

## ***Therapy for Increased Intestinal Permeability ("4 R" approach originated by the field of naturopathy)***

This approach to restoring a healthy gut-immune barrier includes four steps: 1) removing mucosal irritants, 2) replacing agents for digestive support, 3) reinoculating with friendly bacteria and the foods they need to grow, and 4) repairing the mucosal lining.

- 1. Remove** mucosal irritants such as allergenic foods, alcohol, medications and stress.
  - Recommend an elimination diet
    - Start with gluten (wheat) and dairy
    - [See handout on "Elimination Diet"](#)
  - Remove medications if possible
    - Long-term antibiotics
    - Non-steroidal anti-inflammatory medications (Ibuprofen, Naproxen, etc.)
    - Prednisone
    - Prolonged use of acid-suppressing drugs (proton pump inhibitors, H2 blockers)
  - Reduce simple sugars, refined carbohydrates, saturated fat and red meat to adopt a diet that reduces inflammation.
    - [See handout on Glycemic Index](#)
    - [See handout on Anti-Inflammatory Diet \(clinician version\)](#) [\(patient version\)](#)
  - Treat possible pathogens (c. difficile colitis, H. Pylori, parasites, etc.)
  - Reduce perception of stress and stress triggers
    - Suggest a Mindfulness Based Stress Reduction course
    - Refer patients to the following handouts:
      - [Breathing Exercise](#). (Gastric acid secreted is stimulated by the vagus nerve. Deep breathing exercises can induce relaxation and proper acidity in the GI tract.)
- 2. Replace** agents for digestive support. (This step may not be necessary).
  - Consider a short course of pancreatic enzymes and in some cases Betaine HCL if low acidity.
    - If needed, consider prescribing a product called Pancrease MT 10, 1-2 capsules before each meal for a short period of time until the digestive process improves. The patient should not need these enzymes for a long period of time (more than 3 months). They are used just until the GI mucosa has time to return to optimal state of health.
    - If more acid is needed, recommend Betaine HCL for a short period of time until symptoms resolve.
      - This commonly comes in a dose of 10 grains (648 mg). The patient can use 1-3 tablets with each meal. Direct the patient to start with one and increase to 3. If there is any burning sensation in the stomach, the dose should be decreased by one pill. As the stomach develops the ability to create its own acid, a warm feeling may develop that would signal the need to taper off this supplement. This supplement should not be used for longer than one month.



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3. **Reinoculate** with friendly bacteria and the foods they need to grow.
  - Consider probiotic supplementation, including Lactobacilli and Bifidobacteria
    - Probiotics

These “good” bacteria in the colon produce lactic acid and hydrogen peroxide that keeps the growth of “bad” bacteria in check. They have been found to improve diarrhea in those taking antibiotics and have been found to be helpful in reducing the growth of yeast. They also help support the integrity of the lining of the intestines. Products to consider: Floragen 3 which includes three strains of bacteria (made in Madison, WI) and Culturelle which contains lactobacillus GG.
  - Consider fructooligosaccharides and inulin to enhance growth of friendly flora
    - Pre-biotics

Short chain sugars called fructooligosaccharides (FOS) have been found to promote the growth of friendly bacteria in the gut. Foods that contain them include bananas, Jerusalem artichoke, onions, asparagus and garlic.
4. **Repair** mucosal lining.
  - Regular aerobic exercise helps maintain regular motility and reduces the stress-induced enzymes that can disrupt the GI barrier. Encourage daily movement and exercise.
  - Patients should include soluble and insoluble fiber. This helps develop healthy mucous and maintains regular transit time in the gut. Adequate intake of whole fruits and vegetables is important. Good sources of soluble (viscous) fiber include:
    - Psyllium Husks (*Metamucil*) One tsp. before meals in 8-10 oz of water or juice.
    - Guar Gum. This is less “gritty” but more expensive than psyllium. One tsp. before meals in 8-10 oz of water or juice.
    - Oat bran/Oatmeal. Consume as cereal each morning.
    - Ground Flax Seed, one tsp. over food or in water or juice before each meal.
  - Direct patient to drink adequate amounts (2 liters) of filtered water daily.
  - The following supplements have been found to help the lining of the intestinal wall repair itself. Consider supplementing with them for one month:
    - Antioxidants such as vitamins C, E and A, selenium, and carotenoids. Recommend a daily multi-vitamin.
    - Zinc 25-30 mg daily
    - Omega-3 fatty acids (EPA/DHA) in the form of fish oil. Recommend 2 gms daily.
    - L-Glutamine Powder. This amino acid is an important nutrient for intestinal repair. The dose is 5 gms of powder twice daily for one month. Sometimes the dose needs to be increased to 20 gms of powder in liquid twice daily.
    - If the patient is constipated, consider a short course of aloe vera. 5-60 drops of an aloe tincture (1:10, 50% alcohol) can be used daily for one month.

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