

# SPECIFIC DEFENSES: IMMUNITY

revised 15 March 2016  
 Fr: TFC, 2nd Ed, 437.  
 Martini 6th: 798-817, 7th: 779-825, 8th: 796-822, 10th: 802-828

**FUNCTION:** specific antibody or T cell directed against specific antigen  
 enhanced with multiple exposure

IMMUNE SYSTEM has two components:  
 (p 803 for forms, 805 for overview)

**Humoral** (bodily fluid) soluble antibodies made by B cells  
**Cell-mediated** T cells recognize specific antigen, etc

## HUMORAL IMMUNE SYSTEM:

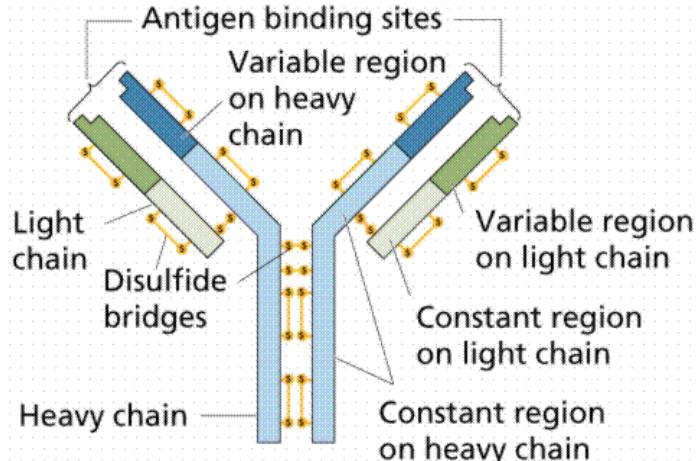
Serum carries **antibodies** in gamma globulin fraction  
 electrophoresis separates into  
 pos +: gamma, beta, alpha, album. negative -

**ANTIGENS:** carry determinant sites = haptens (grasp)

## GENERAL ANTIBODY STRUCTURE: p 812

draw molecule: label Ag binding site

- light chain
- heavy chain
- constant region
- variable regions
- compliment activating region



## MECHANISM OF IMMUNE RESPONSE:

- Fetal**
- 1) generation of library of immune cells by random recombination
  - 2) weed out (kill) cells which make Ab against self
- Mature**
- 1) Ag binds, stim immune cell to multiply producing memory and plasma cells (Clonal selection)
  - 2) anamnestic (upward memory) response due to memory cells

## ANTIBODIES:

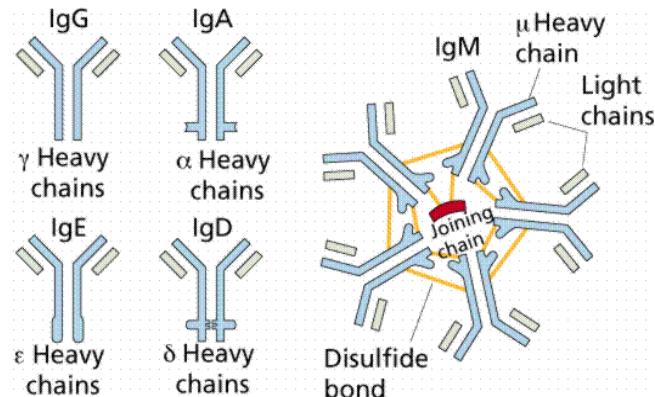
IgG: 80-85% can cross placenta, as illustrated p 813

IgM: 5-10% pentamer, first to appear, highly effective **agglutinators**, microorganisms, ABO blood group antibodies

IgA: 15 % carries secretory component, allows secretion into **saliva, tears, mucus, breast milk**

IgD: 0.2% cannot cross placenta, detectors on surface of B cells, do not fix complement

IgE: 0.002% bound to **mast cells**, triggers **release of histamine**, etc,



## CELL-MEDIATED IMMUNITY:

Established by thymus in young animal, produces "T cells" (T for thymus)

Immunity which is not transferred with blood

Effective against tumors, cells with foreign Ag on surface

**major histocompatibility complex** (MHC, p 807) are cell surface antigens NOT attacked by T cells.  
 MHC explains tissue rejection, even attractiveness during mate selection

## T Cells:

- |                      |   |
|----------------------|---|
| Tc:                  | cytotoxic (killer cells)  |
| Td:                  | delayed hypersensitivity, release <b>lymphokines</b> : macrophage chemotactic factor, lymphotoxin   |
| Th: helper cells     | detects foreign surface antigens, identifies, releases lymphokines which attract other immune cells |
| Ts: suppressor cells |   |

## ACQUIRED ACTIVE IMMUNITY:

natural through exposure to environmental antigens  
 artificial vaccines which purposefully expose the body to antigens

## ACQUIRED PASSIVE IMMUNITY

through colostrum  
 immunoglobulin injections

