Allergies

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Grading:
• Session #3 of 5: Quiz: 20%
• Session #5 of 5: Final test: 60% (all-inclusive)
• Menu Assignment: 20%

Course Overview
• Different types of hyper-sensitivities
• Digestive health and allergy
• pH and role in allergy
• Steps to facilitate recovery from allergy*
* non-anaphylactic allergies only

Are you Allergic?
• 6th leading cause of death in America.
• 50 million Americans suffer allergies, costing the health care system 18 billion dollars annually.
• In Canada, from 1970 to 1990, there was an 11.2% increase in childhood asthma.

Allergy
• a condition of altered reactivity
• reaction to a substance (e.g. biological or chemical) to which most individuals do not react.
• the immune system is responsible for symptoms experienced during an allergic reaction
• ‘allergens’ are only triggers of immune overreaction
• reaction occurs on second or subsequent exposure to a substance, NOT the first!

Basic Terms
Allergen/antigen: name given to a substance which, after more than one exposure, is capable of initiating an allergic reaction.
For ex. foods, animal hair, dander or saliva, moulds, latex, aspirin, dust mites, pollens, etc.

Antibody: Any immunoglobulin protein (for ex., IgA, IgE, IgG) which is produced in response to a specific allergen. Antibodies trigger release of inflammatory agents sometime after the allergen enters the body (immediately or delayed).
Top Allergenic Foods

- Milk
- Wheat
- Eggs
- Corn
- Soy
- Tree nuts
- Beef
- Peanuts
- Shellfish
- Yeasts and moulds**

Facts about Allergy

- Allergy is multi-symptom and complex.
- Can be involved in any disease.
- Can develop slowly and insidiously.
- Weakens the body, allowing other life threatening diseases to develop.
- Occurs at any age, but more common as one ages.

How do you recognize Allergy?

- Allergy always creates INFLAMMATION!
- Cardinal Signs:
  - Swelling
  - Heat
  - Itching (if external or near an orifice)
  - Redness
  - Pain
- Examples that may be allergy:
  - Hives, eczema, and asthma.
  - otitis, arthritis, colitis. ETC.!

Allergy Kills!

2 Ways:

- 1. Anaphylactic shock (death within minutes)

OR:

- 2. Slow break down of the body's immune system.

The 5 Key Concepts of Allergy

#1: The Body Strives for Balance (Homeostasis)

- Homeostasis: the balance of functions and chemical reactions within an organism and maintained by a regulatory system. Equilibrium.

EXCESS OR EXTREME CHANGES WILL WEAKEN THE BODY AS IT MAKES EVERY ATTEMPT TO MAINTAIN METABOLIC BALANCE.
Out of Balance!

Unbalancing of homeostasis can be acute or chronic

- A. Irritation through daily lifestyle
  - dehydration
  - sugar over-consumption

- B. Physical or emotionally traumatic event:
  - accident, break-up

#2:

Any Symptom Can be Allergy.

...but NOT every symptom is!

Examples:

- Any ‘itis’: otitis, arthritis, colitis,…

#3: Symptoms appear only after Allergic Load has been reached.

- Allergic load: the sum of all chemicals, food allergens and inhaled pollutants that a person can be exposed to before symptoms appear.
  a.k.a. “toxic load”, or “the rain-barrel”

i.e. child born to non-smoking mom = non-reactive
vs. child born to smoking mom = reactive (barrel overflows)

What determines if and when the barrel overflows?

Rain-barrel = tolerance for stressors

Exposure factors:

- Intensity: what quantity
- Frequency: how often?
- Duration: for how long?

#4: Allergy Has No Single Cause.

Allergies are multi-factorial.
Most chronic diseases are multi-factorial.

Recall: allergic load = sum of irritants
i.e., the (last) straw that broke the camel’s back
(the last straw is not necessarily the allergen.)

The ‘universal reactor’: a person whose allergic/toxic load is so high that she is hypersensitive to ‘everything’.

#4 cont’d

Factors That Increase our Susceptibility:

- Heredity: family history of allergy
- Biochemical Individuality. Nutritional needs vary.
- Toxic Load – Frequency, duration and intensity.
- Drug use - decrease liver function, increase toxic overload and destroy enzyme systems.
  cont’d..
Factors... cont’d

- Airborne Inhalants: smog, pollens, moulds, etc.
- Food: poor dietary choices increase inflammation
- Premature Weaning/Infant formula
- Chronic Infections (e.g. candidiasis)
- Stress
- Dental Fillings – "Mercury" fillings

#5: Take Charge of Your Health.

- Be an active participant in your health care.
- Be prepared to make changes to get change.
- Requires will-power and won’t-power

“The definition of insanity is to do the same thing over and over and expect a different result.” Albert Einstein

Allergy and the Immune System

- Job description of the immune system:
  - to correctly identify, label and attack pathogens
  - key players: antibodies, lymphocytes, natural killer cells
  - tissues involved: thymus, spleen, lymph tissue, adrenals, appendix, tonsils, GALT.

IN ALLERGY, THE IMMUNE SYSTEM LABELS A TYPE OF MOLECULE AS “DANGEROUS”.

The Food Allergy Umbrella

Anaphylaxis: A Classic Allergy in the Most Severe Form

broncho-constriction
wheezing
Nausea, vomiting and/or diarrhea
Swelling, hives, itching
Cyanosis, hypotension, weakness
epinephrine  no epinephrine
Reaction neutralized  DEATH
Food Allergy Classification cont’d

- **Food Intolerance:**
  - Reaction by which there is no immunological proof using standard scratch tests.
  - Interaction with lymphocytes.
  - Time frame: hours to days after exposure
  - Symptoms difficult to trace to particular antigen.

Terms

- **Immune complex:** a molecule which consists of an antigen and an antibody bound together.
- **Shock Tissue/Organ:** the body site where immune complexes are found in high concentration. A site of ongoing/recurring inflammation and irritation.
  - For ex. gall bladder, prostate, stomach, ear...

How Allergens Enter the Body

1. By inhalation.
2. By injection.
3. By ingestion.
4. By absorption through skin.

The Antibodies Involved...

1. IgE – Immediate onset (classic allergy)
   - Happens within minutes of exposure
2. IgG – delayed
   - Hours to days after exposure
3. IgA
   - Found in saliva, tears, blood, GALT
   - A front-line defense against allergens entering the body
   - ‘used up’ during each allergic response
   - Deficiency associated with many medications and frequency of allergen exposure p.38

The Classic Allergic Reaction

- Sensitized Mast Cell (eyes, nasal, throat, digestive)
- Histamine
- Inflammatory Products
- IgE Binding Site
- Allergen

Lines of Defense Against Allergens

- White blood cells:
  - Mast cells secrete IgE (only 1% of antibodies)
    - Release inflammatory agents
  - Basophils secrete IgE in classic allergy
    - Release inflammatory agents
  - B-lymphocytes secrete IgG
    - Activate complement system involved in 2/3 of reactions
Products of Allergic Reactions

1. Histamine
   - vasodilation
   - smooth muscles contract
   - blood vessels leak, swell (edema) - p.39 for symptoms
2. Kinins
   - bradykinin – the most potent vasodilator
   - dilates peripheral arteries
3. Leukotrienes
   - produced from arachidonic acid
   - play a major role in asthma
4. Prostaglandins
   - exist in every tissue in the body
   - powerful hormone mediators.
5. Thromboxin
   - An eicosanoid made from arachidonic acid
   - a powerful vaso-constrictor

All are vaso-active
All are inflammatory

Chronic Allergy Leads to...

- Immune suppression.
- The Boomerang Effect:
  - Over-active becomes under-active
  - Continual stimulation of the immune cells depletes antibodies and white blood cells
  - Weakening of the immune system
  - May lead to increased risk for infections, cancer

Image: www.plus.maths.org

Allergy Medications Work by Suppressing Immune Response

1. Anti-histamines
   Used for:
   - upper respiratory tract inflammation
   - skin reactions
     e.g. loratidine (Claritin, etc.)
   - Note: non-drowsy' anti-histamines contain a stimulant: pseudo-ephedrine, which is physically addictive
   - not suitable for those with hypertension.

2. Bronchodilators and Corticosteroids
   - used for lower respiratory tract inflammation (asthma)

Skin ‘Scratch’ Test

- favourite diagnostic tool of allergists (M.D.s)

Advantages:
- Produces immediate, visible result
- Accurate for airborne allergies
- Done in M.D.’s office
- Covered by OHIP
- Immunotherapy (shots) may be prescribed to effectively reduce sensitivity over time

Disadvantages:
- Only identifies IgE-mediated (classic) allergies
- Unreliable for vast majority of food sensitivities (IgG)
- Invasive/uncomfortable for patient
- Immunotherapy over-stimulates immune system and can worsen symptoms

Why Doctors Deny Food Allergy

1. Food allergy is not covered in depth at med school.
2. Only immediate (IgE antibody-mediated) responses ‘count’.
   - Over-reliance upon skin-scratch test
   - Double-blind studies do a disservice to food allergy research.
Recap

• 2 kinds of hypersensitivities
• Reactivity determined largely by allergic load
• Allergy should be suspected, ruled out or treated in any disease.
• Doctors largely deny food *intolerance* because it is harder to trace.