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200

You Are What You Eat

Kimberly Reed, OD, FAAO

Room: Ferrante 1-2

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200 – You Are What You Eat
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This course material and information was developed independently of any assistance.

I do have the following financial arrangements to disclose:

RPS – Honorarium/ Advisory Meeting

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You Are What You Eat

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"Let thy food be thy medicine and thy medicine be thy food."

Hippocrates
A long, long time ago

"One man's meat is another man's poison"

Latin Proverbs
A long, long time ago

Lecture Overview

- Introductory Remarks
- Inflammation
- Food Allergies & Food Intolerances
- Environmental Issues:
  - Chemicals
  - Additives
  - Preservatives
  - Other potential toxins

Inflammation

- First described by Celsus (30 BC – 38 AD)
  - Rubor
  - Tumor
  - Calor
  - Dolor
- The purpose of inflammation is to *restore normal tissue function*

Inflammation

- When inflammation becomes chronic, *it becomes the disease state*

Disease and Inflammation

- Rheumatoid arthritis
- Sarcoidosis
- Psoriasis
- Inflammatory bowel disease
- Osteoarthritis
- Ulcerative colotis
- Crohn's disease
- Migraines
- Asthma
- Chronic fatigue
- Heart disease
- Cancer
- Cirrhosis
- Diabetes
- Vascular disease
- Alzheimer's
- Dry Eye Syndrome
- Obesity
- Fibromyalgia
- ADD/ADHD
- Etc…….

"Inflammatory soup" ingredients

Proinflammatory:
- Interleukin 1 (IL-1)
- Tumor Necrosis Factor (TNF)
- Leukotriene b4
- Thromboxane a2
- Histamine
- Prostaglandin e2

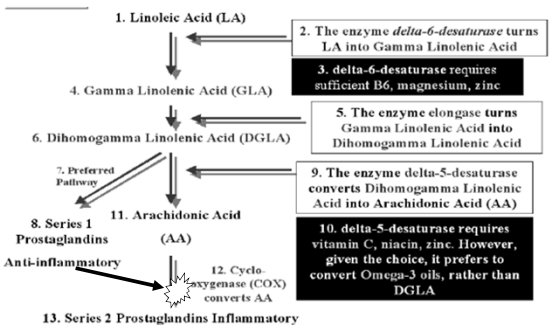
Anti-inflammatory:
- Interleukins 4, 10, & 13
- Prostaglandin I2 & I3
- Thromboxane a3

The diet-induced proinflammatory state?

LCPUFA's and antioxidant-rich foods

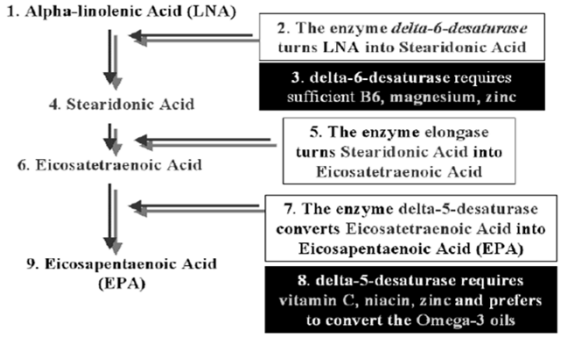
A mini-primer on LCPUFA's

Omega-6 pathway

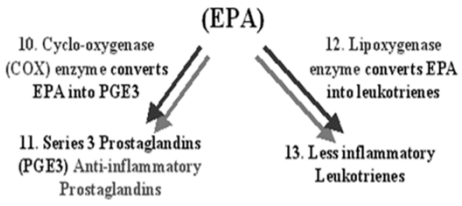


http://www.asthmaworld.org/asthma-OMEGA3.htm

Omega-3 Pathway



EPA Pathway



Supporting players: The Antioxidants

Free Radicals and Disease

- Hemorrhagic shock
- Heart disease
- Aging
- Parkinson's disease
- ALS
- Cataracts
- cancer
- Glaucoma
- AMD
- 100 + other diseases

Turmeric: a prototype of antioxidation

Food allergy & intolerance

Historical perspective

- Theron Randolph, MD – 1940's
- Connected environmental elements including foods to underlying chronic illness

Historical perspective

- Pioneered "avoidance" diet to alleviate unwanted symptoms
- Unsuccessfully tried to convince FDA and others to label food products (1949)
- Founder of current American Academy of Environmental Medicine

Food hypersensitivity vs. intolerance vs food allergy

Food Hypersensitivity

Food Intolerance

Food Allergy

Definitions

- Food Hypersensitivity – any adverse response that can reproducibly be attributed to a food or foods
- Food intolerance – reproducible adverse reaction to a specific food ingredient that is not psychologically based
- Food allergy – a form of food intolerance with evidence that it is caused by an immunological reaction to food

Allergy vs Intolerance

ALLERGY

- Genetic or exposure related
- Specific immunity
- Immediate symptom onset (Type I, IgE)
- Mast cells/basophils
- Skin test/RAST

INTOLERANCE

- Genetic/exposure related
- Innate immunity
- Delayed symptom onset (Type IV, IgG)
- ?Enzyme deficiency
- ?Gut integrity deficiency

True food allergies

- Present in 3-4% of the population

Pathophysiology of Food Allergy

- Breakdown in intestinal immunologic tolerance to foods
- Food/allergen is recognized by T-helper 2 lymphocytes that induce formation of IgE antibodies

Pathophysiology of Food Allergy

- Circulating IgE binds to mast cells and basophils

Pathophysiology of Food Allergy

- Re-exposure to the allergen triggers histamine release and generation of other mediatiors that cause an immediate response
- Itching, swelling, vomiting, diarrhea, rhinitis, asthma, hypotension cardiac arrhythmias, laryngeal edema are possible

Common culprits

- Eggs
- Shellfish*
- Fish
- Tree nuts* (pecan, walnuts)
- Peanuts*
- Milk

*more common in adults than milk and egg allergies

Testing for food allergy

- Skin Test (IgE) – intradermal, prick, or patch (epicutaneous) testing the reaction of the skin to different substances
- RAST (Radioallergosorbent test) – IgE – uses finger prick, in-vitro blood serum testing the amount of IgE antibotides reacting to specific allergens

The “other” pathway: food hypersensitivity

- Cellular immune mechanism
- If immune system in gut sees food within it as “foreign,” the cellular immune response is initiated
- White blood cells aim to destroy invader, causing collateral damage in the process

The “other” pathway in food hypersensitivity

- Chemokines, cytokines, etc. released rendering the tissue (the gut) less able to function normally

The “guts” of it

- 70% of all Americans have gut symptoms or disease
- Healthy GI involves
  - intestinal flora
  - digestive enzymes
  - normal pH
  - intact epithelial barrier
  - normal nervous signaling from autonomic nervous system

Unhealthy GI

- Results from
  - Poor diet
  - Medications
  - Infection
  - Toxins
  - Inadequate enzyme production
  - Imbalanced flora
  - Impaired gut permeability
  - Altered autonomic function

Challenges

- Most food intolerances are delayed, and therefore not directly tied to a food or additive
- Patients who consume their trigger foods regularly often have chronic, ongoing symptoms
- Even when suspected, the first few days of avoiding a trigger foods often causes withdrawal symptoms

Commonly cited examples of food intolerance

- Gluten intolerance
  - Vs true celiac disease/sprue
- Lactose intolerance
- Yeast intolerance

Testing for food intolerance

- ALCAT / Cell Science Systems
- IgG
  - ELISA or lymphocyte response assay
  - Tests the presence of IgG antibodies to food antigens
  - Blood from finger prick mixed with variety of antigens, looking for classic Ag/Ab complex
- Elimination Diet
  - Trial and Error
  - Double-blind placebo-controlled food challenge (DBPCFC)

IgG Testing

- Relies on one immune pathway resulting in serum levels of IgG
- IgG titers are only indicative of exposure to the food or substance, and doesn't indicate intolerance

ALCAT

- Measures the final common pathway of all pathogenic mechanisms
  - Immune
  - Non-immune
  - Toxic
- Whole blood test that detects food and chemical triggers of the cellular immune system
  - Measures changes in the size and population of neutrophils

Summary data: in support of ALCAT

- 98% success with weight loss
- 83.4% correlation with double blind oral challenges with foods
- 96% correlation with double blind, placebo controlled oral challenges with food additives
- 90% improvement with numerous conditions in 18,000 patients over 16 years of study

Not all studies support ALCAT

- University of Cape Town
  - Asthma, eczema, IBS in children
  - Poorly predictive
  - 1994
- Others

Implications of inflammation in ocular disease

- Cataract
  - BMI
  - Dietary influences
    - Antioxidants
    - GI index of foods

Implications of inflammation in ocular disease

- Glaucoma
  - Apoptosis
  - Dietary influences
  - Herbal and alternative medical management
    - Ginkgo biloba
    - Acupuncture

Implications of inflammation in ocular disease

- Macular degeneration
  - Inflammation
  - Reactive oxygen species (free radicals)

Effects of stress, obesity, and the environment on our Health

Mythbusters!

Myth or Fact?

- Cortisol really is the "Belly fat hormone."

The Adrenal Hormones

STRESS →

- Norepinephrine: "I can DO IT!!!"
  - Adrenal medulla
  - Blocks insulin release so body can use available glucose to manage stressful situation

The Adrenal Hormones

STRESS →

- Epinephrine: "….Maybe…not….."
  - Adrenal medulla
  - Relaxes smooth muscles in stomach and intestines
  - Decreases blood flow to GI
  - Depresses appetite centers

The Adrenal Hormones

STRESS →

- Cortisol: "No way!"
  - Adrenal cortex
  - After stress has passed:
    - shuts down norepi and epi production
    - Stimulates appetite to compensate for epinephrine's effects of appetite depression
    - Stimulates production of leptin which further increases appetite

Cortisol

- To make matters worse, natural opiates are released when food is ingested
  - Food becomes addictive in susceptible people
  - "Stress Eaters" have chronically high levels of cortisol
  - Chronically high levels of cortisol inhibits weight loss

So is it the "Belly Fat Hormone?"

- Yes…
- There are more cortisol receptors in the abdomen than in other locations
- "Over-responders" (overreactors) repeat this cycle more frequently and more dramatically than their Zen-like counterparts

"Adrenal Fatigue"

- Insomnia
- Weight gain
- Depression
- Acne
- Hair loss
- Carbohydrate cravings
- Decreased immune function

Leptin

What is leptin?

- Protein
- Produced by fat cells
- Works with thyroid hormone, cortisol, and insulin to regulate appetite and energy centers

How is leptin supposed to work?

- Too much food → fat cells are produced
- Fat cells → secrete leptin
- Leptin → CNS appetite centers in hypothalamus
- STOP EATING, START MOVING YOUR BUTT

How does this work?

- Neuropeptide – Y (NPY) is created in the brain and in fat cells
- Activated by ghrelin → increases appetite
  - Ghrelin secreted when gut is empty or hunger sensation exists
- Leptin inhibits NPY

- Too little food → fat cells not produced, those that are there shrink
- Less leptin secreted → hunger centers are activated, energy centers diminished

Myth or fact? Obesity is the result of laziness and a lack of self-control

- The Hedonic System and Food Intake
- Genetics and Endocannibinoids
- Perceptions

Myth or Fact?

- We would probably be overall a lot healthier if we replaced much of our animal-derived protein with soy protein.

The truth about soy

- What is it?
- Where is it found?
- What effects does it have on the human body?