Growth Hormone

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Bio-synthesis and mechanism of action

- Long arm of chromosome 17 contains GH cluster that contains 5 genes:

hGH-N, hGH-V, hCS

Protein metabolism

- Enhancement of amino acid transport through cell membranes
- Enhancement of RNA translation to cause protein synthesis by the ribosomes
- Increased nuclear transcription of DNA to form RNA
- Decreased catabolism of protein and amino acids- acts like **protein sparer**

Enhances fat utilization for energy

- Causes release of fatty acids from adipose tissue
- Enhances conversion of fatty acids to acetyl co-A
- Hence under the influence of GH fat is used for energy in preference of carbohydrates and proteins
- Fat utilization along with protein anabolic effect causes an increase in lean body mass

- Ketosis can occur
- Excessive fat mobilization from adipose tissue also leads to fatty liver

GH decreases carbohydrate utilization

- Decreased glucose uptake in tissues
- Increased glucose production by liver
- Increased compensatory insulin secretion
- GH is diabetogenic- fatty acids impair insulin's action
- GH fails to promote growth in animals that lack pancreas and if carbohydrates are excluded from diet

GH Stimulates cartilage and bone growth

- Increased deposition of protein by chondrocytic and osteogenic cells
- Increased rate of reproduction of these cells
- Conversion of chondrocytes to osteogenic cells
- GH strongly stimulates osteoblasts

Somatomedins

- Secreted by liver
- Also called Insulin like Growth Factor (IGF)
- Pygmies of Africa have congenital inability to synthesize somatomedins
- Somatomedins have prolonged action