Hormone Function

To study a hormone and its action you must know about:
- Its origin
- Storage
- Secretion
- Transportation
- Mechanism of action
- Function
- Metabolism
- Chemical structure

Best known hormones, insulin, catecholamines, steroids

General Model for Hormone Biosynthesis

Storage, Transport and Metabolism

Protein/peptide hormones
- Cells with much R.E.R.
- Protein packaging in the golgi
- Merging of vesicles
- Movement of vesicles to the membrane
- 3 fates
  - Into blood (endocrine)
  - Reabsorbed (autocrine)
  - To a neighboring cell (paracrine)

Steroid hormones
- Cells with much S.E.R.
- Acetate cholesterol → Larger lipids
- Coalescence into large granules
- Movement of vesicles through the membrane
- 3 fates
  - Into blood (endocrine)
  - Reabsorbed (autocrine)
  - To a neighboring cell (paracrine)
General Model for Hormone Biosynthesis
Storage, Transport and Metabolism

• Steroid hormones
  – Multicellular synthesis
  – Multitissue synthesis
  – Noncellular systems

General Model for Hormone Biosynthesis
Storage, Transport and Metabolism

• Prohormones
  – Large, biologically active precursors (mostly found in protein hormones)
  – Clevage to active and inactive peptides

General Model for Hormone Biosynthesis
Storage, Transport and Metabolism

• Prohormones
  – Significance
    • Hormone storage
    • Spatial configuration for synthesis
    • Efficient movement of large amts of protein

  • Ex. insulin

General Model for Hormone Biosynthesis
Storage, Transport and Metabolism

• Prohormones
  – Significance of Hormone storage
    • No degradation
    • Inactive
    • Readily available for secretion

• Secretion of hormones
  – Movement of granules to membrane (microtubules)
  – Ca and energy dependent membrane changes

• Hormone Degradation
  – Liver, kidney, lung
  – ½ life
  – Binding proteins

General Model for Hormone Biosynthesis
Storage, Transport and Metabolism

• Binding proteins
  – Plasma proteins made in the liver
  – Equilibrium: bound ↔ unbound

• Functions of binding
  – Good storage, increases ½ life, blood brain barrier.

• Metabolism
½ lives in minutes
- Enzymatic degradation in liver, lung, or kidney
- Oxidations, reductions, deaminations, methylations
- Sulfate or glucurononic conjugation (water soluble)
- Trace amounts in feces

General Model for Hormone Biosynthesis
Storage, Transport and Metabolism
- Each of these processes contributes to the overall level of hormone in the blood.