Chapter 10

1. Autoimmunity Auto=self, immunity against your own body
    a. Immune system recognizes "self" cell antigens (Ag) as "foreign" Ag
    b. Immune response (IR) results in abnormal auto-antibodies (auto-Ab) and auto-reactive T cells
    c. Type II and III hypersensitivity
    d. 5-7% of the U.S. population suffer from autoimmune disorders
        i. Women > men
        ii. Mostly in adults 20-40 years old
        iii. Mostly chronic
        iv. High morbidity (complications) and mortality
2. Autoimmunity: Risk Factors= idiopathic, they are risk factors- *not etiology*
    a. Genetic- genes that code for yourself
        i. MHC/HLA
            1. MHC- major histocompatibility complex
            2. MHC 1- found on nucleated cells
            3. MHC 2- found in immune cells
        ii. Gender
        iii. Genetic mutations
    b. Hormonal
        i. Viral/bacterial infections
        ii. Lifestyle/Stress
    c. Environmental
3. Autoimmune Disease Classification
    a. Organ-specific: damage to a single organ (Hashimoto thyroiditis)
    b. Systemic: auto-Ab damage multiple organ systems (systemic lupus erythematosus) whole body
4. Immunodeficiency Disorders: Primary
    a. Congenital born with, or inherited
        i. Present at birth
        ii. Genetic: spontaneous mutation or inherited
        iii. Most defects are minor/subclinical
    b. Acquired
        i. HIV/AIDS
    c. B and T Cell Combined Disorders

i. Severe combined immunodeficiency (SCID) "Bubble boy"- completely no contact with the outside world, starting at birth. It is too easy for them to contract fatal infections and die.

d. T Cell Disorders
   i. DiGeorge syndrome –missing thymus
   ii. What to remember- "Catch 22"

C- Cardiac abnormalities

A- Abnormal facies

T- Thymic aplasia (no production of thymus)

C-Cleft lip/palate

H-Hypocalcaemia or hyperparathyroidism

22- chromosome 22

e. B Cell Disorders
   i. IgA Deficiency most common
   ii. **B**rutons Agammaglobulinema
      1. no **B** cell production= no immunoglobulins
      2. Lactose intolerant
      3. Mainly found in **B**oys
      4. X-linked
      5. Symptoms normally present around 6 months of age
f. Disorders of phagocytes
g. Complement deficiencies

5. Immunodeficiency Disorders: Secondary
   a. Etiological factors
      i. Physical: increasing age, bone marrow infiltration by tumor cells (if bone marrow doesn't have the room to produce B cells, then it wont)
      ii. Psychosocial: depression, stress
      iii. Nutritional: malnutrition, mineral deficiency
      iv. Environmental: viruses, **splenectomy** (increased risk of encapsulated bacteria- the spleen normally gets rid of the encapsulated bacteria)
      v. Pharmacological: alcohol, chemotherapies (chemotoxic), immunosuppressants (suppress immune system- prednisone) (corticosteroids)

b. Usually transient
    i. Temporary
    ii. Can be altered
        1. Take away depression/drugs and take away immunodeficiency
c. Not usually present at birth

6. Immunodeficiency Disorders: HIV-Induced
    a. HIV
        i. Retrovirus Reverse transcriptase as the enzyme, meaning it goes backwards (RNA)- the virus is able to incorporate into the DNA of the host so when the cell is replicated, the virus is now replicated. The more its replicated, the more virus you are infected with
        ii. Gains access to infect CD4 lymphocytes, result in cell death
        iii. STD
        iv. Diagnosis: HIV Ab, viral load, < 200 CD4 cells/mm^3 blood. Less than 200 means AIDS. The higher the viral load, means its getting worse, and the more infected you are.
        v. Causes AIDS
    b. AIDS
        i. Diagnosis: HIV Ab, viral load, < 200 CD4 cells/mm^3 blood, impaired/delayed hypersensitivity, presence of opportunistic infection
        ii. Therapy: highly active anti-retroviral therapy (HAART)- Anti-retrovirals don't eradicate the virus, it just limits the amount of T-Lymphocytes infected, causing the survival rate to increase. This prevents the patient from getting AIDS because it reduces the CD4 cells from decreasing, and keeps the viral load from increasing.
        iii. Research into HIV vaccine development- Research has shown that the newly developed vaccines aren't lasting long enough to help because they mutate so fast that they are no longer useful.
        iv. Pneumocystic Jirovecii- sign of AIDS

7. Hypersensitivity: "overreaction" to stimuli of our immune system
    a. Excess I.R. (humoral/cell-mediated) against normally harmless Ag
    b. Mechanism: Ag-Ab (humoral) or Ag-lymphocyte (T-lymphocyte) interaction
    c. Classification:
        i. Type I: **immediate (<5 min)**, anaphylactic
        ii. Type II: cytotoxic, antibody dependent
        iii. Type III: immune complex (I.C.) mediated
        iv. Type IV: **delayed (>24 hours)**, cell mediated