

Regulation of Hormones

Lecture 2

Regulation of Hormones

The endocrine system is a collection of glands that produce and regulate hormones in the bloodstream to control many functions of the body. This system overlaps with the nervous system and exocrine system affecting metabolism, growth and sexual development.

How does our body control the release of hormones?

- **Tropic hormones** are hormones that control the release of other hormones.
- Tropic hormones can cause release of hormones or they can also inhibit release.
- Glands also can sense the composition of the blood and respond to it; i.e. sensing materials in the blood other than tropic hormones.

Hormonal Axis

A number of glands that signal each other in sequence are usually referred to as an **axis**; several important axes are mediated via the hypothalamus and pituitary.

- TRH - TSH - T3/T4
- GnRH - LH/FSH - sex hormones
- CRH - ACTH - Cortisol.

Feedback mechanism

The term “feedback” means that some element of the physiologic response to a hormone “feeds back” either directly or indirectly, on the endocrine gland that secreted the hormone, changing its secretion rate. Feedback can be negative or positive. Negative feedback is the most important and common mechanism for regulating hormone secretion; positive feedback is rare.

Negative Feedback

In endocrine systems, negative feedback means that *some features of hormone action, directly or indirectly, inhibit further secretion of the hormone.*

- **Long-loop feedback**
- **Short-loop feedback**
- **Ultrashort-loop feedback**

Endocrinopathy

Diseases of the endocrine glands are either:

- 1. *Hypofunction*:** can occur as a result of loss of reserve, hyposecretion, agenesis, atrophy, or active destruction.
- 2. *Hyperfunction*:** can occur as a result of hypersecretion, loss of suppression, hyperplastic or neoplastic change, or hyperstimulation.

Endocrinopathy

Endocrinopathies are classified as:

- **Primary** endocrine disease in the end organ (Target tissue).
- **Secondary** endocrine disease is indicative of a problem with the pituitary gland.
- **Tertiary** endocrine disease is associated with dysfunction of the hypothalamus and its releasing hormones.

Why do we measure Hormones?

1. Detect hormone imbalances prior to the appearance of patient signs or symptoms; called *Screening tests*.
2. Identify hormone imbalances associated with symptoms for *Diagnosis*.
3. Establish hormone baselines prior to beginning therapy; *Baseline* assessment.
4. Monitor hormone levels while supplementing; *Monitoring* treatment.
5. Follow the progress of treatment reports; *Follow-up*.