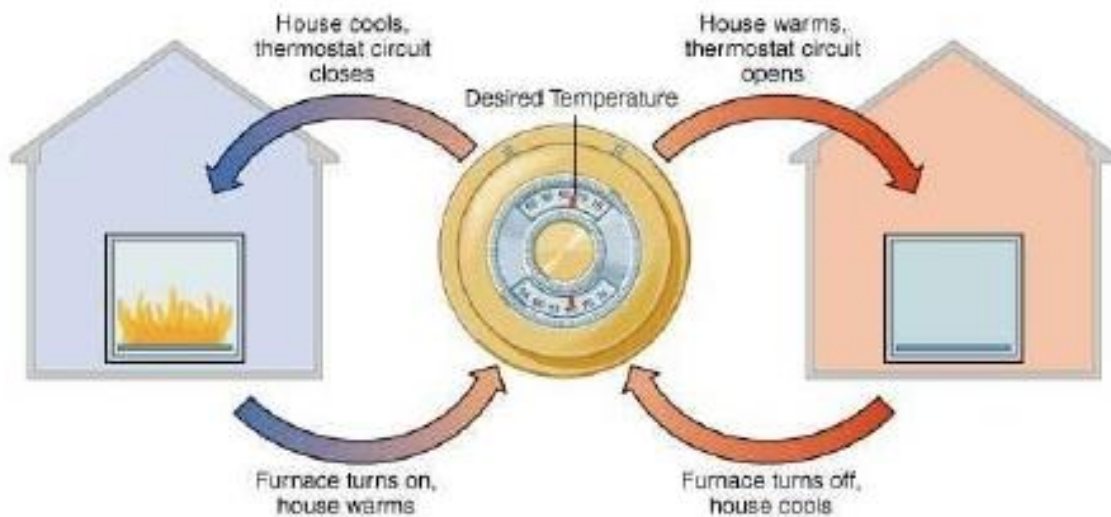


BODY CONTROL SYSTEMS

THE ENDOCRINE SYSTEM

- 1 of the 2 chemical control systems of the human body
- function of the endocrine system:
 - regulate body functions = **maintain homeostasis**
 - ie. physical and mental development
 - control chemical reactions
 - affect maturity and reproduction
- consists of a system of glands that produce and release hormones directly into the bloodstream = **ductless glands**
 - glands may be individual cells, or large masses of cells
 - **hormones** = chemicals which act on various parts of the body
- each gland uses a **negative feedback system** to maintain homeostasis
 1. Change is detected by receptors of an endocrine gland
 2. Receptors trigger the release of a hormone to target cells
 3. When balance is reached, receptors trigger the release of a second hormone to inhibit (counteract the 1st one)

= like a thermostat controls a furnace



Major Glands of The Endocrine System

Hypothalamus

- a) Location: area of brain, near the front
- b) Special feature: links the endocrine system to the nervous system.
- c) Function: **controls the pituitary gland**
- d) Hormones produced: somatostatin, gonadotrophic releasing hormone(GnRH), etc

Pituitary

- a) Location: at the base of the brain connected to the hypothalamus
- b) Special feature: is the **master control gland**
- c) Function: stimulates growth
: controls the function of other endocrine glands
- d) Hormones produced: * p. 276-78

	Hormone	Major Target Organ(s)	Effects
Anterior Pituitary	Growth hormone (GH)	Liver, adipose tissue	Promotes growth (indirectly), control of protein, lipid and carbohydrate metabolism
	Thyroid-stimulating hormone (TSH)	Thyroid gland	Stimulates secretion of thyroid hormones
	Adrenocorticotrophic hormone (ACTH)	Adrenal gland (cortex)	Stimulates secretion of glucocorticoids
	Prolactin (PRL)	Mammary gland	Milk production
	Luteinizing hormone (LH)	Ovary and testis	Control of reproductive function
Posterior Pituitary	Follicle-stimulating hormone (FSH)	Ovary and testis	Control of reproductive function
	Antidiuretic hormone (ADH)	Kidney	Conservation of body water
	Oxytocin	Ovary and testis	Stimulates milk ejection and uterine contractions

Pineal Gland

- a) Location: in the brain posterior to the pituitary and hypothalamus
- b) Function: regulates **circadian rhythms** (day / night cycles).
- c) Hormone produced: melatonin

Thyroid

- a) Location: at the base of the neck near the larynx
- b) Function: regulates metabolism (= **rate of cellular respiration**)
: regulates **growth (bone length)**
- c) Hormone produced: thyroxin, calcitonin
- d) Thyroid Conditions:
 - 1. Goiter = insufficient amounts of iodine in the diet (= iodized salt)
 - result- enlargement of the thyroid (p. 288)
 - 2. Hyperthyroidism = too much thyroxin (= increased metabolism)
 - result - thin, anxious, nervous
 - 3. Hypothyroidism = too little thyroxin
 - result - weight gain, tired, sluggish

Parathyroid

- a) Location: 4 small glands **imbedded** in the back of the thyroid gland.
- b) Function: controls the metabolism of calcium = healthy bones, teeth
- c) Hormone produced: parathyroid hormone (PTH)

Thymus

- a) Location: in the upper chest
- b) Function: controls the growth of certain **white blood cells** (help fight infection)
- d) Hormone produced: thymosin

Adrenal Glands

- a) Location: found on the anterior (top) of each kidney
- b) Special Feature = 2 part structure
 - 1) adrenal medulla
 - a) Function: create increased energy, and aggressiveness
= **fight or flight response**
 - b) Hormones produced:
 - epinephrine (adrenaline)
: increases BP, heart rate, blood clotting, O₂ in the blood
 - ii) nor-epinephrine (nor-adrenaline)
: inhibitor (systems return to normal)

2) adrenal cortex

a) Function: monitors blood glucose, and mineral levels (**sodium and water**)

b) Hormones produced:

- cortisol: controls food metabolism
- aldosterone: aids in maintaining water balance

Islets of Langerhans (Pancreas)

a) Location: structures in the pancreas

b) Function: crucial to the metabolism of **glucose** in the blood

c) Hormones produced:

- **insulin**: allows glucose to enter cells for metabolism & processing
- **glucagon**: allows glycogen to be retrieved from the liver and converted back to glucose when blood sugar is low

d) Pancreas Disorder:

Diabetes mellitus- cause: insufficient or total absence of insulin

- result: to properly break down glucose in the body

* p. 291

Gonads = Ovaries (female) and Testes (male)

a) Location: lower abdominal cavity or groin

b) Special Features: organs of reproduction as well

c) Function: regulate sexual growth, development

: regulate reproductive behavior (sex drive)

d) Hormones produced:

i) males = **testosterone**

- during puberty causes genitals to mature, hair growth, voice changes
- regulates sperm production

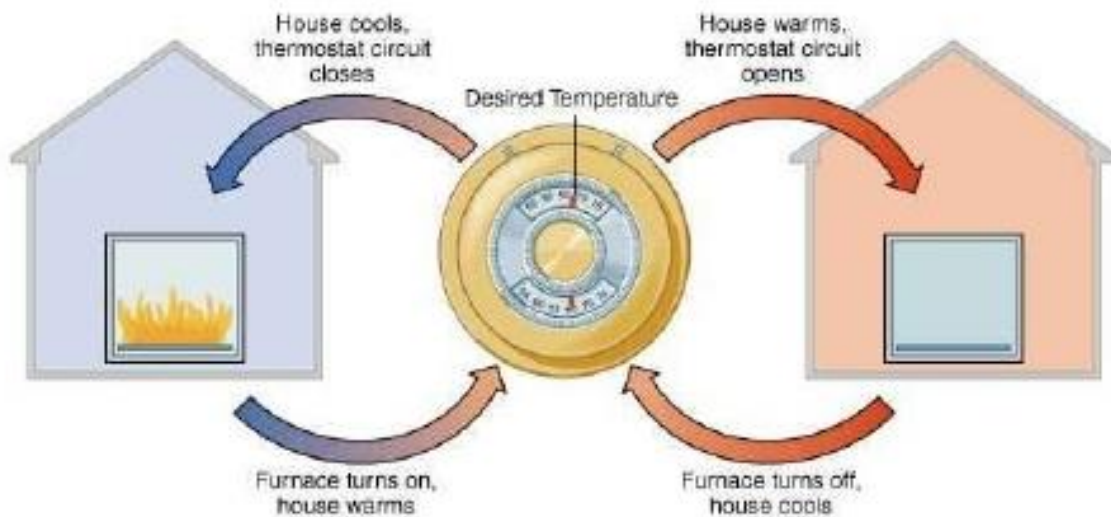
ii) females = **estrogen**

- during puberty causes genitals to mature, breast/ hip development
- beginning of menstrual cycle
- = **progesterone**
- regulates pregnancy and child bearing

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 - regulates sperm production
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 - during puberty causes genitals to mature, breast/ hip development
 - beginning of menstrual cycle
 - = _____
 - regulates pregnancy and child bearing

