Alternative Care or Going Back to Find Our Future?  
Our Food is our Medicine

EVERYTHING IN THE BODY IS ABOUT BALANCE
| Is Everyone the Same?  
<table>
<thead>
<tr>
<th><strong>Personalized Medicine</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- 300 lb 35 y.o. male, 100 lb 70 y.o. women,?</td>
</tr>
<tr>
<td>- Liver Problems</td>
</tr>
<tr>
<td>- Fat and Muscle distribution</td>
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<tr>
<td>- GI/Absorption Problems</td>
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<tr>
<td>- Vegetarian Diet</td>
</tr>
<tr>
<td>- Other Medication reacting with CYP and other metabolizing systems</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Difference in</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Allopathic- make disease diagnosis to label symptom group and use pharmaceuticals to “treat” disease</td>
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<tr>
<td></td>
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<tr>
<td>- Functional Medicine: Uses Biochemistry, Physiology, Genomics</td>
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<tr>
<td>- Natural/Traditional- use herbs, plants and animal natural products to support the body to cure disease itself</td>
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</tbody>
</table>
Clinical Nutrition

- Examination of Basic Science on How Body Works
  - Biochemistry
  - Physiology
  - Genomics
  - Pharmacology
- Uses Alternative Products
  - Herbs
  - Food as medicine
  - Animal Products
  - Orthomolecular Products

Functional AND Allopathic

- Allopathic needed for immediate treatment
  - BP=200/100 I don’t care why—I just do not want a stroke
- Functional Approach gets to the why
  - Does everyone have high blood pressure from the same cause?
    - Stress
    - Cardiac
    - Electrolyte imbalance
      - Glandular imbalance

Stages of Nutrient Deficient Diseases

<table>
<thead>
<tr>
<th>Initial Biochemical Alterations</th>
<th>Impaired Cellular Function</th>
<th>Morphologic and Functional Changes</th>
<th>Diagnosed Pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Overt Symptoms</td>
<td>Subclinical Manifestations</td>
<td>Early Stage Disease</td>
<td>End Organ Failure and DEATH</td>
</tr>
</tbody>
</table>
Believes everything begins in the cell and should be treated there

Myelin, which insulates nerve fibers, contains only 18% protein and 76% lipid. An electron micrograph of myelin is to the right.

Mitochondrial inner membrane contain 76% protein and only 24% lipid.

Plasma membranes of human red blood cells and mouse liver contain nearly equal amounts of proteins (44, 49% respectively) and lipids (43, 52% respectively).
CASE REPORT

- 61 y.o. female with GERD, Goiter, and shoulder pain.
  - Was diagnosed 3 years ago with H. pylori but was told it is now gone
- Labs: TSH low, Cholesterol 220, calcium slightly low
- Tests: Goiter monitored by MRI, Bone Density shows Osteopenia
- Chief Complaint: Taking Nexium 40 mg 2 times a day (has been on PPI of some type for 12 years). Wakes up with acid, sometimes after meals she feels right pain under breast. Has seen 4 doctors with no relief over.

PPI’s from Package Insert

- Duration of use:
  - Short term pyrosis (heartburn): 14 days
  - H. pylori eradicatation: 14 days
  - GERD: 4-8 weeks
  - Erosive esophagitis: up to 6 months
  - Zollinger-Ellison Syndrom: up to 12 months
Old Test Used in Gut Issues

- Give someone a tablespoonful of apple cider vinegar (preferably non-pasteurized) in a ½ c of water after eating, if this helps they need acid
  - Koreans have product with vinegar they eat
  - Europeans eat salad after meal
- Give someone a teaspoonful of baking soda in a ½ c of water if that helps their stomach they have too much acid

Betaine

- Acidifying agent for the stomach
  - Protein Digestion
  - Amino Acid Absorption
  - Maintains Gut Sterility
  - Studies show less calcium absorption
  - Activates Intrinsic factor
    - B12
- Can get from beets

Gut-Brain Connection

- Neurogastroenterology – new field emerging in medicine
- “Enteric nervous system”
  - The gut contains 100 million neurons
    - More than the spinal cord.
  - Two-dozen small brain proteins; major cells of the immune system; one class of the body’s natural opiates; and native benzodiazepines
    - 95% of all serotonin in the body is in the gut, where it triggers digestion
  - Vagus nerve sends messages to the brain, not the other way around
    - “Solotplexus” butterflies
**Gut Function**

- Metabolic process:
  - Vitamin synthesis particularly vitamin K and vitamin B
  - Energy production
- Trophic stimulation:
  - Epithelial cell differentiation,
  - Immunomodulation
  - Normal flora exerts pro-inflammatory & anti-inflammatory effect & protects epithelial cell injury
- Protection:
  - Against pathogen

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**Gut Flora**

- Millions of bacteria inhabit in large intestine
  - Favorable environment such suitable pH
  - Nutrients for the growth of bacteria
- Most abundant species are anaerobic bacteria.
  - There are over 500 different species.
  - **Beneficial Bacterial species or Probiotics:**
    - Bifidobacteria – reduce diarrhea and intestinal infection
    - Lactobacilli – maintain the integrity of intestinal flora, and controls proliferation of undesirable pathogens
  - **Beneficial Yeast species or Probiotics:**
    - Saccharomyces species – clean digestive tract & prevents diarrhea

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**Gut Flora**

- **Harmful Bacteria species:**
  - **Bacteroides**, Peptococci, Staphylococci, Streptococci, Bacilli, Clostridia, Enterobacteria, Fusobacteria, Eubacteria, and many others
  - Infection
- **Yeast**
  - **Candida Albicans** – kept under control by probiotic bacteria
  - Metabolize starch & sugar in absence of bacteria – gives rise to gas & toxic products – causing gut inflammation and alters immune function

---


Multiple intracellular and extracellular regulatory factors affect transcription of the tyrosine hydroxylase (TH) gene encoding the rate-limiting enzyme in the biosynthesis of the neurotransmitters dopamine, norepinephrine and epinephrine.

Intestinal tissues are nutritionally significant sites of de novo synthesis of alanine, arginine, glycine, and especially tyrosine.

Approximately 80% of immune system located in gut

- Gut-associated lymphoid tissue or GALT. The number of lymphocytes in the GALT is roughly equivalent to those in the spleen
  - Intraepithelial lymphocytes
  - Lamina propria lymphocytes:
    - scattered in the lamina propria of the mucosa.
    - majority of these cells are IgA-secreting B cells.
  - Peyer’s Patches
    - lymphoid follicles similar in many ways to lymph nodes, located in the mucosa
    - B lymphocytes predominate in Peyer’s patches. Smaller lymphoid nodules can be found throughout the intestinal tract.

Important Function of Gut flora

- Aids the gut with the process of digestion.
- Plays a part in the absorption of minerals and nutrients
- Synthesizes vitamins.
- Helps to break down carcinogens that are found in the diet.
- Creates a natural barrier that acts against harmful bacteria, antigens, and toxins.
- Helps to protect the body against infection.
Autoimmune Diseases and Gut Flora

- Celiac Disease
  - Gluten intolerance
  - more than 3 million Americans, according to the University of Chicago's Celiac Disease Center
  - gluten prompts your “autoimmune” response attacks your villi, the small finger-like nodules in your small intestine
    - symptoms, including abdominal discomfort and bloating, gas, constipation or diarrhea.
  - malnutrition, neurological symptoms and increased risk of cancer in your intestines.
      - http://www.livestrong.com/article/547649-intestinal-flora-gluten-intolerance/#ixzz1qP3s6Xg4

Diet IS Important

What Do You Think They Eat?
FOOD DISEASE CURE OR CAUSE

- Ways “Food” Causes Disease
  - Trans-fat
  - High Fructose Corn Syrup
  - Artificial Sweeteners
  - MSG
  - Genetically Modified (GMO)
  - Salt
  - Chemical Additives

Hydrogenated Trans Fat

- Long chain unsaturated fats
  - C=C and making them into hydrogenated “TRANS” fat
  - Causes Inflammation and Inhibits Omega-3
  - Does not fit into cell membrane
    - May damage the insulin receptor
  - More cardiovascular disease
    - 30,000-100,000 deaths (NEJM)
    - Raises LDL and c-reactive protein
    - Lowers HDL

Oleic acid /Cis Fat
Elaidic acid/Trans fat

- Hydrogenated Trans Fat
- 0 Grams does not mean 0 (FDA allows <0.5gm)
- Trans fats are artificial fats made when hydrogen gas reacts with oil.
- Researchers at Wake Forest University reported that calories from trans fats made laboratory monkeys fatter than calories from other forms of fat. And this was in spite of efforts by the researchers to prevent the monkeys from gaining weight, by placing them on a low calorie diet.

Hydrogenated Trans Fat

- Catherine Kousmine MD (1940’s)
  - The extraction with hexane is carcinogenic
  - Increase in cancer
  - Increase in diabetes
  - Increase CAD
  - Lightly hydrogenated soybean oil
  - Used to be made by added high heat
  - New fats=enzymatic interesterification
Causes of Inflammation

- Physical Trauma
- Cancer
- Allergies
- Vitamin A deficiency
- Chemicals
- Pharmaceuticals
- Leukocyte defects
- Myopathy
- Foreign Bodies
- Toxins
- Burns
- Fat

High Fructose Corn Syrup

- Shown to cause obesity in children
- Shown to cause fatty liver disease and type II diabetes in rats
- 1/3 of products with HFCS shown to contain mercury
  - Mercury is a neurotoxin
  - [http://www.healthobservatory.org/library.cfm?efld=105040](http://www.healthobservatory.org/library.cfm?efld=105040)
- High-fructose corn syrup is produced by milling corn to produce corn starch, then processing that corn starch to yield corn syrup, which is almost entirely glucose, and then adding enzymes which change the glucose into fructose

Examination of the per capita disappearance data for sweeteners and other sources of fructose showed that during the past two decades there was a considerable increase in the availability of free fructose in the food supply. However, the availability of the total amount of fructose, which includes both free and bound fructose, has remained relatively constant. Estimates of the average daily intake of fructose, based on the 1977-78 USDA Nationwide Food Consumption Survey, ranged from 15 g for infants to 54 g for males aged 15-18 y with a mean of 37 g for the total population. These values represent 7-9% of the energy intake (8% for the total population). For most sex/age groups nonalcoholic beverages (i.e., soft drinks and fruit-flavored drinks) and grain products (i.e., sweet bakery products) were the major sources of fructose; fruits and fruit products were the major sources of naturally occurring fructose; nonalcoholic beverages were the major sources of added fructose.

New Study on Splenda Indicates Significant and Dangerous Side Effects

- James Turner, the chairman of the national consumer education group Citizens for Health, has expressed shock and outrage after reading a new report from scientists outlining the dangers of the artificial sweetener Splenda (sucralose).
- In animals examined for the study, Splenda reduced the amount of good bacteria in the intestines by 50 percent, increased the pH level in the intestines, contributed to increases in body weight and affected P-glycoprotein (P-gp) levels in such a way that crucial health-related drugs could be rejected.
- The P-gp effect could result in medications used in chemotherapy, AIDS treatment and treatments for heart conditions being shunted back into the intestines, rather than being absorbed by the body.
- According to Turner, "The report makes it clear that the artificial sweetener Splenda and its key component sucralose pose a threat to the people who consume the product. Hundreds of consumers have complained to us about side effects from using Splenda and this study ... confirms that the chemicals in the little yellow package should carry a big red warning label."

Aspartame

- In over 4,000 products w/200M using
- 1981 by Searle when Donald Rumsfield CEO
- It is an rDNA derivative made from two amino acids, L-phenylalanine, L-aspartic acid and methanol.
- Originally discovered during a search for an ulcer drug in 1966, it was "approved" by the FDA in 1974 as a "food additive".
- Some of the many aspartame toxicity symptoms reported include seizures, headaches, memory loss, tremors, convulsions, vision loss, nausea, dizziness, confusion, depression, irritability, anxiety attacks, personality changes, heart palpitations, chest pains, skin diseases, loss of blood sugar control, arthritic symptoms, weight gain (in some cases), fluid retention, excessive thirst or urination.
- Formaldehyde may worsen, or in some cases contribute to the development of chronic diseases.
Types of Disease

- Diabetes
- Heart Disease, HBP
- Metal Toxicity
- Cancer
- Seizures
- Pancreas Diseases
- GI Disease (IBS, Diverticulitis)

MSG

- Numbness or paralysis
- Mouth lesions, sores
- Swelling
- Nausea
- Arrhythmias/Tachycardia
- Vomiting
- Rise in blood pressure
- Stomach cramps and gas (rapid)
- Sore throat
- Hyperactivity, especially in children (A.D.H.D.)
- Chronic cough
- Asthma
- Stiffness - jaw, muscles
- Shortness of breath
- Heaviness of arms, legs
- Chest pain/tightness
- Mental dullness
- Runny nose and sneezing
- Dizziness
- Light headedness
- Disorientation, mental confusion
- Anxiety or panic attacks
- Hoarseness

GMO Genetically Modified

- Has “Roundup” Dioxin/aka Agent Orange
- Making it with vaccines
  - Because Africans will not take them
- Shown in animal studies to cause
  - Pre cancerous pancreatic lesions
  - GI abnormalities
  - Premature death
Ways Food May Reverse Disease

- Cancer scavengers
- Calming/Hypnotic
- Build red and white blood cells
- Anti-microbial
- Anti-inflammatory
- And thousands of others.....

What Are Americans Eating?

The U.S. allows over 14,000 chemical additives to our food supply
The average American consumes more than 15 lbs of food additives,
60 pounds of sugar & 60 pounds of high fructose corn syrup annually

Theories for Healing with Food

- Antioxidants
  - Glutathione
  - Polyphenols/bioflavonoids
- Vitamins
- Enzymes
- Fatty Acids
- Anti-inflammatory
- Sugars
- Glycogen
- Prebiotics/Probiotics
- Prebiotics and Probiotics
PTSD Patient

- http://www.youtube.com/watch?v=KEteLzDV8Cw&feature=player_embedded
FOOD CHEMISTRY

- Probiotics
  - Feed good bacteria
- Nutrigenomics
  - Food interactions with genes
- Fiber and complexes in food like an apple used as a delivery system
  - Sustain blood sugar
  - Clear Toxins

Antioxidants

- Oxidation
  - Some needed for metabolism, immunity, and respiration
- Free Radicals
  - GANGS that destroy DNA leads to mutations
  - Causes over 60 diseases
    - Aging
Antioxidants

- Garlic
- Broccoli
- Red and Yellow Onion
- Red grapes
- Green Vegetables
- Blueberries
- Strawberries
- Blackberries
- Spinach
- Tea
- Carrots

Four Important Processes with Food

- Digestion
  - Stomach Acid/Intestine More Base
  - Stomach acid and Intrinsic Factor Problems
    - Proton Pump Inhibitors/osteoporosis
- Absorption
  - No Intrinsic Factor = No Ca, Fe, B12
  - No Bile= No Fat Emulsion
  - No Enzymes

Four Important Processes with Food

- Utilization
  - Insulin
  - Cell Membrane
  - Blood Quality
- Elimination
  - Good Bacteria/Bad Bacteria
  - Parasites
  - Yeast
What does the cell membrane need?

SIMPLIFIED ESSENTIAL FATTY ACID FLOWCHART
Steps in PG Production from Fats in Diet

1. LA Linoleic acid
2. GLA Gamma Linoleic acid
3. ALA Alpha-Linoleic acid
4. LLA Linolenic acid
5. SA Stearidonic acid
6. EPA Eicosapentaenoic acid
7. AA Arachidonic acid
8. LT Leukotriene
9. TX Thromboxane

PROSTAGLANDIN-E1
- Increases Killer Cells
- Decreases Blood Pressure
- Decreases Platelets
**PROSTAGLANDIN-E₂**

- Increases Blood Pressure
- Increases Clots and Platelets
- Inhibits Natural Killer Cells
- Cancer
- Auto-immune*
- Inflammatory*

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**History of Probiotics**

- In the early 20th century the scientist Elie Metchnikoff suggested that the prolonged life span of Bulgarian peasants was a result of their consumption of fermented milk products which contained lactic acid bacteria.
- The balance between the gut flora, the epithelium, and the gut-associated lymphoid tissues (GALT) plays an important role in homeostasis and in health.
- When this balance is disturbed, several gastrointestinal and systemic illnesses may occur.

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**PROSTAGLANDIN-E₃/Omega 3**

- Anti-inflammatory
- Memory
- Weight Loss
- Decrease Triglycerides
- Increase HDL
- Reduce Arthritis
- Osteoporosis
- Anti-Depressant
Good Fats

- **World's Healthiest Foods rich in omega-3 fats**
  - Flax Seeds: 73.8%, 6% Need B-6
  - Walnuts: 69.94%
  - Salmon: 64.06%
  - Sardines: 69.51%
  - Soybeans: 69.41%
  - Halibut: 69.92%
  - Scallops: 69.92%
  - Shrimp: 69.92%
  - Tofu: 69.93%
  - Tuna: 69.94%

* % Daily Value

[FoodCals](http://whfoods.org/genpage.php?tname=nutrient&dbid=84)

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Food Source is Important

Grass-fed beef is better for human health than grain-fed beef in ten different ways, according to the most comprehensive analysis to date. The 2009 study was a joint effort between the USDA and researchers at Clemson University in South Carolina. Compared with grain-fed beef, grass-fed beef was:
- Lower in total fat
- Higher in beta-carotene
- Higher in vitamin E (alpha-tocopherol)
- Higher in the B-vitamins thiamin and riboflavin
- Higher in the minerals calcium, magnesium, and potassium
- Higher in total omega-3s
- A healthier ratio of omega-6 to omega-3 fatty acids (1.65 vs 4.84)
- Higher in CLA (cis-9 trans-11), a potential cancer fighter
- Higher in vaccenic acid (which can be transformed into CLA)
- Lower in the saturated fats linked with heart disease

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Recommendations for Patient

- **Diet**
  - Enzymes to help digest food

- **Liver and Bowel Detoxification**
  - Do you have a gallbladder?
    - What happened to bile salts?

- **Re-build stomach lining with Mucilaginous herbs**

- **Re-build gut with**
  - Proper pH
  - Probiotic
  - Prebiotic
  - Natural Antibiotics

[Patel, K. Dr. Lefferty](#)
Anti-inflammatory Diet

- AM: Eat fruit
- Lunch: Salad, baked potato with organic, butter or good fat
- Snack: Fruit (High fiber), walnuts
- Dinner: Same as lunch, may add cold water fish or grass fed beef

Increase natural Anti-inflammatory

- Balance Adrenals
  - Glandulars
  - Adaptogens
  - B vitamins
  - C vitamin
  - Chiropractic Adjustments
  - Yoga
### Cherries

- Contain anthocyanin compounds
  - Inhibit COX-1 and COX-2
- Antioxidents
  - ROS causes oxidation

### Turmeric and Ginger

- Cox Inhibitor
- Luekotriene inhibitor
- Anti-inflammatory and pain
- Stomach ache and intestinal spasms
- Anti-flagsnant (rids the body of intestinal gas)
- Anti-cholesterol
- Anti-vomiting
- Anti-nausea
- Anti-cancer/anti-tumor
- Immune system builder
- Expectorant Helps rid the body of mucus
Oils Block Inflammatory or Promote Anti-inflammatory Pathways

- Fish Oils
- Flaxseed with B6
- Borage
- Evening Primrose
- Sesame
- Black Current

Supplementation

- Anti-inflammatory Herbs/Spices
  - Turmeric
  - Ginger
  - White willow bark
  - Boswellia
  - Bromelain

CASE REPORT

- 61 y.o. female with GERD, Goiter, and shoulder pain.
  - Labs: TSH low, Cholesterol 220, calcium slightly low
  - Tests: Goiter monitored by MRI, Bone Density shows Osteopenia
  - Chief Complaint: Taking Nexium 40 mg 2 times a day (has been on PPI of some type for 12 years). Wakes up with acid, sometimes after meals she feels right pain under breast. Has seen 4 doctors with no relief over.
Causes of High Stomach Acid

- High fat and large quantities of Protein that is high fiber takes a longer period of time
- H. Pylori Infection
- Cancer and or ulcers
- Lack of sleep
- Studies show as we age that we actually develop a bicarb deficiency

Natural Alternative to PPIs

<table>
<thead>
<tr>
<th>Calcium</th>
<th>Magnesium</th>
<th>Angelica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deglycyrrhizined Licorice</td>
<td>Meadowsweet</td>
<td>Peppermint leaf</td>
</tr>
<tr>
<td>Chamomile</td>
<td>Okra</td>
<td>Caraway</td>
</tr>
<tr>
<td>Slippery elm</td>
<td>Digestive enzymes</td>
<td>Milk thistle</td>
</tr>
<tr>
<td>Okra</td>
<td>Lemon balm</td>
<td>Clown's mustard plant</td>
</tr>
<tr>
<td>Digestive enzymes</td>
<td>Artichoke</td>
<td>Turmeric</td>
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</tbody>
</table>

CASE REPORT 2

- 26 y.o. female comes with the following:
  - Reflux especially after eating animal protein
  - Headaches in the afternoon
  - Constipated
  - But after she drinks milk or eats greasy food she gets watery diarrhea
  - Has Gained 15 lbs. in the last year and 30 since she left high school
CASE 3

- 51 y.o. women has severe burning stomach. She had cancer 2 years ago and was treated with Adriamycin and other chemo agents.
- Her doctor told her that how she eats has no effect on cancer
  - “Eat everything we want you to gain weight”.

ENZYME REPLACEMENT

- What are enzymes
  - Proteins that break down food into molecules
- Why?
  - Aging
  - Stress
  - Pancreas or natural enzyme deficiency
  - Poor quality of foods
    - Man-made vs. from nature

Enzyme Replacement

- Protein Enzymes
  - Proteases
  - Peptidase
- Fat Enzymes
  - Lipase
  - *Bile
    - Not an enzyme
    - Very Important
- CHO Enzymes
  - Amylase
  - Lactase
  - Acid maltase
  - Glucoamylase
  - Invertase
  - Galactosidease
  - Cellulase
Protein Digestion

- Bromelain
- Papaya
- Beets (betaine)

Mucilaginous Herbs

- Herbs that secrete mucilage:
  - Various gummy secretions or gelatinous substances present in plants.
  - Polysaccharides which give them a slippery texture and mild taste
    - Moist, soft, and viscid
  - Herbs used:
    - Okra
    - Slippery Elm
    - Cape Aloe
    - Marshmallow

Mucilaginous Herbs

- From Webster’s Dictionary
  - A gelatinous substance of various plants (as legumes or seaweeds) that contains protein and polysaccharides and is similar to plant gums
  - An aqueous usually viscid solution (as of a gum) used especially as an adhesive
- Fiber and mucilage helps keep the intestinal tract healthy
- Coats and heals tissues
- Hydrophilic colloids from mucilage relieves constipation
  - Provides mobility of feces
Probiotics

- *Lactobacillus acidophilus, paracasei*
  - Helps keep gut proper pH (needs lactose)
- *Bifidobacterium lactis*
  - Strengthen the mucosal barrier of the gut
  - Produce B vitamins
  - Produce Vit. K
  - Produce short chain fatty acids
  - Helps keep gut proper pH

Prebiotic

- Feeds bacteria and gut flora
- Inulin
  - Soluble, non-digestible fiber
    - Chicory root
    - Agave
  - Can be digested by microorganisms providing energy
  - Increases magnesium and calcium absorption
- Galactooligosaccharide

Prebiotics

- Support Gut Flora
- Maintains healthy environment
- Bowel regularity
- Supports immune function
Nutritional Yeast

- Saccharomyces cerevisiae
  - Means “sugar mold”
  - Can be isolated from grape skins
  - Brewer’s and baker’s yeast
  - Causes fermentation
  - Can make the pH in the gut acidic
  - Complete protein
  - Makes B vitamins
  - Antibodies found in 60-70% of Crohn’s patients

Glutamine

- Amino acid
  - Building block for others like glutathione
  - Gut cells use a lot of energy and glutamine can supply energy
  - Decrease permeability
    - Endotoxin-induced permeability changes can be prevented or delayed by the supply of luminal glutamine at the time of insult. *(Journal of Parenteral and Enteral Nutrition 19:83-87 1995)*

Licorice/deglycyrrhizized

- Licorice used since recorded history
  - Triterpene saponins (mainly glycyrrhizin) and flavonoids
    - High does may mimic Cushing’s Syndrome and hyperaldosteronism with symptoms of:
      - Hypertension, cardiac arrhythmias, edema, immuno-suppression, muscle atrophy, and even renal failure
  - Deglycyrrhizinated (DGL)
    - A small study showed it promoted healthy mucosal tissue in stomach by increasing blood flow to tissue

- References
  - Slagel, J. British Medical Journal 1970; 2:177
### Chamomile and Meadowsweet

- Decrease stomach acid
- Decreases spasm in upper and lower gastrointestinal tract

**References**
- Weiss, RF Herbal Medicine, Translated from German, 6th ed, 1988
- British Herbal Pharmacopoeia, 1983

### Protective Effect of Licorice

- **Liver Protective and Increase cortisol**

### B-6/Pyridoxal phosphate

- Gluconeogenesis
- Lipid Metabolism
- Neurotransmitter Synthesis
- Enhanced Hemoglobin Oxygen
- Histamine Breakdown
- Co-factor in Amino Acid metabolism:
  - Transamination
  - Deamination
  - Decarboxylation
Treatments

- Vitamins
  - Natural “food based” vs. synthetic
    - synthetic means two things:
      - manmade
      - occurs nowhere in nature
  - Ascorbic acid is not vitamin C. Alpha tocopherol is not vitamin E. Retinoic acid is not vitamin A.
  - Vitamins are not individual molecular compounds.
  - Vitamins are biological complexes

B6 Deficiency

- Seborrheic dermatitis
- Neuropathy
- Impaired glucose tolerance
- Neurologic changes/Lesions
  - coenzyme pyridoxal phosphate
    - impaired tryptophan-niacin conversion

Albert Szent-Györgyi, isolated Ascorbic Acid

- Earlier that decade, the Budapest-born researcher first isolated the crucial vitamin, which boosts the immune system and is an antioxidant, from paprika.
- Accordingly, Szent-Györgyi's Google doodle boasts some of the best sources of vitamin C including oranges, lemons, strawberries and, of course, paprika.
- Read more: [http://www.dailymail.co.uk/sciencetech/article-2038079/Albert-Szent-Gyorgyi-Google-Doodle-celebrates-man-discovered-vitamin-C.html#ixzz1qb6WtuK1](http://www.dailymail.co.uk/sciencetech/article-2038079/Albert-Szent-Gyorgyi-Google-Doodle-celebrates-man-discovered-vitamin-C.html#ixzz1qb6WtuK1)
Vitamin C

Vitamin C, an essential cellular nutrient, is involved in a variety of metabolic reactions and is an important antioxidant in biological systems. Catecholamines and corticosterone require Vitamin C for their synthesis in the adrenals and to protect them from oxidation.1,2

2. Levine M, Morita K 1985 Ascorbic acid in endocrine systems. Vitam Horm 42:1–64

Although tissues vary widely in their reduced vitamin C [ascorbic acid (AA)] content, the highest concentrations occur in the pituitary, adrenal gland, and gonads.3,4 Adrenals contain the highest concentration of Vitamin C (50 times that of serum).5

Adrenocorticotropic hormone (ACTH) stimulation induces significant loss of ascorbic acid from the adrenal cortex as a part of glucocorticoid mobilization.6

The role of vitamin C in the regulation of steroidogenesis appears to involve selective inhibitory and stimulatory effects on the desmolase, hydroxylase and dehydrogenase reactions which lead to the formation of pregnenolone and its subsequent conversion to steroid hormones.6


Vitamin C in animal model.

Adrenal chromaffin cells in Vitamin C transporter deficient mice show depletion of catecholamine storage vesicles, signs of apoptosis, and increased glycogen storage.

Decreased plasma levels of corticosterone and altered morphology of mitochondrial membranes indicate additional effects of the deficiency on adrenal cortical function.

Vitamin C Physiologic Role

- Vitamin C has been studied for many years. It participates in numerous biochemical reactions, suggesting that vitamin C is important for every body process from bone formation to scar tissue repair (13).
- A well-known function of AA is its role in hydroxylation reactions that are essential for the formation of collagen. Vitamin C is important in collagen formation as it allows for a tight cross-linking of the triple helix, thereby resulting in stabilization of the peptide. Evidence also suggests that AA may be involved in collagen gene expression. However, this mechanism is not well understood.
- Carnitine synthesis prefer to use vitamin C as the reducing agent (13). Carnitine facilitates the biosynthesis of AA through its role transporting long chain fatty acids from the cytoplasm into the mitochondrial matrix of cardiac and skeletal muscle. High concentrations of AA are found in adrenal and brain tissues where they are fairly resistant to AA depletion.
- Vitamin C's role in the enzyme activity of two copper dependent mono-oxygenases, which are important in the formation of norepinephrine and serotonin (13,17). Furthermore, AA regulates the activity of some enzymes within the brain. Some of these functions include neurotransmitter monoamine receptor synthesis, and neurotransmitter dynamics. Indirectly, AA plays important regulatory roles throughout the entire body due to its involvement in the synthesis of hormones, hormone-releasing factors.
- Vitamin C is directly involved in the enzyme activity of two copper-dependent mono-oxygenases, which are important in the formation of norepinephrine and serotonin (13,17).
- Vitamin C readily donates electrons to break the chain reaction of lipid peroxidation.
- The vitamin readily donates electrons to break the chain reaction of lipid peroxidation.

Questions

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