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Wellness Institute

Leaky Gut Syndrome

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Introduction

The chances of being diagnosed with Leaky Gut Syndrome are pretty remote. It does not even occur to many doctors to check for the condition. A further complication is that gut distress often manifests as disease in other parts of the body. Leaky Gut Syndrome is one of the most misunderstood concepts in modern medicine.

This condition is associated with an abnormal increase in the permeability of the small intestine. Increased permeability of the small intestine is associated with a wide variety of conditions including inflammatory and infectious bowel diseases such as Crohn's and celiac, arthritis, skin conditions such as acne, hives, eczema, and psoriasis, liver disease, pancreatic disease, chronic fatigue syndrome, depression, and food allergy.

Intestinal permeability testing is available through Direct Laboratory Services (www.directlabs.com).

The small intestine is the body's largest organ and is responsible for accomplishing the breakdown of foods and absorbing the nutrients into the body. Two-thirds of the body's immune system can be found in the small intestine. This is how the body provides protection from the accidental ingestion of toxins or pathogens that could make us ill.

Leaky gut syndrome is a condition in which the permeability of the small intestine is altered. Undigested foods and toxins produced by bacteria are absorbed into the body activating the immune system and creating a wide variety of problems.

References:

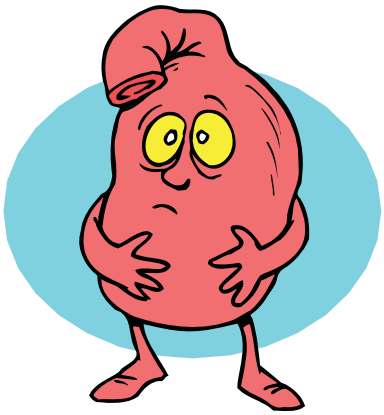
Galland, Leo, Do you have leaky gut syndrome? *Huffpost Healthy Living*, July 25, 2014.

http://www.mdheal.org/leakygut.htm

Food Intolerance

Anything which damages the lining of the digestive tract can contribute to leaky gut syndrme. For example, celiac disease is characterized by damage to the lining of the small intesting as a result of intolerance to gluten. Gluten damages the small finger-like projections of the small intestine called villi which are associated with the digestion of complex carbohydrates. Avoidance of gluten often restores normal gut permeability and health.

Unfortunately, avoidance of gluten does not always restore healthy



gut function even though it may have been the initial cause of the problem. Once the villi are damaged their ability to digest complex carbohydrates is severely compromised. Carbohydrate digestion takes place on the ends of the villi which is the area of the small intestine most susceptible to damage.

Undigested carbohydrate in the small intestine provides a nutrient medium for bacteria which are normally restricted to the large intestine. Bacteria can begin to proliferate in the small intestine releasing toxins which can further damage the intestinal lining.

Undigested foods can contribute to both overgrowth and dysbiosis. Bacterial overgrowth refers to the fact that there are just too many bacteria growing in the digestive tract although they are not necessarily harmful organisms. Dysbiosis refers to increased numbers of potentially harmful organisms and reduced numbers of beneficial organisms growing within the digestive tract or to imbalances in the microbial populations.

Gottshall describes the consequences of undigested sugars in the intestine, "Their presence in the lumen (interior space) of the intestine causes a reversal of the normal nutritional process. Instead of nutrients flowing from the intestinal space into the bloodstream, water is drawn into the intestinal lumen. The water, carrying nutrients, is lost in abnormal

intestinal function (diarrhea) and the cells of the body are deprived of energy, minerals, and vitamins. Most seriously, the sugars remaining in the intestinal lumen provide energy for further fermentation and growth of intestinal microbes."

The bacterial overgrowth can become even more severe when the strong acidity of the stomach is compromised as a result of malnutrition, aging, continual use of antacids, or antibiotic therapy.

Dr. Sidney Haas was treating a child with severe anorexia nervosa many years ago. The girl was refusing all food. She finally accepted a banana and within 48 hours she was on her way to recovery. In 1951 Dr. Haas with his son published *The Management of Celiac Disease*, the most comprehensive medical text ever written on the topic.

Haas developed the Specific Carbohydrate Diet in which banana was prominently featured. Dr. Haas designed the diet to provide foods which would be most easily tolerated and digested by a damaged small intestine. The diet limits complex sugars and carbohydrates including grains and potatoes. Nuts such as almonds substitute for grains. Legumes such as dried beans, split peas, and lentils are permitted if they are soaked for at least 10 hours. Recipes and a complete description of the protocol are available in Gottschall's *Breaking the Vicious Cycle*.

References:

Haas, Sidney V., The value of the banana in the treatment of celiac disease, *Am J Dis Child*, 1924;28(4):421-437.

Gottschall, Elaine, Breaking the Vicious Cycle, Kirkton, Ontario, Canada: Kirkton Press, 1994, 13-31, 26.

Healing a Leaky Gut

There are a number of factors to consider when trying to heal a leaky gut just as there are many causative factors for the problem.

Avoid Alcohol

Alcohol is rapidly absorbed and promotes gut permeability. One study concluded, "The results of this study indicate that alcohol abuse impairs the function of the intestinal barrier, which might enhance the translocation of bacterial toxins..." Toxin accumulations in the blood of alcoholics were more than 5-fold higher than healthy controls contributing to inflammatory processes and damage to the liver.

References:

Parlesak, Alexandr, et al., Increased intestinal permeability to macromolecules and endotoxemia in patients with chronic alcohol abuse in different stages of alcohol-induced liver disease, *Journal of Hepatology*, May 2000; 32(5):742-747.

Beware of NSAIDS

Nonsteroidal anti-inflammatory drugs (NSAIDS) include aspirin, Advil, Motrin, Aleve, and Nuprin. These drugs contribute to relief of pain and inflammation, but they come with a cost. The COX enzyme inhibited by these drugs protects the stomach lining from being destroyed by its own acid. Side effects of NSAIDS include stomach ulcers and intestinal bleeding. Drug makers have tried to distingish between "good" and "bad" COX enzymes, but the results of the newer selective COX inhibitors has been disastrous. The first such drug, Vioxx, increased deaths from heart attacks and strokes and was pulled from the market.

Omega-3 Fatty Acids

One of the best means of reducing intestinal pain and inflammation is to increase the intake of omega-3 fatty acids. What science considers the "bad" COX enzyme was recently found to convert omega-3 fatty acids to resolvins and protectins which control and resolve inflammation.

Testing on the NeoLife Salmon Oil Plus showed a 68% reduction in the Inflammatory Index over a period of 8 weeks. This product has been tested and shown to support the production of resolvins and protectins as well.

Anti-inflammatory Diet

An anti-inflammatory diet avoids refined sugars and white flour, saturated fats, and highly refined vegetable oils. Rancid fats or omega-6 fatty acids are highly inflammatory. Excessive sugar intake is also very inflammatory.

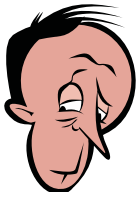
Products from corn-fed animals tend to be very high in the inflammatory fats. By contrast, products from animals consuming grass have anti-inflammatory properties due to a much higher omega-3 content. The anti-inflammatory diet can be augmented by at least four servings of high omega-3 rich fish or grass fed meats per week.

Dietary intake of fruits and vegetables high in antioxidants also has powerful anti-inflammatory effects. Consume at least 9 servings of carotenoid and flavonoid rich fruits and vegetables a day. These foods are usually easy to spot by their rich colors--red, green, orange, yellow and purple. The colors are often the antioxidant principles.

One can also supplement with carotenoids, flavonoids, vitamins C and E and fish oils for a further anti-inflammatory effect.

References:

Boivin, Dominique, et al., Antiproliferative and antioxidant activities of common vegetables: A comparative study, *Food Chemistry* 112(2009): 374-380.



Consequences of Leaky Gut

Leaky gut allows the body to absorb undigested food and bacterial toxins. It can even serve as a portal for entrance of pathogens into the circulatory system.

Food Sensitivities

Absorption of undigested food can result in sensitization of the immune system to these foods. The result is the development of food sensitivities or food allergies. When undigested food particles pass through a leaky gut, they are met by the immune system which can then target these foods as dangerous. The longer the gut remains in disrepair, the greater the number of foods which are poorly tolerated will tend to become. These intolerances can also become more severe over time.

Autoimmunity

Absorption of toxins and undigested foods can also lead to autoimmune activity. If a bacterial toxin bears a close resemblance to joint tissue the body may begin attacking its own joints. The lining of the gut is where self and non-self come into contact. Faulty functioning of the intestinal barrier can result in the body's defenses turning on itself.

One recent paper concludes, "This new paradigm subverts traditional theories underlying the development of these (autoimmune) diseases and suggests that these processes can be arrested if the interplay between genes and environmental triggers is prevented by re-establishing the zonulin-dependent intestinal barrier function."

Zonulin is a protein discovered in 2000 which regulates the tight junctions between cells along the lining of the digestive tract. The protein came to light because it is targeted by the toxin produced by the bacteria which cause cholera. Cholera is characterized by diarrhea and vomiting. A substance in wheat called gliadin activates zonulin increasing intestinal permeability which may explain why this food is so frequently associated with food intolerances and autoimmune conditions.

Fasano suggests that for autoimmune disease to develop several factors are necessary. Firstly, there must be genetic susceptibility to misinterpret an antigen found in the digestive tract. Secondly, the antigen must find its way into the digestive tract. Finally, the competency of the tight junctions must be compromised allowing the immune system to come into contact with the antigen.

References:

Fasano, Alessio, Leaky gut and autoimmune diseases, *Clinic Rev Allerg Immunol*, 2012; 42:71-78.

https://en.wikipedia.org/wiki/Zonulin

Depression

Chronic activation of the immune system by toxins and undigested foods can also result in a flood of cytokines and other chemical messengers of the immune system. These cytokines can create a variety of symptoms including depression.

Both animal models of depression and studies of depressed human subjects suggest that a variety of inflammatory substances are involved with the condition. Less than two-thirds of depressed patients achieve any benefit from current antidepressant drugs. Maes suggests that not only is leaky gut involved in depression, but also oxidative damage to lipids and inflammatory responses are contributing to this debilitating condition. He suggests that subjects with major depression be tested for leaky gut, and when confirmed they be treated accordingly.

References:

Maes, Michael, The cytokine hypothesis of depression: inflammation, oxidative and nitrosative stress (IO&NS) and leaky gut as new targets for adjunctive treatments in depression, Neuroendocrinol Lett , 2008;29(3):5.

Maes, Michael, The gut-brain barrier in major depression: Intestinal mucosal dysfunction with an increased translocation of LPS from gram negative enterobacteria (leaky gut) plays a role in the inflammatory pathophysiology of depression, *Neuroendocrinol Lett*, 2008; 29(1):117-124.

Treating Leaky Gut

Vitamin D

A relatively recent development in nutritional science is the discovery that vitamin D, the sunshine vitamin, plays a key role in the structural integrity of the lining of the digestive tract. Vitamin D deficiency has been associated with inflammatory bowel disease.

The tight junction is the critical structure which regulates the permeability of the digestive tract. This structure requires vitamin D for proper function. One research paper concluded the following:

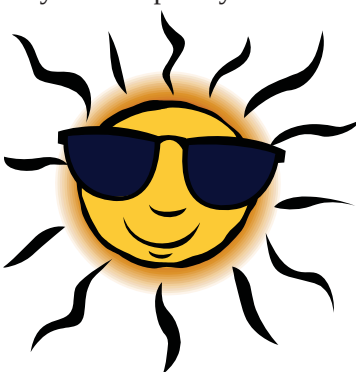
"These observations suggest that VDR (the vitamin D receptor) plays a critical role in mucosal barrier homeostasis by preserving the integrity of junction complexes and the healing capacity of the colonic epithelium. Therefore, vitamin D deficiency may compromise the mucosal barrier, leading to increased susceptibility to mucosal damage and increased risk of IBD (inflammatory bowel disease)."

References:

Kong, Juan, et al., Novel role of the vitamin D receptor in maintaining the integrity of the intestinal mucosal barrier, *American Journal of Physiology - Gastrointestinal and Liver Physiology*, January 2008; 294:G208-G216.

Macromolecules

Leaky gut is characterized by a phenomenon called macromolecular absorption. This term simply means that food particles are absorbed before they are completely broken down



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by digestive enzymes. We have discussed how vitamin D deficiency, infections and food sensitivities can increase intestinal permeability leading to macromolecular absorption.

Research has also shown that deterioration of the normal digestive process can lead to macromolecular absorption. Failure to chew food adequately has been shown to contribute to food intolerances.

Inability to produce adequate quantities of digestive substances can be a major contributor to absorption of incompletely digested foods. Dr. William Philpott conducted extensive research in this area. He concluded that failure of hydrochloric acid production by the stomach and/or inadequacy of pancreatic enzymes was an initiating factor in the process of development of many degenerative diseases.

Philpott conducted research demonstrating that the use of supplements of hydrochloric acid and pancreatic enzymes could decrease the severity of allergic response to foods and decrease the elevations of blood sugars in those with diabetic tendencies.

Philpott demonstrated that digestive failure and leaky gut can manifest symptoms which are localized to the digestive tract, or symptoms can take place at remote locations such as the brain.

One troubling aspect of modern medicine is the tendency to overprescribe antacid tablets. Jonathan Wright, a prominent physician, felt the need to write a book on the importance of hydrochloric acid in an attempt to alleviate this blind spot in modern medicine.

Leaky gut can be aggravated by the presence of the wrong bacteria in the large intestine. Supplementation with prebiotics like aloe vera and probiotics like acidophilus and other beneficial organisms should not be overlooked when treating leaky gut syndrome. A special targeted delivery technology may be required to allow these beneficial organisms to reach the large intestine since they are readily killed by the hydrochloric acid in the stomach.

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Philpott, William H., and Kalita, Dwight K., *Victory Over Diabetes*, New Canaan, CT: Keats Publishing, 1983.

Philpott, William H., and Kalita, Dwight K., *Brain Allergies*, New Canaan, CT: Keats Publishing, 1980.

Walker, W. Allan, and Isselbacher, Kurt J., Uptake and transport of macromolecules by the intestine: Possible role in clinical disorders, *Progress in Gastroenterology*, 1974; 67(3):531-550.

Wright, Jonathan, and Lenard, Lane, *Why Stomach Acid is Good for You*, New York: M Evans and Company, 2001.

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