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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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“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 | • Heart disease |
| • Sarcoidosis | • Cancer |
| • Psoriasis | • Cirrhosis |
| • Inflammatory bowel disease | • Diabetes |
| • Osteoarthritis | • Vascular disease |
| • Ulcerative colitis | • Alzheimer’s |
| • Crohn’s disease | • Dry Eye Syndrome |
| • Migraines | • Obesity |
| • Asthma | • Fibromyalgia |
| • Chronic fatigue | • ADD/ADHD |
| | • Etc..... |

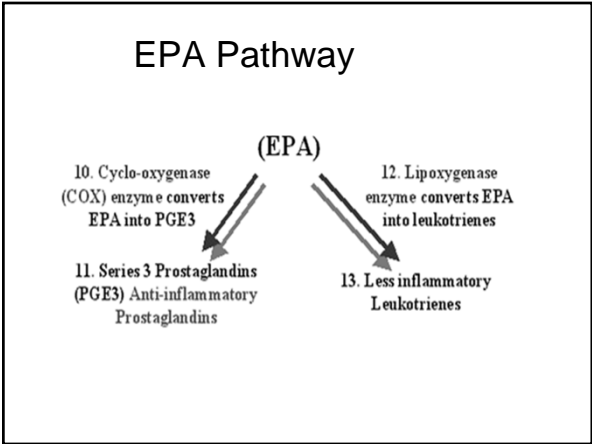
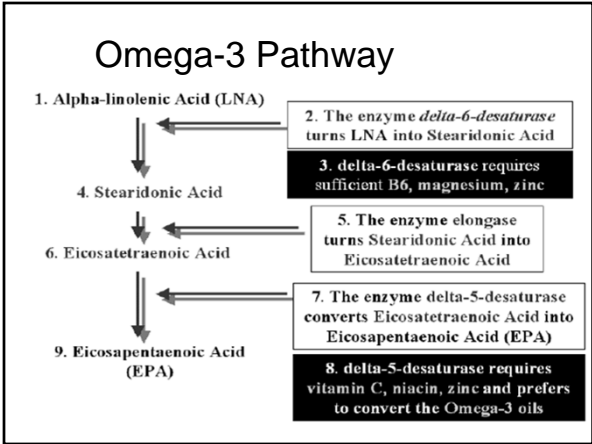
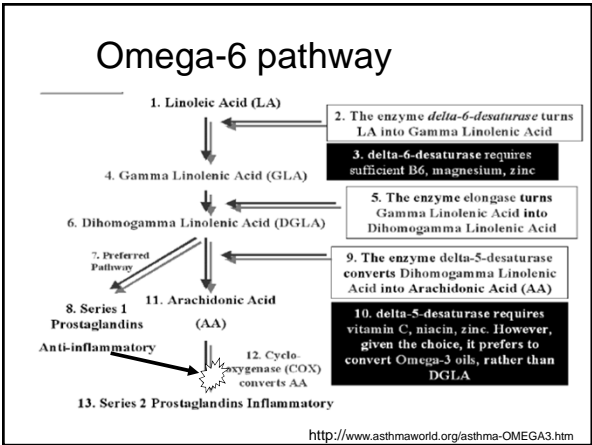
“Inflammatory soup” ingredients

- | | |
|-------------------------------|----------------------------|
| Proinflammatory: | Anti-inflammatory: |
| • Interleukin 1 (IL-1) | • Interleukins 4, 10, & 13 |
| • Tumor Necrosis Factor (TNF) | • Prostaglandin I2 & I3 |
| • Leukotriene b4 | • Thromboxane a3 |
| • Thromboxane a2 | |
| • Histamine | |
| • Prostaglandin e2 | |

The diet-induced proinflammatory state?

LCPUFA's and antioxidant-rich foods

A mini-primer on LCPUFA's



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

<p>ALLERGY</p> <ul style="list-style-type: none"> • Genetic or exposure related • Specific immunity • Immediate symptom onset (Type I, IgE) • Mast cells/basophils • Skin test/RAST 	<p>INTOLERANCE</p> <ul style="list-style-type: none"> • Genetic/exposure related • Innate immunity • Delayed symptom onset (Type IV, IgG) • ?Enzyme deficiency • ?Gut integrity deficiency
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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 mediators 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 antibodies 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 Endocannabinoids
- 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?