

# PITUITARY GLAND (HYPOPHYSIS)

2/23/93, rvsd 2/22/94, 2/16/95, 2/20/97, 2/24/98, 17 Feb 00, 19 Feb 01, 21 Feb 05, 25 Feb 08, 23Feb09, 24Feb10, 21Feb11  
Martini's 6th: p. 615-620, 7th: 600-605, 8th: 614-620

## HYPOPHYSIS EMBRYONIC DEVELOPMENT:

organogenic induction:

anterior pituitary    roof of mouth (**Rathke's pouch**)  
posterior pituitary    floor of brain

Seven hormones from anterior and **two** from posterior pituitary, all trigger cAMP as a second message

## ANTERIOR PITUITARY (adenohypophysis)

Hangs from **infundibulum** between **optic chiasma** and **mammillary bodies**, nestled in **sella turcica**

Blood originates in Circle of Willis, from superior hypophyseal artery:

hypothalamic-hypophyseal *portal system* with fenestrated epithelium capillaries (p 615)

carries releasing factors produced in hypothalamus to anterior pituitary

Four of the hypophyseal hormones regulate other glands (trophic = stim growth)

These are regulated by negative feedback from target organs.

### Table of hormones: p 620

- Growth hormone (somatotropin):** stimulates growth especially of epiphyseal cartilage & muscles. promotes protein synthesis, mobilization and use of fat, conserves glucose, AA uptake  

<b>hyposecretion</b>	<b>pituitary dwarf</b>	can be replaced, also used by body builders
<b>hypersecretion</b>	<b>gigantism</b>	if in childhood
	<b>acromegaly</b>	if in adults (or if they take exogenous HGH)
- Thyroid Stimulating Hormone:** glycoprotein, stimulates thyroid to release thyroxine
- Somatostatin** inhibits release of growth hormone  
blocks release of TSH
- Adrenocorticotrophic hormone:** (**ACTH**) stimulates adrenal cortex to release steroids, especially glucocorticoids. Stimulated by corticotrophic releasing hormone (CRH)  
**stress response integrator** release **stimulated by fever, stress, hypoglycemia**

GONADOTROPINS	♂	♀
5) Follicle Stimulating H.	spermatogenesis	oogenesis, inhibited by estrogen
6) Luteinizing Hormone	stimulates testosterone production:	progesterone in ♀

During puberty, gonadotropic cells become active

- Prolactin** prepares breasts for milk production.  
High estrogen levels stimulate PRF, prolactin levels rise dramatically at end of pregnancy:  
breasts enlarge, milk production stimulated. Suckling maintains.

**NEUROHYPOPHYSIS** (post. pituitary) (p. 618, 619) derived fr hypothalamus, still connected via nerve bundle in infundibulum  
**hypothalamic-hypophyseal tract** originates from **paraventricular** and **supraoptic nuclei**  
 consists mostly of **neuroglia and nerve fibers**, releases hormones synthesized in hypothalamus.

### Only two hormones

**oxytocin**                    paraventricular    triggers uterine contractions (delivery) and milk let-down  
 Stimulated breasts causes oxytocin release

**antidiuretic hormone**    supraoptic            increases permeability of kidney collecting tubules, thus more concentrated urine formed. Triggered by **osmoreceptors**, ADH is also called **vasopressin**

**alcohol** inhibits ADH formation, therefore is a diuretic  
 Lack of ADH leads to **diabetes insipidus**

