DEFENSE: IMMUNITY

IMMUNE SYSTEM

Adaptive Immunity
- either natural or by immunization
- Passive Immunity
- natural through placenta and milk, or by gamma globulin injections

ANTIGENS:
- Anything that can cause antibodies to be made. Determinant sites = epitopes = hapteners (grasp) (p 463)

LYMPHATIC SYSTEM

System to bathe organs with lymph, filter lymph, house immune cells

TWO COMPONENTS OF IMMUNE SYSTEM:
- Humoral [bodily fluid] and Cell-mediated

HUMORAL SYSTEM

B cells (first seen in bursa of Fabricius) found in all lymphoid tissues, 10% of circulating lymphocytes. B cells secrete soluble antibodies, found in bodily fluids (humors)

Serum [whey] carries antibodies in gamma globulin fraction

Electrophoresis separates serum into protein fractions:
- POSITIVE (+):
  - gamma, beta, alpha, album. most NEGATIVE (-)

ANTIBODY STRUCTURE

Illustrate IgG: neutralization, opsinozation, agglutination,(468) [& precipitation]

ANTIBODIES: table: p 469

<table>
<thead>
<tr>
<th>Antibody</th>
<th>Percentage</th>
<th>Form</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG</td>
<td>80-85%</td>
<td>monomer</td>
<td>can cross placenta, Ag binding, light, heavy chains, constant, variable regions, compliment activating region</td>
</tr>
<tr>
<td>IgM</td>
<td>5-10%</td>
<td>pentamer</td>
<td>first to appear, highly effective agglutinators, microorganisms, ABO blood group antibodies</td>
</tr>
<tr>
<td>IgA</td>
<td>15%</td>
<td>dimer</td>
<td>carries secretory component, allows secretion into saliva, tears, mucus, breast milk</td>
</tr>
<tr>
<td>IgD</td>
<td>0.2%</td>
<td>monomer</td>
<td>cannot cross placenta, surface of B, cells, do not fix complement</td>
</tr>
<tr>
<td>IgE</td>
<td>0.002%</td>
<td>monomer</td>
<td>bound to mast cells, triggers release of histamine, anaphylactic rxns, etc</td>
</tr>
</tbody>
</table>

CELL-MEDIATED IMMUNITY:
- cells (thymus derived), 75% of circulating lymphocytes
- Immunity which is not transferred with blood
- Effective against tumors, cells with foreign Ag on surface

T Cells:
- Te: cytotoxic (killer cells)
- Td: delayed hypersensitivity, release lymphokines: macrophage chemotactic factor, lymphotoxin
- Th: helper cells
- Ts: suppressor cells

Recognition of self: (p 473) Apoptosis (detach, fall): Clonal selection hypothesis: Burnet in 1950s:
- Immune cells generated by random genetic recombination: portions of DNA deleted, spliced together
- Each cell makes only a single antibody, unique to that cell, coats itself with it
- Fetal encounter with an antigen which reacts with the cell coating leads to destruction of cell, creating sense of self (tolerance)
- Titer = highest dilution which still shows agglutination (etc)

MAJOR HISTOCOMPATIBILITY COMPLEX: (p 474) glycoproteins identify self.

MECHANISM OF IMMUNE RESPONSE:
- Clonal selection, memory and plasma cells
- anamne stic (upward memory response) increases strength of immune response with each exposure

ACQUIRED IMMUNITY:
- natural through exposure, artificial, vaccines

HYPERSENSITIVITY:
- Four types, I, II, III, IV.
- I Anaphylaxis: within minutes, either systemic or localized, IgE Ab are cytotoxic
- IV delayed hypersensitivity: 12-24 hours later, tuberculin, PI, hapten binds to cells, T cells and macrophages move in, trigger inflammation.