationship between gastro intestinal (GI) health and overall health. In this article, We will take a look at Leaky gut – a disorder that can occur when intestinal permeability is increased - including the anatomy and physiology of the GI tract, gut micro biota, and ways to prevent or reverse leaky gut.

Leaky gut

The term leaky gut is becoming increasingly popular in both community and health care settings. Although leaky gut is the common term, it's another way of saying increased intestinal permeability. To understand what leaky gut is, we need to understand the normal anatomy and physiology of GI tract.

The intestines have an epithelial lining that, when combined with secreted factors, forms a barrier to help control the movement of fluid and macromolecules. Under optimal conditions, the intestinal lining forms a tight barrier that prevents the passage of unwanted material from the GI tract into the blood and surrounding tissues. In the intestines, there's a single layer of specialized epithelium linked together by tight junction proteins. There are multiple types of functional intestinal epithelial cells in the GI tract, including enterocytes, goblet cells, and paneth cells.

Accounting for at least 90% of the functional intestinal epithelial cells, enterocytes, a type of villus cell, are necessary for the uptake of nutrients, nutrient absorption, and digestion. Goblet cells are responsible for scoring and secreting mucus that acts as both a lubricant and barrier to protect against the adherence of unwanted microorganisms and paneth cells play an important role in antibacterial defenses. Mucins, antimicrobial molecules, immune globulins and cytokines also play a role in the development of leaky gut.

Any abnormality in the GI tract may increase intestinal permeability, leading to leaky gut. When a patient has leaky gut, his or her intestinal lining doesn't form a tight barrier

which allows partially digested food, toxins and micro organisms to escape. The body mounts an immune response when this happens, creating antibodies meant to attack the foreign material. Leaky gut can cause both local and systemic immune responses, leading to sickness in the patient experiencing it.

Gut micro biota; The bacterial component



The human gut micro biota refers to the trillions of microbes, such as bacteria, that live in the human gut. The micro biome is the environment they live in. Most microbes in the body are useful, but they may become harmful when out of balance.

The micro biota consists of a wide variety trusted Source of bacteria, viruses, fungi, and other microorganisms present in a singular environment, such as the human digestive tract.

The **micro biome** refers trusted source to the entire habitat of the body, including its microorganisms, genomes, and the surrounding environmental conditions.

The gut micro biota is a vast and complex collection of microorganisms that profoundly affects human health. Previously, people referred to the gut microbiota as micro flora of the gut.

The gut micro biota assists in a range of bodily functions, including:

- Harvesting energy from digested food
- Protecting against pathogens
- Regulating immune function

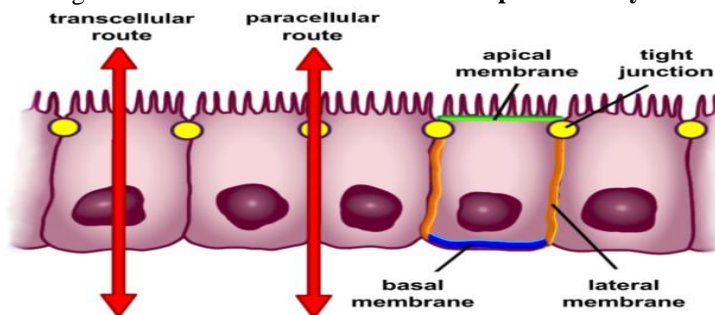
- Strengthening biochemical barriers of the gut and intestine

Changes in micro biota composition can affect these functions.

While there are beneficial bacteria in the gut, there are also harmful bacteria that can enter the GI tract and cause infections including food poisoning and other GI diseases

that result in diarrhea and vomiting. Micro organisms in the GI tract appear to play an essential role in the prevention or development of leaky gut. Made up of bacteria and other classes of microbes, such as fungi and viruses, the gut micro biota is so significant that it's been referred to as the microbial organ.

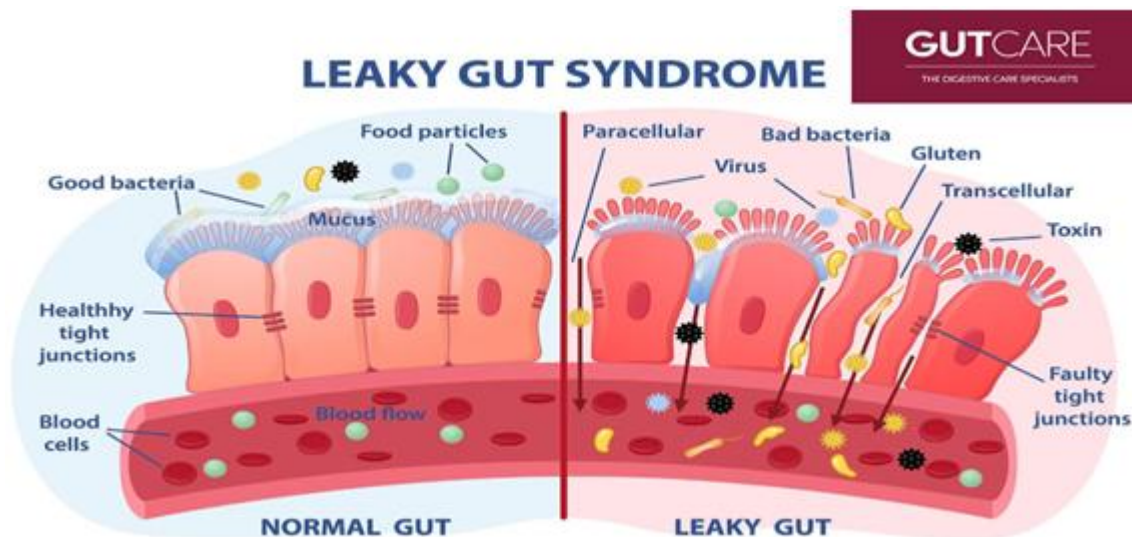
Intestinal permeability



The mucous lining of our intestines is designed to absorb water and nutrients from our food into our bloodstream. But some people have increased intestinal permeability or hyper permeability. That means their guts let more than water and nutrients through — they “leak”.

maintaining a barrier function to keep potentially harmful substances (such as antigens) from leaving the intestine and migrating to the body more widely. In a healthy human intestine, small particles (< 4 Å in radius) can migrate through tight junction claudin pore pathways, and particles up to 10–15 Å (3.5 kDa) can transit through the par cellular space uptake route. [3] There is some evidence abnormally increased intestinal permeability may play a role in some chronic diseases and inflammatory conditions. The most well understood condition with observed increased intestinal permeability is celiac disease.

Intestinal permeability is a term describing the control of material passing from inside the gastrointestinal tract through the cells lining the gut wall, into the rest of the body. The intestine normally exhibits some permeability, which allows nutrients to pass through the gut, while also



Influencing Factors

- Chronic inflammatory states, such as IBD and celiac disease.
- Other diseases that cause intestinal injury, such as HIV/AIDS.
- Chemotherapy and radiation therapies that degrade the intestinal mucosa.
- Chronic overuse of alcohol or NSAIDs, such as aspirin and ibuprofen.
- Food allergies that cause an immune response to certain foods.
- Common everyday factors such as diet and stress may wear down intestinal lining.

Symptoms of a leaky gut

- A burning feeling of ulceration in your gut.
- Painful indigestion from the loss of intestinal mucosa.
- Diarrhea
- Gas and bloating from fermentation by overgrown bacteria in your gut.
- Low energy from the reduced ability to draw energy from your food.
- Gastrointestinal mucositis from radiation therapy.

How can I take care of my gut?

- Probiotics.
- Prebiotics

- Reduce dietary fats and sugars.
- Nutrition
- Low FODMAP Diet (FODMAP stands for **fermentable oligosaccharides, disaccharides, monosaccharides and polyols**, which are short - chain carbohydrates (sugars) that the small intestine absorbs poorly. Some people experience digestive distress after eating them. Symptoms include: Cramping)

Probiotics and Prebiotics

Probiotics are foods or supplements that contain live microorganisms intended to maintain or improve the "good" bacteria (normal micro flora) in the body. Prebiotics are foods (typically high - fiber foods) that act as food for human micro flora. Prebiotics are used with the intention of improving the balance of these microorganisms. Although still ongoing, research has shown that probiotics can be used to prevent and potentially reverse certain diseases and disorders. Consuming dairy products, such as milk, yogurt, and cheese, is an easy way for patients to receive probiotics.

Prebiotics are in foods such as whole grains, bananas, greens, onions, garlic, soybeans, Oats, Sweet potatoes, yams and artichokes. In addition, probiotics and prebiotics are added to some foods and available as dietary supplements. Patients can also increase their intake of beneficial microorganisms by consuming fermented foods, such as milk kefir, Kombucha and sauerkraut. Probiotics can be taken in the form of capsules and tablets as well.

2. Final Thought

It's essential for nurses to be able to recognize this connection and guide patients to a healthier way of life. Although more research on leaky gut is needed, it's important to understand that we can alter gut micro biota to enhance our patients' health and wellness. Nurses can play a role in the prevention of leaky gut by reviewing the most current research and recommending healthy lifestyle changes.

Research on the link between disease and appendix removal is ongoing. It's been shown that there's a link between the removal of the appendix and certain diseases, such as cancer of the GI tract (specifically the large bowel). Although in its infancy, research has also shown a link between appendix removal and mood disturbances, such as depression and anxiety. At this time, more research about the appendix's role in GI health is needed.

References

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