

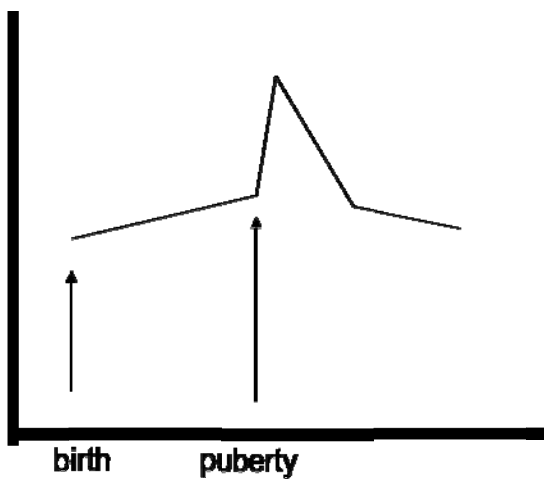
## ANTERIOR PITUITARY GLAND

- **Hormones:**
  - 1- TSH
  - 2- FSH
  - 3- LH
  - 4- GH
  - 5- PROLACTIN
  - 6- ACTH.

## GROWTH HORMONE

- Somatotropic hormone, somatotropin.
- Somatotrophs.(20%)
- 191 AA.
- MW 22000 kD.
- 1.6 – 3 nanograms/ml
- GHRH (ventromedial nucleus).

## REGULATION OF SECRETION



- Pulsatile every 2H.

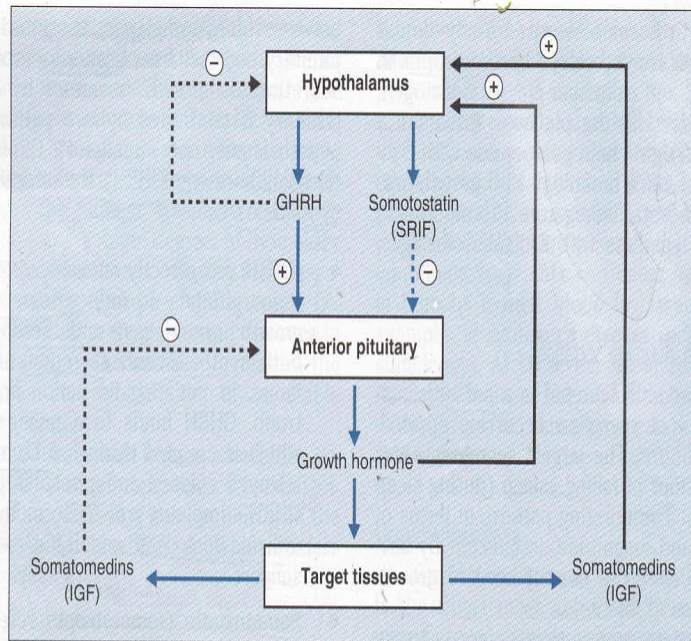


FIGURE 9-10. Regulation of growth hormone secretion. GHRH, growth hormone-releasing hormone; IGF, insulin-like growth factor; SRIF, somatotropin-release inhibiting factor.

- **GHRH → receptor → Gs protein → Adenylyl cyclase and phospholipase C → cAMP and IP3/Ca → secretion + → synthesis.**
- **Somatostatin (SRIF) → receptor Gi → inhibit generation of cAMP → Decrease secretion.**

### ACTION OF GROWTH HORMONE

- Direct.
- Skeletal muscles, liver and adipose.
- Indirect (somatomedine IGF).
- 4500-7500 MW.
- Somatomedine C.

### **EFFECT ON CARBOHYDRATE**

1- Increase blood glucose.

Diabetogenic effect

2- Increase glycogen deposition.

3- Decrease glucose utilization in energy.

Increase in insulin.

### **EFFECT ON PROTEIN**

4- Increase protein synthesis.

a- Increase AA uptake.

b- Increase DNA synthesis.

c- Increase RNA synthesis.

5- Decrease protein catabolism.

### **EFFECT IN FAT**

1- Increase FFA.

2- FFA → Acetyl-CoA → energy

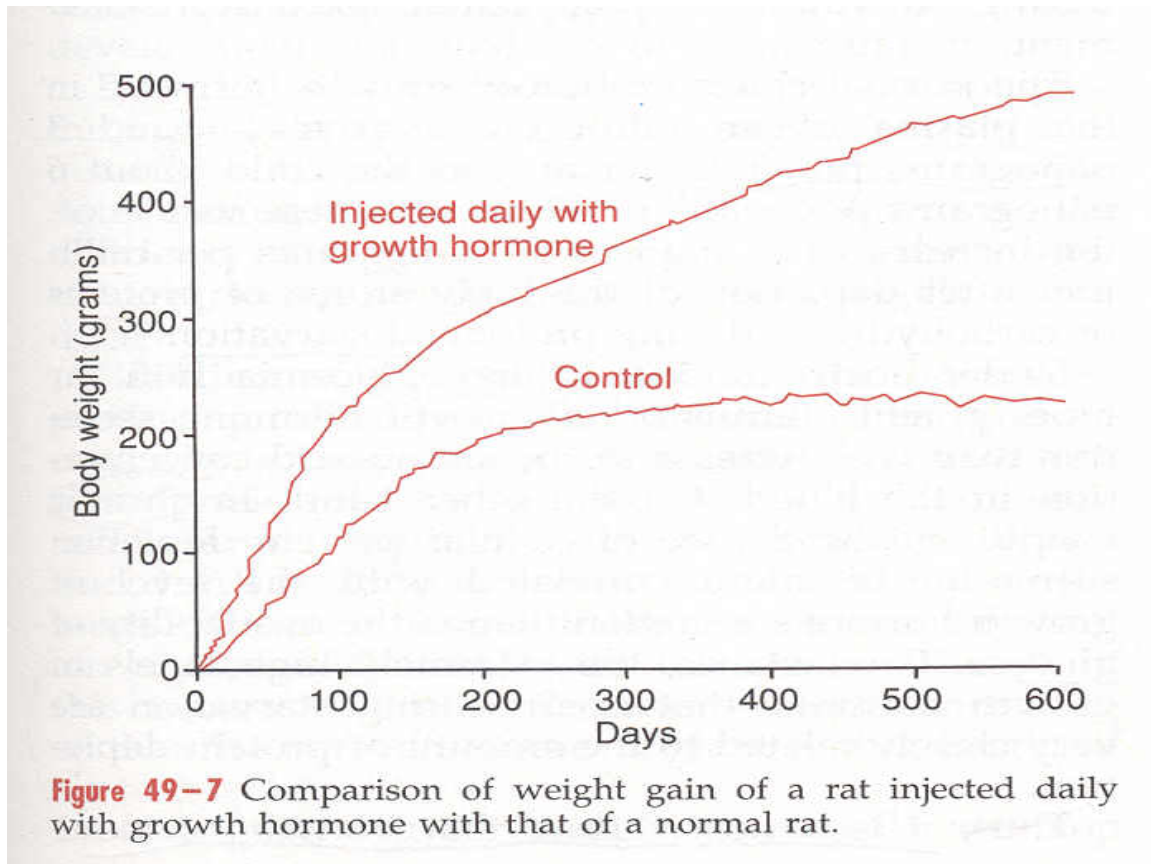
### **EFFECT IN BONE AND CARTILAGE**

1- Increase linear growth.

2- Increase metabolism in cartilage forming cells.

3- Increase proliferation of chondrocytes.

4- Widening of the epiphyseal plate.



- **GH or Somatomedins?**

#### Factors affecting growth hormone secretion

Stimulatory factors	Inhibitory factors
Decreased glucose concentration	Increased glucose concentration
Decreased free fatty acid concentration	Increased free fatty acid concentration
Arginine	Obesity
Fasting or starvation	Senescence
Hormones of puberty (estrogen, testosterone)	Somatostatin
Exercise	Somatomedins
Stress	Growth hormone
Stage III and IV sleep	$\beta$ -Adrenergic agonists
$\alpha$ -Adrenergic agonists	Pregnancy

## ABNORMALITIES

### 1- Hyposecretion of GH.

Dwarfism.

Causes?.

where?

### 2- Hypersecretion.

- Often associated with tumor.
- Gigantism.
- Acromegaly.
- Octreotide.

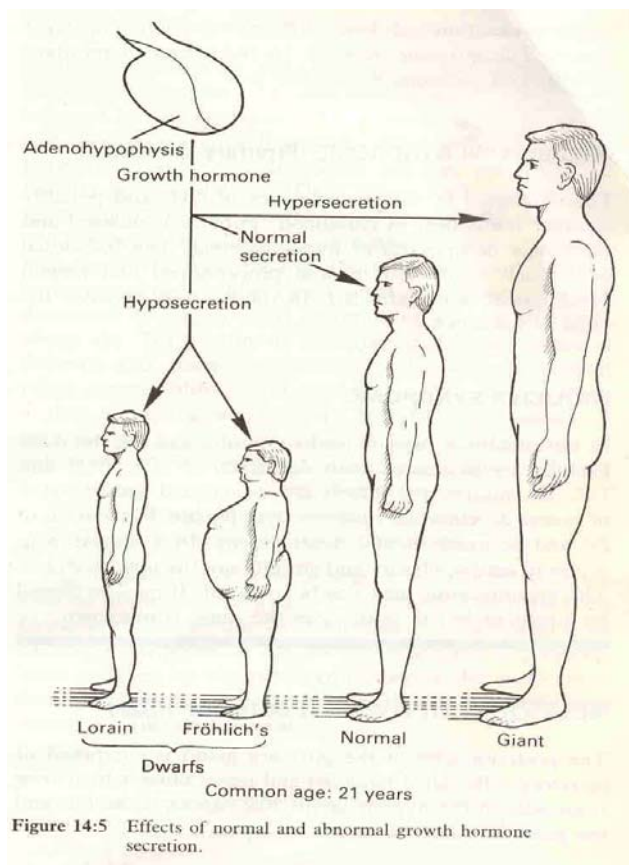


Figure 14:5 Effects of normal and abnormal growth hormone secretion.

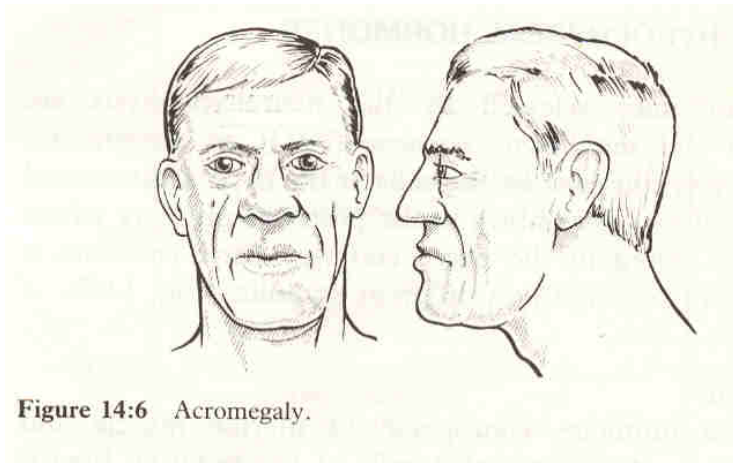


Figure 14:6 Acromegaly.



Figure 49-8 An acromegalic patient. (Courtesy of Dr. Herbert Langford.)