The Gut – Brain Connection

GI Induced Systemic Inflammation & Neurotoxicity Via Activated Microglia and Astroglia Decline

Or

How Everything Starts in the Gut!

A Primary Source of Neuroinflammation

Pro-inflammatory cytokines, such as IL-6 and TNF-α from the GI typically induce a systemic and brain inflammatory response
**Inflamm-ageing.**

- Chronic low-grade inflammation typical of ageing, seems to be the common biological factor responsible for the decline and the onset of disease in the elderly.
- There are complex interactions responsible for inflamm-ageing
- “The gut microbiota and nutrition help determine when, where and how much this phenomenon impacts on the health status during human lifespan.”

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**Pathways Between Liver, GI & Brain**

1. The liver and Gut innervated by vagal afferents that respond to immune mediators e.g. **Inflammatory Cytokines** (TNFα, IL-1β, and IL-6)
2. Vagal afferents project to the dorsal vagal complex
3. From here they project to various cerebral regions, and the hypothalamus.
4. **Circulating TNFα, IL-1β, and IL-6 also access the brain via regions that lack a blood-brain barrier**
5. These Gut/Liver-to-brain communication pathways result in changes in central neural activity, thereby, Behavior, Mood, Sleep, Focus
Communication Pathways Between The Liver, GI And The Brain

**Neuro-Inflammatory Sensitization**
- IL-1β, IL-6, TNF-α

**Physiologic Recursion**

**Cognitive-Emotional & Health Effects**

**Short-term**
- Hypervigilance
- Anticipation of adversity
- Sensitivity to pain
- Social anxiety

**Medium-term**
- Disrupted sleep
- Chronic pain
- Depressed mood
- Social withdrawal

**Long-term**
- Susceptibility to infection
- Inflammatory diseases
- Accelerated aging
- Early mortality

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**Diagram A**
- HPA axis
- Immune system
- Vagus nerve
- Gut microbiota

**Diagram B**
- Anxiety
- Pain
- Autism
- Depression
- Multiple sclerosis
- Obesity
- Cardiovascular risk
FLC Syndrome: Chronic Fatigue and IBS Patients

- Have increased levels of pro-inflammatory cytokines, IL-6 and IL-8, IL-1β and TNF-α
- They showed low-grade inflammation or immune activation of the bowel
- Increased serum concentrations of these cytokines are evidence of spill-over from a primary activation in the gut.

FLC Syndrome: Chronic Fatigue and IBS Patients

- CFS & IBS (FLC Syndrome) were associated with marked alterations in the **gut microbiota**.
- Lower levels of *Bifidobacteria* and higher levels of aerobic bacteria were found.
- “Probiotics decrease mood-regulating systemic pro-inflammatory cytokines, decrease oxidative stress and improve nutritional status when orally consumed.”
Mechanisms of Gut Inflammation Activating Brain Inflammation

Excitatory amino acid production and removal

* Glutamate and quinolinic acid are excitatory amino acids that can have neurotoxic effects through NMDA receptor agonism. Excess glutamate is removed by astroglial EAAT. Microglia, activated by pro-inflammatory mediators, produce quinolinic acid and inhibit EAAT expression, potentially leading to excess NMDA agonism. NMDA antagonists such as ketamine and memantine can inhibit microglial release of pro-inflammatory mediators. How this occurs is not known.

NMDA=N-methyl-D-aspartate; Th1 helper cell; IL-interleukin; EAAT=excitatory amino acid transporter; TNF=tumor necrosis factor; IFN=interferon; Rx-prescription.

Assessing Oxidative Stress CNS Inflammation Through Urinary Organic Acid Test

No. 26—Increased neuro-inflammatory response—Chronic pain, fatigue, depression, ASD & neurodegeneration

No. 28—Oxidative Damage to DNA—High Antioxidant need

From: Role of gut microbiota and nutrients in amyloid formation and pathogenesis of Alzheimer disease
Effects elicited by nutrients and foods on either gut microbiota composition or amyloid formation. Protective, anti-amyloidogenic foods and nutrients and their salutogenic effects are shown on the right side of the figure; pro-amyloidogenic foods and nutrients and their pathogenic effects are indicated on the left side.

Therefore Heal The Gut
Hippocrates said 2,500 years ago: “All disease begins in the gut.”

SIBO, Leaky Gut, Dysbiosis Greatest Source of Inflammation/Oxidative Stress

- ROS
- Xenobiotics
- Dysbiotic Endotoxins, LPS
- Chronic Pain States
- Depression and Fatigue

Inflammation/Pain in the Gut and Systemic

Cytokines
IL-1, IL-6, IL-8, TNa, NFkB
Digestion
The Root of Most Disease-Poor Digestion!

>100 million individuals suffer from digestive disorders: GERD, gastritis, peptic ulcer, IBS, IBD & colitis and

-20 million adults Dx with digestive disorders each year

› > 200 OTC drugs for digestive complaints-can cause other digestive & general health problems

› Research links digestive disorders to diseases outside the GI tract: chronic muscle & joint pain, arthritis, headaches, fibromyalgia, chronic fatigue, ADHD, autism, asthma, allergies, eczema and many more

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Primary Causes of Functional Digestive Disorders

› Inadequate stomach acid (HCL)

› Poor pancreatic enzyme function

› Overgrowth of ‘bad bacteria’ & yeasts in GI

1. Causes maldigestion/malabsorption allowing partially digested food to enter the large intestine

2. Bad bacteria in the small & large intestine feed on undigested foods, causing gas, bloating & cramps.

3. This dysbiosis or SIBO can release toxins that are absorbed poison cellular function
Human Gut Flora

- 20,000 species in the normal healthy human GI tract
- Experts estimate modern humans may only have half that
- Total weight of gut flora is about 2-4 lbs.
- Constitutes the largest organ in your body
- Geneticists now suggest the DNA of these bacteria should be included as part of the human genome

**Balanced Gut Flora**

Up to 20,000 bacterial species may be present in the GI tract of a healthy person, consisting of 100,000,000,000,000 cells

Life Is Promoted & Enhanced In The Colon

- GI tract is sterile before birth
- Birth & nursing starts process of gut colonization
- 1st bacteria immune-building from breast milk, improving health & favoring survival
- 70% of the immune system is in the GI tract
- 80% of the antibodies produced come from the GI
- GI Flora is 10X the number of cells in the body
- Some bacteria are "good", others Commensal
- The ideal balance between them is 85% good, 15% "Commensal" no pathological
Life Is Promoted & Enhanced In The Colon

- Poor diet & other lifestyle choices cause the wrong flora to flourish
- Beneficial bacteria aid digestion and nutrient absorption boosting to overall health
- Microorganisms in the intestines dynamically affecting the immune system
- Beneficial bacteria prevent less desirable and pathological species by competing for nutrition & attachment sites on the mucosa

Human Gut Villi & Flora
Altered Intestinal Flora

- Present dietary patterns, medications, food additives and toxic chemicals have a detrimental effect on the gut flora
- 20% of the US population suffers with the functional GI disorder IBS
- Correlation between IBS and SBBO -


Small Intestinal Bacterial Overgrowth or SIBO

Have you been diagnosed with irritable bowel syndrome (IBS), or do you have chronic digestive complaints?

Most people are simply told to “eat more fibre and live with it” or “it’s all in your head”. Often symptoms get worse with this advice.

Now there is a way to finally get some answers!
FMS and SIBO-IBS

- 81% with FMS have bowel problems
- 1 out of 3 with FMS are also diagnosed with irritable bowel syndrome
- Irritable bowel patient’s harbor bacterial overgrowth in their painful small intestines
- Removal of “Bad Bugs” eliminated the condition of SIBO and IBS Symptoms

SIBO Symptoms: GI & Systemic

- Bloating/ abdominal Gas
  - Belching, flatulence
- Abdominal Pain, Cramps
- Constipation, Diarrhea, both
- Heartburn/ GERD
- Nausea
- Leaky Gut/SI Sx- any Systemic sx:
  - food sensitivities, h/a, joint P, respiratory, skin, brain
- Malabsorption Sx- steatorrhea, anemia, weight loss
Dysbiosis, SIBO, and the Chronically “Subluxated”

- IBS, Interstitial Cystitis, FMS and CFIDS are associated with dysbiosis and SIBO
- Induction of tissue inflammation via endotoxin & polypeptide absorption source of a shared etiology
- Inflammatory & auto-immune response increases oxidative damage to mitochondria and decreases ATP production


How SBBO or Dysbiosis Causes Leaky Gut & Systemic Inflammation

- Absorption of bacterial or fungal debris and endotoxins
- These foreign materials attach to cell receptors activating NF-kappaB creating inflammation and oxidative stress - Pahl HL. Activators and target genes of Rel/NF-kappaB transcription factors. Oncogene. 1999 Nov 22; 18(49):6853-66
Is FMS A Condition of SIBO?

- Research shows strong correlation between chronic myofascial pain (e.g. FMS) & SBBO
- Two different studies compared lab findings for SIBO between IBS and FMS
- **100% of those with FMS tested positive for SBBO!** – Dysbiosis of Small intestine

How to Test For SIBO - Breath Test the Gold Standard
Dysbiosis Markers Profile

The Russian scientist Elie Metchnikoff (1845 - 1916) popularized the idea of “Dysbiosis” or “Dysbiosis,” describing an imbalance in the microbiology of the digestive tract. Intestinal dysbiosis contributes to many health problems, ranging from IBS, acne, and food allergies to chronic fatigue and depression. The Metametrix Dysbiosis Markers Profile, which is also reported within the Organis™ Profile, measures the by-products of microbial metabolism that are excreted in urine, making it particularly useful in detecting the presence of pathogenic microbial overgrowth. Ordered alone, the Dysbiosis Markers Profile allows you to assess microbial overgrowth and guide and monitor therapy.

Is urine or stool better for assessing dysbiosis?

Although stool testing has been the traditional method for assessing dysbiosis, there is increasing evidence that the fecal microbiota may not accurately reflect the situation. A study in a group of healthy volunteers showed that stool samples did not always reflect the true status of the gut microbiota. urine contains unique products of microbial metabolism. While the exceptions are rare, the compounds measured in the urine are not normally produced by human cells. Additionally, intestinal microorganisms, however, can manufacture them in relatively high quantities. These compounds are absorbed into the bloodstream from the intestines and eventually appear in the urine.

Microbial overgrowth can lead to a wide variety of symptoms due to the toxic products produced by bacteria, parasites, or fungi. Various patterns of the compounds appear elevated conditions of general intestinal microbial overgrowth.

Clinical effects can be as diverse as:

- Behavioral Disorders
- Chronic Fatigue
- Depression
- Headache
- Irritable Bowel Syndrome
- Joint Pain
- Learning Disorders
- Nutritional Deficiencies
- Skin Disorders

The Metametrix Dysbiosis Markers Profile features:

- In a healthy gut, urine specimens result in a better test for acceptance than stool testing.
- Discrimination between microbial classes, allowing more targeted therapies.
- D-arabinitol, a specific marker for Candida sp.
- D-lactate, an indicator of E. coli or E. faecalis overgrowth and carbohydrate malabsorption.
- As a component of the Organis Profile, it can be used as an economical follow-up to monitor therapy.

Tests For Digestive Dysfunction & SIBO

Urinary Organic Acid Profile- Test SI Dysbiosis

<table>
<thead>
<tr>
<th>COMPOUNDS OF BACTERIAL OR YEAST/FUNGAL ORIGIN</th>
<th>35 Benzoate</th>
<th>36 Hippurate</th>
<th>37 Phenylacetate</th>
<th>38 Phenylpropionate</th>
<th>39 p-Hydroxybenzoate</th>
<th>40 p-Hydroxyphenylacetate</th>
<th>41 Indican</th>
<th>42 Tricarballylate</th>
<th>43 D-Lactate</th>
<th>44 Dihydroxyphenylpropionate</th>
<th>45 D-Arabinitol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial - general</td>
<td>&lt; 1</td>
<td>1,490 H</td>
<td>0.15</td>
<td>4.4 H</td>
<td>1.5</td>
<td>30 H</td>
<td>99</td>
<td>10.1 H</td>
<td>1.4 H</td>
<td>0.29</td>
<td>67 H</td>
</tr>
<tr>
<td>L. acidophilus / general bacterial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clostridial species</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeast / Fungal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>5.3</td>
<td>420</td>
<td>0.19</td>
<td>2.8</td>
<td>3.1</td>
<td>1.10</td>
<td>3.9</td>
<td>1.3</td>
<td>0.59</td>
<td>0.57</td>
<td>0.83</td>
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</tbody>
</table>
Small Bowel Microbial Overgrowth In ASD

- Elevated urine arabinose has been linked with yeast overgrowth (Candida)
- Shaw reported analyzing urine from more than 95 autistic children and 20 age-matched controls
- He found the arabinose levels to be 5X higher in ASD than controls


First Line of Attack

- With Chronic Myofascial Pain, FMS and CFIDS patients:
  - Always access for SIBO, Dysbiosis first before detoxification or treating mitochondria dysfunction
  - Must remove reservoir of offending agents before tackling anything else
Leaky Gut and FLC Syndrome

Five Clues You Might Have Leaky Gut!
1. Tired, Achy, Bloated, and/or Anxious
2. Over or under weight, as well as high or low cholesterol, and blood sugar issues
3. Autoimmunity—a positive ANA panel or an autoimmune disease
4. Use of antacids, anti-inflammatory drugs and/or antibiotics
5. Over-stressed
Leaky Gut Syndrome

- A condition of an altered or damaged bowel lining.
- The syndrome is not a recognized ICD-10 diagnosis.

Leaky Gut Syndrome

- The leaky gut allows substances such as toxins, microbes, polypeptides, or larger than normal macromolecules to leak through an abnormally permeable gut wall.
- These out-of-place substances affect the body directly or initiate an immune reaction.
Leaky Gut Syndrome

Leaky Gut - Its Causes and Effects

Factors affecting mucosal immune system resulting in intestinal barrier dysfunction, autoimmunity and nervous system abnormalities:

- Dietary Proteins & Peptides
- Antibodies
- Drugs & Xenobiotics
- Physical Stress
- Infections
- Cytokines
- Neurotransmitters
- Enzymes

Intestinal Barrier Dysfunction

Food Allergy & Intolerance

Immune System Abnormalities

Autoimmunity

Influence on the Blood-Brain Barrier and Neuroautoimmunity
Leaky Gut Exposes 70% of Your Immune System (GALT) To Immune System Activation

Diagnosing Leaky Gut, SIBO and Dysbiosis

- There are specific laboratory tests to identify if you have a leaky gut, SIBO, Dysbiosis causing immune activation and systemic inflammation
- Once identified there are specific GI healing programs that can be implemented to reverse this condition and improve your systemic inflammation, muscle pain, arthritis even autoimmune
Leaky Gut Diagnosis

### Test Results

#### Test 1

<table>
<thead>
<tr>
<th>Test Description</th>
<th>IN RANGE (Normal)</th>
<th>EQUIVOCAL*</th>
<th>OUT OF RANGE</th>
<th>REFERENCE (ELISA Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actomyosin IgA **</td>
<td>7.58</td>
<td></td>
<td></td>
<td>0.0-20</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgG</td>
<td>0.56</td>
<td></td>
<td></td>
<td>0.2-1.5</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgA</td>
<td>0.64</td>
<td></td>
<td></td>
<td>0.1-1.8</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgM</td>
<td>2.74</td>
<td></td>
<td></td>
<td>0.1-2.1</td>
</tr>
<tr>
<td>Lipopolysaccharides (LPS) IgG</td>
<td>2.63</td>
<td></td>
<td></td>
<td>0.1-1.5</td>
</tr>
<tr>
<td>Lipopolysaccharides (LPS) IgA</td>
<td>1.41</td>
<td></td>
<td></td>
<td>0.1-1.6</td>
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<tr>
<td>Lipopolysaccharides (LPS) IgM</td>
<td>3.18</td>
<td></td>
<td></td>
<td>0.1-2.0</td>
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</table>

#### Test 2

<table>
<thead>
<tr>
<th>Test Description</th>
<th>IN RANGE (Normal)</th>
<th>EQUIVOCAL*</th>
<th>OUT OF RANGE</th>
<th>REFERENCE (ELISA Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actomyosin IgA **</td>
<td>7.63</td>
<td></td>
<td></td>
<td>0.0-20</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgG</td>
<td>1.77</td>
<td></td>
<td></td>
<td>0.2-1.5</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgA</td>
<td>0.64</td>
<td></td>
<td></td>
<td>0.1-1.8</td>
</tr>
<tr>
<td>Ocludulin/Zonulin IgM</td>
<td>1.03</td>
<td></td>
<td></td>
<td>0.1-2.1</td>
</tr>
<tr>
<td>Lipopolysaccharides (LPS) IgG</td>
<td>2.24</td>
<td></td>
<td></td>
<td>0.1-1.6</td>
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<tr>
<td>Lipopolysaccharides (LPS) IgA</td>
<td>1.84</td>
<td></td>
<td></td>
<td>0.1-1.8</td>
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<tr>
<td>Lipopolysaccharides (LPS) IgM</td>
<td>1.37</td>
<td></td>
<td></td>
<td>0.1-2.0</td>
</tr>
</tbody>
</table>
Leaky Gut
Can Effect
Anything
and
Everything

What caused the increase of autoimmune and allergic diseases? A decreased or an increased exposure to luminal microbial components?

John Doe

Leaky Gut Affects the Whole Body

Brain
Depression
ADHD

Skin
Acne
Rosacea
Eczema
Psoriasis

Joints
Rheumatoid Arthritis
Fibromyalgia
Headaches

Adrenals
Fatigue

Colon
Constipation
Diarrhea
IBD

Thyroid
Hashimoto's Hypothyroidism
Graves

Leaky Gut
Can Effect
Anything
and
Everything

Sinus
and
Mouth
Frequent Colds
Food Sensitivities

increase in intestinal permeability was shown in patients with these autoimmune and allergic diseases, such as those with IBD, type 1 diabetes, asthma, and atopic eczema. The increased intestinal permeability in these patients seems to be a prerequisite rather than a consequence of these diseases, as it could precede the clinical onset of these diseases.


Food Allergies?

- “Leaky Gut” leads to increased food allergies and increased IgG antibodies
- The majority of my chronic pain patients (e.g. FMS, osteoarthritis, rheumatoid arthritis) have food allergies
- I have found in myself and many patients I can reduce the pain symptoms by identifying and removing the patient’s food allergies by using a sophisticated Alletess IgG food allergy test for 184 foods.

To Heal the Body
Heal the Gut

Remove Food Allergies!
Absorption of polypeptides may increase food sensitivities and allergies

- Absorption of polypeptides from foods may increase inflammatory response in myofascial tissues
Food Allergies & Sensitivities Are Common

- Many individuals have one or more foods that they are allergic or sensitive to.
- Food allergies and sensitivities occur when your immune system mistakenly identifies and tags a normally harmless substance as an invader, as it does to bacteria or viruses.
- Your immune system then attacks this substance the same way it would attack any invader.

The Symptoms of Food Allergies, Sensitivities and Immune Activation

- When your immune system chronically attacks an invader, it has side effects.
- The immune system’s cytokines can cause: aches, pains, fatigue, brain fog, mood and behavioral problems.
- Think about the symptoms you experienced when you last had the flu.
- Many of the symptoms were caused by your own immune system cytokines and not the bacteria or virus.
- These immune cytokines are also released when activated by a food allergy response.
The Symptoms of Food Allergies and Sensitivities

They are varied, common ones are:
- Chronic muscle ache and pains, chronic fatigue, low energy, mood disorders, premenstrual syndrome, chronic and recurrent infections.
- Research is now connecting food allergies and sensitivities even to behavioral and learning disorders, ADHD and even autism.
- With food allergies and sensitivities gastrointestinal symptoms are quite common!

GI Symptoms Of Food Allergies And Food Sensitivities

- The are primarily bloating, gas, abdominal pain and discomfort, nausea and heartburn.
- I find in my practice that the vast majority of individuals being treated with medications for gastrointestinal problems such as reflux, GERD, IBS, IBD have undiagnosed food allergies or food sensitivities.
<table>
<thead>
<tr>
<th>If Allergic to:</th>
<th>Risk of Reaction to at Least One:</th>
<th>Risk:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A legume*</td>
<td>Other legumes</td>
<td>5%</td>
</tr>
<tr>
<td>A tree nut</td>
<td>Other tree nuts</td>
<td>37%</td>
</tr>
<tr>
<td>A fish*</td>
<td>Other fish</td>
<td>50%</td>
</tr>
<tr>
<td>A shellfish</td>
<td>Other shellfish</td>
<td>75%</td>
</tr>
<tr>
<td>A grain*</td>
<td>Other grains</td>
<td>20%</td>
</tr>
<tr>
<td>Cow's milk*</td>
<td>Beef</td>
<td>10%</td>
</tr>
<tr>
<td>Cow's milk*</td>
<td>Goat's milk</td>
<td>4%</td>
</tr>
<tr>
<td>Cow's milk*</td>
<td>Mare's milk</td>
<td>92%</td>
</tr>
<tr>
<td>Pollen*</td>
<td>Fruits/vegetables</td>
<td>55%</td>
</tr>
<tr>
<td>Peanut*</td>
<td>Fruits</td>
<td>55%</td>
</tr>
<tr>
<td>Latex*</td>
<td>Fruits</td>
<td>35%</td>
</tr>
<tr>
<td>Fruits</td>
<td>Latex</td>
<td>11%</td>
</tr>
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</table>

IgE or IgG?
IgE and IgG Actual Food Allergies

- There are two types of immune system reactions causing actual food allergy reactions:
  - IgE and IgG antibody reactions.
  - IgE reactions are very quick usually in 2 hours or less and therefore easier to identify.
  - If you eat a strawberry and your throat swells up from an IgE reaction it's easy to identify your allergy.

IgE Versus IgG Food Allergies

<table>
<thead>
<tr>
<th>Immediate Onset (IgE-mediated)</th>
<th>Delayed Onset (IgG-mediated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace amounts of food are enough to trigger reactions</td>
<td>Large amount of food needed to provoke symptoms</td>
</tr>
<tr>
<td>Reactions usually occur within 2 hours of consumption of offending food</td>
<td>Reactions occur 2-72 hours after eating reactive foods</td>
</tr>
<tr>
<td>Severe symptoms</td>
<td>Less severe symptoms</td>
</tr>
<tr>
<td>Primarily affects: skin, airway &amp; digestive system</td>
<td>Any organ system can be involved</td>
</tr>
<tr>
<td>IgE and skin test positive</td>
<td>IgE RAST negative; IgG positive</td>
</tr>
<tr>
<td>Treatment: avoidance / exclusion diet; epinephrin in emergencies</td>
<td>Treatment: avoidance / exclusion diet</td>
</tr>
</tbody>
</table>

Characteristics of immediate and delayed onset reactions
Role of the GI in Food Allergies and Sensitivities

- When these undigested particles “Leak” into the bloodstream, the body’s immune system recognizes them as foreign and attacks them with IgE or IgG antibodies.
- OR, a complex immune response is initiated at this point that may not involve IgE or IgG antibodies, a food sensitivity.
- Some experts have estimated that as many as 60% of the population suffers from undetected food sensitivities.

Check For Food Allergies & Sensitivities

- Have patient keep symptom-food diary
- After strict casein & gluten removal other foods problems surface: Eggs, tomatoes, eggplant, avocados, peppers, soy, & corn
- Beef, pork, rice, & potatoes are occasionally implicated
- I use a Food IgG-ELISA Blood Test
### Test Results

<table>
<thead>
<tr>
<th>Food</th>
<th>In Range (Normal)</th>
<th>Equivocal</th>
<th>Out of Range</th>
<th>Reference (ELISA Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy, Barley, Spelt, Polish wheat</td>
<td>0.40</td>
<td></td>
<td></td>
<td>0.1-1.4</td>
</tr>
<tr>
<td>Rice (Red)</td>
<td>0.75</td>
<td></td>
<td></td>
<td>0.1-1.3</td>
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<tr>
<td>Casein (Alpha &amp; Beta)</td>
<td>0.82</td>
<td>1.44</td>
<td></td>
<td>0.1-1.2</td>
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<tr>
<td>Cocomo</td>
<td>0.73</td>
<td></td>
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<td>0.2-1.5</td>
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<td>Millet (Barley)</td>
<td>0.58</td>
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<td>0.1-1.3</td>
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<tr>
<td>Whey Protein</td>
<td>0.69</td>
<td></td>
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<td>0.1-1.4</td>
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<tr>
<td>Chocolate (Milk)</td>
<td>0.73</td>
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<td></td>
<td>0.1-1.4</td>
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<tr>
<td>Oats</td>
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<td>Yeast</td>
<td>0.69</td>
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<td>0.2-1.2</td>
</tr>
<tr>
<td>Coffee</td>
<td>0.69</td>
<td>1.23</td>
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<td>0.2-1.2</td>
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<tr>
<td>Sesame</td>
<td>0.62</td>
<td></td>
<td></td>
<td>0.1-1.3</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>0.59</td>
<td></td>
<td></td>
<td>0.1-1.3</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0.84</td>
<td></td>
<td></td>
<td>0.3-1.2</td>
</tr>
<tr>
<td>Millet</td>
<td>0.84</td>
<td></td>
<td></td>
<td>0.3-1.5</td>
</tr>
<tr>
<td>Hemp</td>
<td>0.87</td>
<td></td>
<td></td>
<td>0.3-1.5</td>
</tr>
<tr>
<td>Amaranth</td>
<td>0.78</td>
<td></td>
<td></td>
<td>0.2-1.3</td>
</tr>
<tr>
<td>Quinoa</td>
<td>0.62</td>
<td></td>
<td></td>
<td>0.6-1.5</td>
</tr>
<tr>
<td>Tapioca</td>
<td>0.45</td>
<td>0.81</td>
<td></td>
<td>0.1-1.4</td>
</tr>
<tr>
<td>Tear</td>
<td>0.54</td>
<td></td>
<td></td>
<td>0.2-1.1</td>
</tr>
<tr>
<td>Soy</td>
<td>0.54</td>
<td></td>
<td></td>
<td>0.5-1.5</td>
</tr>
<tr>
<td>Egg</td>
<td>0.52</td>
<td></td>
<td></td>
<td>0.3-1.7</td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td>1.45</td>
<td></td>
<td>0.3-1.4</td>
</tr>
<tr>
<td>Rice</td>
<td>0.65</td>
<td></td>
<td></td>
<td>0.6-1.4</td>
</tr>
<tr>
<td>Potato</td>
<td></td>
<td>1.65</td>
<td></td>
<td>0.6-1.4</td>
</tr>
</tbody>
</table>
Gluten and Casein Defined

- Gluten is a protein component of grains, the following grains contain gluten:
  - Wheat (durum, semolina)
  - Rye
  - Barley
  - Spelt
  - Triticale
  - Kamut
  - Farina
  - Oats (controversial)

- Casein is a protein derived from dairy products:
  - Includes milk, butter, cheese, yogurt, ice cream, etc.
  - Goat’s milk has casein

24 Ways To React To Gluten®!

ARRAY: WHEAT/GLUTEN PROTEOME REACTIVITY & AUTOIMMUNITY™

2 ml serum

CLINICAL USE:
- Accurately Identify Gluten Reactivity
- Measure antibody production against 9 wheat proteins and peptides and 3 essential structure enzymes

RECOMMENDED FOR PATIENTS WHO:
- Have non-responsive GI symptoms
- Present multiple symptom complaints (including Chronic Fatigue Syndrome and Fibromyalgia)
- Suffer from depression or neuro-autoimmunity
The Opioid Excess Theory

- Partially digested food proteins can be absorbed via a leaky gut
- Absorbed peptides called exorphins may exert an opioid-like behavior on the CNS
- Producing other physiologically-based symptoms of ASD
- Casein-free diet improves Sx in 3 weeks
- Predicts success with a gluten-free diet which takes longer than 3 months

Consider Strict Casein And Gluten Free (CFGF) Diet

- Adverse brain effects associated casein (dairy) and gluten (wheat & rye)
- Due to opioid-acting peptides called exorphins
- Well-conducted studies find present in 80% ASD subjects
- Improvement following strict dietary exclusion of casein & gluten
Urinary Peptides
The Gut Brain Connection

Urinary Test for Casein and Gluten
- Relatively simple specimen collection – 5 ml. or more of first morning urine, ideally 6 Hr. Sample

Patient 1: Results indicate elevated casein and gluten in urine.

Patient 2: Results show elevated gluten, but normal levels of casein.
Strict Casein/Gluten Free Diet

Abrupt removal of both casein and gluten can cause withdrawal symptoms—use a 2-step withdrawal

- **1st step:** remove all cows milk and other casein containing dairy products
- Trial found 66% benefited from intervention
- Benefits can manifest quickly—within 2-3 days in young children or 10-14 days in adults
- However, a longer period required for casein to be fully cleared from the body


Research Has Established Why and How Patients Developed an Autoimmune Disorder From a Leaky Gut
Depression may be linked to leaky gut syndrome

Is it possible that the key to depression is linked to bacteria in the bowels? Numerous studies over the past five years have suggested that the root of chronic depression may be associated with a specific medical condition known as leaky gut syndrome. Correcting this medical condition can result in significant improvement in chronic depression.

If you were to ask 10 physicians if leaky gut syndrome exists, probably all would say no. Well, leaky gut syndrome is mentioned in my medical textbook from 25 years ago. I actually remember the lecture in medical school, that described leaky gut syndrome and the specific diagnostic test.

Basically, leaky gut syndrome is a problem with intestinal permeability. Toxins and possibly bacteria are able to get past the intestinal wall cells, causing an increased immune response. This enhanced immune response is may lead to chronic inflammation ultimately increasing the risk for a number of illnesses — theoretically. In addition, some of the toxins produced by bacteria and yeast are very toxic, especially to the nervous system. One specific toxin is lipopolysaccharide (LPS). LPS is so toxic that even in minute doses, death is almost certain. It is believed to be one of the main pathologic factors in septic shock (an often fatal medical condition caused by serious bacterial infections).

Since 2007, there is good medical research to indicate that a person's immune response to LPS may increase the risk of chronic depression. From this research, the question arose “where does LPS come from?”. Research over the past four years has demonstrated that the source of LPS is the bacteria in the bowel in association with an increase in bowel permeability — a leaky gut.

One specific, 2009 Belgian study demonstrated that serum levels of two specific immunoglobulins, IgA and IgG, were diagnostic in fatigue, bowel irregularity and the feeling of chronic, low-grade infection. This study also showed that there was intestinal cell dysfunction and an increased amount of LPS — rich bacteria were getting through the bowel wall. They postulated that this “leaky gut” has an important role in depression. Correcting the leaky gut using a combination of dietary supplements and diet simultaneously improved gut function and reduced levels of depression.
**Comprehensive Digestive Stool Analysis - Dx Dysbiosis**

**Digestion/Absorption**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pancreatic Elastase *</td>
<td>&gt;1.**</td>
<td>&gt;= 201 mcg/g</td>
</tr>
<tr>
<td>2. Puflective SCFAa (Total)</td>
<td>428</td>
<td>1.8-6 micromol/g</td>
</tr>
</tbody>
</table>

*Total values equal the sum of all measurable parts.

**Gut Immunology**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Eosinophil Protein X</td>
<td>&lt;= 7.0 mg/g</td>
<td>&lt;=10 mg/g</td>
</tr>
<tr>
<td>4. Cytokinin</td>
<td>&lt;=10</td>
<td></td>
</tr>
</tbody>
</table>

**Metabolic**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Benoic SCFAa (CA)</td>
<td>0.065</td>
<td>0.65-2.01 mg/g</td>
</tr>
<tr>
<td>6. n-Butyrate</td>
<td>0.017</td>
<td>0.056-2.01 mg/g</td>
</tr>
<tr>
<td>7. pH</td>
<td>6.1</td>
<td>6.1-7.9</td>
</tr>
<tr>
<td>8. Beta-glucuronidase</td>
<td>3.108</td>
<td>0.037-4.433 Ulug</td>
</tr>
</tbody>
</table>

**Secondary Bile Acids**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Lithocholic acid (LCA)</td>
<td>0.178</td>
<td></td>
</tr>
<tr>
<td>10. Deoxycholic acid (DCA)</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>11. LCA / DCA Ratio</td>
<td>4.13</td>
<td></td>
</tr>
</tbody>
</table>

**Bacteriology**

<table>
<thead>
<tr>
<th>12. Beneficial Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactobacillus species</td>
</tr>
<tr>
<td>Escherichia coli</td>
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**Additional Bacteria**

<table>
<thead>
<tr>
<th>13. Additional Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>gamma haemolytic streptococci</td>
</tr>
<tr>
<td>Bacillus species</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
</tr>
<tr>
<td>Enterobacter species</td>
</tr>
</tbody>
</table>

**Mycology**

<table>
<thead>
<tr>
<th>Candida albicans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhodococcus species</td>
</tr>
<tr>
<td>Saccharomyces cerevisiae</td>
</tr>
</tbody>
</table>

**CDSA:** tests for digestive function, metabolic function (short-chain fatty aids reflect probiotic activity), microbiology (from bacterial culture), mycology (types of yeasts and fungi), and parasitology.

---

**Female With FMS, IBS & Depression**

**Digestion/Absorption**

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<tbody>
<tr>
<td>1. Pancreatic Elastase *</td>
<td>462</td>
<td>&gt;= 201 mcg/g</td>
</tr>
<tr>
<td>2. Puflective SCFAa (Total)</td>
<td>42</td>
<td>1.8-6 micromol/g</td>
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**Gut Immunology**

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<td>Bacillus species</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
</tr>
<tr>
<td>Escherichia hermanni</td>
</tr>
</tbody>
</table>

**Mycology**

<table>
<thead>
<tr>
<th>Candida albicans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhodococcus species</td>
</tr>
<tr>
<td>Candida parapsilosis</td>
</tr>
</tbody>
</table>

**Fecal Fat Distribution**

| Triglycerides | 0.7 | 0.2-3.3 mg/g |
| Cholesterol   | 6.4 | 0.3-5.5 mg/g |
| Long Chain Fatty Acids     | 7.4 | 1.5-23.7 mg/g |
| Phospholipids            | 0.8 | 0.3-8.8 mg/g |
| Fecal Fat (Total)*        | 10.3| 2.6-32.4 mg/g |
CDSA on 42 y.o. Female With FMS & Clinical Depression

**Digestion/Absorption**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pancreatic Elastase</td>
<td>433</td>
<td>-&gt; 201 mcg/g</td>
</tr>
<tr>
<td>2. Propulsive SCFAs (Total)</td>
<td>0.84</td>
<td>1-6.8 microg/ml</td>
</tr>
</tbody>
</table>

*Total values equal the sum of all measurable parts.

**Gut Immunology**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
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</tr>
</thead>
<tbody>
<tr>
<td>3. Elastophil Protein X</td>
<td>&lt;16</td>
<td>-&gt;10 mcg/g</td>
</tr>
<tr>
<td>4. Captopril</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Metabolic**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Benzoate SCFAs (Total)</td>
<td>9.7</td>
<td>-&gt;1.6 microg/ml</td>
</tr>
<tr>
<td>6. n-Butyrate</td>
<td>1.1</td>
<td>-&gt;2.5 microg/ml</td>
</tr>
<tr>
<td>7. pH</td>
<td>7.5</td>
<td>7.2-7.4</td>
</tr>
<tr>
<td>8. Beta-glucuronidase</td>
<td>0.37</td>
<td>0.37-4.433 Ig/l</td>
</tr>
</tbody>
</table>

**Secondary Bile Acids**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Lithocholic acid (LCA)</td>
<td>0.055</td>
<td>0.055-0.21 mg/g</td>
</tr>
<tr>
<td>10. Deoxycholic acid (DCA)</td>
<td>0.076</td>
<td>0.076-0.14 mg/g</td>
</tr>
<tr>
<td>11. LCA / DCA Ratio</td>
<td>0.39</td>
<td>0.39-2.07</td>
</tr>
</tbody>
</table>

*Total values equal the sum of all measurable parts.

**Microbiology**

**Bacteriology**

12. **Beneficial Bacteria**
- Lactobacillus species
- Escherichia coli
- Bifidobacterium

13. **Additional Bacteria**
- alpha haemolytic Streptococcus
- gamma haemolytic Streptococcus
- E. coli enterococcus

14. **Mycology**
- Candida albicans

36 y.o. Female Reported with Chronic Pain and Fatigue

**Digestion/Absorption**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pancreatic Elastase</td>
<td>260</td>
<td>-&gt; 201 mcg/g</td>
</tr>
<tr>
<td>2. Propulsive SCFAs (Total)</td>
<td>1.8</td>
<td>1.3-6.8 microg/ml</td>
</tr>
</tbody>
</table>

**Gut Immunology**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Elastophil Protein X</td>
<td>36</td>
<td>-&gt;70 mcg/g</td>
</tr>
<tr>
<td>4. Captopril</td>
<td>&lt;16</td>
<td>-&gt;60 mcg/g</td>
</tr>
</tbody>
</table>

**Metabolic**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>5. Benzoate SCFAs (Total)</td>
<td>9</td>
<td>-&gt;13.6 microg/ml</td>
</tr>
<tr>
<td>6. n-Butyrate</td>
<td>1.3</td>
<td>-&gt;2.5 microg/ml</td>
</tr>
<tr>
<td>7. pH</td>
<td>7.2</td>
<td>7.2-7.4</td>
</tr>
<tr>
<td>8. Beta-glucuronidase</td>
<td>0.46</td>
<td>0.37-4.433 Ig/l</td>
</tr>
</tbody>
</table>

**Secondary Bile Acids**

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<th>Result</th>
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<tbody>
<tr>
<td>9. Lithocholic acid (LCA)</td>
<td>0.65</td>
<td>0.65-2.21 mg/g</td>
</tr>
<tr>
<td>10. Deoxycholic acid (DCA)</td>
<td>0.57</td>
<td>0.57-6.75 mg/g</td>
</tr>
<tr>
<td>11. LCA / DCA Ratio</td>
<td>0.39</td>
<td>0.39-2.07</td>
</tr>
</tbody>
</table>

**Microbiology**

12. **Beneficial Bacteria**
- Lactobacillus species
- Escherichia coli
- Bifidobacterium

13. **Additional Bacteria**
- alpha haemolytic Streptococcus
- gamma haemolytic Streptococcus
- E. coli enterococcus

14. **Mycology**
- Candida albicans
- *NG*
8 y.o. Female With ASD and Severe Digestive Problems

Some Labs Use Fecal Lactoferrin


- “Fecal lactoferrin is a sensitive and specific marker in measuring the activity of IBD”
Inactivation of digestive proteases: Another aspect of gut bacteria that should be taken into more consideration

By Xiaofa Qin World J Gastroenterol 2007 April 28;13(16): 2390-2391

- Gut damage can be greatly alleviated by inhibition of these digestive proteases
- Therefore, a prompt inactivation of these digestive proteases may play an important protective role against this digestive damage.
- Normalization of GI Microbiota effectively inactivates digestive proteases at the lower intestine

“Metabolic endotoxemia initiates obesity and insulin resistance”

- Diabetes and obesity are characterized by insulin resistance and a low-grade inflammation.
- We have identified bacterial lipopolysaccharide (LPS) as causative factor triggering low-grade inflammation in insulin resistance, obesity, and diabetes.
- We conclude that the LPS/CD14 system sets the tone of insulin sensitivity and the onset of diabetes and obesity.
- Lowering plasma LPS concentration could be a potent strategy for the control of metabolic diseases.
So To Heal the Body/Brain
Heal the Gut

Toxins from gut bacteria and yeast reach the brain. Immune chemicals from Inflammation also reach the brain.

To Heal the Body
Heal the Gut

Use Proper Herbal Anti-microbials to Remove Dysbiotic Organisms
Botanical Intervention of Dysbiosis

Weed, Seed & Feed Healthy Digestion Program

1. First Weed out the Bad Bugs with Berberine sulfate
   Most digestive complaints and other health problems can be improved by weeding out harmful microbes in the G.I. tract.

2. Second Seed in Healthy Broad Spectrum Probiotic
   Research shows that probiotics benefit many different disorders, such as IBS, IBD, asthma, allergies FMS and inflammation. Probiotics takes about 1 to 3 months to normalize the flora of the intestines.

3. Third Feed Digestive Enzymes If Needed
   Inadequate stomach acid or low pancreatic enzymes are extremely common and cause maldigestion and malabsorption.
   Sx are: 4 B’s: burping, belching, burning and bloating after meals.
   Nausea & even acid reflux often caused by deficiency of HCL acid stomach. Do not take Betaine HCL if you have a prior history of or a current peptic or duodenal ulcer.
Berberine Sulfate Extract

- A specific alkaloid extracted from Berberis plants
- Possesses antibacterial, antifungal, & antiprotozoal activities
- Direct anti-inflammatory and antidiarrheal actions
- Shows effectiveness against Giardia, Candida, and Streptococcus
- Berberine sulfate interferes with the adherence of group A streptococci by two distinct mechanisms
- An oral dose of 400 mg per day is common for adults.
  - Singh M, et.al. Fitoterapia. 2007 Dec; 78(7-8):574-6. Antimicrobial activities of Indian Berberis species

Berberine Sulfate Extract

- 165 adult patients with acute diarrhea due to enterotoxigenic Escherichia coli (ETEC)
- Patients received 400 mg of berberine sulfate (BS) in a single oral dose
- “At 24 hr after treatment, significantly more patients who were treated with BS and had enterotoxigenic Escherichia coli (ETEC) diarrhea stopped having diarrhea as compared with the controls."
Myrrh Gum Extract-
Commiphora molmol

- Antibacterial activity of oleo-gum resins of Commiphora molmol against methicillin resistant Staphylococcus aureus (MRSA)
- Phytochemical investigation demonstrated the presence of phenolic compounds, alkaloids and saponins only in the methanol extracts, which is lacking in the petroleum ether and ethyl acetate extracts
- The Commiphora molmol methanol extracts exhibited the highest antibacterial activity against methicillin resistant Staphylococcus aureus (MRSA)

Emad M. Abdallah1*, Amna S. Khalid1 and Nazlina Ibrahim2
Scientific Research and Essay Vol. 4 (4) pp. 351-356, April, 2009

Undecylenic acid (10-undecenoic acid)

- 11-carbon monounsaturated fatty acid, found naturally in the body, occurring in sweat
- Produced by the vacuum distillation of castor bean oil
- Shown to be approximately 6 times more effective than caprylic acid and effective in maintaining a healthy balance of intestinal and vaginal flora - Neuhauser I. Successful treatment of intestinal moniliasis with fatty acid-resin complex. Arch Intern Med 1954;93:53-60.
  - May be over 30 times more effective than caprylic acid - Peck SM, J Invest Dermatol 1938;1:237-265.
- Has been shown to have antibacterial and antiviral properties in vitro
Why Not Grapefruit Seed Extract?

**Adverse effects by artificial grapefruit seed extract products in patients on warfarin therapy** - Brandin, Myrberg, Rundlöf, European Journal of Clinical Pharmacology Volume 63, Number 6 / June, 2007

- **Results:** NMR analysis showed that all 3 investigated GSE products contained the synthetic preservative benzethonium chloride (BTC) in addition to glycerol
- No authentic GSE extract was found in any of the 3 GSE products analyzed
- BTC was found to be a potent inhibitor of CYP3A4 and CYP2C9 activity in vitro.

**Conclusion:** Our results suggest that BTC in the GSE products is responsible for the increase in the INR value in a patient on warfarin treatment

Artemesia annua

- Artemisia annua, also known as Sweet Wormwood
- Artemisinin has been used safely for centuries in Asia for the treatment of malaria
- Effective for treatment of protozoan infection
- **Now shown effective against anaerobic bacteria,** due to the pro-oxidative sesquiterpene endoperoxide
Antimicrobial In SIBO, Dysbiosis And Candida Syndrome

• TWO (2) Capsules PROVIDE:
  • Calcium Undecylenate.................................500 mg
  • Myrrh Gum Extract (methanol extract).............300 mg
  • Artemesia Root Extract.....................................300 mg
  • Berberine Sulfate (berberis aristata root extract) .........200 mg

• I utilize this antimicrobial in SIBO, dysbiosis and candida syndrome at 1 to 2 capsules 2 times daily before or with meals for 4 to 6 weeks.

• If SIBO Sx or Dysbiosis is not completely resolved, I repeat course.

• It is vital to also seed in proper Probiotics to establish healthy gut ecology. For best results, take these products at least 3 hours apart. **WARNING: Do not use if pregnant or nursing.**
In SIBO Start Off With Specific Strains of Low Dose Probiotics

- With this formula start off one per day and see how tolerated
- If no increased SIBO symptoms increase to 1 two times daily
- These species helpful to re-establish healthy microbiome

Serving Size: 2 Capsules
Servings Per Container: 30

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>%DV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactobacillus Rhamnos GG</td>
<td>4 Billion CFU *</td>
</tr>
<tr>
<td>Lactobacillus Plantarum 299V</td>
<td>2 Billion CFU *</td>
</tr>
<tr>
<td>Bifidobacterium Longum</td>
<td>1.5 Billion CFU *</td>
</tr>
<tr>
<td>Lactobacillus Salivarius</td>
<td>1.5 Billion CFU *</td>
</tr>
<tr>
<td>Lactobacillus Sporogenes</td>
<td>1 Billion CFU *</td>
</tr>
</tbody>
</table>

*Daily Value not established

**PROBIOTIC-5**
High Potency, Multi-Strain Probiotic
Stabilized at 5 Billion Organisms per Capsule

**DIRECTIONS:** As a nutritional supplement, 1 or 2 capsules daily with or without food or water. Probiotic-5 is safe for infants and children. Consult your Healthcare Professional for further directions or recommendations. For maximum shelf life and potency, please store in a cool, dry place with cap tightly closed. Refrigerate After Opening.

**SUPPLEMENT FACTS**
Serving Size: 2 'Acid Resistant' Veggie Caps
Servings Per Container: 30

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>%DV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactobacillus Rhamnos GG</td>
<td>4 Billion CFU *</td>
</tr>
<tr>
<td>Lactobacillus Plantarum 299V</td>
<td>2 Billion CFU *</td>
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<td>Bifidobacterium Longum</td>
<td>1.5 Billion CFU *</td>
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<tr>
<td>Lactobacillus Salivarius</td>
<td>1.5 Billion CFU *</td>
</tr>
<tr>
<td>Lactobacillus Sporogenes</td>
<td>1 Billion CFU *</td>
</tr>
</tbody>
</table>

*Daily Value not established

Other Ingredients: Gellan Gum, Hypromellose and Vegetable Magnesium Stearate.
Suitable for Most Vegetarians.

**Note:** Probiotic-5 is a very unique, high potency complex designed to promote healthy intestinal flora. Every precaution has been taken to ensure formula stability and shelf life. If stored properly, this formula should retain full potency for at least 6 months from date of purchase. Refrigerate After Opening.

Store In A Cool, Dry Place With Cap Tightly Closed / Contains Dairy
New Acid Resistant' capsules ensure maximum probiotic delivery.
FORM: 60 'ACID RESISTANT' VEGGIE CAPS
PRODUCT: 760
Beneficial Probiotic Strains at High dosage 50 billion CFUs

- 50 Billion Probiotic Organisms Per Capsule
- Gel Matrix Gut-Transit Protection
- 10 Different Strains From 3 Genera
- Vegetarian Capsules

A high potency probiotic supplement designed to restore, protect and maintain a balanced intestinal flora.

A maximum survival of viable cells through the stomach and the intestinal tract is made possible by a unique delivery system consisting of a vegetarian acid resistant capsule, and the integration of the probiotic strains with a gel forming matrix.

* The gel forming matrix helps provide protection to probiotic bacteria against negative effects of stomach and/or duodenal fluids.*

10 Beneficial Probiotic Strains

<table>
<thead>
<tr>
<th>Supplement Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size 1 Capsule</td>
</tr>
<tr>
<td>Servings Per Container 60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount Per Serving % DV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Blend 50 Billion Viable Cells</td>
</tr>
<tr>
<td>Composed of the following strains:</td>
</tr>
<tr>
<td>L. acidophilus La-14</td>
</tr>
<tr>
<td>L. rhamnosus R0011</td>
</tr>
<tr>
<td>L. helveticus (L. acidophilus) R0052</td>
</tr>
<tr>
<td>L. casei Lc-11</td>
</tr>
<tr>
<td>L. paracasei Lpc-37</td>
</tr>
<tr>
<td>L. plantarum Lp-115</td>
</tr>
<tr>
<td>L. salivarius Ls-33</td>
</tr>
<tr>
<td>B. lactis Bl-04</td>
</tr>
<tr>
<td>B. breve Bb-03</td>
</tr>
<tr>
<td>B. longum BB536</td>
</tr>
</tbody>
</table>

* Daily Value not established.
Best To use Fermented Foods

12 Reasons You Should Be Eating More Fermented Foods + 25 Best Recipes

SPARKLING PROBIOTIC DRINK
KeVita Sparkling Probiotic Drink is light and refreshing with a fruit-forward taste. Fermented with KeVita's Water Kefir Culture, Sparkling Probiotic Drinks have 4 billion CFUs with 4 strains of live probiotics.
Intestinal Permeability And Systemic Infections In Critically Ill Patients: Effect Of Glutamine.

- “Review of all clinical and experimental studies before 2005 investigating the correlation between intestinal permeability, bacterial translocation, and frequency of infections, associated or not with the effect of glutamine administration.”

**DATA SYNTHESIS:**

1. Intestinal permeability is increased in critically ill patients.
2. Establishes association between intestinal permeability and systemic infections.
3. Oral glutamine has a protective effect that prevents or reduces the intensity of the increase in intestinal permeability.
4. Glutamine reduces the frequency of systemic infections and may also reduce the translocation of intestinal bacteria and toxins.
5. **CONCLUSIONS:** Glutamine administration improves the prognosis of critically ill patients presumably by maintaining the physiologic intestinal barrier and by reducing the frequency of infections.

“Effects of enteral supplementation with glutamine granules on intestinal mucosal barrier function in severe burned patients.”

- Glutamine primary energy source of intestinal mucosa
- Small intestine the major organ of glutamine uptake and metabolism
- Plays an important role in the maintenance of whole body glutamine homeostasis.
- This clinical study is to observe the protective effects of oral glutamine granules on intestinal mucosal barrier function in severe burned patients.


Glutamine granules 0.5 g/kg (35 gms for average 70 Kg) were supplied orally for 14 days in A group, same dosage of a placebo given for in B group.

These results indicated that glutamine granules taken orally could abate the degree of intestine injury, lessen intestinal mucosal permeability, ameliorate wound healing and reduce hospital stay.

“Intravenous glutamine supplementation to head trauma patients leaves cerebral glutamate concentration unaffected.”

- **OBJECTIVE:** There is reluctance to use glutamine-containing I.V. nutrition for neurosurgical patients, as this may result in elevated intracerebral glutamate levels, which are thought to be associated with neuronal injury and cell swelling, causing an increase in ICP and an unfavorable outcome.

- As general ICU patients benefit from I.V. glutamine supplementation in terms of reduced mortality and morbidity, neurosurgical patients might also be candidates for such treatment, if the possible relation between I.V. glutamine supplementation and a possible increase in cerebral glutamate could be sorted out.


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“Intravenous glutamine supplementation to head trauma patients leaves cerebral glutamate concentration unaffected.”

- **MEASUREMENTS AND RESULTS:** Glutamine infusion increased plasma glutamine concentration by 30%. Intracerebral glutamate was unaffected in median values and in all individual patients.

- **CONCLUSION:** Intravenous glutamine in clinically relevant doses leaves cerebral glutamate unaffected.

“The pattern of amino acid exchange across the brain is unaffected by intravenous glutamine supplementation in head trauma patients”

- **BACKGROUND & AIMS:** The effect of an exogenous supply upon glutamine and glutamate exchange across the brain has still not been characterized.

- **METHODS:** A prospective randomized cross-over study, where i.v. glutamine dipeptide was compared with placebo.

- **CONCLUSION:** Intravenous glutamine supplementation to head trauma patients was associated with an unaffected amino acid exchange pattern across head and leg, without any measurable uptake of glutamate across the brain.


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**L-Glutamine Powder**

- **Therapeutic Dosages:**

- Typical therapeutic dosages of glutamine used in studies ranges from 3 to 30 g daily, divided into several separate doses.
**Gut Healing Product**

- Each (1) scoop provides:
  - **L-Glutamine USP** 5000 mg
    - utilized by the gastrointestinal cell lining for energy and repair
  - **Acacia Gum** 1000 mg
    - provides an excellent prebiotic for optimal beneficial bacterial growth
  - **N-Acetyl Glucosamine (N-A-G)** 300 mg
    - forms the basis of complex molecular structures, and are key components of connective tissues and mucous membranes of the GI tract
  - **Dosage**: start 1 scoop 2 times daily = 1 gm L-Glutamine. After a few days work up to 2 scoops 2 times daily = 2 gm daily L-Glutamine. After a week or two can work up to 3 scoops 3 times daily = 4.5 gm daily of L-Glutamine, dosage depend on condition and response

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**IP-EASE**

*High Potency G.I. Healing Complex*  
*Intestinal Permeability Support*

**DIRECTIONS:** As a nutritional supplement for adults, 1 scoop twice daily or as directed by your Healthcare Professional. Stir well in 4-6 ounces of water or non-acidic juice and drink quickly.

**SUPPLEMENT FACTS**

<table>
<thead>
<tr>
<th>Serving Size: 1 Scoop (provided)</th>
<th>Servings Per Container: 60</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount Per Serving</strong></td>
<td><strong>%DV</strong></td>
</tr>
<tr>
<td>L-Glutamine USP</td>
<td>5,000 mg</td>
</tr>
<tr>
<td>Acacia Gum</td>
<td>1,000 mg</td>
</tr>
<tr>
<td>N-Acetyl-Glucosamine (NAG)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

*Daily Value not established

Other Ingredients: Maltodextrin.  
**Caution:** Do not use if allergic to shellfish (NAG).  
**FORM:** 14 OZ POWDER  
**PRODUCT:** 765
Can Zinc Carnosine Affect Gut Injury And Repair?

- **Study Design:** 10 healthy human subjects took indomethacin, a drug that can cause gastric injury. **Half the subjects also took zinc carnosine, while the others took a placebo.**

- **Dosage:** 37.5 mg, 2 times/day for 5 days or placebo (human study)

- **Results:** Zinc carnosine increased the migration and proliferation of cells needed for healing the gastrointestinal lining by 300%. The effect was dose-dependent.
  - Subjects taking zinc carnosine experienced a 75% reduction in gastric injury and a 50% reduction in small intestine injury with no significant increase in permeability.
  - Those subjects taking the placebo suffered a threefold increase in gut permeability. Gut permeability (or leaky gut) is thought to leave the body vulnerable to infection by pathogens that pass through the gastrointestinal tract.

- **Conclusion:** “ZnC, at concentrations likely to be found in the gut lumen, stabilizes gut mucosa.”
Zinc Carnosine Works In Multiple Ways To Prevent And Heal GI Ulcers:

1. moderates the secretion of acid.
2. increases the expression of basic fibroblast growth factor, vascular endothelial growth factor, and ornithine decarboxylase — all of which help heal the gastric mucosa.
3. down-regulates the expression of tumor necrosis factor, a cytokine that causes inflammation in ulcerated tissue.

4. As an antioxidant it can alleviate gastric mucosa damage and promote the healing of ulcers.
5. It protects cells in the stomach lining by increasing levels of heme oxygenase and heat shock protein (HSP72), which helps protect cells from stress.
6. It increases gastric microcirculation
7. It may promote cell proliferation and differentiation during ulcer healing, allowing the lesions to close.
Zinc-Carnosine

- "Most successful clinical trials of Zinc-Carnosine used 37.5 mg to 75 mg twice daily for 8 weeks."
- "This amount of Zinc-Carnosine provides 7.5 mg to 15 mg of elemental zinc per dose."
- "Interestingly, there was no statistical significant difference between the two groups by most measures, meaning that the 75-mg per day dosage was just as effective as the 150-mg per day dosage."

Zinc carnosine is used as a treatment for intestinal ailments. What is the best dose?

- Human clinical intervention trial of 173 subjects with moderate to advanced gastritis.
- Multicenter, double-blind dose finding study. Subjective and objective symptoms were measured at 3 days, 1 week and 2 weeks.
- Symptoms were also assessed by endoscopy, and hemorrhaging was measured as well.
- Dosage: 37.5 mg, 2 times/day or 75 mg, 2 times/day

**Zinc carnosine is used as a treatment for intestinal ailments. What is the best dose?**

- In the 75 mg group, symptoms were “significantly” or “moderately” improved in 86% of the group **by the 2 week mark**.
- Similarly, erosion within the gut was “significantly” or “moderately” improved in 73% of the group.
- Hemorrhaging decreased by 71% and endoscopy revealed that 71% of subjects enjoyed moderate to significant improvement of symptoms.
- **Conclusion**: “The 75-mg per day dosage was just as effective as the 150-mg per day dosage. ZnC, at concentrations likely to be found in the gut lumen, stabilizes gut mucosa.”

**“Chios gum mastic: A review of its biological activities.”**

- Used for over 2500 years in traditional Greek medicine for treating several diseases such as gastralgia and peptic ulcers
- Herodotus, Dioscorides, Galen and several Roman, Byzantine, Arab and European authors make extensive references to mastic’s healing properties.
- Recent research has proven the beneficial action of mastic in gastric diseases, by revealing **its in vivo and in vitro activity against Helicobacter pylori**, which is considered as the main cause for gastric ulcers.
- Furthermore, studies of the **antimicrobial, antifungal, antioxidant, hypolipidemic, anti-inflammatory, anti-Crohn** and anticancer activities of mastic have characterized it as a wide-range therapeutic agent and a potential source of nature-originated treatments.
Chios mastic treatment of patients with active Crohn’s disease

**CONCLUSION:** The results suggest that mastic significantly decreased the activity index and the plasma levels of IL-6 and CRP in patients with mildly to moderately active CD.


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Gut Healing Product #2

- **Each (1) capsule provides:**
  - Deglycyrrhizinated Licorice (DGL).............375 mg
  - **Mastic Gum** (Pistacia lentiscus)............... 250 mg
  - Slippery elm (ulmus fulva) extract (bark).....150 mg
  - **Zinc Carnosine** (3.75 mg elemental Zinc)...18.75 mg
  - Provides 1,000 mgs of Mastic gum and 75 mgs Zinc Carnosine daily
  - 120 Capsules per Bottle one month supply
  - **Recommended Use:** Adults: Two (2) capsules two (2) times each day as a dietary supplement or as otherwise directed by a healthcare professional. Considered Dysbi-Ease and Pro-Biotics if SIBO or dysbiosis is suspected
Treating GI and Systemic Inflammation and Its Connection to Everything
1st Revise The Diet
& Remove Food Additives

1. Remove food additives, sensitizing foods & sugars - results in some improvement
2. Assess for allergies, nutrient deficiencies, and toxic burden
3. Lower the body burden of POPs & potentially toxic metals
   - Eat organic foods as much as possible
   - Lead contamination an obvious culprit in hyperactivity-aluminum cookware & silver-mercury dental fillings should be avoided

Shop Smart – Eat More Organic And Healthy Foods

- EPA considers 60% of all herbicides, 90% of all fungicides and 30% of all insecticides as potential health risks!
- A 1993 National Research Council report-
  - 1) Child’s pesticide exposure is primarily though diet
  - 2) Children are more susceptible because they consume more food on a per weight basis and their bodies are still developing and maturing
- University of California study found newborn infants are 65 to 164 times more vulnerable than adults to a pair of common agricultural pesticides
Anti-Inflammatory Diet

- No refined foods, such as white breads, pastas, and especially sugars and artificial sweeteners
- Eliminate trans-fatty acids, found in processed foods, margarine and commercially baked goods
- Eliminate potential food allergens, including dairy, wheat (gluten), corn, preservatives, and food additives.
- Foods rich in antioxidants, fruits (blueberries, cherries, tomatoes), & vegetables (squash, bell peppers)

- Foods high in B-vitamins and magnesium, such as almonds, beans, whole grains (if no allergy), dark leafy greens, and sea vegetables such as dulce
- Cold-water fish, tofu (soy, if no allergy), or beans for protein
- Use healthy oils for cooking, such as canola or olive oil
- Avoid coffee and other stimulants, alcohol, and tobacco.
- Drink 6 - 8 glasses of filtered water daily.
OBJECTIVE: To investigate the single and combined effect of Mediterranean diet, being physically active, moderate alcohol use, and nonsmoking on all-cause and cause-specific mortality in European elderly individuals.

RESULTS: The combination of 4 low risk factors lowered the all-cause mortality rate to 0.35 (95% CI, 0.28-0.44). In total, lack of adherence to this low-risk pattern was associated with a population attributable risk of 60% of all deaths, 64% of deaths from coronary heart disease, 61% from cardiovascular diseases, and 60% from cancer.

CONCLUSION: Among individuals aged 70 to 90 years, adherence to a Mediterranean diet and healthful lifestyle is associated with a more than 50% lower rate of all-causes and cause-specific mortality.

Adipose tissue, an endocrine organ, produces numerous proteins, called adipokines, with broad biological activity

Visceral fat VAT is a key regulator of inflammation, a primary trigger factor in atherogenesis, Syndrome X & type 2 diabetes

Mediterranean-style diet in obesity or metabolic syndrome decreases the inflammatory milieu, ameliorating both insulin resistance & endothelial dysfunction

CONCLUSIONS: “Mediterranean-type diets represent therapeutic strategies to reduce inflammation and the associated metabolic and cardiovascular risk.”
Nutraceuticals to Reduce Peripheral And Central Sensitization

Managing Chronic GI and Systemic Inflammation as Well as Oxidative Stress

Ginger--an Herbal Medicinal Product With Broad Anti-inflammatory Actions.

- Chinese and Ayurvedic practitioners rely on ginger roots anti-inflammatory properties for at least 3,000 years
- Excellent anti-oxidant scavenging free radicals from multiple sources.
- Dried ginger root contains 1 to 4% volatile oils, and gingerols/shogaols the potent anti-inflammatory compounds
- “This discovery provided the first evidence that ginger modulates biochemical pathways activated in chronic inflammation.”

- Ginger extract modulates the induction of several genes involved in the inflammatory response, including genes encoding cytokines, chemokines, and the inducible enzyme cyclooxygenase-2.
- "This discovery provided the first evidence that ginger modulates biochemical pathways activated in chronic inflammation."
- Ginger root extract possesses analgesic, anti-inflammatory and hypoglycemic properties; and thus lend pharmacological support to uses of ginger in the treatment and/or management of painful, arthritic inflammatory conditions, as well as in the management and/or control of type 2 diabetes." -Phytother Res. 2006 Sep;20(9):764-72

Ginger (Zingiber Officinale) In Rheumatism And Musculoskeletal Disorders.

- 56 patients-28 with RA, 18 with OA and 10 with muscular pain
- 1gm to 4gm for 3 months to 2.5 years, depending on severity of Sx
- No adverse side-effects reported
- More than 75% with arthritis and 100% with muscular pain experienced relief of their pain and swelling.
Ginger Extract Components Suppress Induction Of Chemokine Expression In Human Synoviocytes

- Effective in inhibiting proinflammatory cytokines and chemokines produced by synoviocytes, chondrocytes, and leukocytes!

- Conclusion: Ginger extract may be useful for suppressing inflammation due to arthritis.
Ginger Extracts and Substance P

- Substance P averaged 3x higher in the CSF in 32 with FMS

Ginger Extracts and Substance P

- Quality ginger root extract contains gingerols including (6)-shogaol
- Ginger extract with (6)-shogaol shown to reduce substance P at the dorsal horn in mammalian spinal cords
- Provides an analgesic effect
The Benefits of Ginger Extracts

- Gingerols shown in research to inhibit the growth of colorectal cancer cells.-
  Bode AM, et al., Inhibition of epidermal growth factor-induced cell transformation and activator protein 1 activation by [6]-gingerols. Cancer Res. 2001 Feb 1; 61(3):850-3


Gastroprotective Activity Of Ginger Zingiber Officinale Rosc., In Albino Rats.

- The extract also prevents the occurrence of gastric ulcers induced by NSAIDs
- “These research observations suggest a cytoprotective and anti-ulcerogenic effect of the ginger”.

Ginger Root For Pain

- Ginger root extract standardized to at least 5% gingerols and 6-shogaols
- Research on ginger root extracts for chronic pain disorders utilized 1000 mg to 4000 mg/day.
- For compliance get a concentrated product
- At 200 mg per capsule that would be 20 capsules a day to reach the dosage used in that research

Anti-Inflammatory Effects of Vit. D, Curcumin, Resveratrol & Gingerols

MKP5: modifying kinase-regulated pathways:
MKP5 is a regulator of both innate and adaptive immune responses
Comprehensive Review of 1500 Abstracts & 300 Papers On Curcumin

The Best Natural Anti-Oxidant and Anti-Inflammatory

INFLAM-95
High Potency Standardized Herbal Extracts®

DIRECTIONS: As a nutritional supplement for adults, 1 capsule three times daily between meals increasing to 2 capsules three times daily after one week or as directed by your Healthcare Professional.

SUPPLEMENT FACTS
Serving Size: 6 Veggie Caps
Servings Per Container: 10/30

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>%DV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ginger Root Extract 2,000 mg</td>
<td>*</td>
</tr>
<tr>
<td>(standardized to 5% gingerols and shogaols)</td>
<td></td>
</tr>
<tr>
<td>Curcumin Root Extract 1,200 mg</td>
<td>*</td>
</tr>
<tr>
<td>(standardized to 95% curcuminoids; curcumin, demethoxycurcumin &amp; bisdemethoxycurcumin)</td>
<td></td>
</tr>
<tr>
<td>Boswellia Serrata Extract 500 mg</td>
<td>*</td>
</tr>
<tr>
<td>(standardized to 65% boswellic acids)</td>
<td></td>
</tr>
<tr>
<td>Nettle Leaf Extract 500 mg</td>
<td>*</td>
</tr>
<tr>
<td>Bioperine Extract 6 mg</td>
<td>*</td>
</tr>
<tr>
<td>(standardized to 95% piperine)</td>
<td></td>
</tr>
</tbody>
</table>

Daily Value not established.

Other Ingredients: Vegetable Cellulose, Vegetable Magnesium Stearate and Silicon Dioxide.

Suggestion: For musculoskeletal pain, consider combining Inflam-95 with Fibro-Ease Multi and Super Omega-3. With more metabolically complicated disorders such as Fibromyalgia, consider adding the “metabolic tune-up” Mito-Detox II.

FORM: 60 / 180 VEGGIE CAPS
PRODUCT: 710
CURCUMIN

Research has now established that Curcumin has been demonstrated to act as if effective a highly antioxidant, anti-inflammatory, antispasmodic, anticoagulant, anticarcinogenic, with immunomodulatory activities

- Only drawback is that therapeutic effectiveness of curcumin is often limited due to its poor absorption from the GI tract
- When taken orally only traces appear in the blood
- **BioPerine®** a patented extract from the black pepper fruit significantly enhances the bioavailability of various nutrients through increased absorption
- Human studies have now confirmed that the relative bioavailability of curcumin when co-administered with BioPerine® was improved by 2000%.

Comprehensive Review of 1500 Abstracts & 300 Papers On Curcumin-Concluded:

- **Nontoxic with strong antioxidant activity**
- Safely, **modulates numerous mediators** of chronic inflammation e.g. NFkappaB, COX-2, LOX, and inducible nitric oxide synthase (iNOS)
- Significant preventive/curative effects observed in animal and human research including:
  - arteriosclerosis, cancer, diabetes, respiratory, hepatic, pancreatic, intestinal and gastric diseases, neurodegenerative and eye diseases.
Safety and Anti-inflammatory Activity Of Curcumin: A Component Of Tumeric

Chainani-Wu N


- 1 human trial-25 subjects up to 8 gm of curcumin per day for 3 months-no toxicity found
- Five other human trials using 1125-2500 mg of curcumin per day have also found it to be safe.
- Identified various molecules of inflammation modulated by curcumin including: phospholipase, lipooxygenase, cyclooxygenase 2, leukotrienes, thromboxane, prostaglandins, nitric oxide, collagenase, elastase, hyaluronidase, monocyte chemoattractant protein-1 (MCP-1), interferon-inducible protein, tumor necrosis factor (TNF), and interleukin-12 (IL-12).

CURCUMIN -Heart Disease & Colitis/IBD

“The curcuma antioxidants: pharmacological effects and prospects for future clinical use”


- Turmeric extract decreases significantly the LDL and apo B and increases HDL and apo A in healthy subjects!
- Normalization of plasma levels of fibrinogen and the apo B/apo A ratio -decreases cardiovascular risk
Curcumin & Colon Cancer

- "Curcumin inhibits human colon cancer cell growth by suppressing gene expression of epidermal growth factor receptor through reducing the activity of the transcription factor"

- Demonstrated curcumin inhibits human colon cancer cell growth and provides a potential therapeutic strategy for the prevention and treatment of colon cancer.

Treatment of Depression With Curcumin

- Results suggest a potent antidepressant property of curcumin

- Conclusion: “Our findings provided a basis for examining the interaction of serotonergic receptors and AC-cAMP pathway in depression and curcumin treatment.”

Treatment of Depression With Curcumin

- **Significant neurotransmitter enhancement (serotonin and dopamine) and monoamine oxidase inhibitory effects**
- “This study provided a scientific rationale for the use of curcumin and its co-administration with piperine in the treatment of depressive disorders.”


Protecting the Brain With Curcumin

- “Previously, we have reported its significant antidepressant effect.”
- **Study Conclusion:** “Taken together, these results suggest that the neuroprotective effect of curcumin might be mediated via BDNF/TrkB signaling pathway.”

Curcumin & Alzheimer's


- In living animals Curcumin reduced amyloid levels and effectively disintegrated B-amyloid.

- Conclusion: Data supports curcumin to be used in clinical trials for the prevention and treatment of Alzheimer's disease.

Proper Dosage of Curcumin

- Quality turmeric standardized to 95% Curcuminoids—the active components
  - Curcumin (73% to 83%)
  - Demethoxy Curcumin (14% to 24%)
  - Bisdemethoxy Curcumin (2% to 4%)

- Dosage for preventative measures, or chronic regional myofascial pain and FMS - 1 gm to 3 gm total per day
Why Standardized Boswellic acid

- Boswellic acids selective 5-lipoxygenase inhibitors
- Positively impacts biological markers associated with joint and general health, e.g. TNFa, CRP, & IL-6, provides improvement in joint comfort & mobility
- **Boswellic acids in chronic inflammatory diseases:** “…suggest efficacy in some autoimmune diseases including rheumatoid arthritis, Crohn’s disease, ulcerative colitis and bronchial asthma. Side effects are not severe when compared to modern drugs used for the treatment of these diseases

Optimal Botanicals & Total Daily Dosages For Systemic Inflammation & Oxidative Stress

- Ginger Root Extract (standardized to 5% gingerols & shogaols) ......................... 2000 mg
- Curcumin Root Extract
  (standardized to 95% curcuminoids)....... 1200 mg
- Boswellia Serrata Extract
  (standardized to 65% boswellic acids)..... 500 mg
- Nettle Leaf Extract .............................. 500 mg
- Bioperine Extract
  (standardized to 95% piperine)............... 8 mg
Anti-Inflammatory Effects of Vit. D, Curcumin, Resveratrol & Gingerols

MKP5: modifying kinase-regulated pathways:
MKP5 is a regulator of both innate and adaptive immune responses