

# Endocrine System: CH 15

- mostly comprised of glands @ various location throughout the body
- secretes hormones that move through the <sup>blood-</sup>stream
- results in a slow but prolonged response to target cells

## Major glands of endocrine system:

- hypothalamus • posterior pituitary gland, • thyroid gland
- anterior pituitary gland • parathyroid gland
- adrenal glands • testes • ovaries • thymus gland
- pineal gland

— What are hormones? • chemicals significant that promote communication between cells, body parts, & even individuals.

— What kinds of chemicals are hormones? :

- proteins or lipids
- peptide hormones: small proteins that bind to a receptor in the plasma membrane
- steroid hormones: lipids that enter a cell & affect DNA
- ~~steroid~~ hormones once secreted by a gland interact w/ "target cells"

— Target cells: Hypothalamus & Pituitary

- together 2 structures produce many of the body's hormones & control the secretion of other endocrine glands.

## 1. Hypothalamus

— what role in endocrine system?

- interacts w/ pituitary gland
- produces hormones that are stored in & stimulate the pituitary gland.

2. Posterior Pituitary Gland : stores hormones produced  
ADH : regulates water balance in hypothalamus  
by reabsorbing water into bloodstream.

Oxytocin : causes uterine contractions during childbirth &  
allows milk to be released during nursing.

3. Anterior Pituitary Gland : secretions of hormones

• hypothalamus produces controlled by hypothalamus  
& sends to :

- hypothalamic-releasing hormones = stimulates  
pituitary to produce & release its hormones

- hypothalamic-inhibiting hormones = slows/  
inhibits pituitary hormone ~~secretion~~ secretion

Hormones produced by anterior pituitary:

• Thyroid-stimulating hormone (TSH) : stimulates thyroid <sup>to prod</sup> hormone

• Adrenocorticotropic hormone (ACTH) : stimulates the  
adrenal cortex to prod. cortisol

• Gonadotropic hormones : stimulate gonads to prod.  
sex cells & hormones.

• Prolactin (PRL) : stimulates mammary glands to develop  
& produce milk only after childbirth.

• Melanocyte-stimulating hormone (MSH) : causes <sup>skin cells to</sup> prod. melanin

• Growth hormone (GH) : promotes skeletal & muscular  
growth.

~~Hypothalamus~~ Example Endocrine Functions

• Thyroid Gland - controlled by pituitary & hypothalamus

• Pancreas - controlled by blood glucose levels

- Thyroid gland • large gland located below larynx • Iodine is needed in diet to allow the thyroid gland to produce its hormones
- It produces:
- thyroid hormone (TH): regulates metabolism
  - Calcitonin: helps lower blood  $Ca^{2+}$  levels by stimulating the deposition of calcium in bones

- Thyroid hormone • produces thyroid hormone - also known as Thyroxine (T<sub>4</sub>)
- most cells in body are target cells
  - hormone sets/controls the basic metabolic <sup>rate</sup> of cells - needed for proper cell growth & function<sup>ing</sup>

### Control of Thyroid hormone

- involves 3 glands: 1) hypothalamus 2) <sup>primary</sup> pituitary 3) thyroid gland

### Thyroid Abnormalities

- simple goiter - thyroid enlarges due to lack of iodine in diet
- Hypothyroidism - low blood levels of thyroid <sup>hormones</sup>
  - ↳ congenital hypothyroidism: thyroid does not develop properly & characterized by short, stocky person who may be mentally handicapped
  - myxedema: hypothyroidism in adults characterized by lethargy, weight gain, hair loss, cold intolerance, thick-puffy skin