Objectives

- To define the endocrine system and associated terminology.
- To identify the different organs recognized as being part of the End. System.
- To identify the different ways that hormones may be classified.
- To describe the action of hormones.
- To list the different hormones produced by the pituitary gland and their respective actions.

Role of the Endocrine System

Communication & Regulation

Consists of the hormones and the various cells and glands that secrete them, as well as the target cells receiving the message.

Regulates

- Metabolism
- Growth
- Water Regulation
- Reproductive Cycles & Seasons
- Response to Stress
- Metamorphosis
- Stimulates blood cell production
- Lactation

Gland

An organ that synthesizes a specific chemical substance.

Then secretes this substance either through a duct or onto the surface of the body or directly into the bloodstream.

Endocrine vs. Exocrine

Anatomy of the Endocrine System

Hormones

A chemical messenger liberated by a certain type of gland and transported in the blood to a specific (target) organ.

“......molecular triggers”

Types:
- Based on composition (a.a., protein, lipid)
- Based on speed (fast vs. slow acting).
  - Seconds → days
- Free vs. Bound
- Effect on target cells
Target Cell Specificity
Generalizations about receiving cells.
- Must have a specific protein receptor to accept the Hormone.
- Binding Hormone with the receptor “turns on” some gene-determined function.

Cell activation depends upon:
1) Blood levels of the hormone.
2) Relative numbers of receptor sites.
3) Affinity (strength) of the bond.

Mechanisms of Hormone Action
Hormone action on target cells
1. Alter plasma membrane permeability of membrane potential by opening or closing ion channels.
2. Stimulate synthesis of proteins or regulatory molecules.
3. Activate or deactivate enzyme systems.
4. Induce or activate secretion activity.
5. Stimulate action e.g. mitosis.

Action of Hormones
- Slow acting – long lasting e.g. steroid
- Fast acting – short duration e.g. peptide hormones like thyroxine.
Other tissues and organs

...That produce hormones include:
- Adipose cells
- Thymus
- Cells in the walls of the small intestine & stomach
- Kidneys
- Heart

Pituitary

Formerly known as "Master Gland"
  a.k.a. Hypophysis
  2 parts
Anterior Pituitary = adenohypophysis
  Glandular tissue
Posterior Pituitary = neurohypophysis
  (H's produced in hypothalamus)
  Pituicytes (glial-like supporting cells) & nerve fibers

Pituitary-Hypothalamic Relationships

Posterior lobe
- A down growth of hypothalamic neural tissue
- Neural connection to the hypothalamus
- Nuclei of the hypothalamus synthesize the neurohormones oxytocin and antidiuretic hormone (ADH)
- Neurohormones are transported to the posterior pituitary
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<thead>
<tr>
<th>Anterior</th>
<th>Posterior</th>
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<tr>
<td>(all are peptide H’s)</td>
<td>(neurohormones)</td>
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<tr>
<td>Growth hormone GH</td>
<td>Antidiuretic ADH</td>
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