Chapter 41: Endocrine System

Key Concepts

1. Hormones & how they work

2. Nervous & endocrine systems overlap

3. Major mammalian endocrine glands & hormones
Internal Communication
Systems of the Body

-Nervous system controls endocrine function; these systems are cooperative

-nervous system = quick responses
-endocrine system = slower but longer acting responses
Endocrine System

Endocrine cells:

Target cells:

Hormones:

1. Circulating:
2. Paracrine:
3. Autocrine:
3 Hormone Types

- Peptides or polypeptides:
  -
  -
  -

- Steroid hormones
  -
  -
  -

- Amine hormones:
  -
3 Hormone Types

Peptides
- ADH, oxytocin, insulin

Amines (derived from amino acids)
- Thyroxine, epinephrine (adrenaline)

Steroids
- Testosterone, estrogen, progesterone

Water soluble

Lipid soluble
Hormone receptors:

- Water-soluble hormones:
- Lipid soluble hormones:
How Hormones Function
Hormone Affects Are Diverse
Hypothalamus & Pituitary Gland

Hypothalamus:
-
-
-

Pituitary gland:
-
-
-
Hypothalamus & Pituitary Gland

**Posterior Pituitary**
Connection via neurosecretory cells

**Anterior Pituitary**
Connection via portal blood vessels

Fig. 41.7
Anterior pituitary secretes:

- Tropic hormones:
- Non-tropic hormones:
Ex. of Anterior Pituitary Gland
Tropic Hormones
(controls other endocrine glands)

Follicle stimulating hormone
Ex. of Anterior Pituitary Gland
Non-Tropic Hormones
(direct effects on target tissues)

**Prolactin**
Many functions
- 
-
Anterior Pituitary Gland Hormone: Human Growth Factor (GH)

*Tropic & Non-tropic effects

Wide variety of effects
Anterior pituitary also secretes **thyrotropin (TSH)** (Tropic) activates Thyroid Gland to produce thyroxine
Hormones Coordinate Other Responses

1. Digestion
Hormones Coordinate Other Responses

2. Blood Calcium
Hormones Coordinate Other Responses

3. Blood glucose
Hormones Coordinate Responses to External Environment Changes

1) Short-term stress (fight-or-flight):
2) Long-term stress:
Adrenal Gland: Stress

Pineal Gland: Biorhythms
Hormone receptor abundance can be regulated
How is the release of hormones controlled?

Feedback Loops!