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Pathology Paper: Leaky Gut Syndrome
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Twenty-five hundred years ago, when Hippocrates stated that “All disease begins in the gut”, he had an incredible intuition that only recently has been fully appreciated because of new insights into the pathogenesis of many chronic inflammatory diseases afflicting humankind, including Leaky Gut Syndrome. [4]

Leaky Gut Syndrome Defined:

The medical community defines leaky gut syndrome as symptoms including bloating, gas, cramps, food sensitivities, and aches and pains. Leaky gut syndrome is also called intestinal permeability and has been associated with asthma, psoriasis, allergies and inflammatory bowel diseases.

The American Herbalists Guild published a paper in 2015 by Stephen Byers in which he states “Leaky Gut Syndrome is not a medically recognized diagnosis. It uniquely refers to increased permeability or hyper-permeability of the intestinal walls which occurs when tight junctions of the epithelial cells become loosened or “leaky”. This can allow undesired foreign substances, including undigested food particles to more easily pass through into the bloodstream. It is believed that this intestinal permeability can contribute to a cascade of imbalances in the function of the body leading to a variety of immune, hepatic, and/or lymphatic associated conditions”. [2]

An article by Frontiers in Immunology published in May of 2017 defines the condition as “Leaky gut allows the entry of exterior antigens from the gut lumen into the host, which may promote both local and systemic immune responses. Multiple diseases may arise or be exacerbated due to a leaky gut, including autoimmune diseases such as inflammatory bowel disease, celiac disease, autoimmune hepatitis, type 1 diabetes, multiple sclerosis, and systemic lupus erythematosus.” [1]

In my research for this paper I noticed a definite change in the medical community's stance on Leaky Gut Syndrome starting in about 2016. Previous to that year many of

the research papers I read had titles like “Debunking Leaky Gut Syndrome” or “Leaky Gut, Concept or Clinical Entity”. Today, leaky gut syndrome or intestinal permeability is recognized in both the medical and herbal communities as a condition that may cause many other diseases.

What Exactly Is Leaky Gut Syndrome: At its most basic, leaky gut syndrome is like having large holes in what is supposed to be tightly woven fabric. The holes allow particles, such as toxins and harmful bacteria that would normally be eliminated from the body to enter the bloodstream, where they can create health problems.

A more scientific explanation is that the bacteria that naturally live inside the stomach and on the body are collectively referred to as the microbiome. A healthy and diverse microbiome is important for gut and overall health. Growing evidence shows that the gut microbiome is important in supporting the epithelial barrier and therefore plays a key role in the regulation of environmental factors that enter the body.

Scientists have studied the gut microbiome for many years, but recent advancements in molecular biology has enabled researchers to gain new insight in this field. Growing evidence suggests that the gut microbiome is important in modulating gut permeability and intestinal barrier functions. We have an efficient multifaceted intestinal barrier system with physical, biochemical, and immunological components that prevents the entry of most pathogens. These components coordinate with each other to prevent uncontrolled leakage of intestinal contents into the body. Without an intact and properly functioning intestinal barrier, substances can penetrate the tissues beneath the intestinal epithelial lining, diffuse into blood and lymphatic circulations, and disrupt tissue homeostasis.^[4] This may trigger inflammation and changes in the gut flora (normal bacteria) that could lead to problems within the digestive tract and beyond. The research world, both western medicine and herbal, is booming today with studies showing that modifications in the intestinal bacteria and inflammation may play a role in the development of several common chronic diseases.^[5]

How do these “holes” form? According to Dr. Alessio Fasano, director of the Center for Celiac Research and Treatment with Harvard-affiliated Massachusetts General Hospital, “the biggest culprits are genes and diet, some people may have a weaker barrier because they were born with it, or they follow an unbalanced diet low in fiber and high in sugar and saturated fats, which may be the trigger that weakens the gut lining.” Age also plays a role because as you age, cells get damaged more easily and heal slowly, if at all, so the gut becomes more vulnerable.^[6]

Leaky gut syndrome is the direct consequence of gut inflammation and the abnormal function of the proteins that keep the cells in our gut close together. Among the cells of our gut are the tight junctions or TJs. These are one of the main mechanisms of regulation of the passage of substances into our interior. The tight junctions are not fixed structures, their environment modulates their function. This modulation of the tight junctions is carried out by a protein called zonulin. ^[8] People with a higher expression of zonulin protein consequently have a more permeable intestine or leaky gut, and when the gut becomes "leaky" bacteria and toxins enter the bloodstream, which can cause general inflammation and possibly trigger a reaction from the immune system. These people are more susceptible to develop some autoimmune diseases such as type one diabetes, celiac disease or Crohn's disease^[9]. Other symptoms associated with leaky gut syndrome include bloating, food sensitivities, digestive issues, fatigue, and skin problems.

The symptoms for leaky gut can include arthralgias (pain in multiple joints), myalgias (muscle pain), fever of unknown origin, food intolerance, abdominal pain, abdominal distension, diarrhea, chronic skin conditions, toxic feelings (i.e. chronic depression), cognitive and memory deficits, shortness of breath, malaise, and chronic fatigue. You should also suspect it if you drink heavy amounts of alcohol or take NSAIDS on a daily basis.

Dr. Leo Galland, a leading expert in gastrointestinal dysregulation and chronic disease, has drawn attention to Leaky Gut Syndromes since the early 1990's and he writes "Hyperpermeability may play a primary etiologic role in the evolution of each disease, or may be a secondary consequence of it which causes immune activation, hepatic dysfunction, and pancreatic insufficiency, creating a vicious cycle". Dr. Galland says to suspect compromised intestinal permeability in a long list of conditions which include the following; inflammatory bowel disease, infectious enterocolitis, spondyloarthropathies, eczema, urticaria, pancreatic insufficiency, irritable bowel syndrome with food intolerance, chronic fatigue immune dysfunction, neoplasia treated with cytotoxic drugs, celiac disease, and many more.^[1]

Western Medicine's Approach to Leaky Gut

Considering the contributions of leaky gut and bacterial passage to inflammation and multiple diseases, reversing gut leakiness appears to be an attractive therapeutic strategy.

Prebiotics are types of dietary fiber that feed the friendly bacteria in your gut and are present in fiber-rich foods such as fruits, vegetables, and whole grains. Prebiotics help

the gut bacteria produce nutrients for your colon cells and lead to a healthier digestive system by stimulating the growth and/or activity of probiotics in the colon. Probiotics are live bacteria and yeasts that are good for you, especially your digestive system. Probiotics occur in many fermented foods, including yogurt, sauerkraut, and tempeh. Diverse probiotic species have been uncovered that possess the properties to protect the intestinal barrier through targeting different components of the mucosal barrier system. A randomized, double-blind, placebo controlled trial to observe the effects of probiotic supplementation on markers of intestinal barrier oxidation and inflammation was conducted and showed that the zonulin protein decreased with supplementation from values slightly above normal into normal ranges and was significantly lower after 14 weeks with probiotics compared to placebo. Even with this study showing the positive results, the medical community states that “so far the traditionally prescribed prebiotics and probiotics do not show significant impact on improvement of diseases in general. Thus the development of next generation prebiotics and probiotics designed to target specific diseases is urgently needed.” [10]

Some researchers have focused their efforts on the discovery and characterization of the zonulin protein as the only human protein discovered to date that is known to reversibly regulate intestinal permeability by modulating intercellular tight junctions. Zonulin expression is increased in autoimmune conditions associated with tight junction dysfunction, including celiac disease and Type 1 Diabetes^[11]. Both animal studies and human trials using the zonulin synthetic peptide inhibitor AT1001 (now named Larazotide acetate) established that zonulin is integrally involved in the pathogenesis of autoimmune diseases. Alternatively, pathogenic bacteria that can facilitate a leaky gut and induce autoimmune symptoms can be helped with the use of antibiotic treatment. Therefore, it was hypothesized that modulating the gut microbiome can serve as a potential method for regulating intestinal permeability and may help to alter the course of autoimmune diseases in susceptible individuals.^[4]

In short, the medical community would like to alter prebiotics and probiotics to a “next generation level” or prescribe another type of antibiotic to “modulate” the gut microbiome.

A Holistic Approach to Leaky Gut Syndrome:

When we say we take a holistic approach, what does that mean? A holistic approach means to provide support that looks at the whole person, mind, body and spirit, not just the immediate symptomatic needs.

One of the wonders of the human body is resilience. We have an amazing capacity to reverse damage and restore health. Some of the best herbs to reverse damage to the intestinal lining would include Larch tree bark, Marshmallow Root, Licorice root, Slippery Elm and Aloe Vera.

Larch Tree bark contains arabinogalactan which is a type of prebiotic fiber. Research suggests that arabinogalactan promotes a balanced microbiome, which is key for maintaining a healthy gut and keeping viruses, candida and other bad bacteria in check.^[13] Probiotic bacteria in your digestive system can ferment the arabinogalactan and produce fatty acids in the process that help repair your gut lining.

Marshmallow root has a high mucilage content which covers the digestive tract with a protective lining and eases inflammation in the gut, helping to soothe ulcers, diarrhea, and constipation, as well as restoring the integrity of the small junctions found in your digestive system. This is one of the reasons why marshmallow root has been found to be so beneficial for people suffering from ulcerative colitis and Crohn's disease^[14]

Licorice root helps your body repair your gut lining by replenishing the mucus that creates a healthy intestinal barrier. Licorice root has been used for more than 3,000 years as a treatment for digestive issues such as ulcers and indigestion, and this ancient wisdom is now backed up by science. A study comparing licorice root with an over-the-counter medication for peptic ulcer disease found the licorice root to have the same powerful protective action against the recurrence of an ulcer as the medication. It is thought that this effect is due to its ability to protect your body by promoting a healthy mucosal lining.^[15]

Slippery elm is another herb for gut repair that has been used for centuries in the United States. It works to your advantage in three ways. Slippery elm increases the mucilage content in your digestive tract, stimulates nerve endings to boost mucus secretion, which neutralizes excessive acidity in the gut and soothes ulcers, and it also provides antioxidants that help relieve inflammatory bowel symptoms. These properties make it a great addition to any IBS protocol as normalizing bloating, abdominal pain, and stool frequency and consistency can provide much-needed relief.^[16]

Aloe vera is soothing and protecting and helps your body replace the lost mucus associated with gut damage and leaky gut. Aloe vera supports your immune system, increases the water content within your intestines, and aids in the control of candida overgrowth, bad bacteria, and inflammation. It also provides a wide range of nutrients

and antioxidants, including vitamins A, C and E. Studies show aloe vera's beneficial effect on IBS and its ability to boost the number of good bacteria in your gut.^[17]

It's always best to support your overall system's health whether or not you have leaky gut syndrome. This becomes even more important if you are suffering from Leaky Gut as it will strain other organs. You will want to choose herbs that are specific to your body, which may mean something that specifically nourishes your heart such as Hawthorn or Linden, or something that supports the lungs such as Mullein or Elecampane, or whatever extra support is needed by your body.

A holistic approach to our overall health also reminds us to address the cause. For a leaky gut this would mean not eating fast foods, additives and highly refined foods. Enjoy vegetables, fruits, legumes, seeds, nuts and whole grains. Avoid NSAIDs, learn stress management techniques, reduce consumption of sugar, tobacco and alcohol, eat prebiotic foods to restore a healthy microbiome or supplement with high quality probiotics.

Eat slowly, mindfully and gratefully, eating slowly allows your digestion to work optimally. Breathe deeply before meals and have a spirit of gratitude. Modern life makes it challenging to do all the things mentioned here, but each step in the right direction helps to reduce the damage and aids in healing.^[12]

Another recommendation to aid in the health of our gut microbiome would be a short-term elimination diet that can help clarify which foods might be causing digestive distress. The approach is to simply remove suspected foods for a few weeks, then assess how you feel.

Because a holistic approach to gut health goes beyond the physical body, you need to focus on your spiritual and mental health, as well. Don't rush things to help decrease anxiety and stress. Speak affirmations to improve mindset. Learn new things constantly to achieve personal growth and fulfillment. Connect with like-minded individuals to discover more about holistic medicine and how it benefits others. We should always keep in mind that what was true many hundreds of years ago is still true today, that you truly are what you eat.

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