TSH, Thyroid stimulating hormone
ACTH, Adrenocorticotropin hormone
FSH, Follicle-stimulating hormone
LH, Luteinizing hormone
MSH, Melanophore-stimulating hormone
GH, Growth Hormone
PRL, Prolactin
The rate of growth

• The growth period in boys extend from birth till the age of about 20 years (18 years in girls).

• The rate of growth is high immediately after birth (5 cm ‘in the first month).

• This rate drops sharply in the first two years down to about 8 mm/month then the drop continues at a slower rate.

• At the onset of puberty (12 - 14 yrs in boys, 11 - 12 yrs in girls), there is a pubertal spurt of growth but this is followed by rapid decline, then arrest of growth due to union of epiphyses.
• The size of the viscera also increases.
• The increase in the size of the heart without parallel increase in its blood supply leads to high tendency of myocardial ischemia and a special type of cardiomyopathy “acromegalic cardiomyopathy”.
• Glucose tolerance is reduced and frank diabetes is common.
• Pressure on the optic chiasma by the pituitary tumor could lead to bitemporal hemianopia.
Dwarfism

- Dwarfism is a state of short stature with normal proportions which results from lack of growth hormone activity during the growth period.
- According to the mechanism which causes the lack of GH activity, there are four types of dwarfism:
  - a. **Pituitary dwarfism**
    Caused by deficiency in hypothalamic GRH or in pituitary GH. Can be treated by synthetic GRH or GH.
  - b. **Laron dwarfism**: Caused by lack of response of the tissues to the secreted GH due to absence of GH receptors on the cells can be treated by IGF-I
• Treatment of all types of dwarfism should always start before puberty (i.e. before union of epiphysis).

• Except for their small size, and some acceleration of the aging process, dwarfs have normal functioning of different organs. At the age of puberty, there is a little spurt of growth due to the direct action of androgens, but this is followed shortly by arrest of growth because of the union of epiphyses.

• There is normal maturation of the sexual organs and functions. Mental development and brain functions are normal. The metabolic rate is normal.
Effects of hyper secretion of prolactin

- Hyper prolactinemia results from "prolactinomas"—prolactin-secreting tumors of the mammotropes of the anterior pituitary.

- Prolactinomas are the most common type of pituitary tumors.

- It is found in over 10% of the population, but clinical manifestations appear in a small minority.
Treatment

• Dopamine or dopamine agonists, e.g. bromocriptine are successful in suppressing prolactin secretion and reducing the size of the tumor.

• The manifestations disappear with successful treatment.
The pituitary gonadotropins

• Gonadotropins are hormones which act on the gonads (testes or ovaries).
• Two gonadotropins are secreted by the anterior pituitary, i.e. the follicle-stimulating hormone (FSH) and the luteinizing hormone (LH).
• Both hormones are secreted in response to stimulation by the hypothalamic gonadotropin-releasing hormone (GnRH)
Lutinizing hormone (lh)

• Actions
• In the male: It stimulates the interstitial cells of Leydig in the testis to secrete testosterone.
• In the female: It reduces ovulation by rupture of the graafian follicle, formation of the corpus, formation of the corpus luteum, and secretion of estrogen and progesterone by the corpus luteum.
Manifestations

• A) Hypofunction of other glands:
• i) Hypoadrenocorticism: There is atrophy of the zonae fasciculata and reticularis of the adrenal cortex, with resultant drop in plasma glucocorticoids and adrenal androgens.
• The patient can not tolerate stressful conditions.
• In females, there is decrease in libido, and lack of axillary, and pubic hair.
• Zona glomerulosa, and its aldosterone secretion are maintained.
• The stress-induced increase in aldosterone does not occur any more, but the increase induced by salt depletion persists.
• Salt depletion does not occur, except in long-standing cases.
• ii) Hypothyroidism → decrease in general metabolism → less metabolic waste products:

• E) Pallor of skin:
• This due to lack of ACTH and other hormones with melanocyte stimulating hormone MSH) activity.

• F) Bodyweight:
• There is no loss of weight. Only some decrease in protein mass may be found, but patients with pituitary insufficiency tend to be well nourished.
• The cachexia and emaciation which was reported before in cases of hypopituitarism was due to “anorexia nervosa” which may be present in some cases.