

# Medical Terminology

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# MEDICAL TERMINOLOGY

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## Lecture Four

### ENOCRINE SYSTEM

The **endocrine system** (end/o means “within”; crin/o means “to separate or secrete”) consists of glands that produce special chemicals called **hormones** . This system is responsible for maintaining homeostasis, a balance or stable condition within the body. Unlike the nervous system, the endocrine system responds more slowly to internal changes in the body. Its release of hormones is regulated by the nervous system, which is either stimulated or delayed according to an intricate feedback mechanism. This feedback system in the body strives to maintain the homeostatic environment through a coordination of the two systems. The nervous system plays a vital role in regulating endocrine functions as it directs the release of hormones that influence other tissues in the body.

**Endocrinology** is the medical practice of treating **endocrine** and hormonal disorders. The practitioner, an **endocrinologist** (end/o means “within”; crin/o means “to separate or secrete”; -logy means “to study”; -ist means “specialist”) specializes in caring for patients with endocrine diseases and hormonal dysfunctions that may involve sexual development, body growth, or other body functions. The Lecture covers seven of the more common glands .

[ Pituitary gland , Thyroid gland , Parathyroid gland , Adrenal gland , pancreas , Ovaries ] .

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Tab 8-1 Summary of endocrine gland Hormones and hormones function

| Gland                              | Hormone                              | Hormone Function  |
|------------------------------------|--------------------------------------|---|
| pituitary<br>anterior lobe         | growth hormone (GH)                  | master gland; regulates activities of other glands<br>growth and development of bones, muscles,<br>other organs   |
|                                    | thyroid-stimulating hormone (TSH)    | growth and development of thyroid gland   |
|                                    | adrenocorticotropin hormone (ACTH)   | growth and development of adrenal cortex  |
|                                    | follicle-stimulating hormone (FSH)   | stimulates production of sperm in the male and<br>growth of ovarian follicles in the female   |
|                                    | luteinizing hormone (LH)             | stimulates the production of testosterone in<br>the male and secretion of estrogen and<br>progesterone in the female  |
|                                    | prolactin hormone (PRL)              | stimulates milk secretion in the mammary glands   |
| posterior lobe                     | melanocyte-stimulating hormone (MSH) | regulates skin pigmentation   |
|                                    | antidiuretic hormone (ADH)           | stimulates the reabsorption of water by the<br>kidney tubules   |
|                                    | oxytocin                             | stimulates the uterus to contract during labor<br>and delivery  |
| thyroid                            | thyroxine (T <sub>4</sub> )          | influences growth and development, both<br>physical and mental  |
|                                    | triiodothyronine (T <sub>3</sub> )   | maintenance and regulation of metabolism  |
| parathyroid                        | calcitonin                           | decreases the blood level of calcium  |
| adrenal                            | parathormone (PTH)                   | increases the blood level of calcium  |
| cortex                             |                                      | consists of outer portion (cortex) and inner<br>portion (medulla)   |
|                                    | cortisol (hydrocortisone)            | regulates carbohydrates, proteins, fat<br>metabolism; anti-inflammatory effect; helps<br>the body cope during stress  |
|                                    | aldosterone                          | regulates water and electrolyte balance   |
| medulla                            | androgen (sex hormone)               | development of secondary male sex<br>characteristics  |
|                                    | epinephrine (adrenaline)             | acts as a vasoconstrictor, cardiac stimulant<br>(increases heart rate and cardiac output),<br>and antispasmodic; releases glucose into<br>the blood (giving the body a spurt of energy) |
| pancreas<br>(islets of Langerhans) | norepinephrine (noradrenaline)       | acts as a vasoconstrictor; elevates blood<br>pressure and heart rate  |
|                                    | insulin                              | transports glucose into the cells; decreases<br>blood glucose levels  |
| ovaries                            | glucagon                             | promotes release of glucose by liver; increases<br>blood glucose levels   |
|                                    | estrogen                             | promotes growth, development, and<br>maintenance of female sex organs   |
| testes                             | progesterone                         | prepares uterus for pregnancy; promotes<br>development of mammary glands  |
|                                    | testosterone                         | promotes growth, development, and<br>maintenance of male sex organs   |

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## Disorders and Treatments

Disorders of the endocrine system are almost always the result of either an excess or a deficit in hormone production.

That means that either too much or too little of a hormone will cause a problem.

The serum or blood level of a hormone may be assessed by means of a laboratory examination, scans,

magnetic resonance imaging (MRIs), and/or ultrasonic examinations to detect abnormalities. A biopsy may be used to determine whether lesions detected during testing are benign or malignant.

The treatment of the disorder depends on its cause. If there is a deficit in hormone production,

then replacement therapy would be the normal treatment. If there is an overproduction of a hormone, then surgical or radiation intervention may be used. Table 8-2 is a summary of some of

the more common disorders of the endocrine system.

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## Disorders of the pituitary gland

One of the most common causes of pituitary disorders is a benign (nonmalignant or noninvasive) adenoma (aden/o means “gland”; -oma means “tumor”). The hormonal effects of the tumor may cause an excessive amount of hormone to be secreted, or the tumor may destroy pituitary cells, causing a deficit in hormone production. It is important to determine the cause of the hormonal imbalance—whether it is in the pituitary gland or the target gland. As mentioned earlier, the treatment will usually be hormone replacement or surgical excision (ex- means “outside, out”; -cise means “to cut out”); the decision depends on whether the problem is overproduction or underproduction of a hormone.

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## Diabetes Insipidus

**Diabetes insipidus** is caused by an insufficient production of the antidiuretic (anti-means “against”; diuresis means “excessive urination”) hormone (ADH). An excess amount of fluid is excreted by the kidneys, resulting in extreme thirst and excessive urination (**polyuria**: poly- means “many” or “a lot”; ur/o means “urine”; -ia is an adjective suffix meaning “pertaining to”). Treatment usually consists of administration of a form of the antidiuretic hormone to replace the deficit.

Table 8-2 Endocrine Disorders

| Gland     | Hormone                         | ↓ | ↑ | Disorder   |
|-----------|---------------------------------|---|---|--|
| pituitary | growth hormone                  | ↓ |   | dwarfism   |
|           | antidiuretic hormone            | ↓ |   | diabetes insipidus   |
|           | growth hormone                  |   | ↑ | gigantism in children; acromegaly in adults                      |
| thyroid   | T <sub>3</sub> , T <sub>4</sub> | ↓ |   | hypothyroidism; a deficiency in adults                           |
|           | T <sub>3</sub> , T <sub>4</sub> | ↓ |   | Hashimoto, Graves, Addison, and Cushing thyroiditis              |
|           | T <sub>3</sub> , T <sub>4</sub> |   | ↑ | Graves disease; usually characterized by goiter and exophthalmos |
|           | T <sub>3</sub> , T <sub>4</sub> |   | ↑ | goiter or thyromegaly  |
| adrenal   | T <sub>3</sub> , T <sub>4</sub> |   | ↑ | hyperthyroidism  |
|           | cortisol                        | ↓ |   | Addison disease  |
|           | cortisol                        |   | ↑ | Cushing syndrome   |
| pancreas  | epinephrine                     |   | ↑ | pheochromocytoma   |
|           | insulin                         | ↓ |   | hypoglycemia   |
| gonads    | insulin                         | ↓ |   | diabetes mellitus; type 1, type 2                                |
|           | estrogen                        |   | ↑ | gynecomastia (males only)  |
|           | testosterone                    |   | ↑ | hirsutism (females only)   |

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## Pharmacology

body. When these hormones are deficient, the body responds with characteristic disease states.

Hormone replacement therapy is often used to correct these disorders. Examples of disorders treatable by hormone replacement are hypothyroidism and diabetes mellitus.

Medications for hypothyroidism include Synthroid, Levothroid, and Levoxyl. Some of the more common medications given for diabetes mellitus are insulin (Humulin, Lente, NPH) and the oral hypoglycemic agents Orinase, Diabinese, Glucophage, metformin, Avandamet, and Avandia. Oral hypoglycemic drugs are prescribed for patients who have some insulin production by the pancreas but not enough to sustain proper blood sugar levels. The ultimate goal in prescribing replacement hormones is to maintain the body at an optimal homeostatic balance.

As mentioned earlier, the adrenal glands secrete corticosteroids, which act on the immune system to relieve inflammation and swelling and suppress the body's response to infection or trauma. Corticosteroids may be administered as a replacement therapy or for their immunosuppressant and anti-inflammatory properties.

They usually are used as a supportive therapy as opposed to being curative.

Corticosteroids have a variety of preparations including creams (topical), inhalants, oral, injection, and intravenous. Some examples include Decadron, Solu-Cortef, Kenalog, Aristocort, Rhinocort, Prelone, and Solu-Medrol.



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## Abbreviation Tables For The Endocrine System

### *Abbreviation Table • The Endocrine System*



| ABBREVIATION | MEANING                      |
|--------------|------------------------------|
| ACTH         | adrenocorticotrophic hormone |
| ADH          | antidiuretic hormone         |
| BS           | blood sugar                  |
| DM           | diabetes mellitus            |
| FBS          | fasting blood sugar          |
| FSH          | follicle-stimulating hormone |
| GH           | growth hormone               |