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Sequence Intro

Monday, February 11, 2008
9:00 AM

- Origins of a disease state: inherited, chemical toxicity, trauma, dietary, infectious pathogen, immune response to self
- The Immune Response
  - Pathogen enters body and travels to nearest lymph node/spleen
  - Innate immunity (non-specific) cells take up pathogen
    - Macrophages specialized to phagocytose
    - Neutrophils for phagocytosis and activation of bactericidal mechanisms
    - Dendritic cells acquire and present pathogens to the immune systme
  - Lymphocytes w/ specific antigen receptors recognize antigen
    - Recognition phase of immune response - T and B cells recognize the pathogen by binding to receptors on cell surface
    - Binding of antigen to specific receptor on cell surface
    - Antigens - foreign molecules w/ a distinctive shape
    - Carrier, immunogen - large molecules (>8aa) that are able to elicit a response
    - Hapten, determinant, epitope - small molecules that cannot elicit an immune response but can bind to an antibody
  - B cells - produce antibodies to bind antigens; fxn'l term; one antibody/epitope
    - Immunoglobulin - structural term for antibody
    - Small, round, WBCs; 8-10 microns
  - Activation phase: T and B cells differentiate and divide
  - Adaptive immunity: protection against pathogens that involves specific immunity
  - T cells - development in thymus, CD3 on surface
    - CD4 - helper T - interact with B cells to help them make large amounts of antibody
    - CD8 - cytotoxic T - recognize antigens on the surface of cells infected w/ viruses or intracellular bacteria and kill those cells
    - Do everything via cell to cell contact - cell mediated immunity
  - Effecter phase - pathogen is neutralized or otherwise eliminated
    - Helper T cells produce cytokines to act on other cells
    - Lymphokines secreted by one WBC to act on another
      - Interleukins act on other WBCs
    - B cells --> plasma cells --> secrete antibodies; humoral immunity
  - Active Immunization: organism's own immune cells and antibodies mediate response
  - Passive immunization: administration of immune cells or antibodies from another individual
- Immunological Memory
  - Generation of memory T cells and B cells during activation phase
  - Subsequent encounter w/ pathogen, memory cells make a faster, more vigorous, qualitatively different/better response
  - Basis of vaccination
- Most of the time, active immune response desired w/ notable exceptions
  - Transplantation
  - Allergy
  - Autoimmune disease
- Characteristics of Immune Response
  - Specificity of recognition
  - Diversity of recognition
  - Memory/secondary responses
  - Tolerance