Framework Matters:

“Nothing in biology (nutrition or medicine) makes sense except in the light of evolution”.

Dr. Loren Cordain

Intestinal Barrier Function & Leaky Gut:

- The western diet and lifestyle and diseases of civilization Research Reports in Clinical Cardiology: 2011 March
- Zonulin and Its Regulation of Intestinal Barrier Function: The Biological Door to Inflammation, Autoimmunity, and Cancer Alessio Fasano Physiol Rev 2011 Jan
- Leaky Gut and Autoimmune Diseases Fasano Clinic Rev Allerg Immunol 2011 Nov

### Increasing Intestinal Permeability

<table>
<thead>
<tr>
<th>Gluten/Prolamines</th>
<th>Casein</th>
<th>HBC</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectins &amp; Saponins</td>
<td>Low Vitamin D</td>
<td>PPI</td>
<td>Sleep Deprivation</td>
</tr>
<tr>
<td>Omega 6 Fats</td>
<td>Antibiotics</td>
<td>Alcohol</td>
<td>Endurance Exercise</td>
</tr>
<tr>
<td>FODMAPs</td>
<td>NSAIDs</td>
<td>Capsaicin</td>
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### Improving Intestinal Permeability

<table>
<thead>
<tr>
<th>IBD Diet</th>
<th>Krill Oil</th>
<th>Probiotics &amp; Fermented Food</th>
<th>Colostrum</th>
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</thead>
<tbody>
<tr>
<td>Proline (Broth &amp; Gelatin)</td>
<td>Curcumin -- BCM95</td>
<td>Mutaflor, VSL#3, Lactobacillus paracasei</td>
<td>LDN</td>
</tr>
<tr>
<td>CLA (Bones &amp; Butter)</td>
<td>Boswellia -- 5Loxin</td>
<td>S. Boulardii, B. Coagulans</td>
<td>Cannaboids (CBD)</td>
</tr>
<tr>
<td>D3 &amp; K2</td>
<td>L. Glutamine</td>
<td>Sleep, Meditation/Yoga, Acupuncture</td>
<td>IF &amp; HIIT = Growth Hormone</td>
</tr>
</tbody>
</table>
Diet:

- Does gluten cause gastrointestinal symptoms in subjects without coeliac disease? J Gastroenterol Hepatol. 2011 Apr
- Dietary Lectins as Disease Causing Toxins. Pakistan Journal of Nutrition 2009
- Dietary fructooligosaccharides increase intestinal permeability in rats. J Nutr. 2005
- Indigestible disaccharides open tight junctions. Dig Dis Sci. 2004 Jan

Fat Balance:

- Linoleic Acid, a Dietary N-6 Polyunsaturated Fatty Acid, and the Aetiology of Ulcerative Colitis - A European Prospective Cohort Study. Gut 2009 July
- The Type of Dietary Fat Modulates Intestinal Tight Junction Integrity, Gut Permeability, and Hepatic Toll-Like Receptor Expression. Alcohol Clin Exp Res. 2011
- Lipid based therapy for ulcerative colitis-modulation of intestinal mucus membrane phospholipids as a tool to influence inflammation. Int J Mol Sci. 2010 Oct
- Butyrate enhances the intestinal barrier by facilitating tight junction assembly via activation of AMP-activated protein kinase in Caco-2 cell monolayers. J Nutr. 2009
Microbiota & Probiotics:

- Gut Microbiota and Pediatric Disease *Dig Dis* 2011
- Association of Repeated Exposure to Antibiotics With the Development of Pediatric Crohn's Disease--A Nationwide, Register-based Finnish Case-Control Study. *Am J Epidemiol.*, 2012 Apr
- Influence of Saccharomyces boulardii (Florastor) on the intestinal permeability of patients with Crohn's disease in remission. *Scand J Gastroenterol.*, 2008
- Anti-inflammatory effects of Saccharomyces boulardii mediated by myeloid dendritic cells from patients with Crohn's disease and ulcerative colitis. *Am J Physiol Gastrointest Liver Physiol.*, 2011 Dec
- The probiotic Escherichia coli Nissle 1917 (Mutaflor) reduces pathogen invasion and modulates cytokine expression in Caco-2 cells infected with Crohn's disease-associated E. coli LF82. *Trop Med Int Health*, 2011 May
- Lactocepin Secreted By *Lactobacillus* Exerts Anti-Inflammatory Effects By Selectively Degrading Proinflammatory Chemokines *Cell Host & Microbe* 2012 April

Supplements:


<table>
<thead>
<tr>
<th>Target Vitamin D Levels 25(OH)D</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dr. Jaquelyn McCandless</td>
<td>65 – 90</td>
</tr>
<tr>
<td>Robb Wolf</td>
<td>60 – 80</td>
</tr>
<tr>
<td>Vitamin D IBD Study</td>
<td>30 – 60</td>
</tr>
</tbody>
</table>

- Therapy of active Crohn disease with Boswellia. *Z Gastroenterol*, 2001 Jan
- Dietary supplementation of krill oil attenuates inflammation and oxidative stress in experimental ulcerative colitis in rats. *Scand J Gastroenterol*, 2012 Jan
- Glutamine and Whey Protein Improve Intestinal Permeability and Morphology in Patients with Crohn's Disease: A Randomized Controlled Trial. *Dig Dis Sci*, 2011 Oct
- Zinc supplementation tightens "leaky gut" in Crohn's. *Inflamm Bowel Dis*, 2001 May
Drugs:

- Therapy with the opioid antagonist naltrexone promotes mucosal healing in active Crohn's disease: a randomized placebo-controlled trial. *Dig Dis Sci.* Smith & Zagon 2011 Jul


- Cannabinoid-induced apoptosis in immune cells as a pathway to immunosuppression. *Immunobiology*, 2010 Aug

- Cannabinoids mediate opposing effects on inflammation-induced intestinal permeability. British Journal of Pharmacology 2011

- Linaclotide in the management of gastrointestinal tract disorders. *Drugs Today (Barc)*, 2012 Mar

- 5-aminosalicylate is not chemoprophylactic for colorectal cancer in IBD: a population based study. *Am J Gastroenterol*, 2011 Apr