

# Anthropology 215

## Growth II: Factors Affecting Growth

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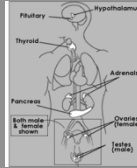
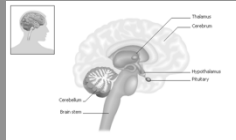
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# Factors Affecting Growth

Growth  
Nervous system  
Hormonal system



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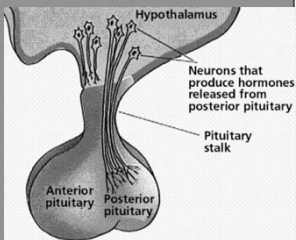
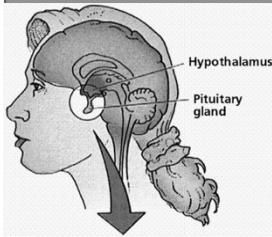
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**Hypothalamus**  
➤ 7 hypothalamic hormones that affect the release of the pituitary gland hormones

**Pituitary gland**  
➤ master gland



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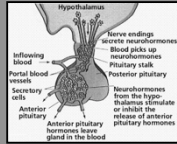
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**Pituitary hormones regulate reproduction:**

- Gonadotropin - stimulate gamete formation and production of sex hormones, which include
  - follicle-stimulating hormone-FSH
  - luteinizing hormone-LH
- Prolactin - near the end of pregnancy and prepares the breasts for milk production

**Other anterior pituitary gland hormones:**

- Thyroid stimulating hormone, TSH (or Thyrotropin) - metabolism
- Growth hormone (GH) - skeletal growth and protein synthesis



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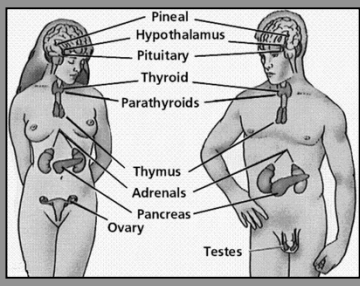
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**Endocrine System**

Hormones  
Trophic  
Non-trophic



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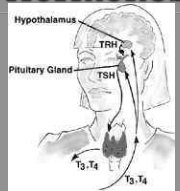
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**Trophic Hormones**

- e.g. Thyroxine Stimulating Hormone (TSH) or thyrotropin produced by pituitary gland
- low levels of TSH → triggers hypothalamus to release TSH-Releasing Hormone (TRH) → release of TSH from anterior pituitary → stimulates production of thyroid hormone, or thyroxine



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## Non-trophic Hormones

Growth Hormone (GH) or somatotrophic hormone

GH-Releasing Hormone produced by the hypothalamus

hypertrophy – when cells under the action of GH increase in size

hyperplasia – when cells under the action of GH increase in number

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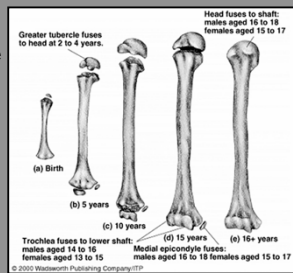
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## Sex Hormones

During adolescence replacement of cartilage by bone, halting further bone growth even though GH is still present.



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## Growth Hormone

Gigantism - too much of GH before skeletal maturity

Acromegaly (gross thickening of bone) - too much of GH after skeletal maturity

Dwarfism - too little of GH



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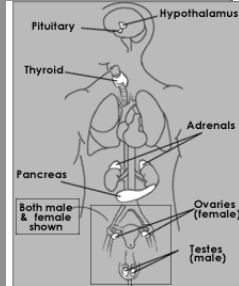
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## Hormones important to human growth

- 1) thyroid hormone: thyroxine  
promotes general body growth and development and promotes skeletal, dental and sexual maturation  
Thyroid deficiencies are linked to Cretinism
- 2) Insulin – produced by islets of Langerhans of Pancreas  
diffusion of glucose  
protein synthesis



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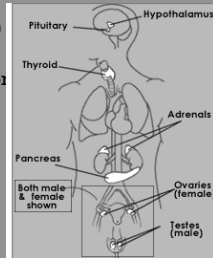
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## Hormones important to human growth

- 3) Androgen (e.g., testosterone)  
responsible for secondary sexual characteristics at puberty and for epiphyseal bone closure
- 4) Estrogen  
female sex hormones



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## Diseases and Nutritional Inadequacies

thalidomide – drug administered to pregnant women in 1<sup>st</sup> trimester in UK; resulted in babies lacking limbs

pre-natal growth period - most often due to maternal undernutrition or to placental exchange problems

post-natal growth

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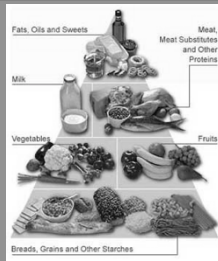
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## Basic components of the diet

- protein - growth and the maintenance of structures
- carbohydrates - primary fuel for energy yielding reactions
- lipids (fat cells)- are for fuel storage
- vitamins
- minerals



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## Protein-Calorie Malnutrition (PCM)

Undernutrition - an inadequate calories  
Malnutrition - inadequacy of some key element  
Kwashiorkor - Ghanaian word meaning "second child disease"

- diet low in protein, especially animal protein
- symptoms include fat and distended bellies



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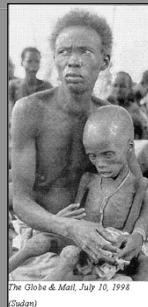
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## Marasmus

diet is low in both protein and calories and the result is starvation

**Hypercalcemia:**  
excessive vitamin D



**Marasmus**

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**Secular trends**

- decline in age of menarche
- increase in height
- socioeconomic
- males reaching maturity earlier

**Population variability**

- population differences with regard to child and adult stature, body weight, body proportions, and rate of maturation

**Seasonal Factors**

- Growth in height is fastest in the spring and growth in weight is fastest in the autumn

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**Other Factors Affecting Growth**

**Psychological disturbances**

- Widdowson (1951) study of rations in orphanage

**Socio-economic Differences**

Upper class are always more advanced along the course to maturity

**Size of Family**

Height, weight, auditory and visual acuity, and mental ability all had lower values in children of 3-sib and larger families

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