Tishk International University
Faculty of Applied Science
Department of Nutrition and Dietetics

Nutritional Biochemistry II/ NUT 204

TOPIC: Hormones

2nd Grade- Spring Semester 2025-2026

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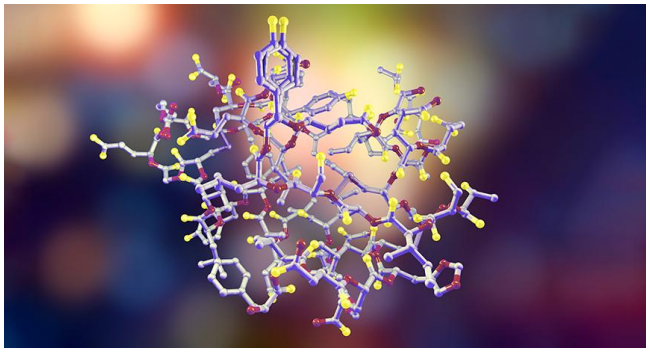
Objectives:

- ✓ Definition
- ✓ Importance of Hormones
- ✓ Types of hormones

Hormones Are your body's chemical messengers.

Hormones are substances produced by highly specialized tissues called the "Endocrine" or "Ductless glands", carried by bloodstream to a remote tissue or viscera called the "Target Organ" on which they exert characteristic physiological effects.



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Importance of Hormones

- They travel in your bloodstream to tissues and organs.
- They work slowly, overtime and affect many different processes including*;*

✓ ***Growth and Development***

✓ ***Metabolism***

✓ ***Sexual function***

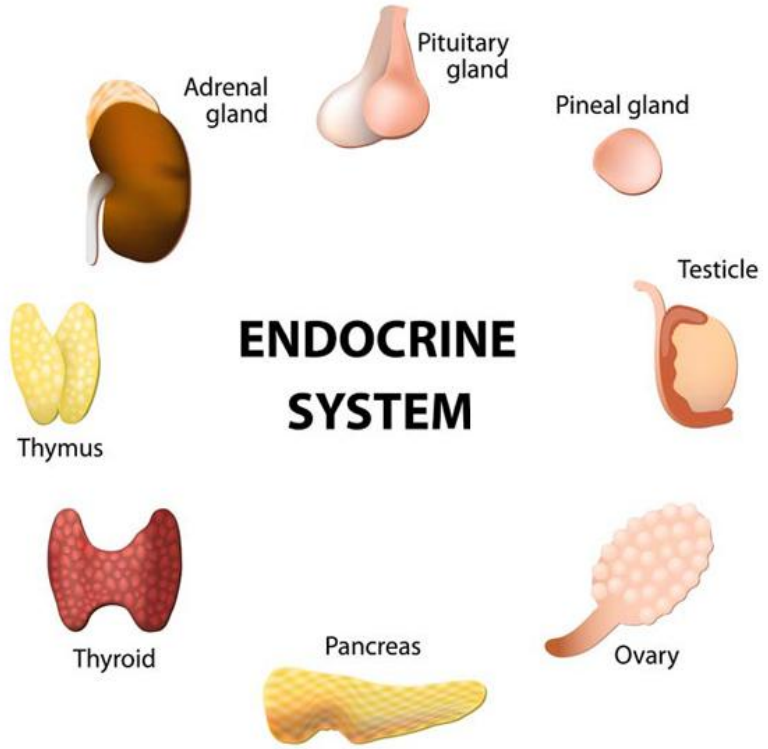
✓ ***Reproduction***

✓ ***Mood***

Endocrine Glands which are special groups of cells, make hormones.

The major endocrine glands are;

- *Pituitary*
- *Pineal*
- *Thymus*
- *Thyroid*
- *Adrenal glands*
- *Pancreas.*



- Hormones are powerful. It takes only a tiny amount to cause big changes in cells or even your whole body.
- *That's why!*

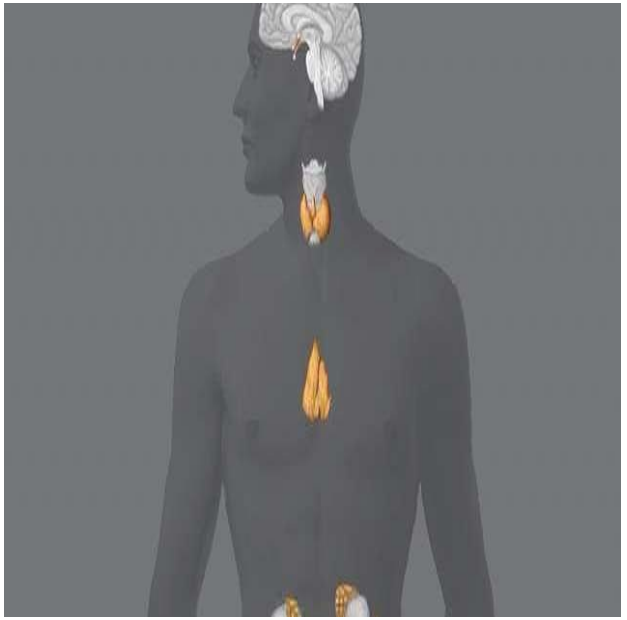
Too much or too little of a certain hormone can be serious.

- Laboratory tests can measure the hormone levels in your blood, urine or saliva.

Examples of some human hormones and roles they play

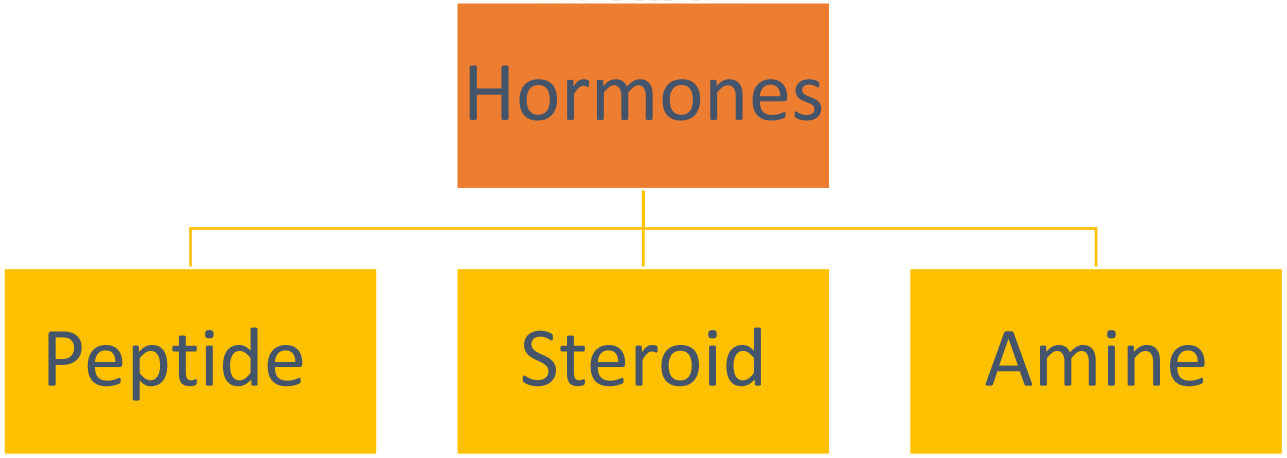
The human body makes around 50 different hormones, which direct the timing of actions by cells and tissues throughout the body. Here are some of them:

- Adrenaline
- Estradiol
- Ghrelin
- Insulin
- Leptin
- Melatonin
- Testosterone
- Thyroxine



Types of Hormones

Hormones can be categorized into 3 distinct groups according to their chemical composition:



Peptide Hormones

Are proteins that have an effect on the endocrine system of animals.

Like other proteins, peptide hormones are synthesized in cells from amino acids according to mRNA transcripts.

- Several important peptide hormones are secreted from the pituitary gland.

(Prolactin, ACTH & Growth hormone) – anterior pituitary

(Antidiuretic hormone & Oxytocin) – posterior pituitary

Steroid Hormones

Steroid hormones are a group of hormones, derived from cholesterol, from the class of compounds known as steroids.

The steroid hormones are synthesized mainly by endocrine glands such as the gonads (testis and ovary), the adrenals and (during gestation) by the fetoplacental unit, and are then released into the blood circulation.

They act both on peripheral target tissues and the central nervous system (CNS). An important function of the steroid hormones is to coordinate physiological and behavioural responses for specific biological purposes, e.g. reproduction.

Amine Hormones

- ✓ Are derived from the amino acid tyrosine and include adrenaline, thyroxin and triiodothyronine.
- ✓ Amine hormones do not all share identical properties and have properties common to both peptide and steroid hormones .

- ✓ Another example of amine hormone derived from tryptophan is melatonin, which is secreted by the pineal gland and helps regulate circadian rhythm.

- ✓ Tyrosine derivatives include the metabolism-regulating thyroid hormones, as well as the catecholamines, such as epinephrine, norepinephrine, and dopamine.

- ✓ Epinephrine and norepinephrine are secreted by the adrenal medulla and play a role in the fight-or-flight response, whereas

- ✓ dopamine is secreted by the hypothalamus and inhibits the release of certain anterior pituitary hormones.

1. Hormones of Thyroid

Thyroid gland basically release two hormones;

Triiodothyronine T3 & *Thyroxine T4*

These hormones;

- regulate weight,
- Determine energy levels,
- Internal body temp, skin& hair, etc.

2. Insulin

- This hormone is secreted by pancreas.

- Helps in keeping blood sugar level from getting too high i,e. hyperglycemia

OR

- too low i,e. hypoglycemia

3. Estrogen

- A female sex hormone, released by ovaries.
- Excess of Estrogen in the female body increases the risk of breast cancer, uterine cancer, depression, moodiness, etc.
- Low levels lead to acne, skin lesions, thinning skin, hair loss etc.

4. Progesterone

- This hormone is produced in the ovaries and the adrenal glands.
- It stimulates and regulates various functions.

5. Prolactin

- Released by the pituitary gland after a child birth.
- During pregnancy this hormone level rises and has role in fertility by inhibiting FSH.

6. Testosterone

- A male sex hormone.
- It's an anabolic steroid by nature which helps in building body muscles.
- Also promotes secondary sexual characteristics like increasing the mass of muscles & bones, growth of body hair, etc.
- If TESII is insufficiently secreted it may lead to bone loss.

7. Serotonin

- It’s a mood-boosting effect hormone.
- It’s associated with;

Learning & memory, regulating sleep, digestion, regulates mood, some muscular functions, etc.

- Low levels of serotonin causes depression, migraine, weight gain, insomnia, craving of carbs, etc.

- Excess level of serotonin in the body causes agitation, stage of confusion, sedation, etc.

8. Cortisol

- This hormone is produced by the adrenal gland.
- Helps you stay healthy and energetic.
- It's main role is to control physical and psychological stress.
- High levels of cortisol consistently causes ulcer, high blood pressure, anxiety, etc.
- Low levels causes alcoholism, condition responsible for a chronic fatigue syndrome, etc.

9. Adrenaline

- It's secreted in the medulla in the adrenal gland as well as some of the CNS's neurons.
- (Emergency hormone).
- It increases metabolic rate.
- Create a specific response during stressful situations.

10. Growth Hormone

- ✓ It's basically a protein hormone having 190 amino acids, which is synthesized and secreted by somatotrophs in the anterior pituitary.
- ✓ It stimulates growth, cell reproduction, cell regeneration and in boosting metabolism.
- ✓ It's important in human development.