

## I. General Principles

- A. Binding Specificity - ability of receptor to distinguish closely related substances
- B. Cellular response

## II. Intracellular Receptors

## III. Cell Surface receptors

- A. Overview
- B. Classes
  - 1. Ion-channel-coupled receptors
  - 2. G-protein-coupled receptors
  - 3. Enzyme-coupled receptors

## IV. Ion-channel-coupled Receptors

## V. G Protein-coupled Receptors

- A. Components
- B. Receptor Structure
- C. G Protein part of GTPase Superfamily
  - 1. Molecular functioning
    - a. Guanine nucleotide Exchange Factor (GEF)
  - 2. Two subfamilies
    - a. Trimeric
    - b. Monomeric
- D. Trimeric G proteins
  - 1. Structure
  - 2. Activation
  - 3. Deactivation
- E. Toxins
  - 1. *Vibrio cholera*
  - 2. *Bordetella pertussis*
- F. G protein Effector Proteins
  - 1. adenylyl cyclase
    - 1) cAMP phosphodiesterase
  - a. Protein Kinase A
  - 2. phospholipase C
    - a. PIP<sub>2</sub>
      - 1) DAG
      - 2) IP<sub>3</sub>
    - b. IP<sub>3</sub>
      - 1) calmodulin
    - c. DAG
      - 1) protein kinase C
  - 3. ion channels
- G. Down regulation

## VI. Enzyme Coupled Receptors

### A. Overview

## VII. Receptor Tyrosine Kinases (RTKs)

### A. Structure

1. dimers
2. Off

### B. Ras / Raf Pathway

1. GRB2
  - a. SH2 domain
  - b. SH3 domain
2. Sos
3. Ras
4. Raf
5. MAP kinase kinase kinase
6. MAP kinase kinase
7. MAP kinase
8. transcription factors
9. Turning off Ras
  - a. GAP

### C. Phosphoinositide 3-kinase

1. Protein kinase B (PKB) = Akt
2. Bad

## VIII. Receptors with no enzymatic activity

### A. JAK / STAT pathway

1. receptor
2. JAK
3. STAT
4. Off
  - a. SOCS

### B. Protein cleavage

1. NF- $\kappa$ B & I- $\kappa$ B