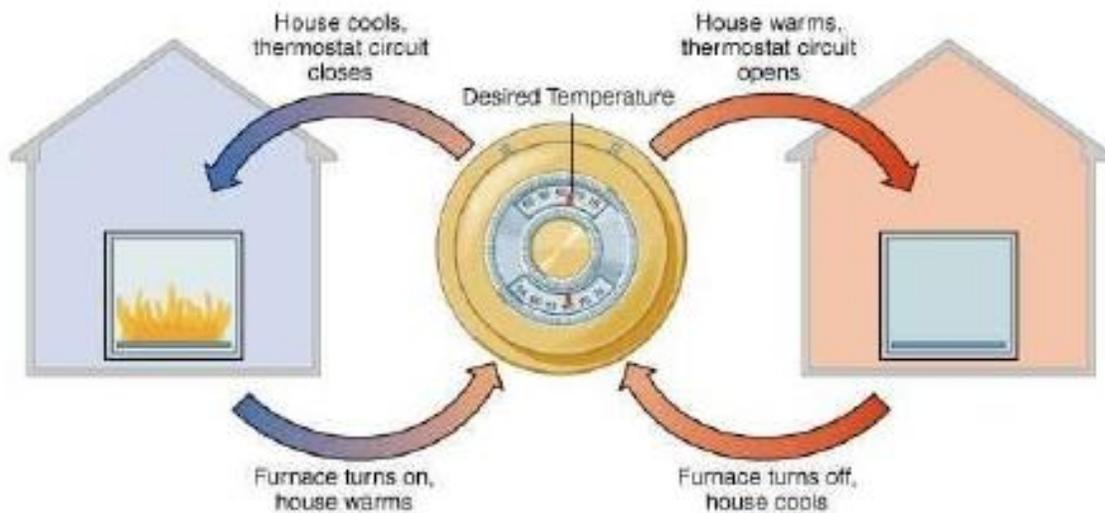


# BODY CONTROL SYSTEMS

## 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 1<sup>st</sup> 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	<a href="#">Growth hormone</a> (GH)	Liver, adipose tissue	Promotes growth (indirectly), control of protein, lipid and carbohydrate metabolism
	<a href="#">Thyroid-stimulating hormone</a> (TSH)	Thyroid gland	Stimulates secretion of thyroid hormones
	<a href="#">Adrenocorticotropic hormone</a> (ACTH)	Adrenal gland (cortex)	Stimulates secretion of glucocorticoids
	<a href="#">Prolactin</a> (PRL)	Mammary gland	Milk production
	<a href="#">Luteinizing hormone</a> (LH)	Ovary and testis	Control of reproductive function
	<a href="#">Follicle-stimulating hormone</a> (FSH)	Ovary and testis	Control of reproductive function
Posterior Pituitary	<a href="#">Antidiuretic hormone</a> (ADH)	Kidney	Conservation of body water
	<a href="#">Oxytocin</a>	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, O<sub>2</sub> 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

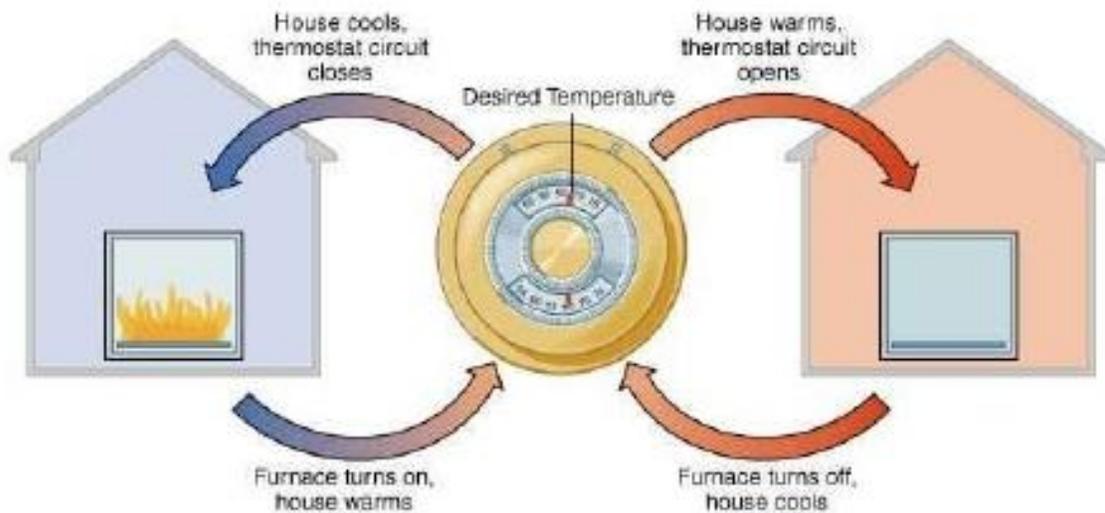
ii) females = **estrogen**

- 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
  - ii) females = \_\_\_\_\_
    - during puberty causes genitals to mature, breast/ hip development
    - beginning of menstrual cycle
    - = \_\_\_\_\_
    - regulates pregnancy and child bearing

