WELCOME!

Training for Dietitians in Integrative and Functional Medicine

Integrative Nutritionists

Functional Nutritionists

~

The future of dietetics and nutrition therapy

W.H.O.~ Chronic Disease

- 63% of deaths worldwide
- 25% under 60 years old (premature deaths)

80%

Obesity
Inflammation
Heart Disease
Cancer
Autoimmune
Neurological
Reproductive
Pain

Chronic Disease pathophysiology

~
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80%

Chronic Disease pathophysiology

1

Biochemical Individuality

2

- Functional Labs
- Genotype /genomics
- Beliefs
- Lifestyle
- Community
WELCOME!

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~

The future of dietetics and nutrition therapy

1. Chronic Disease pathophysiology

2. Biochemical Individuality

3. Dietary Supplements

- 80% US Pop < RDA Mg
- Long-latency Nutritional Insufficiencies
- Vitamin D deficiency related to almost all chronic diseases
- Triage nutrient utilization
Integrative Nutritonist

Dietitians in Integrative & Functional Medicine
Objectives:
ALLERGIC & INTOLERANT REACTIONS

- Review present **global epidemic**
- Identify the **five most common** evidence-based nutritional imbalances
- Consider nutrition **assessment** and intervention **protocols**
- Describe **antigen testing methodology**
Allergies

• 6th leading cause of illness in the United States

• 25% adults report allergies related to food

• 1 in 12 people have asthma

• 4% Adults have allergies

• 8% (and growing) children have allergies
Food Allergy Facts

Study: Food allergies on the rise in kids

Updated 10/22/2008 7:30 PM | Comments 76 | Recommend 32

By Liz Szabo, USA TODAY

Experts say they can't explain why the number of children with food allergies has increased 18% in the past decade.

About 4% of kids under 18 — or 3 million children — had food allergies in 2007, according to a report released Wednesday from the National Center for Health Statistics, part of the Centers for Disease Control and Prevention. About 9,500 a year were hospital-treated for food allergies from 2004 to 2006 — more than double the number as in 1998 to 2000, according to the CDC.

The foods most likely to cause allergies are eggs, fish, soy and wheat, according to the study. Allergic reactions can include respiratory problems, such as wheezing, as well as a rash, diarrhea or vomiting.

Because as many studies have documented a rise in allergies, experts say they are seeing children who have been allergy-prone since birth being diagnosed at an older age. Parents are more likely to try to keep their children with severe allergies out of school or day care and are more likely to try to avoid certain foods in the diet. This means that children are more likely to develop severe allergies if they develop milder ones.

IgE IMMUNE RESPONSE OR BASOPHIL GRANULOCYTE RESPONSE
1 out of 15 young children have IgE Food Allergies

- Skin

Hives
Eczema
Swelling of the face
MOST COMMON FOOD TRIGGERS

TOP 8 Food Allergens

- Casein / Milk
- Wheat
- Eggs
- Peanuts
- Tree Nuts
- Fish
- Shellfish
- Soy
- (Strawberries)

*Mayo Clinic Staff 2012*
SENSITIVITIES

Demonstrate defined markers:
• Clinically
• Serologically
• Histologically

Anectdotal – the patient’s story

“It is much more important to know what sort of a patient has a disease than what sort of a disease a patient has.”

William Osler, MD
Johns Hopkins
276 patients with WS with IBS or CD type symptoms

- High frequency of anemia (sideropenic), weight loss, wheat intolerance (S-R), atopy, food allergy in infancy

- High frequency + serum IgG/IgA anti-gliadin & basophil activation

- Histological eosinophil infiltration of duodenum/colon mucosa.

- Data confirmed existence of non-celiac Wheat Sensitivity as a distinct condition
Patient selection

- CD symptoms
- IBS like symptoms
SENSITIVITIES

ANTIGEN PORTALS OF ENTRY

• GUT
• SKIN
• BREATHING / LUNGS
• SURGERY
• MEDICAL PROCEDURES
• OCCUPATIONAL
SOURCES OF SENSITIVITY TRIGGERS

- **FOOD**
  - SPECIFIC FOODS
  - ADDITIVES TO FOODS
  - COOKWARE

- **COSMETICS**
  - PHENOXYETHANOL (KNOWN SKIN IRRITANT)
  - Colorings
  - Wheat Protein

- **INHALANTS**
  - SEASONAL PLANTS / POLLEN
  - CIGARETTES
  - PERFUMES
  - AIR FRESHENERS
  - CHEMICAL FUMES
INTOLERANCES

inherited? OR acquired?

- ENZYME DEFICIENCY
  - Disaccharidase Deficiency (Celiac)
  - Lactase (Lactose)
  - Biotinase (Biotin)
  - DiamineOxidase (Histamine)
  - Acquired can be post-gut barrier injury
    - e.g. Antibiotics
    - e.g. infection
    - e.g. chemical exposure

- GENOTYPE SUSCEPTIBILITY
  - Parents positive
  - Tests: specific
    - e.g. HLA-DQ2/DQ8
    - e.g. Hydrogen Breath
  - Elimination Diet
  - Enzyme Supplement trial
GET??
IS THERE SOMETHING LACKING IN ORDER TO THRIVE?

RID??
IS THERE A TOXIN OR IRRITANT INFLUENCE PRESENT?
NUTRITION CARE PROCESS

- ASSESSMENT
- INTAKE
- DIAGNOSIS / PES
- INTERVENTION
- MONITORING & EVALUATION
NUTRITION CARE PROCESS

- ASSESSMENT
- **INTAKE**
- **DIGESTION / ABSORPTION**
- DIAGNOSIS / PES
- INTERVENTION
- MONITORING & EVALUATION
NUTRITION CARE PROCESS

- ASSESSMENT

- INTAKE

- DIGESTION / ABSORPTION

- MICROENVIRONMENT

- DIAGNOSIS / PES

- INTERVENTION

- MONITORING & EVALUATION
Genetics and Epigentics

- Allergies (IgE) most associated with genetic predispositions
- Both parents with allergies, child high risk for allergies
- Polymorphisms:
  - IL-2
  - IL-10
KEY MESSAGE

Correcting nutrient imbalances present in **allergic, sensitive, and intolerant** clients will result in more successful outcomes.
“HYPER-IMMUNE REACTIONS”

ALLERGY
- IgE
- Basophils

SENSITIVITY
- IgG, IgA
- Cytokines, TH1, TH2, TH17
- Lectins

INTOLERANCES
- Genetic (Celiac, Lactose Intolerant)
- Acquired secondary to “leaky gut”, toxicity, etc.
- Specialty Testing through physician
KEY MESSAGE

Correcting nutrient imbalances present in Hyper-immune clients will result in more successful outcomes.
HYPER-IMMUNE – Chronic
Loss of recognizing “Self” & “Non-Self”

Characteristics / probable associations

- Immune Overload
- Over activity TH2
- Antibiotic Overuse
- Childhood Vaccination
- Epigenetic messaging to inflame
  - Inflammatory Susceptible SNPs
    - IL-6, IL-1, IL-2, IL-10, IL-13, TNF-α, etc.
“INFLAMMATORY LOAD”??

- Hyper-immune reactions
- Stress
- Excess VAT/Visceral adipose tissue
- Infection
- Toxins
- Inflammatory Diet
INFLAMMATION & CHRONIC DISEASE

CARDIO-METABOLIC

AUTOIMMUNE

NEUROLOGICAL

CANCER

ENDOCRINE

INFLAMMATION COMMON DENOMINATOR
Adhesion of Inflammation

- Hypercoagubility of body fluids
- Rouleau
- Physiological management system is AUTOPHAGY
- Increased risk of altered metabolism
- Decrease in ability to discard of metabolic wastes
Rouleau
HYPER-IMMUNE FACTORS

- Loss of self vs. non-self
- Sympathetic stress
- Inflammation
- Long-latency nutrient insufficiencies
- Adhesion
- Gut-dysbiosis
FIVE COMMON EVIDENCE-BASED NUTRITIONAL IMBALANCES

1. MICROFLORA IMBALANCES / Microbiome
2. ESSENTIAL FATTY ACIDS: EPA/DHA and GLA/DGLA
3. BIOFLAVONOIDS / CAROTENOIDS
4. NUTRIENT MINERALS: Zinc, Magnesium
5. ANTIOXIDANTS: Vitamin D, E, A, Vitamin C
MICROFLORA

- Defense Shield on all mucosal surfaces
- 100 X HUMAN GENES
- IMMUNOMODULATORY
- 400-1000 SPECIES
- SYMBIOTIC TO HUMANS
- RATIONALE FOR “HYGEINE HYPOTHESIS” (now called the “Microbiota Hypothesis”)

“MICROBIOME” – microflora community

GUT – influence GALT – 70% lymphoid tissue (immune system)
  -- influence on weight management
  -- influence on cancer phenotype

SKIN – barrier protection – major influence on vulnerability to skin atopy

ORAL - hi association periodontal health
  - influence entire GI tract microflora

NASAL – influence vulnerability to inhalant sensitivities, allergies and infections

UROGENITAL – barrier protection to bladder and vagina – influence vulnerability to infection, allergy, sensitivity (eg., IC, chemicals)
Globulin Proteins: Proteins that may prevent unhealthful bacteria from adhering to the intestine wall.

Lactoferrin: A protein that traps iron and blocks its use by unhealthful bacteria, thus starving them.
Immunity, Inflammation, and Allergy in the Gut

Thomas T. MacDonald¹† and Giovanni Monteleone²

The gut immune system has the challenge of responding to pathogens while remaining relatively unresponsive to food antigens and the commensal microflora. In the developed world, this ability appears to be breaking down, with chronic inflammatory diseases of the gut commonplace in the apparent absence of overt infections. In both mouse and man, mutations in genes that control innate immune recognition, adaptive immunity, and epithelial permeability are all associated with gut inflammation. This suggests that perturbing homeostasis between gut antigens and host immunity represents a critical determinant in the development of gut inflammation and allergy.

The gastrointestinal tract is the site where the divergent needs of nutrient absorption and host defense collide: The former requires a large surface area and a thin epithelium that has the potential to compute different antigens. Many infectious diseases of the gut are evident in the abundant and immune cells it harbors. In westernized countries, most infectious diseases of the gut are largely under control, yet gastrointestinal food allergies and idiopathic inflammatory conditions have dramatically increased; in other words, we now have inflammation without infection. Although the reason for this remains unknown, a prevailing notion is that the absence of overt gut infection has upset the balance between the normal bacteria that colonize the healthy gut and the mucosal immune system.

The Gut Epithelial Barrier

The primary cellular barrier of the gut in preventing antigens encountering the immune system is the single layer of gut epithelium, the surface area of which is expanded to the order of 400 m², largely because it is formed into millions of fingerlike villi in the small and large intestines. Food exposure comes from diet, whereas in the ileum and colon, the additional antigenic load of an abundant and highly complex commensal microflora exists.

Nevertheless, the gut epithelial barrier does not completely prevent luminal antigens from entering the tissues. Thus, intact food proteins can be detected in plasma (1), and a few gut bacteria can be detected in the mesenteric lymph nodes draining the gut of healthy animals (2). Antigens can cross the epithelial surface through breaks in tight junctions, perhaps at villus tips where epithelial cells are shed, or through the follicle-associated epithelium (FAE) that overlies the organized lymphoid tissues of the intestinal wall (3). Peyer’s patches (PP) in the small bowel are aggregates of lymphoid tissue numbering ~200 in the average adult, although tens of thousands of much smaller individual follicles also line the small bowel and colon. FAE contains specialized epithelial cells termed M cells whose function is to transport luminal antigens into the dome area of i’c’ follicle (3) (Fig. 1). Antigen-presenting dendritic cells (DC) also send processes between gut epithelial cells and sample commensal and pathogenic gut bacteria (4,5). The gut epithelial barrier therefore represents a highly dynamic structure that limits, but does not exclude, antigens from entering the tissues, whereas the immune system constantly samples gut antigens through the FAE and DC processes.

Commensal Bacteria in Epithelial/Immune Cell Function in the Gut

Interaction of commensals with gut epithelium.

The gut epithelium itself can also directly sense commensal bacteria and pathogens; in- and outwards, mammalian pattern recognition receptors (PRRs), which recognize components of bacteria and viruses and initiate pro-inflammatory pathways alerting the host to infection (6). Two different classes of PRRs are involved. The Toll-like receptors (TLRs) are usually associated with cell membranes and have an external leucine-rich repeat (LRR) recognition domain and an intracellular interleukin-1 receptor (IL-1R)–like signaling domain (7). The nucleotide-binding oligomerization domain (Nod) molecules, Nod1 and Nod2 [also known as CARD4 and CARD15 (caspase activation and recruitment domain)], are present in the cytosol of epithelial cells and immune cells. These proteins also have LRRs at the C terminus, a Nod domain, and CARD domains at the N terminus (8). There is abundant evidence that signaling through Nod or TLR activates transcription factor NF-κB, leading to pro-inflammatory gene expression (7,8).

TLR1 to TLR9 and Nod1 and Nod2 are each expressed by gut epithelial cells (6,9). Nod1 and Nod2 recognize slightly different mureptide motifs derived from bacterial peptidoglycans (6), which suggests that they sense intracellular infection or attempted bacterial subversion of epithelial cells (10). TLRs recognize many different components of bacteria.
“Chronic inflammasome dysregulation may eventually lead to inflammation-induced tumorogenesis and is mediated by the dysbiotic microflora, chronically impaired tissue repair mechanisms and altered local tumor surveillance.”
FOUR A’s of CHILDREN

- asthma
- probiotics
- EFAs
- NO Casein

- allergies
- probiotics
- EFAs
- NO allergen
- Minerals

- autism
- probiotics
- EFAs
- NO gluten
- NO casein
- Methylation

- ADD/ADHD
- EFAs
- NO allergen
- Methylation

Nutrient Dense Low Allergy/Sensitivity Diet / low sugar
Vitamin D3 and A (retinyl palmitate) as needed
Case: 9 yo boy – severe asthma

CASE STUDY – Asthma/Allergies

Client Story: MC is a 9 year-old boy who presented with a diagnosis of asthma and a low immune system. He has known allergies to grass, trees and possibly dogs. He is currently taking 6-7 prescribed medications daily and his mother reports frequent visits to the emergency room for asthma-related symptoms (2x per month). He has difficulty playing outdoors, especially near grass and trees. He also presented with a chronic cough that he has had for about 3 months and frequently has to spit up what comes from his lungs.

Data:
- Anthropometrics: BMI 15.9; Height 54”; Weight 66 lbs
- Dietary/Alimentation: High intake of processed foods, trans fats, gluten, diary and sugar and low intake of vegetables, fruits and high quality proteins. Fast food comprises about 75% of diet. Not taking vitamin supplement.
- Nutrition Focused Exam: Fatigue, bags under eyes, poor skin tone, tongue appear compromised. Low BIA capacitance
- Genotypic Risks: premature birth, mother asthma with inhalers
- Biochemical: High IgE and low IgG; cow’s milk IgE

Signs/Symptoms: Frequent colds and flu, fatigue, coughing, stomach pain, and severe asthma since age one. More than 3 bowel movements daily of good consistency. does not play outdoors due to allergies

Nutrition Assessment:

Intake: High trans fats, fast food, sugar and dairy; no significant EFAs

Digestion & Absorption
Poor assimilation possibly due to childhood vaccines (bad reactions), frequent antibiotics and poor diet

Microenvironment:
- Protein: Low protein suspected; poor lung structure; poor immune strength
- Oils/Fatty Acids: Low GLA and low DHA
- Methylation: Tongue depapillation; family Hx of depression
- Minerals: Low BIA Capacitance, low energy, low cellular function and structural integrity
- Vitamin D & Fat soluble vitamins: Very pale skin; low sun exposure.
- Bioflavonoids: low dietary intake

Intervention:
- Casein free diet, VSL#3 Probiotics, MVI RDA, Vit D3, EPA/DHA/GLA supplements
GUT ECOLOGY & PROBIOTICS

“All roads lead to Rome…”
GUT ECOLOGY & PROBIOTICS

“All roads lead to the GUT…”
Is there enough iron to satisfy healthy oxygen needs?

Is the body’s microbiome flourishing to support a strong immune function?

Do the RBC fatty acids provide cell membrane integrity?

Is the Vitamin D 25-OH adequate to modulate a healthy immune function?
Nutritional implications of food allergies

Abstract

Food allergy is becoming an increasing problem worldwide, with an estimated 6–8% of children affected at some point in their childhood. It is important to recognize that the nutritional implications encompass not only the elimination of essential food(s) from the diet (and the consequent attendant lack of energy, protein or other macro or micro constituents, including vitamins), but that undiagnosed or poorly managed conditions such as severe hay fever or asthma may result in decreased activity, and/or increased or decreased food intake, which can cause either negative effects on growth, or obesity. Clinical awareness is required among health professionals as to the clinical epidemiology, investigation, and management of food allergic disorders, as is the inclusion of a dietitian as part of the allergy team. Dietary intervention in children (and adults) with single or multiple food allergies should be seen as an integral part of the allergy management. It remains an essential part of holistic care.

Food allergy is becoming an increasing problem worldwide, with an estimated 6–8% of children affected at some point in their childhood. However, consumer surveys indicate that the perceived prevalence of food allergy is even higher; 20–30% of the people interviewed consider that they or a family member have an allergy to a food product, and around 22% implement some form of an elimination diet, which may or may not be required, on the mere possibility that the food may contain an allergen. For example, milk elimination diets are frequently adopted in the treatment of atopic dermatitis when the actual prevalence of cow’s milk allergy in patients on milk elimination diets may be significantly lower than the number of patients prescribed such diets. Elimination of any major food, without considering its nutritional implications, has the potential to result in harm. In fact there are a number of scenarios that can impact adversely on the diet of an individual and their family members (Table 1).

It is important to recognize that the nutritional implications encompass not only the elimination of essential food(s) from the diet (and the consequent attendant lack of energy, protein or other macro or micro constituents, including vitamins), but that undiagnosed or poorly managed conditions such as severe hay fever or asthma may result in decreased activity, and/or increased or decreased food intake, which in turn may cause either negative effects on growth, or obesity. Alternative concepts of health, as published in the media, may result in diets self-selected by children with behavioral disorders, or parent-selected from nutrition misinformation, cultural preferences, alternative nutrition therapies, or misconceptions about the benefits and risks of a restrictive diet.
Vitamin D Deficiency as a Strong Predictor of Asthma in Children

Abdulbari Bener¹,², Mohammad S. Ehlayel³, Meri K. Tulic⁴, Qutayba Hamid⁵

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ANTIOXIDANTS: D,A,E,C


BIOFLAVONOIDS

- **Quercitin** – suppress mast cells, basophils & is an antioxidant
  
  
  Chirumbolo et al. Bimodal action of the flavonoid quercetin on basophil function: an investigation of theputative biochemical targets. *Clinical and Molecular Allergy* 2010, 8:13

- **Rutin**
  
  Similar action to quercitin, but may have more reported side effects.
  
  Works well with Vitamin C
ESSENTIAL FATTY ACIDS

EFA: Omega 3 EPA/DHA

EFA: Omega 6 GLA/DGLA – only portal into production of the Prostaglandin-1 series that are anti-inflammatory in autoimmune, allergic conditions

Balance with:

Omega 9 Fatty Acids (olive oil, almonds, avocado)

Omega 3 Arachidonic Acid (eggs, red meat, organ meats)

Beneficial Saturated Fats (grass-fed butter, coconut oil)
Eicosanoid Cascade of Inflammatory Control

- Essential fatty acid production and metabolism to form eicosanoids.
- At each step, the ω-3 and ω-6 cascades compete for the enzymes.

Wallace JM. Nutritional and Botanical Modulation of the Inflammatory Cascade—Eicosanoids, Cyclooxygenases, and Lipoxygenases—As an Adjunct in Cancer Therapy. Integrative Cancer Therapies 1(1); 2002:7-37.
MINERALS: ZINC, MAG

**Zinc**
- Critical EFA conversion LA to GLA
- Mobilization of DGLA to PG1 Series
- Necessary for growth and healing
- Moderate evidence reflecting improvement in hyperimmune conditions

**Magnesium**
- Magnesium promotes parasympathetic response, has bronchodilator action, strong evidence for therapeutic use in asthmatics.
OBESITY

• Increased risk of hyper-immune conditions

• 68% US Population overweight

• 35% Obese

CDC: 2010
ANTIGEN TESTING METHODS

• ALLERGIES
  • SKIN PRICK
  • RAST
  • ELIMINATION DIET / EXPOSURE

• SENSITIVITIES
  • IGG
  • MRT
  • ELISA

• INTOLERANCES
  • BREATH TESTS
  • PANCREATIC FUNCTION
  • SPECIFIC TESTS (LIKE CELIAC PANEL, ETC.)
## Disorder: Hyper-immune conditions

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<th>Conventional</th>
<th>Functional Therapy</th>
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<td>- R.A.S.T Blood Testing for IgG/ IgE</td>
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<td>- Cyrex Cross-Reactivity</td>
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<td>- Prednisone</td>
<td>- Homeopathic remedies</td>
<td>- Quercitin</td>
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<td>- Oral</td>
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<td>- Lactaid</td>
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<td><strong>Therapeutic Diets</strong></td>
<td>- Balanced Diet with Elimination of Offending Foods</td>
<td>- Whole Foods Balanced with Elimination of Offending Foods</td>
<td>- Whole Foods Organic with Elimination</td>
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<td>- Adults</td>
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<td>- Children</td>
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<td>- Phosphatidylcholine</td>
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<td>- Liquid EPO</td>
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<td></td>
<td>- Liquid Minerals</td>
<td>- Reconcostat 400</td>
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NUTRITION PROTOCOLS

FROM ASSESSMENT DETERMINE PRIORITIES – WHICH ARE THE PRIORITIES FOR YOUR CLIENT?

- GUT HEALTH / MICROFLORA “assess gut health, use 4 R’s”

- MINERAL STATUS “check dietary intake Zn, Mg & blood test”

- ANTIOXIDANTS “blood test for Vit D 25-OH-goal >40 ng/ml”
  “Check dental/gum health for vitamin C & need for antiox”
TAKE AWAY PEARLS

• Allergies, sensitivities and intolerances are a BIG problem in our client population

• Nutrition-related imbalances promote susceptibility to hypersensitivity reactions

• Hypersensitivity testing is available for the practitioner

• After assessment, diagnosis, basic nutrition protocols are available to consider for intervention
KEY MESSAGE

Correcting nutrient imbalances present in HYPER-IMMUNE clients will result in more successful outcomes.
Questions

DIFM_Listserv@yahoogroups.com

[Instructions to join is on DIFM website; under member services tab]
RESOURCES

Bibliography


Food and Nutrition Information Center, National Agricultural Library, USDA. Food Allergies and Intolerances Resource List for Consumers December 2010. (great list of resources).

RESOURCES


McLoughlin RM, Mills KHG. Influence of gastrointestinal commensal bacteria on the immune responses that mediate allergy and asthma. Mechanisms of allergic diseases. J Allergy Clin Immunology 127(8);1097-1107.


Pedotti, et.al. Multiple elements of the allergic arm of the immune response modulate autoimmune demyelination. PNAS, 2003;100(4): 1867-1872.


RESOURCES


Websites

Multiple Sclerosis Resource Centre. Msrc.co.uk [great resource on nutrition, free e-newsletter]
Fats & Oils Survey

Check your oils!

“Are the nutrient oils balanced?”

<table>
<thead>
<tr>
<th>Fats and Oils</th>
<th>Name</th>
<th>Date</th>
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<tbody>
<tr>
<td><strong>OMEGA 9 (stabilizer)</strong></td>
<td>~50% of daily fat calories</td>
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<tr>
<td></td>
<td>Almond Oil</td>
<td>Olives</td>
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<td></td>
<td>Almonds/Cashews</td>
<td>Olive Oil</td>
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<td>Almond butter</td>
<td>Sesame Seeds/Tahini</td>
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<td>Avocados</td>
<td>Hummus (tahini oil)</td>
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<td>Peanuts</td>
<td>Macadamia Nuts</td>
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<tr>
<td></td>
<td>Peanut butter (natural/soft)</td>
<td>Pine Nuts</td>
</tr>
</tbody>
</table>

| **OMEGA 6 (controllers)** | Essential Fatty Acid Family | ~30% of daily fat calories | |
| | Eggs (whole), organic (AA) | Evening Primrose (GLA) |
| | Meats (commercial) (AA) | Black Currant Oil (GLA) |
| | Meats (grass-fed, org) (AA) | Borage Oil (GLA) |
| | Brazil nuts (raw) | Hemp Oil |
| | Pecan (raw) | Grapeseed Oil |
| | Hazelnuts/Filberts (raw) | Sunflower Seeds (raw) |
| | Hemp Seeds | Pumpkin seeds (raw) |

| **OMEGA 3 (fluidity/communicators)** | Essential Fatty Acid Family | ~10% of daily fat calories | |
| | Fish Oil capsule: ↑DHA | Flax Oil |
| | Fish Oil capsule: ↑EPA | UDO’s DHA Oil |
| | Fish (salmon, fin-fish) | Algae |
| | Fish (shellfish) | Greens Powder/w/algae |
| | Flax seeds/meal | Chia seeds |

| **BENEFICIAL SATURATED (structure)** | Short Chain/Medium-chain Triglycerides | ~10% of daily fat calories | |
| | Coconut Oil | Meats, grass-fed |
| | Butter, organic | Wild game |
| | Ghee (clarified butter) | Poultry, organic |
| | Dairy, raw & organic | Eggs, whole organic |

| **DAMAGED FATS/OILS** | (promoting stress to cells & tissues) | Should be <5% (try to avoid) | |
| | Margarine | Doughnuts (fried) |
| | Reg. vegetable oils (corn, sunflower, canola) | Deep-fried foods |
| | Mayonnaise (commercial) | Chips fried in oil |
| | Hydrogenated Oil | Reg. Salad dressing |
| | (as an ingredient) | Peanut Butter (JIF, etc) |
| | “Imitation” cheeses | Roasted nuts/seeds |
| | Tempura | Non-dairy products |
ESSENTIAL FATTY ACIDS

n-6 family

Linoleic Acid (LA)

\[ \text{Delta-6-Desaturase} \]

\[ \rightarrow \]

\[ \gamma \text{-Linolenic Acid (GLA)} \]

\[ \rightarrow \]

\[ \text{Elongase} \]

\[ \rightarrow \]

\[ \text{Dihomo-\( \gamma \)-Linolenic Acid (DGLA)} \]

\[ \rightarrow \]

\[ \text{Cyclooxygenase} \]

\[ \rightarrow \]

\[ \text{Prostaglandin } E_1 \ (PGE_1) \]

\[ \text{anti-inflammatory metabolite} \]

\[ \text{potent inhibitor of PGs of 1-series} \]

\[ \rightarrow \]

\[ \text{15-Lipoxygenase} \]

\[ \rightarrow \]

\[ \text{15-Hydroxyeicosatetraenoic Acid (15-HETE)} \]

\[ \text{anti-inflammatory metabolite} \]

\[ \text{potent inhibitor of } LT \text{s} \]

\[ \text{15-HETE} > 15 \text{-HETE} \]
GET THE NATURAL ANTIINFLAMMATORIES

- Essential Fatty Acids in Balance – ω6(GLA) and ω3
- Beneficial Monounsaturated Fats in Balance – ω9
- Beneficial Saturated Fats in Balance – SCFA / MCT
- AVOID: Damaged Fats
- Bioflavonoids and Phytonutrients
- Good Nutrient Dense Foods
The 4-R GUT Restore Program

1. REMOVE (trigger)
2. REPLACE
3. REINOCULATE (PRE/PROBIOTICS)
4. REGENERATE
   - SI: glutamine, gamma oryzanol, duodenum glandular, N-acetyl glucosamine
   - Colon: fiber, butyrate, Bifidobacteria
   - Boswellia, geranium, licorice, quercetin, hydrastis, cheledonium, artemisia, aloe
   - Okra, cabbage, rice protein, GLA, EPA, DHA
   - Fasting
   - Elemental Diet
The 5th R

RESTORE

Modify attitude, diet and lifestyle of the patient to promote a healthier way of living
Primary Immune Control

- The Inner Tube of Life – Gastrointestinal Tract
  - 2-3 kilograms Beneficial Bacteria
  - Digestion of food to elemental nutrients for life
  - A selective vibrant wall for absorption of nutrients
  - An symbiotic relationship with liver to aid detoxification
  - An elimination of wastes organ
  - A partner with the brain – “The Second Brain”
  - The most intimate intersection with the environment