

The Hidden Disease: Leaky Gut Syndrome

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Leaky Gut Syndrome – even the name is mysterious. What is it that leaks? Where does it leak to? What is the substance that leaks? What are the symptoms of a “leaky gut?” How do you know if you have it? How is it treated?

Although Leaky Gut Syndrome, also called Intestinal Hyperpermeability or Intestinal Permeability, is common, it is rarely tested for by doctors, and some doctors have maintained it does not even exist! That stance is changing, as more and more chronic diseases and syndromes are connected with having a “leaky gut.”

What is a Leaky Gut?

Normally, the lining of the small and large intestines provides a semi-permeable barrier which prevents toxins, large molecules of food, bacteria and yeasts from passing through the barrier and entering the bloodstream where they cause mild to severe health problems. This lining has 3 extremely important jobs to do:

1. It absorbs and transports nutrients from our food across the intestinal wall.

2. It provides a protective barrier and prevents toxins, bacteria, yeasts, viruses and inappropriate food molecules from passing into the bloodstream.

3. It is an important part of our immune system. It fights off negative bacteria and viruses before they can invade our body and make us sick.

The intestinal lining is supposed to have small spaces or “junctions” between the cells. These spaces can open and close, allowing larger or smaller molecules to pass as appropriate. However, when these spaces become destroyed by inflammation, ulcerations or breaks between the cells, the spaces become *too large*. This allows toxins and large molecules to “leak” from the intestines into the bloodstream.

Once the intestinal lining becomes too permeable, it affects all 3 of the jobs it is supposed to do with disastrous results:

1. Our body loses its ability to absorb nutrients properly leading to malnutrition and severe mineral deficiencies such as magnesium and copper deficiency.

2. Toxins, negative bacteria, yeasts, and large protein molecules enter the bloodstream and cause the body to attack them as “foreign invaders,” setting off a series of autoimmune problems.



3. The gut immune system is no longer able to protect us from negative bacteria and viruses.

Another result of a damaged gut lining is that the pathways in the gut that are supposed to detoxify the body become compromised and fail to detoxify the many chemicals we are exposed to every day. The liver then becomes overburdened, and it, too, is then unable to detoxify the chemicals and eliminate them safely from our bodies. The toxins then recirculate through our body continuing to cause damage. Eventually, one could develop Multiple Chemical Sensitivities and become ill around even minute amounts of the chemicals of every day, modern life: Fragrances, cleaning fluids, building materials, car interiors, etc.

Building a Strong Intestinal Barrier From Birth

A strong intestinal mucosal lining helps us stay healthy our whole life. When we are born, the intestinal barrier is not fully developed. Since it does not mature until after the age of 2, it is not a fully functioning barrier and immune system until then. This immature lining is more likely to let harmful contents out of the intestines into the bloodstream in infants and young children, causing allergies and other autoimmune problems. That is one of the reasons that exclusive breast feeding until 6 months is recommended. After then, allergenic foods such as cows' milk, chicken, eggs, peanuts,

soybeans and fish should be avoided until the intestinal barrier matures. Great caution should also be used in giving NSAIDs to infants and young children that might damage the intestinal lining. If they are given antibiotics which will kill off friendly bacteria, you will also want to give them a children's formula of friendly bacteria/probiotic therapy. If the mother is still breast feeding and the child is given antibiotics, the mother will want to take supplemental probiotics that will pass through the breast milk and help restore good bacteria killed off by the antibiotics.

How do You Know if You Have Leaky Gut Syndrome?

According to an article in the *Alternative Medicine Review*, Vol. 2, Number 5, 1997 and an article by Dr. Leo Galland, director of the Foundation for Integrated Medicine, diseases and conditions known to be associated with Leaky Gut Syndrome include:

- Lupus
- Rheumatoid arthritis
- Food allergies
- Fibromyalgia
- Multiple Sclerosis
- Chronic Fatigue Syndrome
- Migraines
- Thyroiditis
- Crohn's disease
- Ulcerative colitis
- Hives
- Celiac disease
- Cystic fibrosis

- Endotoxemia
- Pancreatic dysfunction
- Schizophrenia
- Autism
- Ankylosing spondylitis
- Candida albicans overgrowth
- Liver dysfunction
- Alcoholism
- Multiple food and chemical sensitivities
- Abdominal pain & distension
- Diarrhea
- Skin rashes
- Inflammatory bowel disease
- Acne, eczema, psoriasis
- HIV infection
- Irritable bowel syndrome
- Chronic arthritis/pain

Symptoms Associated With Leaky Gut Syndrome

- Fatigue and malaise
- Arthralgias
- Myalgias
- Fevers of unknown origin
- Food intolerances
- Abdominal pain
- Abdominal distension
- Diarrhea
- Skin rashes
- Toxic feelings
- Cognitive and memory problems (brain fog)
- Shortness of breath
- Poor exercise tolerance

So many diseases and conditions are associated with Leaky Gut Syndrome that many medical experts are advising doctors to *always* test

for intestinal hyperpermeability with the above conditions or symptoms.

The 7 Stages of Damage to the Intestinal Lining

1. Gut lining becomes inflamed, does not absorb food and nutrients.

Symptoms: Fatigue and bloating.

2. Gut becomes permeable and allows large food molecules into the bloodstream.

Symptoms: Food allergies, arthritis, fibromyalgia.

3. Carrier proteins are damaged so nutrients are not carried across the intestinal lining.

Symptoms: Severe magnesium, copper and other deficiencies occur, no matter how much they are supplemented.

4. Detoxification pathways are damaged and the liver becomes overwhelmed, unable to detoxify the body.

Symptom: Chemical sensitivities.

5. Immunoglobulin A coating on the gut lining is damaged and cannot fight off parasites, bacteria, viruses and yeasts.

Symptoms: Diarrhea, constipation, bloating, gas, fatigue, headaches, flu and colds, “catch everything,” slow recovery from illnesses, fatigue and immune disorders.

6. Bacteria, fungal and chemical toxins pass through the gut into the bloodstream.

Symptom: Other organs and parts of the body become inflamed and painful.

7. Formation of antibodies in the intestinal tract leak through the lining and look like anti-

gens, so other antibodies attack. We are then attacking our own tissue and develop autoimmune responses characteristic of rheumatoid arthritis, lupus, multiple sclerosis, thyroiditis and other autoimmune disorders.

Symptoms: Chronic pain, fatigue and weakness.

Other general symptoms of Leaky Gut Syndrome may be: Chronic sinusitis, eczema, uterine and breast fibroids.

Doctors may treat the above symptoms with antibiotics for infections, antifungals for yeast, pain killers for arthritis and fibromyalgia, steroids for

inflammation – which may be necessary in the acute, critical phase of infections and pain relief. However, these medications can make Leaky Gut Syndrome worse.

What Causes the Damage to Our Intestinal Lining?

Fortunately, the causes of Leaky Gut Syndrome are not a mystery. There is no exotic virus or strange, unknown bacteria causing the problem. In fact, there is amazing agreement among medical experts about what causes damage to the intestinal lining. Dr. Leo Galland, M.D., Dr. Jeremy E. Kaslow, M.D., Dr. Zoltan P. Rona, M.D., and Dr. Alan L. Miller, N.D, the authors of a comprehensive article, “The Pathogenesis, Clinical Implications, and Treatment of Intestinal Hyperpermeability,” in the *Alternative Medicine Review*, Vol. 2, 1997, among others, state the following factors as causes of increased intestinal permeability:

1. Medications: NSAIDs and Antibiotics

Aspirin, ibuprofen, naproxen, and nabumetone (under various brand names Bayer®, Motrin®, Advil®, Naprosyn®, Aleve® and Relafen®) are called Non-Steroidal Anti-Inflammatory Drugs and are the main culprits in damaging the intestinal lining. These are some of the most widely used drugs in America with more than 70 billion prescriptions and 30 billion over-the-counter tablets sold annually. Commonly used for pain and as a blood thinning therapy



for older people, millions of people believe these familiar pain medications to be harmless. Unfortunately, they have severe gastric side effects.

According to a research review out of the University of Southern California, Los Angeles, a *single dose* of aspirin can cause gastric injury and damage to the intestinal lining within 15 to 30 minutes and continued aspirin use over a 24-hour period leads to the development of gastric erosions. NSAIDs also decrease production of prostaglandin, which is essential for the maintenance of a normal intestinal mucosal barrier. According to Dr. Leo Galland, "Chronic exposure to NSAIDs produces a chronic state of [intestinal] hyper-permeability associated with inflammation..." If NSAIDs must be used, Dr. Galland notes that nabumetone has the

least damaging effect on the intestinal lining.

Antibiotics kill off the natural microflora in the intestinal tract which would normally protect the intestinal lining from overgrowth of yeast and negative bacteria. Normal flora also helps protect the gut immune system in the intestinal lining.

Other medications and drugs which cause intestinal inflammation and/or increased permeability include:

- Chemotherapy
- Gold compounds
- Estrogen
- Cocaine
- Amphetamines
- Birth control pills
- Corticosteroids (e.g. prednisone)
- Antibiotics

2. Alcohol

Ethanol has a damaging effect on the lining of the small intestine.

3. Viral, Fungal or Bacterial Infections of the Intestines

Infections such as *H. pylori*, *Yersinia* infection, *Candida albicans*, *Clostridia difficile*, HIV infection, "stomach flu," "food poisoning," "traveler's diarrhea," and other types of infection can damage the intestinal lining.

4. Parasites

Giardia lamblia, amoebic parasites and others can dam-

age the intestinal lining.

5. Refined Sugars Such as High Fructose Corn Syrup and White Sugar

Recent evidence indicates refined sugars may irritate and inflame the intestinal lining. Sugars and carbohydrates feed yeast and encourage its growth. In the absence of friendly bacteria, a diet with high levels of sugar and starches will enhance yeast infections and overgrowth.

6. Stress Chemicals

High levels of cortisol and other stress chemicals can inflame the intestinal lining.

7. Mold and Fungal Mytoxins

Mold in the environment or in peanuts, corn, tobacco, and other stored grains and foods may infect the body with mold and toxic fungi that damage the intestinal lining, allowing the mold or fungus to invade the entire body.

8. Food Allergies

Food allergies may be caused by Leaky Gut Syndrome, or an initial food allergy may damage the intestinal lining, leading to more food allergies.

9. Radiation

Abdominal radiation therapy can cause an increase in permeability of the gut which can become a chronic condition lasting years if it is not treated.

10. Trauma

Victims of severe trauma and burns have increased intestinal permeability.

11. Surgery

Patients undergoing heart bypass surgery were found to have an increase of intestinal permeability.



12. Enteral and Total Parenteral Nutrition (TPN)

TPN given intravenously or orally causes cecal bacterial overgrowth with increased intestinal permeability.

The Antibiotics/Candida Connection to Leaky Gut Syndrome

Antibiotics are one of the most prevalent medications given to patients in modern medicine. It can be life saving. However, most antibiotics are not used for major, life threatening illnesses. According to data from the National Center for Health Statistics, approximately 75% of all outpatient antimicrobial prescriptions are issued for ear infections, sinusitis, bronchitis, sore throat and colds. Antibiotic drug use rates are highest for children.

Approximately 83 million antibiotic prescriptions a year are written for these 5 conditions. The Center for Disease Control and Prevention estimates over 50 million of those antibiotic prescriptions were unnecessary! Doctors prescribe 18 million prescriptions a year for the common cold, *all* of which are unnecessary and will not help. Eighty percent (13 million) of all prescriptions issued for bronchitis are ineffective and unnecessary. Thirty percent (6-7 million) of all prescriptions for ear infections are unnecessary and 50% (6.5 million each) of all prescriptions for sore throats and sinusitis are unnecessary. Fifty million people take antibiotics each year that do not help them. What's worse, those antibiotics may kill off the friendly bacte-

ria in the intestines of those 50 million people which may then lead to intestinal problems, diarrhea, constipation, Candida overgrowth and leaky gut.

Antibiotics damage the intestinal tract in two ways. The first is that the friendly bacteria in the intestinal tract is destroyed. The small and large intestine normally should have billions and billions of cells of several hundred kinds of friendly bacteria. Through their natural enzyme secretions, friendly bacteria break up viral toxins, bile, pus, chemical wastes, hormones, cellular debris, negative bacteria and other harmful substances before they can cause damage. For example, when bile flows into the small intestine it is an extremely caustic substance. It is the job of friendly bacteria to break up the bile into a less caustic material before it goes into the large intestine. If there is not enough friendly bacteria to do this, caustic bile enters the large intestine where it can destroy and damage the lining.

The second way that antibiotics damage the intestinal lining is by allowing the overgrowth of *Candida albicans*, negative bacteria and other yeasts. When the lining of your intestinal tract is colonized by its normal friendly bacteria, *Candida* and negative bacteria may be present in small amounts, but have no place to grow. However, when antibiotics destroy your friendly bacteria, the antibiotic resistant *Candida* and antibiotic resistant bacteria such as *Clostridia difficile* take over your intestinal lining!

In addition, *Candida*

releases a chemical called "aldehyde," a form of alcohol, that causes the cells in the intestinal lining to shrink and opens up the spaces between the cells resulting in the classical leaky gut. Toxins and negative bacteria can now invade the bloodstream and lodge in other areas of the body. In addition, the immune barrier in the mucosal lining eventually becomes overwhelmed by the *Candida* and no longer functions properly to protect your body. Some experts estimate that over 80% of your immune-producing cells are in the lining of your small intestine. If that lining is damaged, you are losing most of your immune function.

National experts agree that it is extremely important that you only take antibiotics when it is appropriate and necessary and that probiotic therapy accompany any treatment with antibiotics. Probiotics at high concentrations of live bacteria (at least 15 billion cells per capsule) and with as many strains as possible, can help colonize the intestinal tract and help prevent *Candida* and bacterial overgrowth. Probiotics should be taken during the course of antibiotics and then afterwards for at least 3 months.

Leaky Gut and Immune Problems

Many autoimmune disorders may be complicated by or originate with a leaky gut. When the larger spaces between the cells allow too large protein molecules or microbes and fungi to get into the bloodstream, the immune system

perceives them as a foreign, invading substance. They begin to make antibodies against them and attack them. If it is food molecules, then food allergies and food sensitivities will occur.

In addition, the antibodies created by the body to fight off the foreign invaders can get into various tissues in other parts of the body and trigger an inflammatory reaction when the food, chemical or microbe enters the bloodstream. Auto antibodies are created and the inflammation becomes chronic. If this inflammation occurs in the joints, the person may develop rheumatoid arthritis. If it occurs in the brain, chronic fatigue syndrome may occur.

Autoimmune response in the blood vessels may create vasculitis (inflammation of the blood vessels). If the antibodies attack the lining of the gut itself, colitis or Crohn's disease may result. In the lungs, asthma could develop. Any organ of the body tissue can be affected by an autoimmune response triggered by molecules that are supposed to stay within the intestinal system instead of leaking into the bloodstream.

Unfortunately, part of the Leaky Gut Syndrome is that the immune system itself becomes compromised. The protective coating of the intestinal lining hosts most of the IgA immune cells of the body. This gut immune system helps us fight off viruses, bacteria, fungi and molds. When the lining becomes damaged by medications, Candida, bacteria and chemicals, these immune cells also become damaged and no longer help protect us. We get sick more often and have a harder time getting well.

Testing for Leaky Gut Syndrome

Your doctor can help determine if you have a hyperpermeable intestine with the Lactulose/ Mannitol Test, developed by Claude Andre, the leading French researcher in allergy and gut permeability.

Lactulose/Mannitol Test Protocol

Patients ingest 5 grams each of the sugars lactulose and mannitol. Since these sugars are not metabolized by humans, the amount absorbed is fully excreted in the urine within 6 hours. Mannitol is well absorbed and will be passively transported through the cells (transcellular) of the intestinal lining at a mean absorption of 14% of the administered dose. However, the intestinal tract is impermeable to lactulose. Less than 1% of the administered dose is normally absorbed through the spaces between the cells (paracellular/tight junction). Urine is collected and measured. The normal ratio of lactulose/mannitol is less than 0.03. If mannitol levels are low, the small cells of the intestinal tract may be compromised. If lactulose levels are high, it indicates increased intestinal permeability. The lactulose/mannitol test is performed after fasting and again after eating a test meal.

Therapy for Leaky Gut Syndrome

Of course, the most important question is, "What can be done about it?" What are the best treatments for Leaky Gut Syndrome? The good news is

that under normal conditions the mucosal lining replaces itself faster than almost any other part of the body. Old cells are sloughed off and new cells on the intestinal lining are generated every 3 to 6 days. However, this rapid cell turnover uses a lot of energy which must be provided by eating highly nutritional food. If the diet is primarily one of potatoes, pastries, french fries, sodas, diet sodas, white breads and other processed and junk foods, the intestinal lining will not have the energy resources necessary to regenerate itself. If the lining is damaged, it requires even more nutrition to provide the energy to restore it. Because the pesticides and chemicals in commercial food may become especially toxic to the body with a leaky gut, it is best to *eat as much organically grown food as possible*. Fasting and crash dieting may increase gut permeability.

Food allergies may make it difficult to eat all the nutritious foods you would normally eat, as eliminating allergenic foods will be necessary to help repair the gut. People with food intolerances and allergies will take longer to heal, so you must be patient.

The overgrowth of Candida will also require a special diet low in all sugars and carbohydrates: Refined sugars or white flour, alcohol, fruits, fruit juices, dried fruits, potatoes, pasta, bread and high sugar vegetables. Some people with Candida can eat dairy and nuts; some cannot. Eat a diet high in proteins, olive oil, avocados and vegetables. There are many good books published with suggestions for effective

Candida diets and strategies.

A basic healthy diet would include 5 to 8 servings of fresh fruits and vegetables daily, high quality protein from meat and chicken, eggs, (depending on allergies), healthy fats such as olive oil and coconut oil (avoid polyunsaturated vegetable oils such as corn oil, safflower oil and refined supermarket oils). Avoid irritants such as caffeine, all trans fatty acids found in hydrogenated and partially hydrogenated oils, high fructose corn syrup, sugar, aspartame, (NutraSweet), white flour products and preservatives.

According to medical specialists in intestinal hyperpermeability, if a patient stays on an appropriate diet, recovery is possible in 1 to 2 months using the types of therapy below. However, some patients with depleted reserves may need up to 9 months of treatment for complete recovery. Because Leaky Gut Syndrome cannot be “fixed” with prescription medications, and many physicians are not trained in the following therapies, it may be necessary to coordinate your treatment with naturopathic, chiropractic, traditional Chinese medicine or herbalist health practitioners.

Patients with Multiple Chemical Sensitivities and severe intestinal permeability may not be able to tolerate all of the supplement and herbal therapies because they may “leak” into the bloodstream causing sensitivities and reactions, similar to food allergies. Various supportive therapies to support the intestinal lining may have to be tried at low doses to determine optimal treatment.

5 Things You Can do to Repair a Leaky Gut

1. Supplement With Probiotics/Friendly Bacteria.

All of the experts agree that a complete course of high-quality probiotics is necessary to repopulate the intestinal tract and allow the intestinal lining to repair itself. Yogurt is a good natural source of friendly bacteria, but it usually contains only 2 or 3 strains of bacteria and commercial yogurt will probably not have the potency necessary to repopulate the intestinal tract. A supplement with at least 15 billion active cells per capsule and as many strains as possible is the best choice. Probiotic formulas may contain up to 16 active strains.

Probiotics provide a good pH level for the gut to work properly, crowd out pathogenic organisms which harm the intestinal lining, kill off negative bacteria and yeasts that may be harmful to the intestinal lining and promote proper immune secretions, supporting the gut immune system. They also break down harmful viruses and caustic bile that



can damage the intestinal lining. Animal studies have confirmed reduction of intestinal hyperpermeability with strains of *Lactobacillus*.

Signs and symptoms of a lack of friendly bacteria and resulting leaky gut may be arthritis, eczema, migraine, asthma or other forms of immune dysfunction. Other common symptoms of bowel flora imbalance and leaky gut syndrome are bloating and gas after meals and alternating constipation and diarrhea.

Studies have shown that pregnant and lactating mothers who took supplemental probiotics during their pregnancy and nursing had infants with much lower incidences of atopic dermatitis (eczema).

2. Eat an Allergy Elimination Diet With High Nutritional Content.

In order to heal the intestinal lining, exposure to food that stimulates an allergic reaction must be avoided. The Lactulose/Mannitol test may be used to help diagnose which foods are causing the allergic reaction. Research studies have shown that children and adults with eczema, hives or asthma triggered by atopic food allergy have higher gut permeability. Permeability increases dramatically after exposure to allergenic foods. Several research studies have shown that pre-treatment with sodium cromoglycate helps avert this sudden rise in permeability. According to Dr. Leo Galland, this probably indicates that the release of atopic mediators like histamine and serotonin is responsible for the increase in permeability.

For people who do not have access to testing, elimination diets may help them determine the foods to which they are allergic. Unfortunately, for many people with leaky gut, distinguishing between allergenic and non-allergenic foods becomes difficult when the body is in a constant state of inflammation.

Some health practitioners recommend going off *all* grains, soy, peanuts, chicken, eggs, chocolate and dairy for 3 weeks. These are the most common allergenic foods. Each food would then be reintroduced one at a time to see how the body reacts. If there is bloating, gas, diarrhea, constipation, fatigue, aches, inflammation or a recurrence of other symptoms, then the food can be removed from the diet during the treatment period.

3. Eliminate Harmful Medications and Alcohol.

For people in pain with arthritis and other conditions, finding relief from the pain is a top priority. It becomes a vicious cycle. Arthritis causes inflammation and pain, so you take pain medication that damages the gut lining, which allows more molecules to leak through into the bloodstream causing more inflammation which causes more pain, so you take more medications. Alternative anti-

inflammatory therapies to steroids and NSAIDs include: Proteolytic (protein) enzymes such as bromelain and serratiopeptidase (serrapeptase); essential fatty acids, phosphatidylcholine, antioxidants or herbs such as turmeric (curcumin). Serratiopeptidase is a proteolytic enzyme that has been used in Japan and Germany for over 30 years to reduce swelling in inflammatory conditions. It also relieves pain by breaking up the amine chemicals that signal the brain to feel pain. It has an excellent record of safe use with a very low incidence of side effects.



4. Treat Harmful Bacteria, Candida and Parasites.

Negative bacterial overgrowth can be confirmed by an abnormal hydrogen breath test. One of the most common and most well-known negative bacteria is the *Helicobacter pylori* infection which causes ulcers and damages the mucosal linings. This is often treated with a strong course of antibiotics. If you undergo antibiotic treatment, most specialists strongly recommend that you take potent probiotics during the treatment. Researchers at the University of Nottingham in England tested mastic gum derived from a species of acacia tree in Greece against the *H. pylori* infection. They found that one gram of mastic gum a day for 2 weeks had comparable results to antibiotic treatment, but without the damaging side effects.

Restoring a natural balance of Candida in the gut can be very challenging. Specialists in this area usually recommend taking large doses of probiotics, eliminating sugar and starches from the diet that feed the fungus, and taking antifungal herbs and supplements such as olive leaf extract, oregano or grapefruit seed extract. Commercial products high in carbohydrate enzymes that destroy the shell of the Candida may also be helpful. Because it may be possible for Candida to adapt to antifungals and become resistant to them, varying the antifungal and varying the dosages may prevent this from occurring. Varying the dosage of probiotics from high to low dosage is also suggested by many practitioners.

When Candida begins to die

off, it releases ammonia and other harmful chemicals. If there also exists a condition of leaky gut, these may be absorbed into the bloodstream and cause worse feelings of achiness, headaches, nausea, bowel changes and fatigue. This is often called “the die-off” effect. It is a delicate balancing act in restoring a healthy intestinal lining while killing off toxic substances in the gut.

Hydrogenated fats may also be a problem with Candida and leaky gut. According to Stephan Cooter, Ph.D., a researcher in Candida treatments, Candida digests part of the hydrogenated fat into pseudo bile. This partially digested fat sends messages to the brain that result in cravings for more unhealthy junk fats. The undigested fat also creates chemicals in the body that leak into the bloodstream causing allergic reactions.

Candida also converts sugars into ethanol (alcohol). This is another reason to eliminate sugars and starches from the diet when there is a Candida overgrowth. Too much unused alcohol turns into acetaldehyde which causes the spaces to be too large in the intestinal lining. Adequate amounts of glutamine, selenium, niacin, folic acid, B6, B12 and molybdenum convert aldehydes into acetic acid which can be excreted from the body. Aldehydes cannot be excreted from the body, so the body is not able to detoxify itself. Inadequate amounts of these nutrients in the gut allow aldehydes to collect in the body’s tissue causing damage. Stephan Cooter, Ph.D., a researcher in Candida treatments, has found that tak-

ing 100 mcg of molybdenum 3 times a day for 4 months helped eliminate aldehyde and other toxins and improve energy levels, joint pain, feelings of chronic weakness, muscle pain, headaches, mental concentration, memory, insomnia and depression.

Parasites may also contribute to leaky gut. The most common parasites to infect humans in the United States and Canada are giardia (*Giardia lamblia*), *Entamoeba histolytica*, cryptosporidium (*Cryptosporidium* spp.), roundworm (*Ascaris lumbricoides*), hookworm (*Ancylostoma duodenale* and *Necator americanus*), pinworm (*Enterobius vermicularis*), and tapeworm (*Taenia* spp.). Travelers to other countries may be infected with amoebic or other parasites as well. Medical treatment with prescription medications may stress the liver, especially in individuals with leaky gut, so experts advise caution and liver support when taking medications.

Herbal formulas for parasitic infection have not been tested clinically, but have been used by many people. Bee propolis has been studied as a parasitic remedy. One study of children and adults with giardiasis showed a 52% success rate of parasite elimination in children and 60% rate in adults.

5. Reduce Stress Chemicals Such as Cortisol Through Relaxation Training.

Stress activates chemical responses in the body that have a direct effect on the gut. When one is in the adrenalin response pattern, i.e. “under stress,” the digestive system is shut down.

It will not digest, absorb or eliminate properly. Nature designed our danger response system to be used infrequently. Chronic stress, therefore, is an unnatural state and leaves the tissues of the digestive tract depleted of a natural supply of oxygen and other essential nutrients. In order for the digestive system to function properly, the body *must* be in the parasympathetic state. This state produces the proper chemicals for the body to rest and digest.

Unfortunately, when we stay in a constant adrenalin state, the ability to trigger the parasympathetic atrophies. It may be necessary to literally retrain your body

to be able to rest and digest. Techniques that may be used to do this include: Breathing techniques, meditation, biofeedback, self hypnosis, listening to sound frequencies that trigger rest and digest chemical responses, qigong and yoga.

13 WAYS TO BUILD A HEALTHY GUT LINING

1. Bovine colostrum and whey protein.

Bovine colostrum is rich in natural immunoglobulins, especially IgG, and helps support the healthy functioning of the intestinal immune system.

Colostrum also helps prevent damage to the intestinal lining by NSAIDs. Whey protein concentrates are also rich in IgA and IgG and may help support the intestinal lining.

2. Bioactive peptide protein from white fish.

Hydrolyzed white fish protein is sold under various brand names. A study in the American Journal of Gastroenterology, 2001, showed trends toward improvement in intestinal permeability in patients given 3 grams daily of the peptide supplement. The lactulose to mannitol ratio was used to ascertain results. When we ingest proteins, they are at the amino acid level. In order to be utilized by the body, the stomach must break the amino acids down to the peptide level with certain enzymes. If the stomach does not have the enzymes to do this, the protein will not be utilized by the body. Hydrolyzed white fish protein is pre-digested by the fish's own enzymes from the amino acid level to the peptide protein level. Some brands add additional enzymes to break down the bonds between the peptide molecules, making it even more absorbable. This peptide molecule of protein is then available to be absorbed into the intestinal lining where it may help to restore and repair tissue.

3. Chew your food.

Epidermal Growth Factor (EGF) stimulates growth and repair of intestinal lining tissue. Saliva is a rich source of EGF. Thorough chewing of your food may nourish your gut by providing it with salivary EGF.

4. Glutamine.

The amino acid glutamine is the primary fuel for cells of the



small intestine. The lungs and the skeletal muscle produce glutamine that circulates in the body. The intestinal tract is the primary user of glutamine. In studies with rats, uptake in the intestines accounted for 40% of the entire glutamine uptake in the body. Glutamine is used by the gut to repair damage to the intestinal lining. If you have an infection, injury or trauma, your glutamine level will drop drastically, so you might not have enough glutamine to repair the intestinal lining during that time. If you ingest medications that damage the intestinal lining, there may not be enough glutamine to repair it. Glutamine increases the height and thickness of the mucosal lining and increases immune secretions which help protect the lining as well. Glutamine supplementation has been used successfully in animal studies of injury to the gut, with significant healing. Glutamine was used in patients with intestinal mucosal injury caused by chemotherapy and radiation and they had less intestinal cellular damage, increased mucosal healing, and decreased passage of toxins through the gut wall. Glutamine is supplemented with up to 15 grams per day by some practitioners.

Glutamine also helps form glutathione in the body. Glutathione helps the liver clear toxins from the body. A study with rats revealed that acetaminophen toxicity caused a drastic decline of the amount of glutathione in the liver in those rats who were receiving standard TPN solution which did not contain glutamine. A glutamine enriched solution prevented loss of glutathione in the liver. If there is not enough glu-

tamine in the body, the intestinal lining becomes permeable allowing toxins to permeate into the bloodstream. Without enough glutamine, the liver does not produce glutathione to detoxify the toxins.

5. Glutathione.

Glutathione is an important part of the antioxidant defense against free radical tissue damage. Depletion of glutathione in the liver is a common occurrence in Leaky Gut Syndrome, leading to liver problems especially among alcoholics and people with immune problems, especially with patients with AIDS. Supplemental glutathione is not well absorbed. The most effective way to raise glutathione in the liver is to supplement with its dietary precursors, cysteine or methionine. According to experts in this area, supplementation should include Glutathione and N-acetyl cysteine. (If you are also battling a parasite infection, Dr. Leo Galland suggests that one not take these supplements during the treatment of parasites.)

6. Flavonoids/Antioxidants.

Flavonoids naturally occur in many fruits, vegetables and herbs, especially in blueberries, grapes, apples, fresh oregano, garlic and onions. They are also available in supplements. Quercetin and related flavonoids inhibit the release of histamine and inflammatory mediators. Taken before eating, they may block allergic reactions of histamine which increase permeability. Flavonoids called catechins have been used in Europe to treat gastric ulcerations which damage the intestinal lining. The flavonoids in the herbs milk thistle (silymarin) and in

dandelion root (taraxacum) protect the liver from damage. Others include: B complex vitamins, vitamins C, E, zinc, selenium, coenzyme Q10 and others. Zinc is essential to cells such as intestinal lining cells that have a rapid turnover. Some specialists suggest supplementing zinc in the range of 50-80 mg a day, but not more than 100 mg a day, for leaky gut. They also suggest taking 1 mg copper for every 15 mg of zinc.

7. Essential fatty acids.

Essential fatty acids, which occur naturally in fish, flax seed and walnuts, help the formation of prostaglandin in the body. Prostaglandin helps the immune system and helps reduce inflammation. Experiments with animals showed that fish oil helped reduce mucosal injury. Essential fatty acids are probably best supplemented with purified fish oil capsules, guaranteed free of contaminants and mercury. Supplements high in gamma-linolenic acid (GLA) such as evening primrose oil and borage oil also help decrease permeability. Gamma oryzanol derived from rice bran has been extensively researched in Japan for its healing effects in the treatment of gastric and duodenal ulceration. It also has potent antioxidant activity.

8. Fiber.

Although most doctors and health specialists will tell you to eat fiber for intestinal problems, the ingestion of fiber supplements can have complex effects on a leaky gut. We do know that people who eat a lot of natural fiber in raw fruits, vegetables, legumes and whole grains have healthier, stronger gut linings. There are contra-

dictory studies on the types of supplemental fiber that helps Leaky Gut. Dr. Leo Galland recommends insoluble fiber such as cellulose powder. He notes that soluble fiber such as psyllium seeds, fruit pectin or guar gum has a biphasic or dual effect. At low levels they help leaky gut by stimulating mucosal growth factors. At high levels, they may increase leaky gut problems, probably by increasing the amount of bacterial enzymes that may degrade the intestinal mucous.

9. Good yeast.

Saccharomyces boulardii is a "friendly yeast" widely used in Europe to treat *Candida* and diarrhea. Experimental data suggest that the yeast stimulates SIgA secretion, a key immune component of the function of the intestinal lining.

10. Support for the endocrine system, especially the adrenals.

Support for the liver, lymphatic, and interstitial mobilization, drainage and detoxification with herbs and supplements.

11. Nutrients and herbs to promote healing of the intestinal lining and support the liver.

Slippery elm, ginkgo, aloe vera, DGL licorice, kudzu, chlorella, burdock, sheep sorrel, ginger root, milk thistle, zinc and vitamin A have all been used to help soothe, restore and repair the tissue in the intestinal lining. (Please note that *wild-crafted* Slippery elm should not be purchased as it is endangered. Purchase only cultivated Slippery elm.)

12. Traditional Chinese Medicine.

Acupuncture and herbal medicine treats the spleen to repair the intestinal lining of the small intestine.

13. Digestive enzymes.

Plant and microbial enzymes or pancreatic animal enzymes may help digestion and aid pancreatic function which is often associated with hyperpermeability. Since plant and microbial enzymes break down food particles in the stomach before it gets to the intestinal tract, they may help prevent the irritation of the lining from undigested food particles. Digestive enzymes may help provide better nutrition by breaking food down into the appropriate molecules that can be absorbed by the small intestine. Some researchers say that food that is broken down by enzymes may be less likely to provoke a negative reaction in people with a leaky gut.

Conclusion

Leaky Gut Syndrome is a key element in many different diseases. Hyperpermeability of the intestinal lining starts a vicious cycle of allergies, autoimmune reactions of pain and inflammation, liver dysfunction, pancreatic insufficiency, malnutrition and mineral depletion. Symptoms of leaky gut include chronic fatigue, diarrhea, constipation, gas, bloating, joint pain, brain fog, muscle and nerve pain, headaches and migraines, mem-

ory problems, weakness, fevers, abdominal pain, skin rashes, toxic feelings, and constant illness and inability to recover. Effective treatment requires eating a healthy diet, elimination of medications that damage the gut, avoidance of allergenic foods and toxic chemicals, and treatment for the overgrowth of negative bacteria, parasites, and yeasts. Therapies that have been effective include diet, probiotic and nutritional supplements, plus relaxation techniques to reduce stress chemicals and assist the normal digestive function.

Although this process can be neatly summed up in a paragraph, for sufferers of Leaky Gut Syndrome it may require months of delicate treatment and disciplined adherence to stringent diets to see the results. However, because the gut lining has a great capacity to repair itself, removing the offending culprits gives it a good chance to heal. Helping that process with an allergen-free diet and nutritional supplementation assists the gut in repairing and restoring its own tissue. Relief from pain, inflammation, food allergies, fatigue and weakness and many chronic and debilitating illnesses may result from effective treatment of Leaky Gut Syndrome. Providing our children with healthy food, good habits of relaxation and eating, and being careful about giving them unnecessary antibiotics and NSAIDs will help them grow into adults with healthy, strong intestinal linings.