Immune Cell Receptor Complex Structures

I. Signal Transduction Overview
  A. Definition
    1. process
  B. Kinases
    1. tyrosine kinases
    2. serine/threonine kinases
    3. phosphatase
  C. Receptor categories
    1. non-receptor tyrosine kinases
    2. receptor tyrosine kinases (RTKs)
    3. nuclear receptors
    4. seven-transmembrane receptors = G protein-coupled receptors
    5. others
  D. Immune receptor family
    1. ITAMs
    2. ITIMs
  E. Coreceptors

II. B Cell Receptor Complex
  A. BCR
  B. Accessory molecules
  C. B cell coreceptor complex
    1. CR2
    2. CD19 & CD81

III. T Cell Receptor
  A. Overview
    1. clonally distributed
  B. $\alpha\beta$ TCR
    1. structure
      a. extracellular domain
        1) Ig-like domains
          a) variable Ig-like (V)
            - hypervariable (CDRs)
          b) constant (C)
      b. hinge region
      c. transmembrane domain
      d. cytoplasmic domain
    2. recognition of MHC complex
      a. loops
      b. affinity
  C. CD3 and ζ (zeta) Proteins of the TCR Complex
    1. CD3
      a. structure
        1) extracellular
        2) transmembrane domain
        3) cytoplasmic domains
    2. ζ (zeta)
      a. structure
        1) extracellular domain
        2) transmembrane domain
        3) cytoplasmic domain
      b. function
      c. ZAP-70
  D. TCR summary

IV. CD4 and CD8
- A. Structure
  - 1. CD4
  - 2. CD8
- B. Functions
- C. Costimulatory Receptors of T cells

V. MHC
- A. Discovery
- B. Overview
  - 1. Class I MHC
  - 2. Class II MHC
- C. Structure
  - 1. properties of both classes
    - a. extracellular domain
      - 1) cleft
      - 2) Ig-like domain
    - b. transmembrane domain
    - c. cytoplasmic domain
  - 2. Class I MHC Molecules
    - a. proteins
      - 1) α chain
      - 2) β2-microglobulin
    - b. cleft
  - 3. Class II MHC Molecules
    - a. proteins
      - 1) α chain
      - 2) β chain
    - b. cleft
    - c. Ig domains
- D. In the cleft
  - 1. peptide-MHC Interactions
  - 2. structural basis of binding