Human Growth Hormone

Metabolic Effects

- **Protein Metabolism**
  - increase amino acid transport into cell
  - enhances ribosomal activity
  - enhances mRNA synthesis

- **Lipid Metabolism**
  - increases lipolysis
  - enhances beta-oxidation

Metabolic Effects (cont.)

- **Carbohydrate Metabolism**
  - decreases cellular uptake of glucose
  - diabetogenic effect
    - lipids favored as energy source
    - increases gluconeogenesis in the liver
    - increases plasma glucose levels

Growth Hormone and Growth Effects

- **Factors affecting growth**
  - genetic background
  - diet
  - freedom from chronic disease and stress
  - hormones
    - GH, thyroid hormone, insulin, estrogen, androgens, etc.

Ossification

- **Intramembranous**
  - flat bones
  - bone repair
  - increase diameter of long bones

- **Endochondral**
  - most long bones
  - cartilage precursor
  - primary/secondary ossification centers
    - diaphysis
    - epiphysis
    - epiphysial plates
Somatomedins (IGF’s)

- Insulin-like growth factors
  - IGF I, IGF II
- Differences between IGF-1 and IGF-II
  - Puberty
  - Adult
  - Embryo

Regulation of Growth Hormone (cont.)

- GHRH/GHIH
  - produced by hypothalamus
  - released into ant. pit. via hypothalamic portal system
- Other factors
  - low glucose
  - low fatty acids
  - high proteins
  - sleep, stress, exercise

Pathologies

- Giantism
  - high levels of GH
  - usually due to pituitary tumor
  - hyperglycemia---diabetes mellitus
- Dwarfism
  - most due to low levels of GH
    - Laron Dwarfism
      - normal to high levels of GH
      - Low IGF-I; Mutated GH receptor
    - Pygmies
    - Poodles

Pathologies (cont.)

- Acromegaly
  - occurs in adults after fusion of epiphyseal plates
  - increase size of intramembranous bones
    - facial bones, bones of hands and feet
  - increase diameter of all bones
  - increase tissue growth