

Two Sides of the Adaptive Immune System

Humoral = Immediate sensitivity

Antibodies (Type I, II, III)



Two Sides of the Adaptive Immune System

Cellular = Delayed sensitivity (Type IV)



24 - 48 hours after exposure
CONTACT DERMATITIS

HUMORAL (ANTIBODY-MEDIATED) IMMUNE SYSTEM

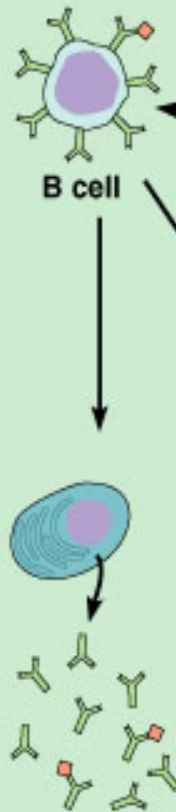
Control of freely circulating pathogens



1 A B cell binds to the antigen for which it is specific. Usually requires cooperation from helper T cell.

2 The B cell, often with stimulation from a helper T cell, differentiates into a plasma cell.

3 Plasma cells proliferate and produce antibodies against the antigen.



CELL-MEDIATED IMMUNE SYSTEM

Control of intracellular pathogens

Intracellular antigens expressed on the surface of a cell infected by a virus, bacterium, or parasite. (Also may be expressed on surface of an APC).

1 A T cell binds to MHC-antigen complexes on the surface of the infected cell, activating the T cell (with its cytokine receptors).

2 A helper T cell produces cytokines that cause the activated T cell to differentiate into a cytotoxic T cell. These cytokines also influence the formation of plasma cells and activated macrophages.

3 The infected target cell is lysed by the cytotoxic T cell.

Cytokines

Helper T cell

Cytokines

Activated macrophage (Enhanced phagocytic activity)

Memory cell

Some T and B cells differentiate into memory cells that respond rapidly to any secondary encounter with an antigen.



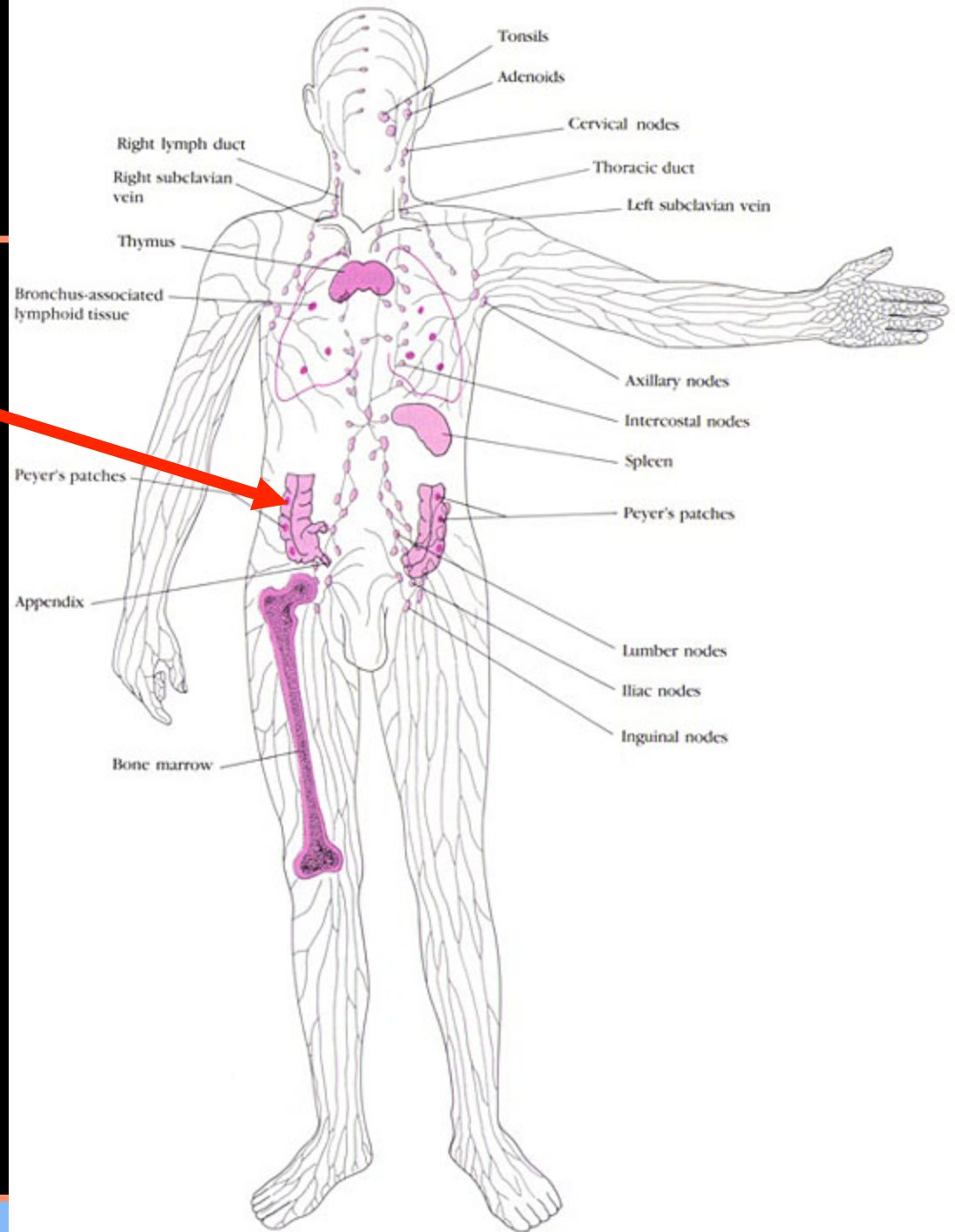
T cell

Cytotoxic T cell

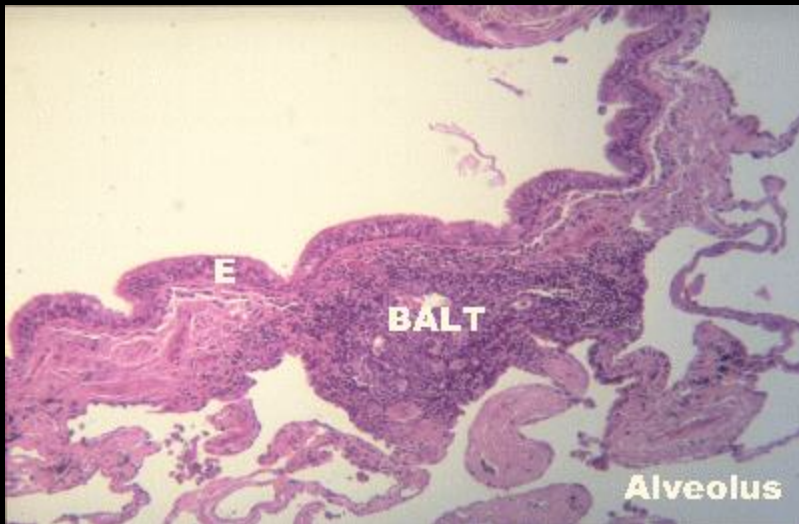
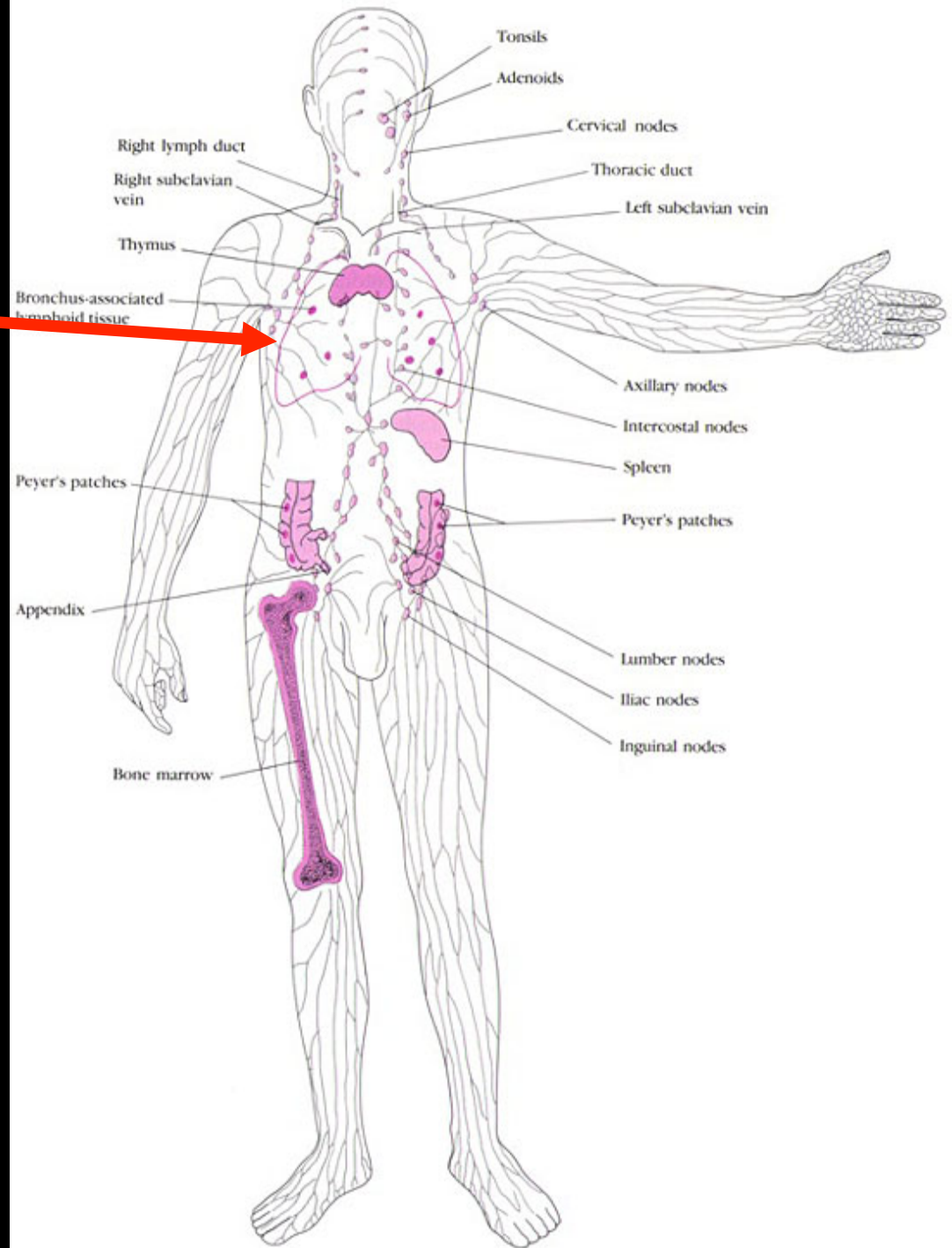


Target cell

GALT = Gut Associated Lymphoid Tissue

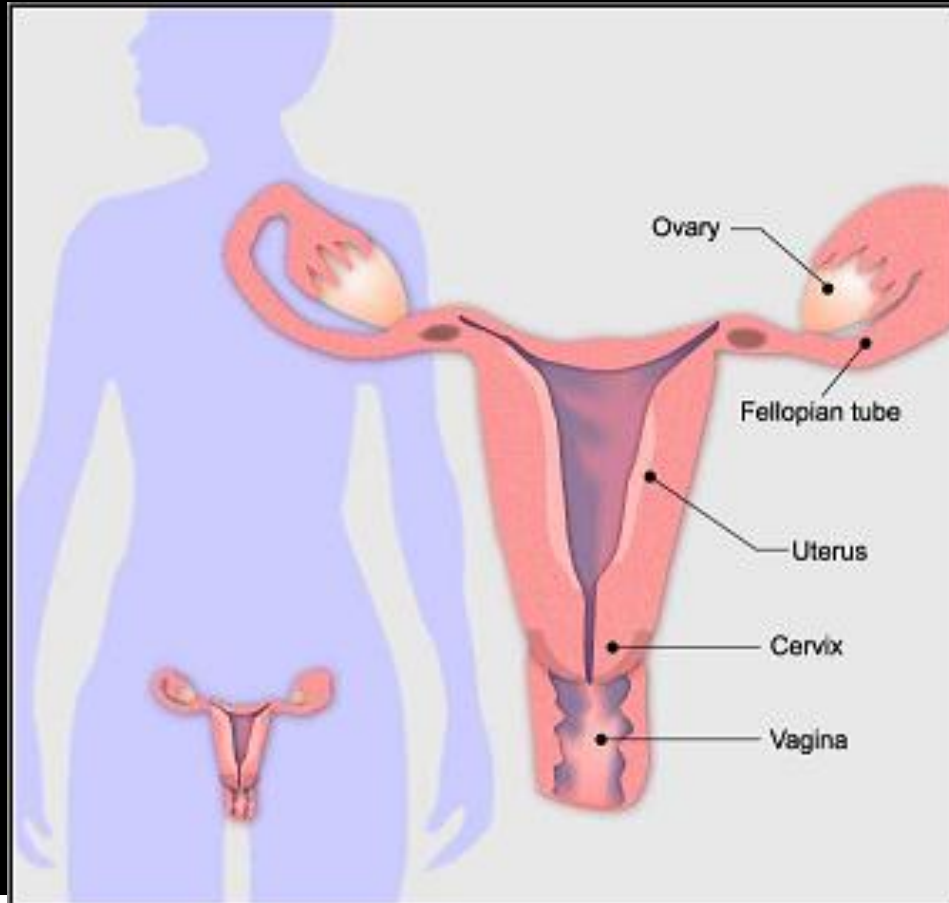


BALT =
Bronchial Associated
Lymphoid Tissue



GENITAL TRACT

- no associated lymphoid tissue
- no clear site of immunologic priming

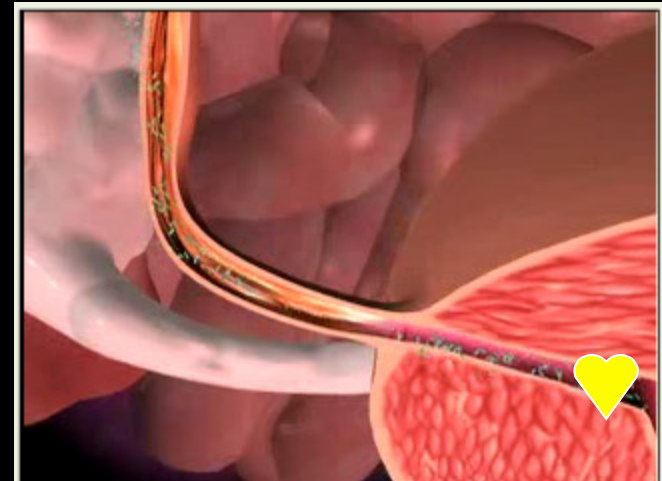


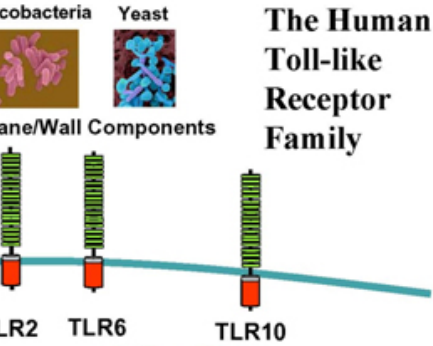
Why Doesn't the Genital Tract have Lymphoid Tissue?

Self or non-self for the woman?

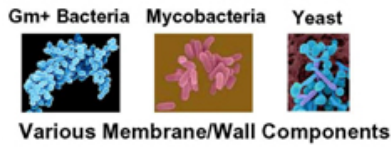
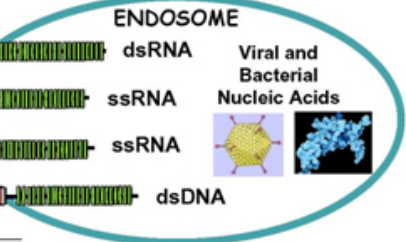


STD

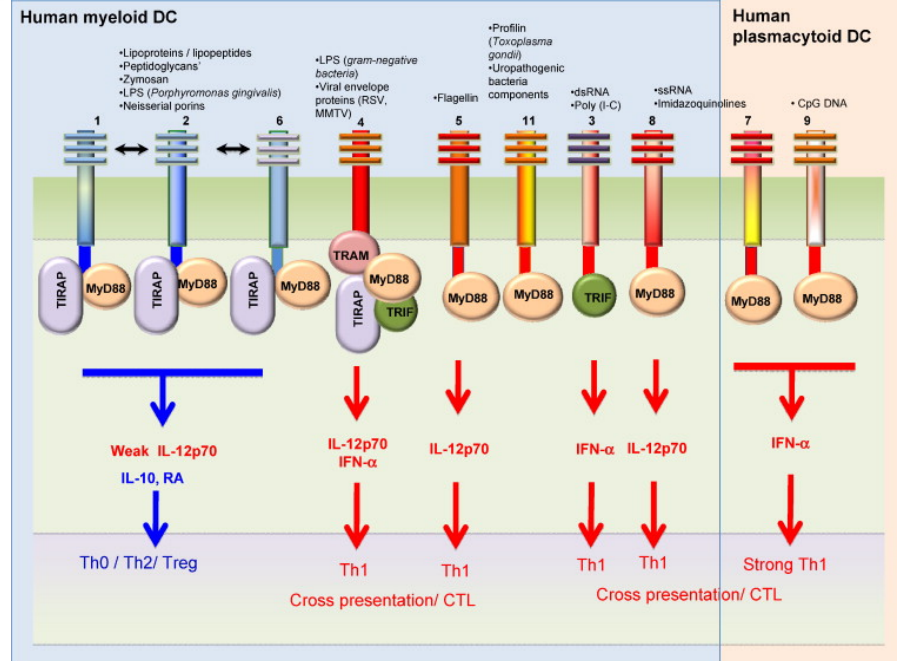
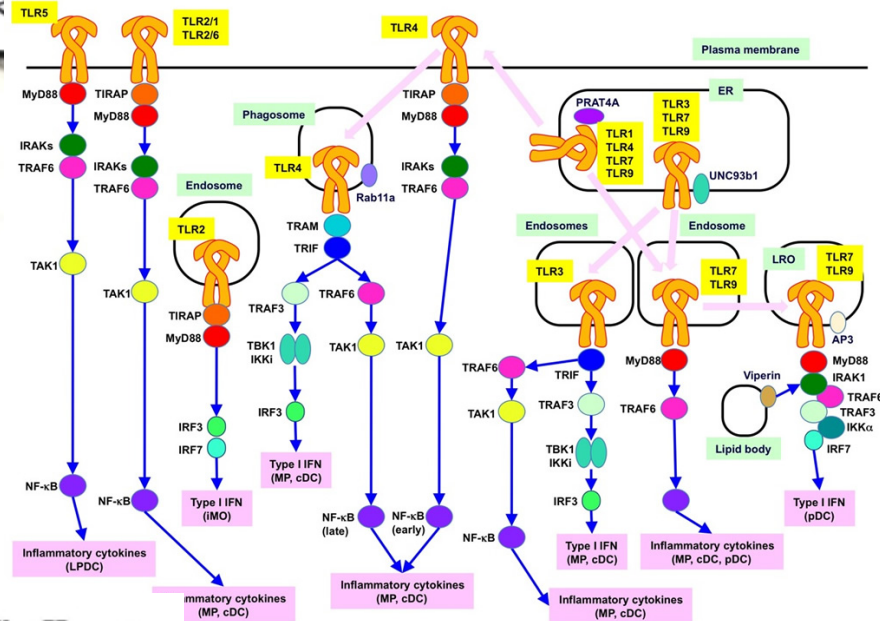
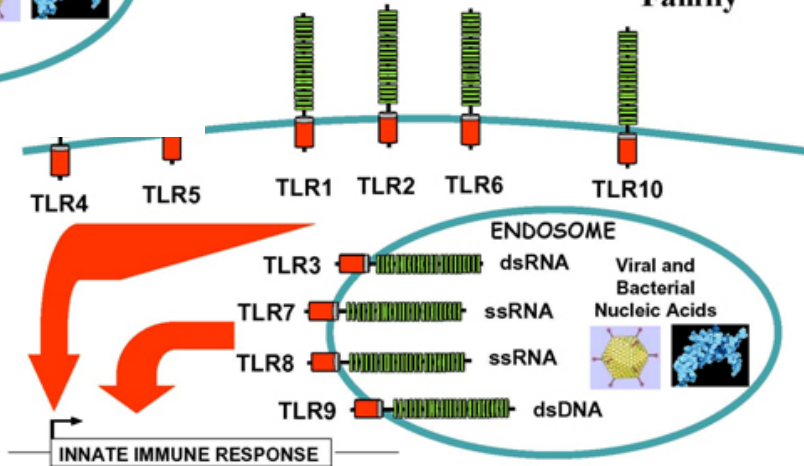




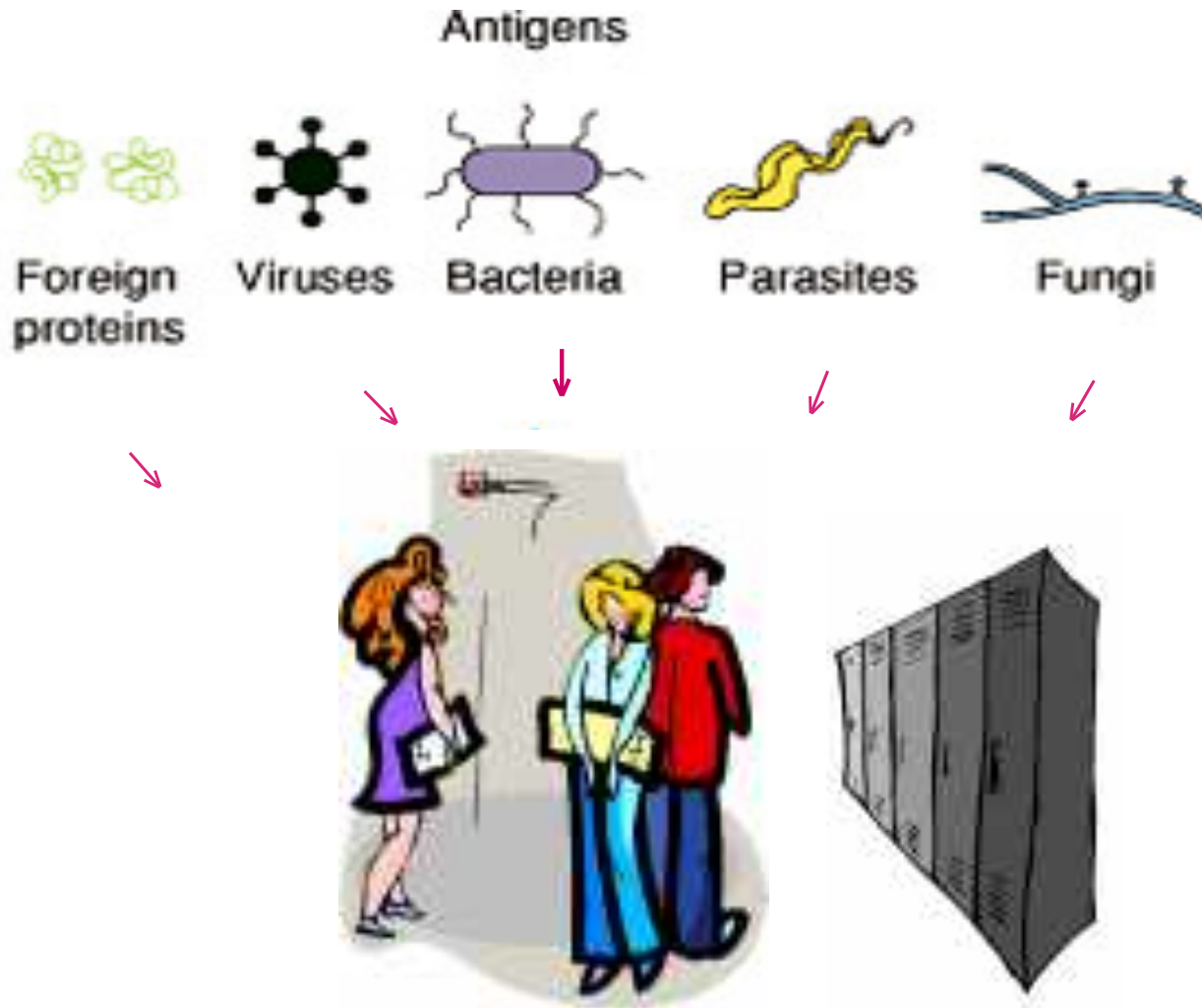
The Human Toll-like Receptor Family



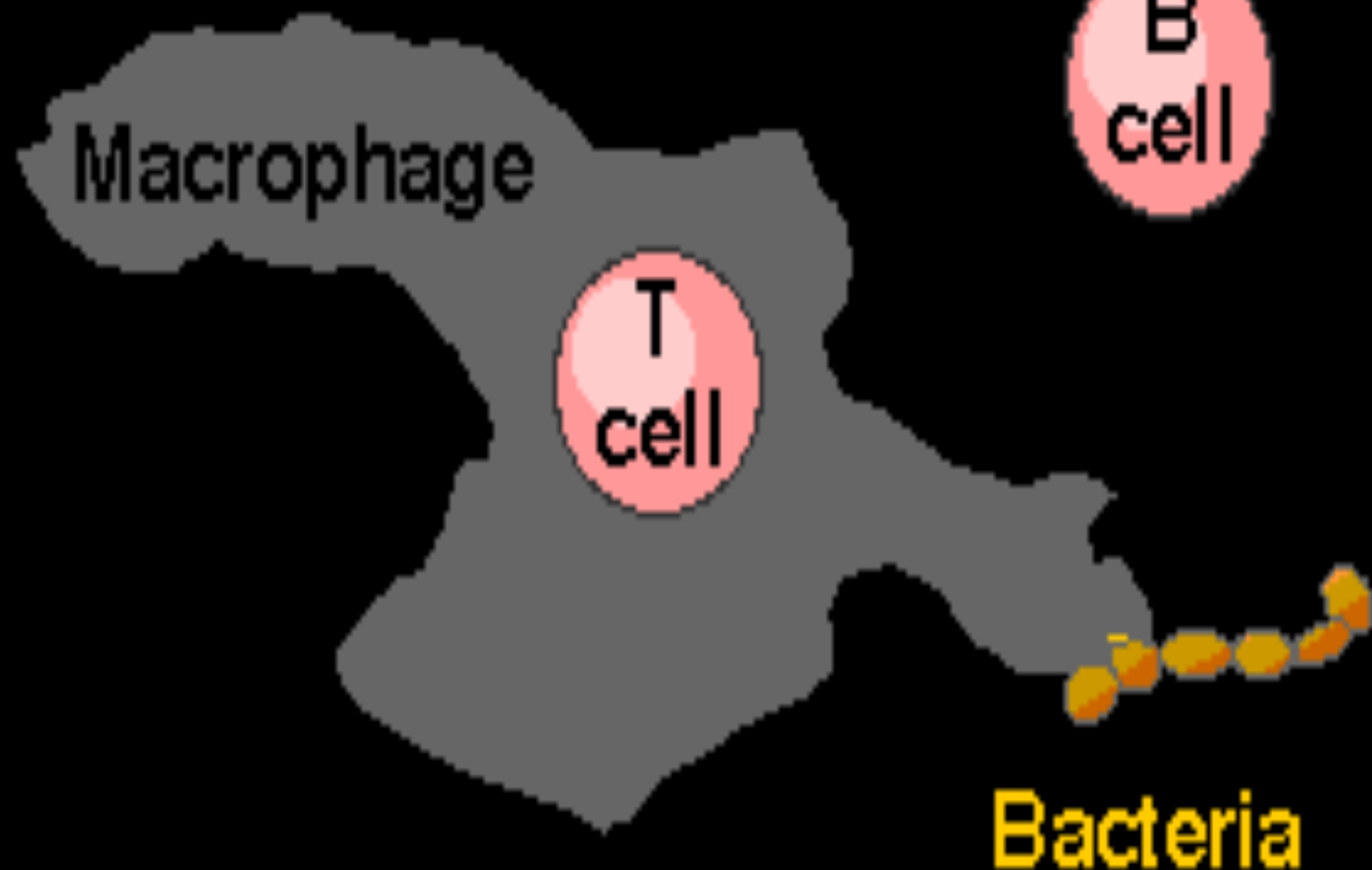
The Human Toll-like Receptor Family



Exposure to Pathogens



Antigen Processing



Remember the 5 Classes of Antibodies

- Ig = Immunoglobulin

G – A – M – E – D

- Ig**G** = “Good” major antibody class
- Ig**A** = “Appetite” to “**A**” hole, orifices
- Ig**M** = Macroglobulin, first one out
- Ig**E** = “Evil”, causes allergies
- Ig**D** = “Dumb class”, does nothing

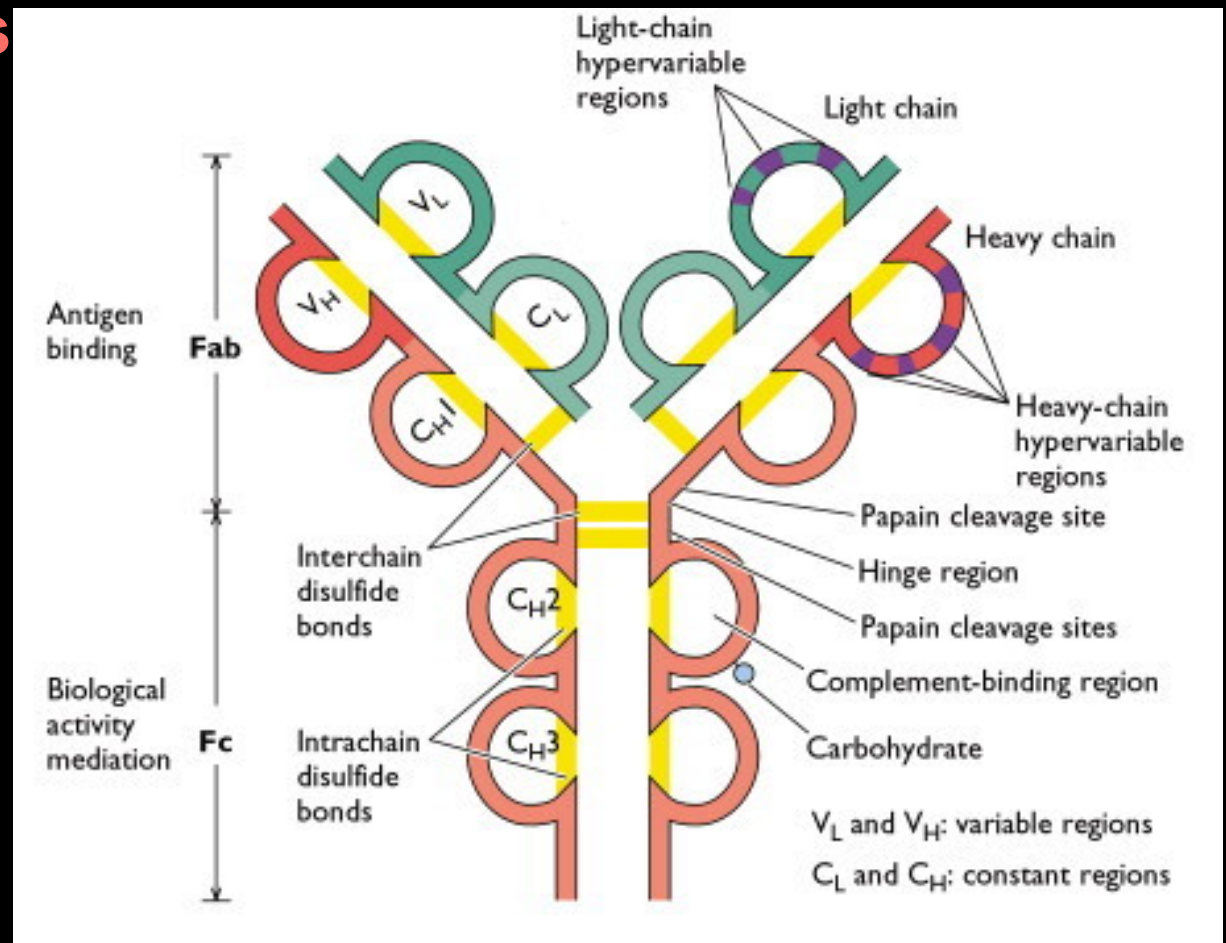
Antibody Structure

- **Two Heavy Chains**

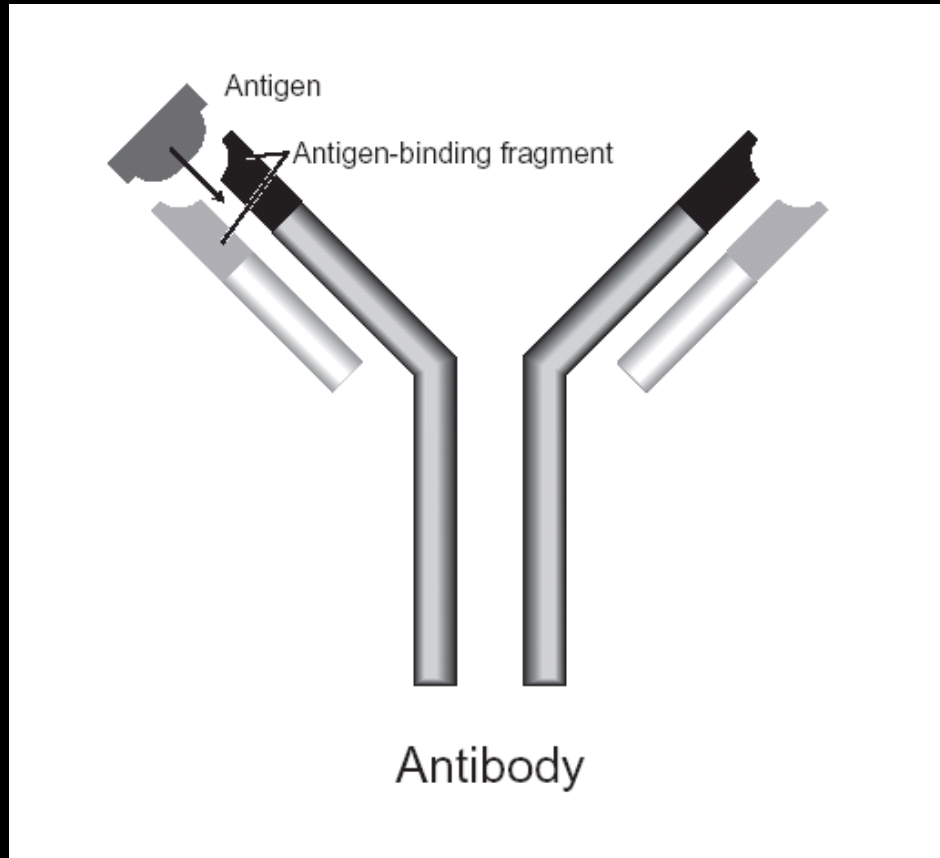
- IgA = α Alpha
- IgD = δ Delta
- IgM = μ Mu
- IgE = ϵ Epsilon
- IgG = γ Gamma

- **Two Light Chains**

- Kappa κ
- Lambda λ



Antibody Drawing

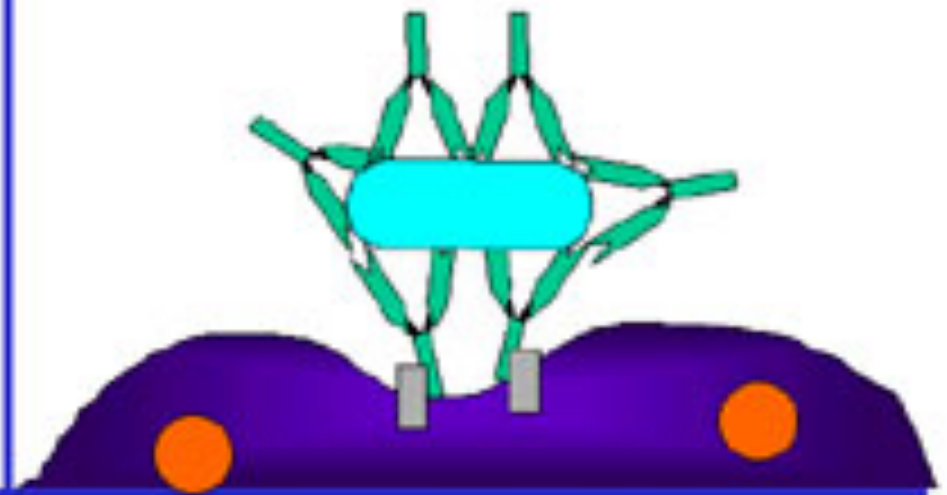




Extracellular
bacteria

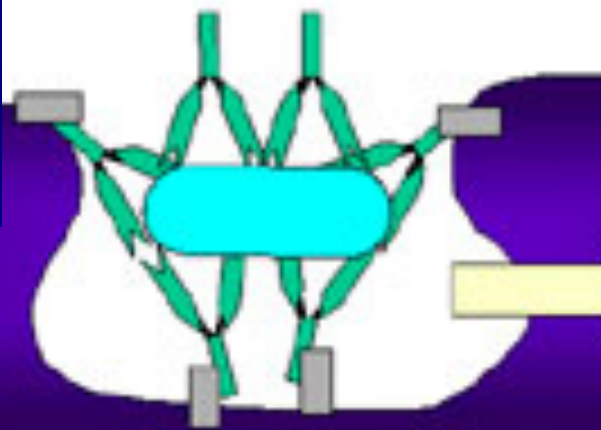


Opsonization



BACTERIAL CAPSULE:
The slippery capsule of
Streptococcus pneumoniae
enables these bacteria to
avoid being eaten by
neutrophils

Digestion by macrophage



BACTERIAL CAPSULE:
The slippery capsule of
Streptococcus pneumoniae
enables these bacteria to
avoid being eaten by
neutrophils

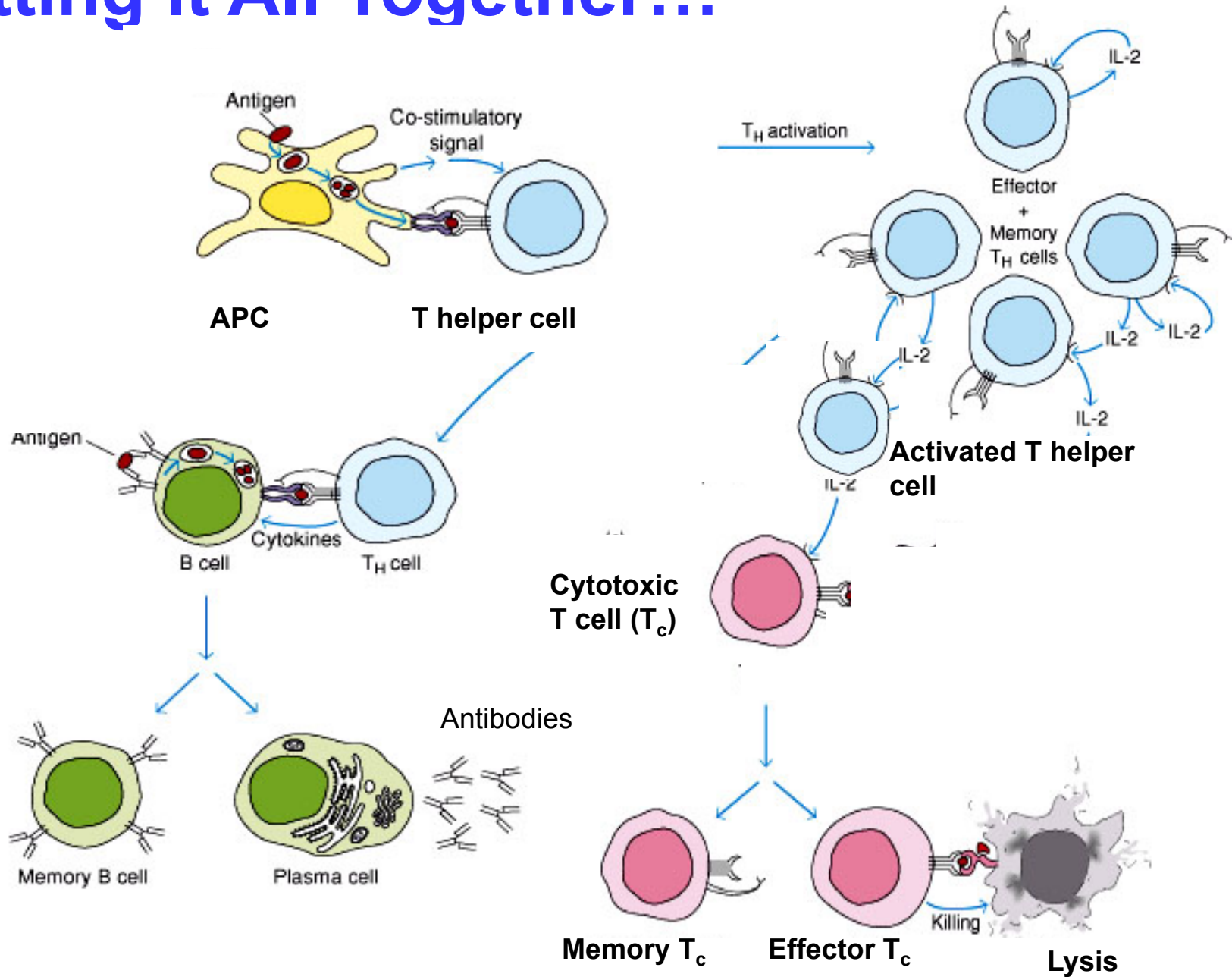
Digestion in lysosome



Antibodies Working for YOU!



Putting It All Together...



HIV

An infection of T Helper or CD4 Cells

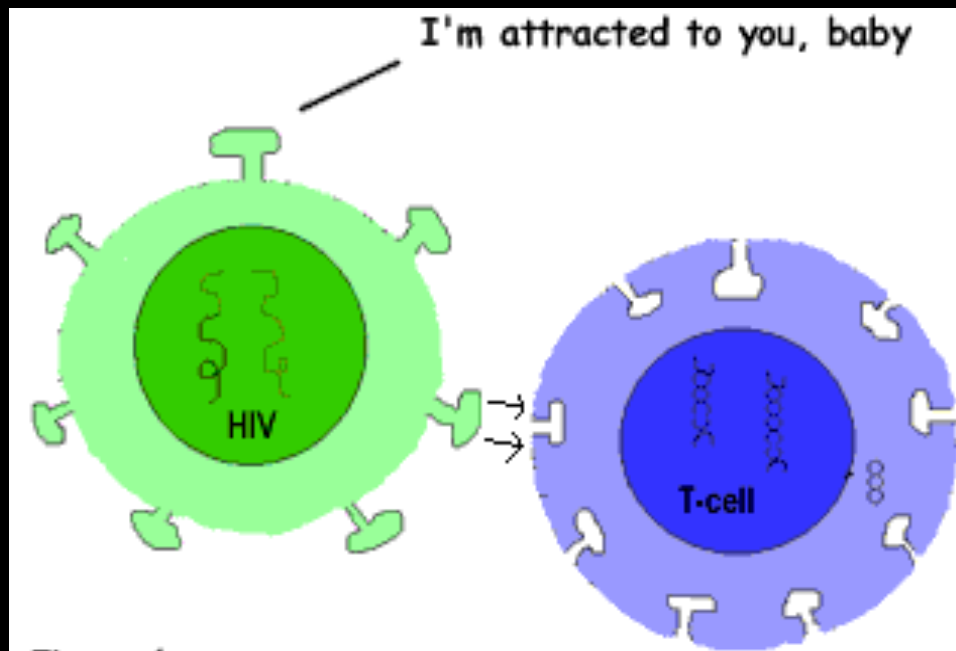


Figure 4
Virus attaches to healthy T-cell

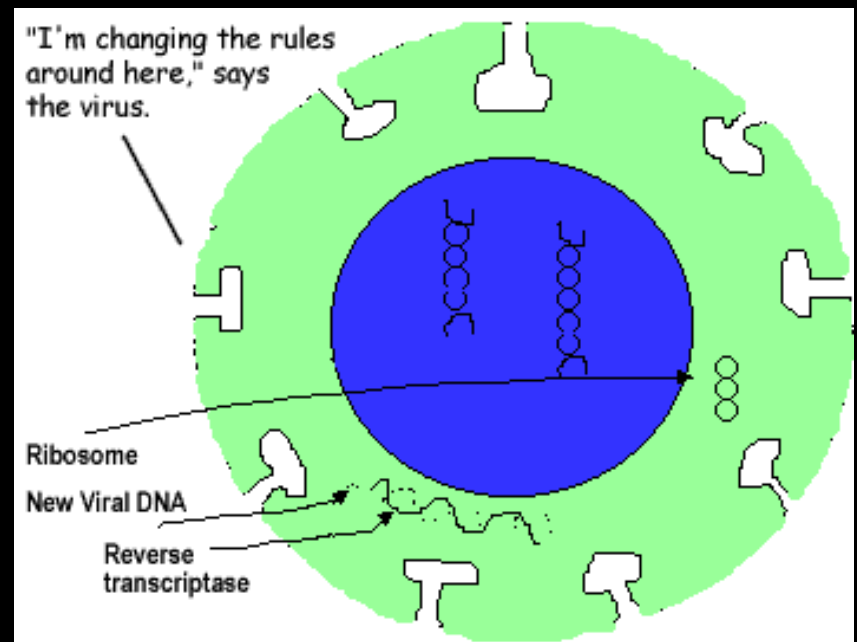
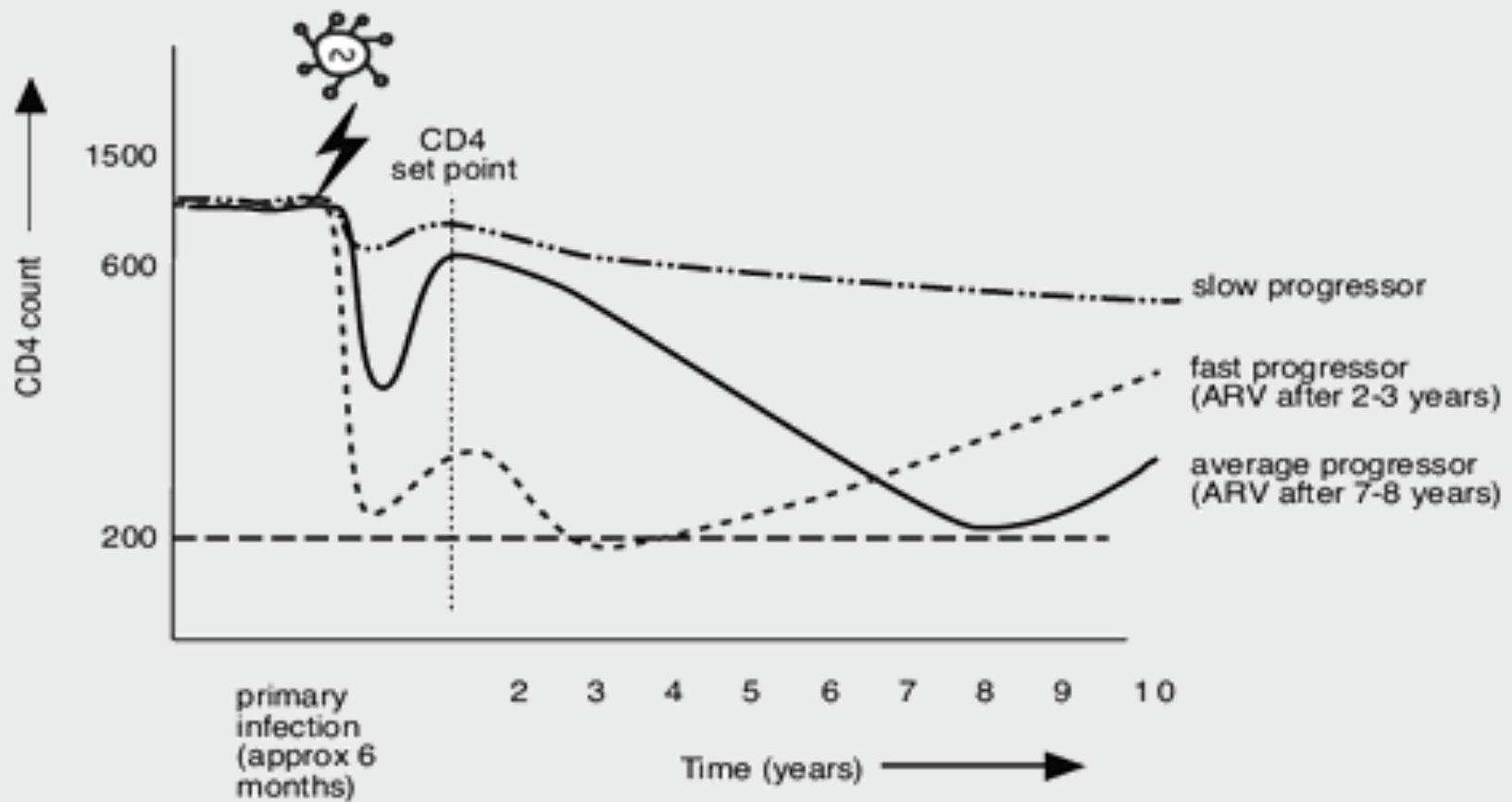
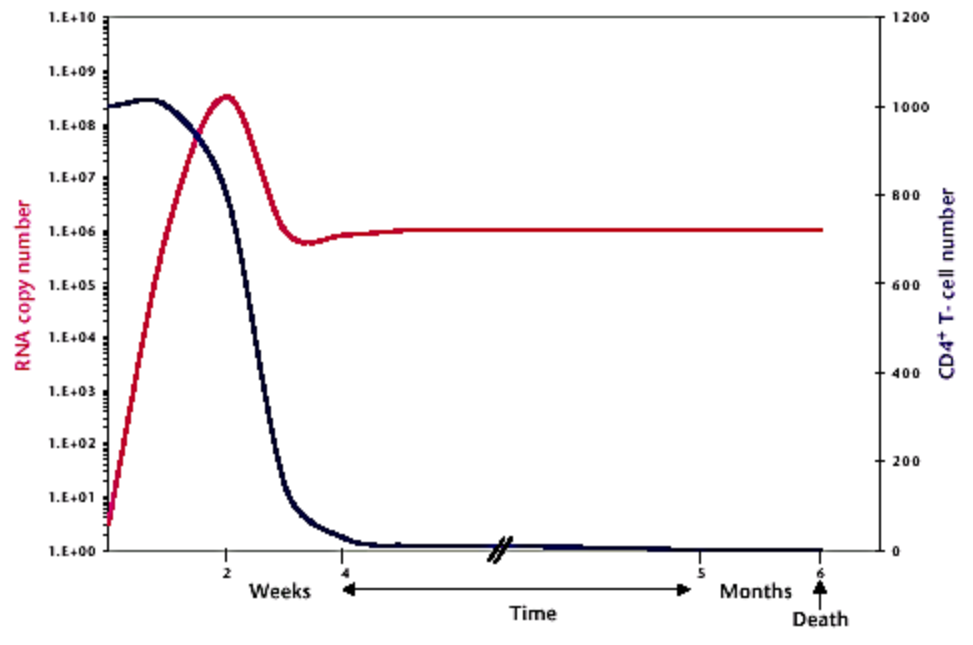
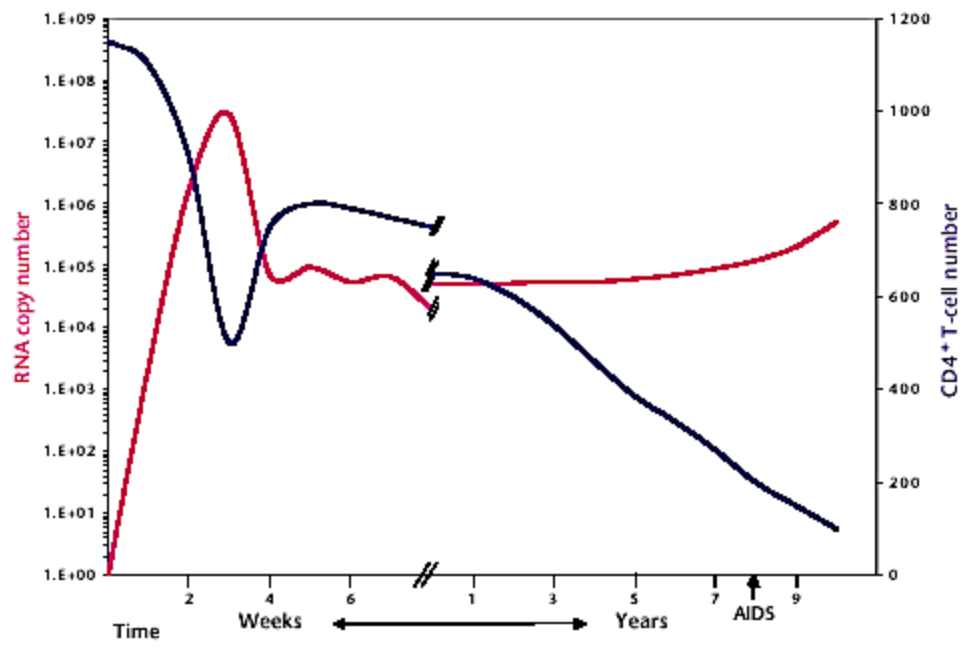


Figure 6
The viral RNA and the reverse transcriptase change the T-cell, giving it a new set of codes/info

CD4 CELLS with HIV







Global
HD

ALLERGIES?

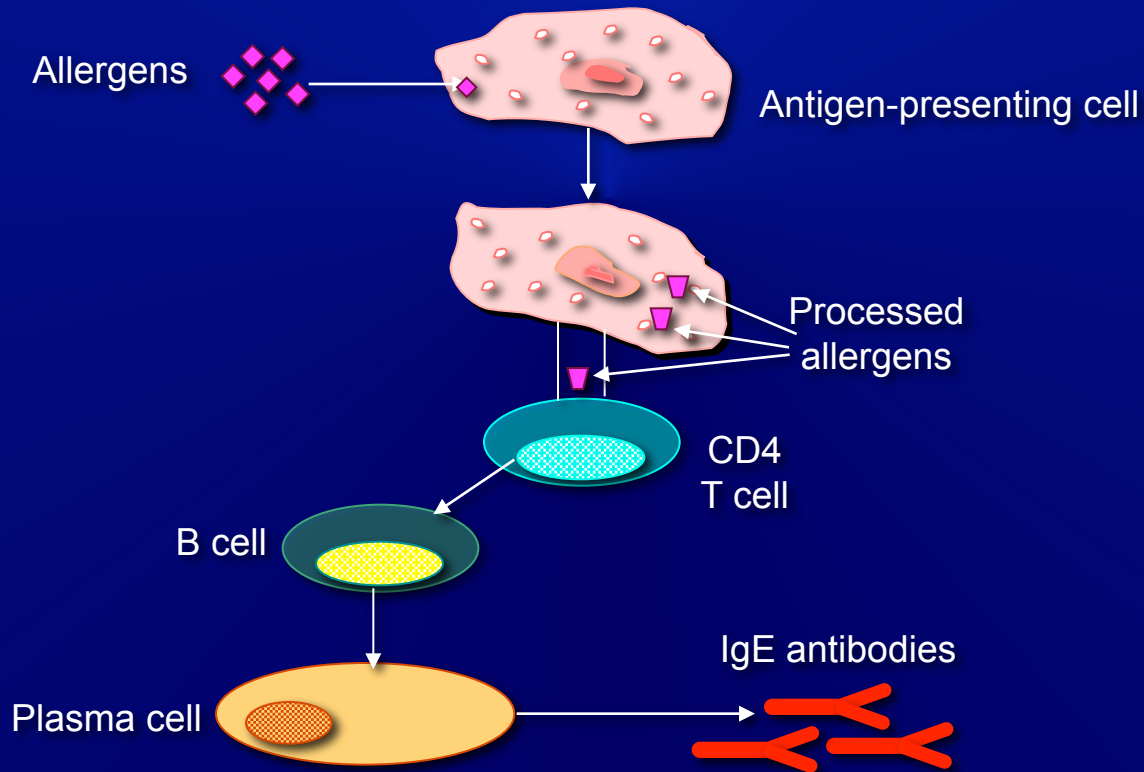


(C) WWW.OHMYGOODNESS.COM

MANGOSI

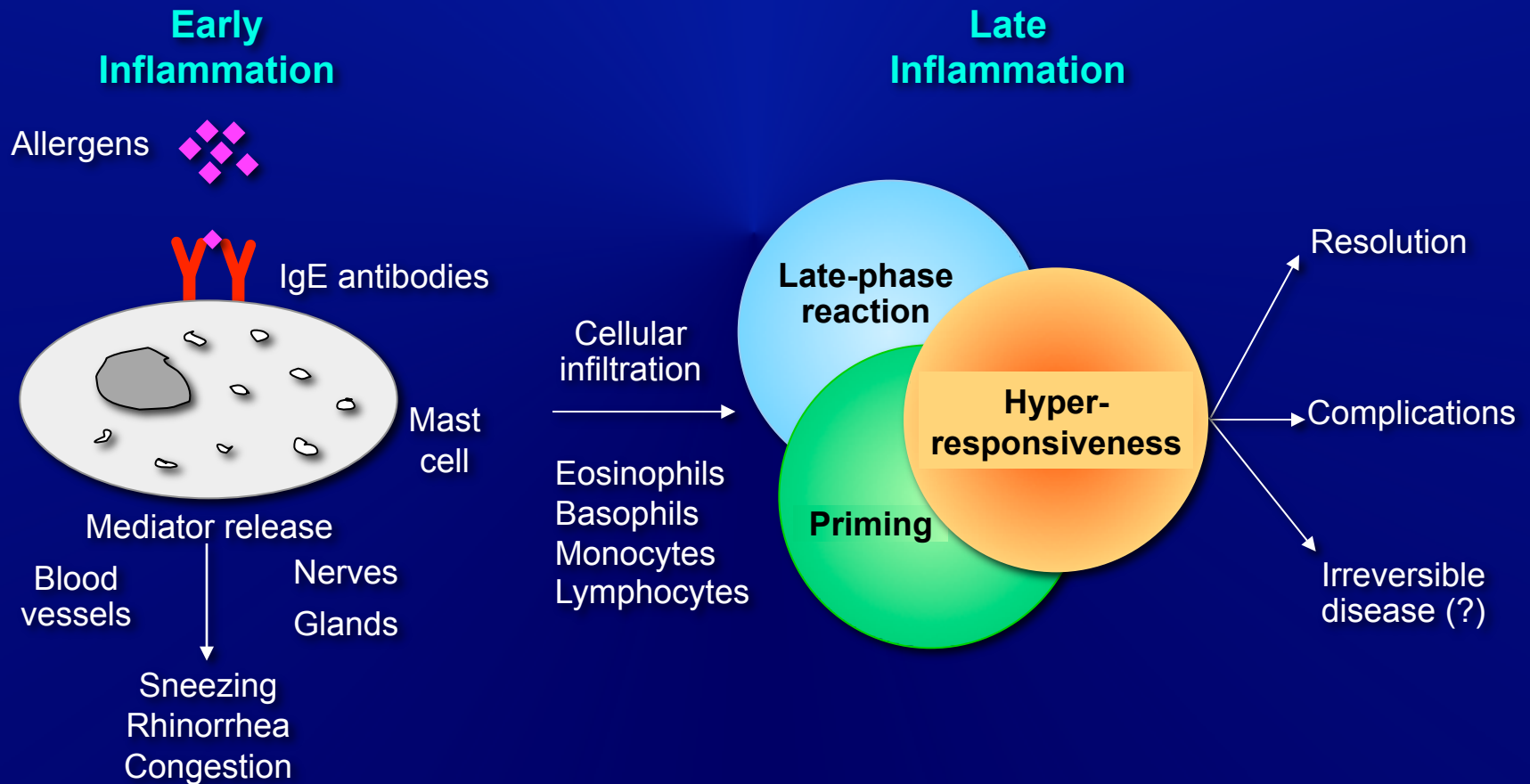
Pathophysiology of Allergic Inflammation: Sensitization

Phase 1: Sensitization



Pathophysiology of Allergic Inflammation: Clinical Disease

Phase 2: Clinical Disease

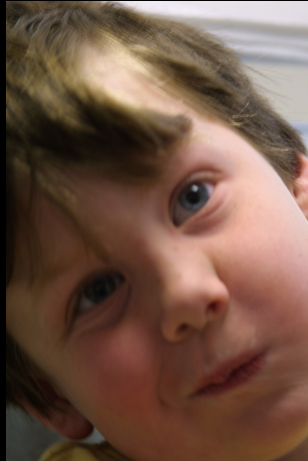


Allergic Rhinitis





The Eyes Have It!







CLOSE TO HOME By John McPherson



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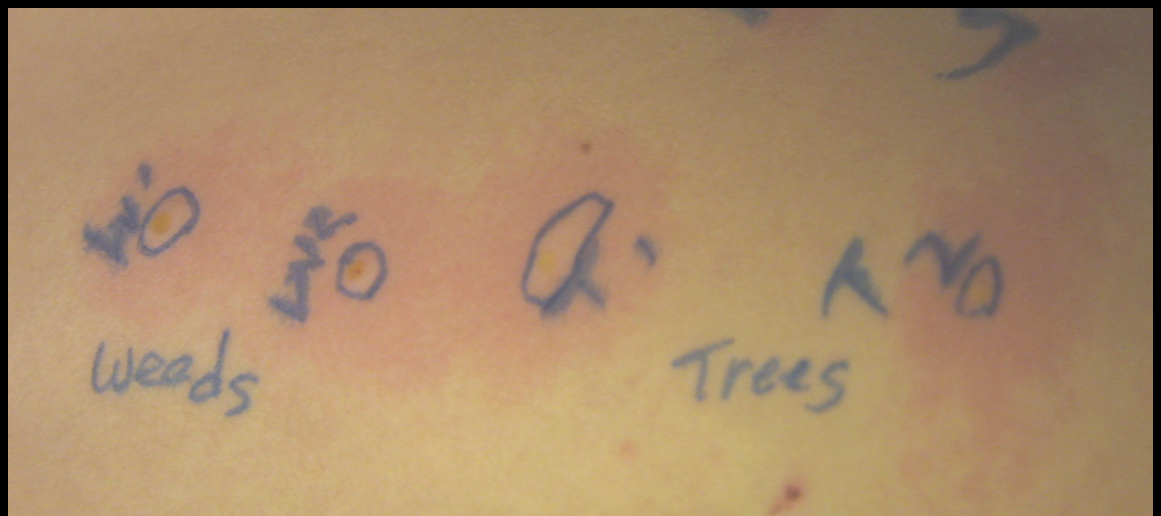
In the midst of final exams, Noreen developed an allergic reaction to algebra.



N Drive, Research, Patient Photos, Skin tests



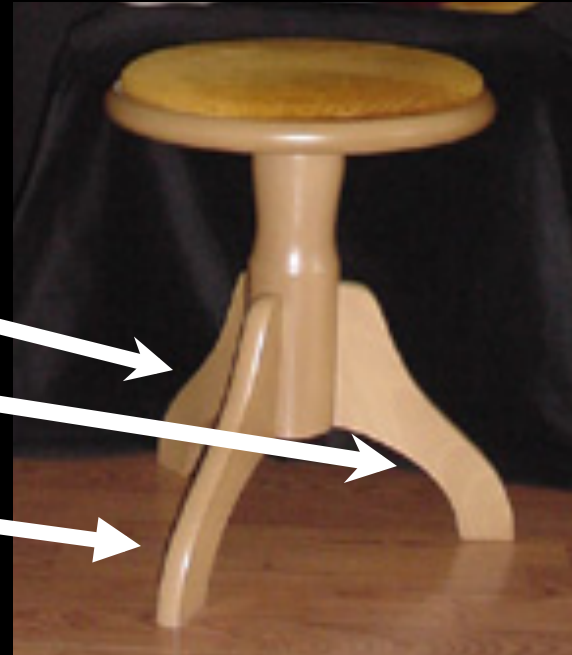
ST DOB: 04-09-1995
Skin Tests 12-28-2001 Weeds, Trees, Mixed Grass, Cat Pelt





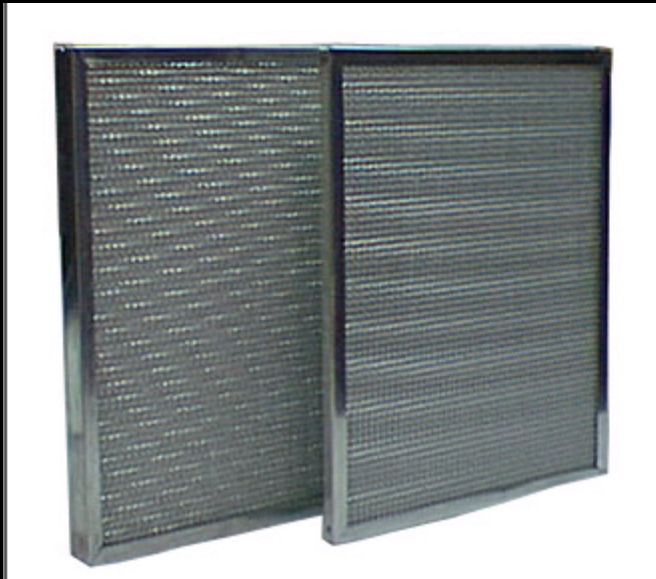
Three Legged Stool of Allergy Treatment

1. Avoidance
2. Medications
3. Immunotherapy



Avoidance





Medications





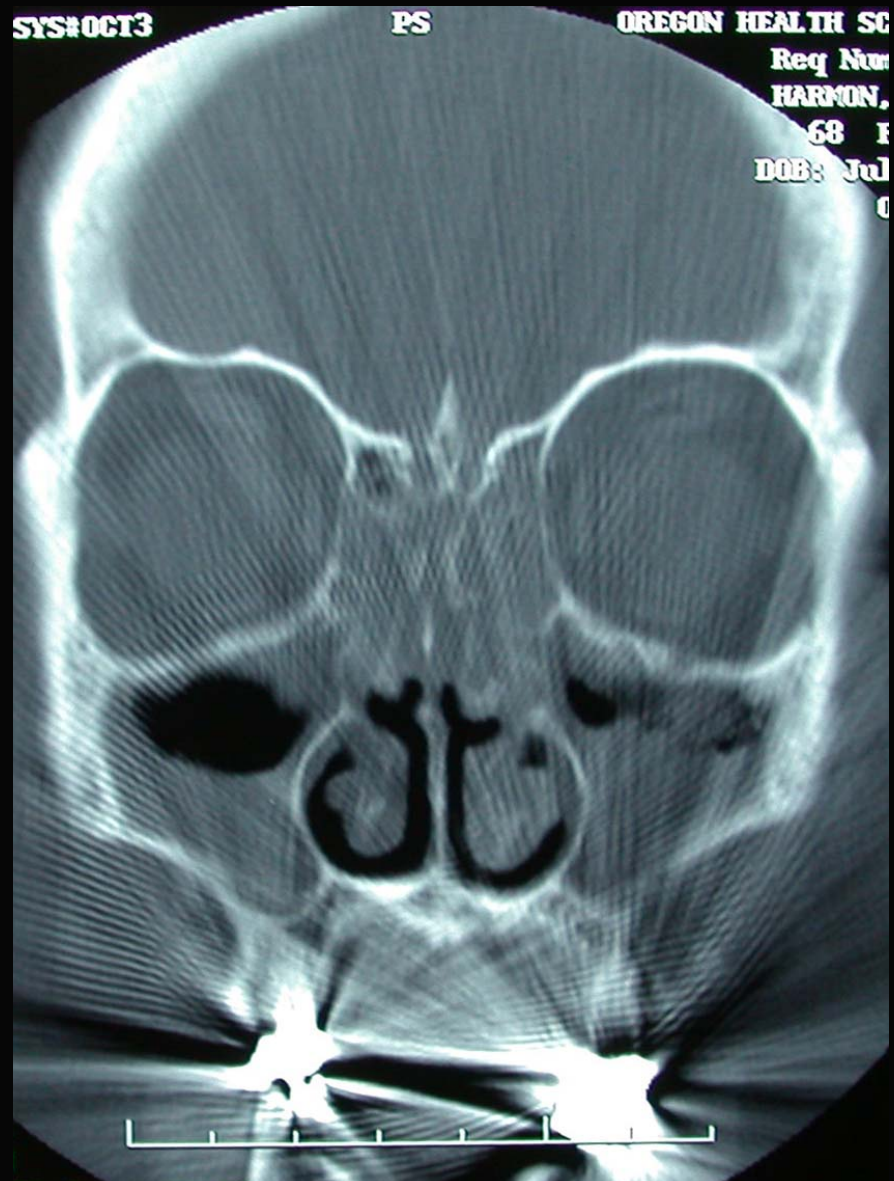
Immunotherapy



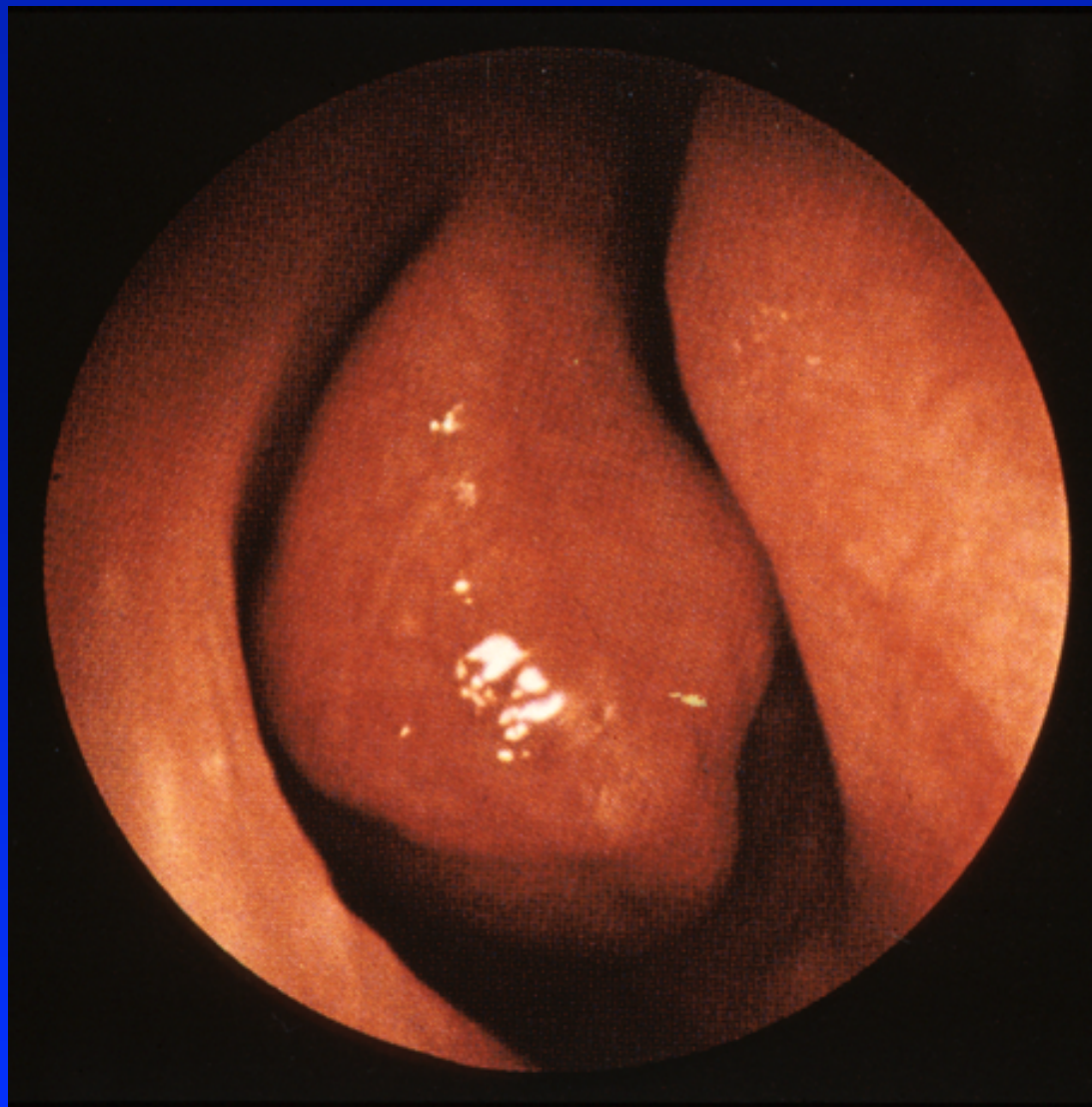
Chronic Sinusitis



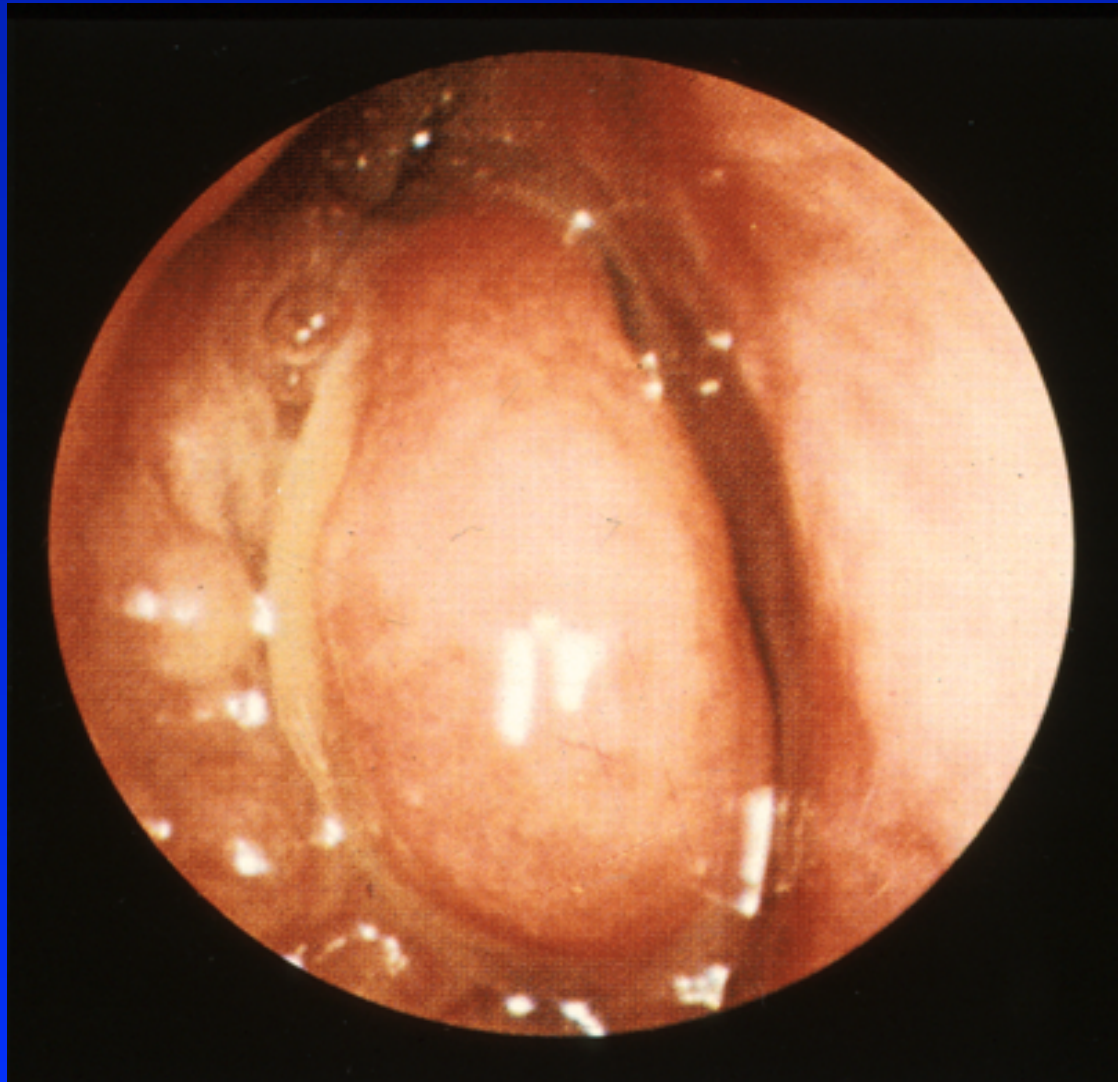
Photo—CT pansinusitis 2



Normal Endoscopy

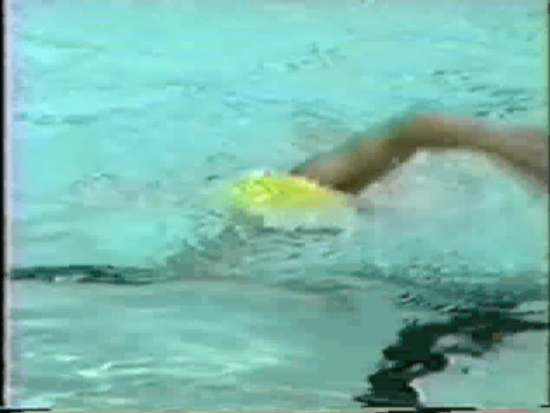


Endoscopy - Sinusitis



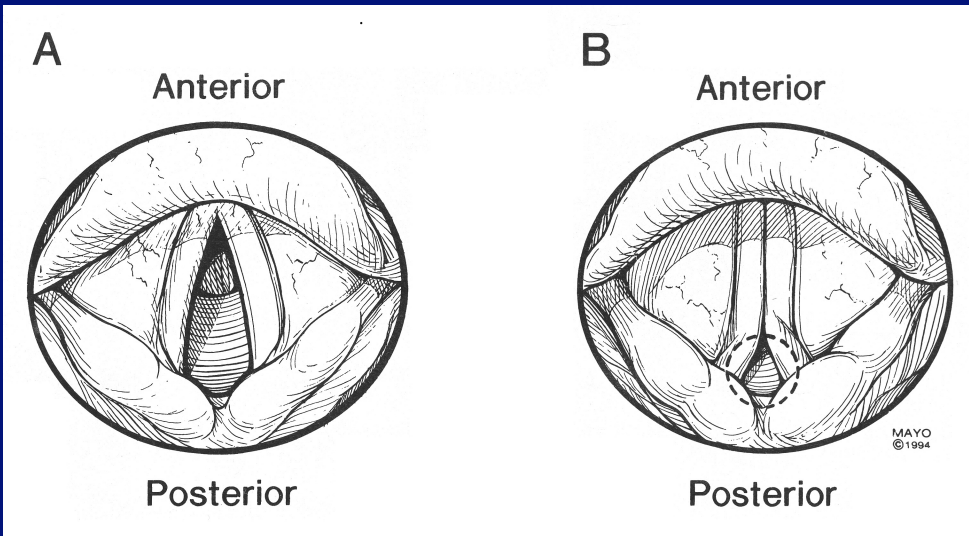


Vocal Cord Dysfunction



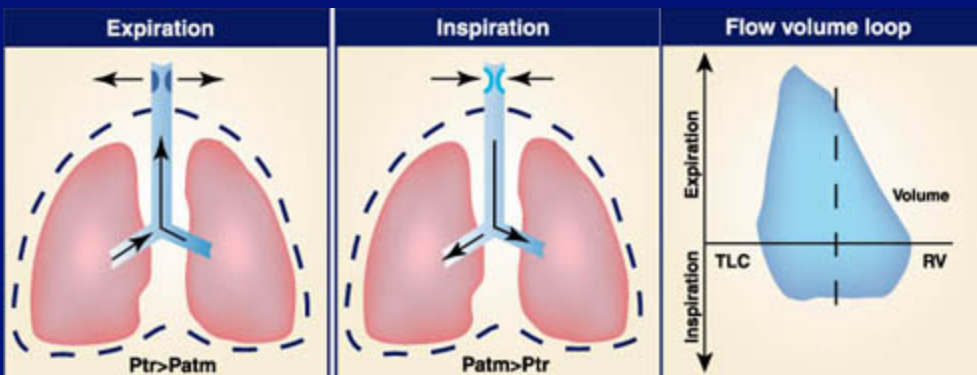
Ray Davis, Susan Brugman, Gary Larsen, JACI, 118, 6, 1329-31
June, 2007

Vocal Cord Dysfunction (VCD) Exercise Induced Laryngeal Dysfunction (EILD)

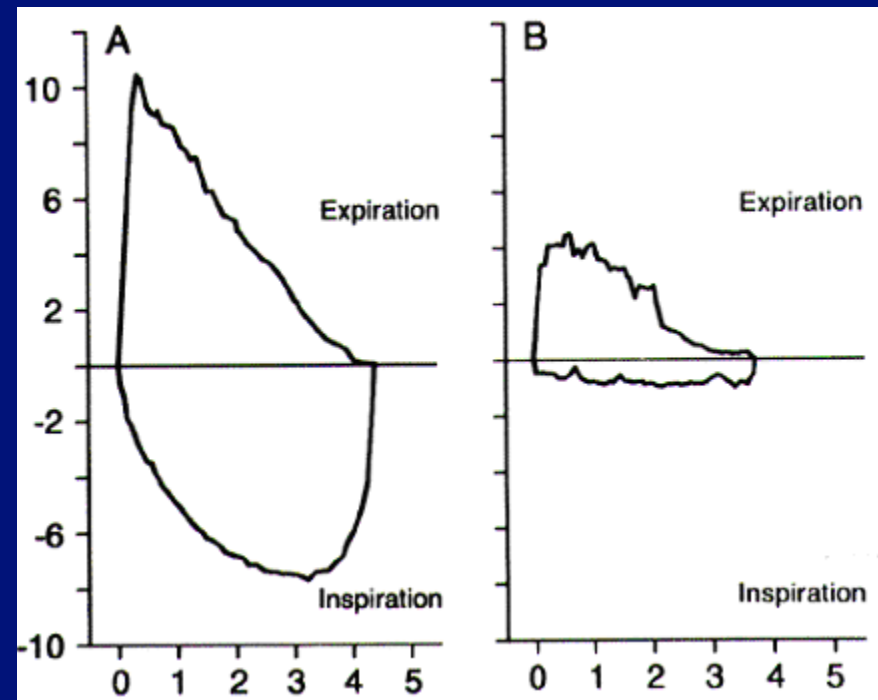


Normal

VCD

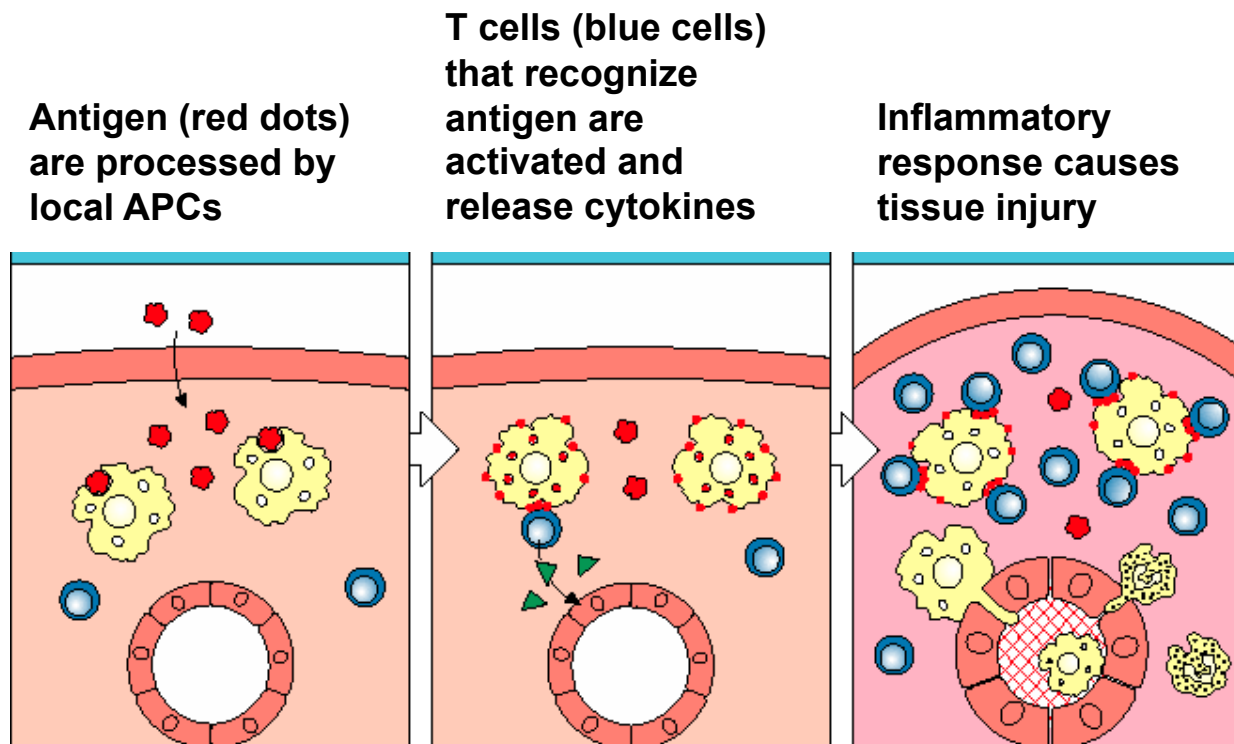


1. VCD
2. Exercise laryngeal prolapse
3. Exercise laryngomalacia



Type IV Hypersensitivity - A Delayed Reaction ⁷⁵

CONTACT DERMATITIS



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Antigen is presented by APC's to antigen-specific memory T cells.

They become activated and produce chemicals that cause inflammatory cells to move into the area, leading to tissue injury.

Inflammation by 2 - 6 hours with peak in 24 - 48 hours.

ALLERGIC CONTACT DERMATITIS

