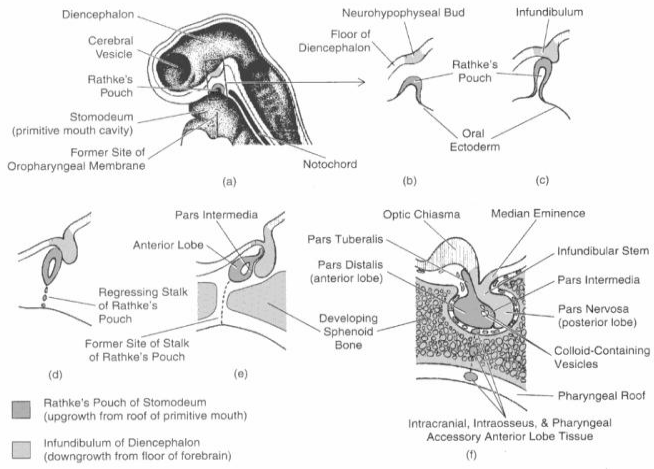
Lecture 11 (Chapters 5)

Pituitary gland (hypophysis)

Pituitary (Latin): pituita (phlegm)
removal of phlegm/mucus from brain cavities

I. Adenohypophysis = anterior lobe
- Pars Distalis } **Anterior Lobe**
- Pars Tuberalis }
- Pars Intermedia = Intermediate Lobe } **Neurointermediate Lobe**

II. Neurohypophysis = posterior lobe } **Neurointermediate Lobe**
- Pars Nervosa = **Posterior Lobe**
  - Infundibulum

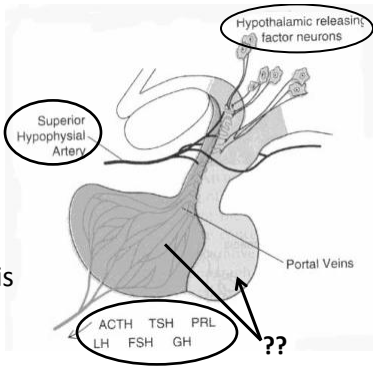


III. Cells near infundibulum proliferate → pars intermedia
- cleft arises separating anterior pituitary from posterior wall
- lack of contact of adenohypophysis with neurohypophysis
- failure of formation of pars intermedia

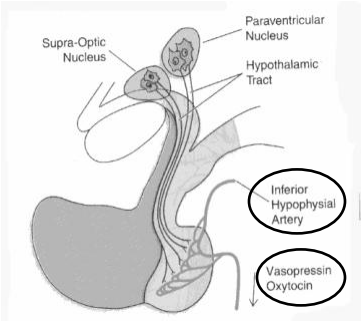
birds: connective tissue separates adenohypophysis from neurohypophysis
human fetus: pars intermedia regresses → adult: absent

Hypophysis

I. Adenohypophysis
- glandular
- superior hypophysial artery
- portal veins
  - carry neuronal factors from hypothalamic neurons to stimulate adenohypophysis



II. Neurohypophysis
- neuronal originating from hypothalamus
- inferior hypophysial artery



?? hormones shunted to CNS to modulate neuronal activity

TABLE 5.1 Histochemical classification of pituitary pars distalis cells

Cell Type	Hormone		Staining Characteristic
Corticotroph[a]	Corticotropin	(ACTH)	Basophil
Thyrotroph	Thyrotropin	(TSH)	Basophil
Gonadotroph			
FSH-gonadotroph	Follitropin	(FSH)	Basophil
LH-gonadotroph	Lutropin	(LH)	Basophil
Lactotroph (mammotroph)	Prolactin	(PRL)	Acidophil
Somatotroph	Growth hormone	(GH)	Acidophil

[a]Cytological classification uses either the suffix -troph or -trope (e.g., corticotrope).

Hypophysectomy ⟶ gonadal atrophy

two pituitary fractions (glycoproteins) ⟶ gonadotropic activity

I. **Follicle Stimulating Hormone** ($B_{1/2}$: 3-4 hrs *)

A. ovary: stimulate early follicular growth

B. testes: spermatogenic activity

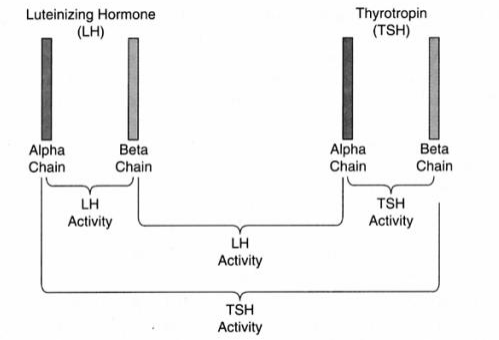
LH receptors

synthesis of **Sertoli cells**
androgen binding protein (ABP)
aromatase enzyme

II**. Luteinizing Hormone** ($B_{1/2}$: 20 min)

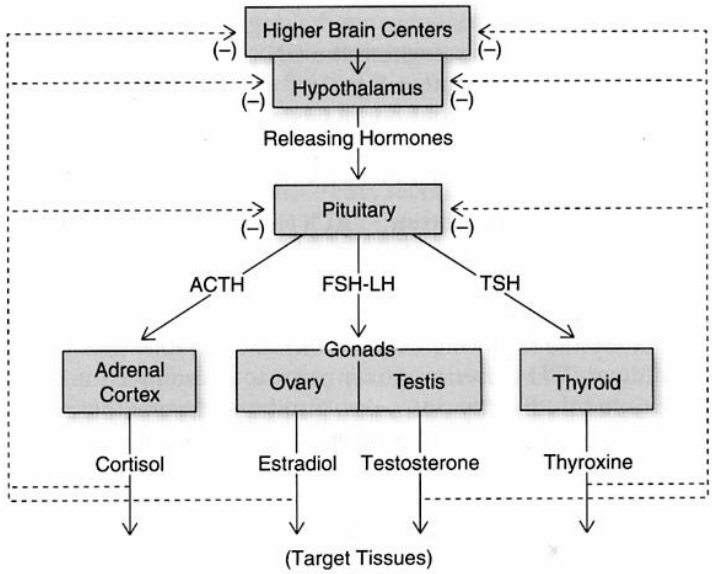
A. stimulated corpora lutea formation
B. female ovulation
C. testes: testosterone secretion by **Leydig cell** ⟵ receptors
D. secondary male sexual characteristics

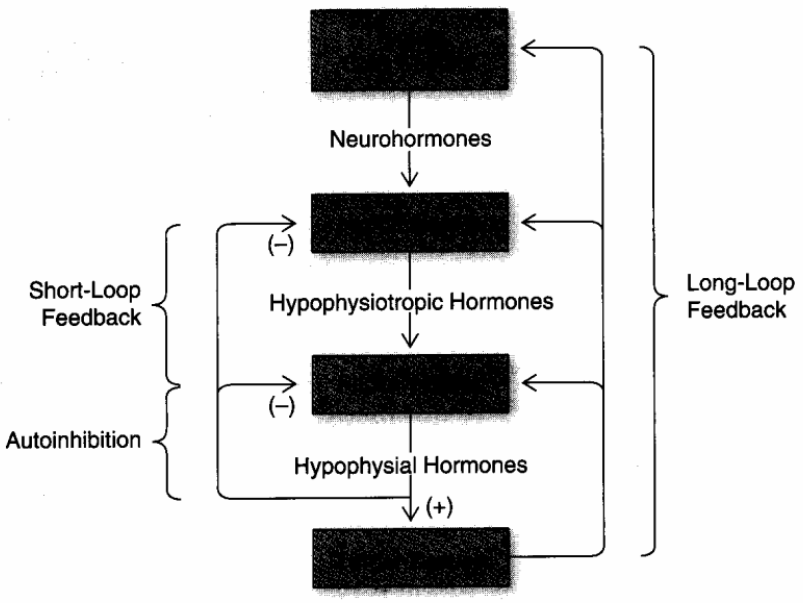
***sialic acid**



I. α chain same: LH, FSH, TSH, hCG ⟶ 92 AAs

II. ß chain difference
FSH ⟶ 118 AAs
LH ⟶ 121 AAs


Higher Brain Centers
(–)
(–)
Hypothalamus
(–)
(–)
Releasing Hormones
Pituitary
(–)
(–)
ACTH
FSH-LH
TSH
Gonads
Adrenal Cortex
Ovary
Testis
Thyroid
Cortisol
Estradiol
Testosterone
Thyroxine
(Target Tissues)

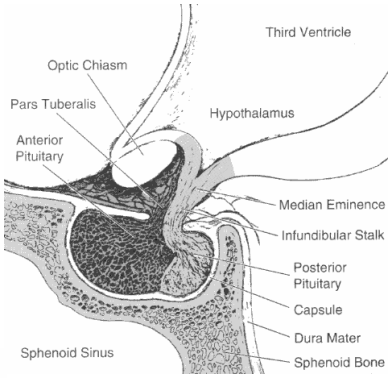

Neurohormones
(–)
Short-Loop Feedback
Hypophysiotropic Hormones
Long-Loop Feedback
(–)
Autoinhibition
Hypophysial Hormones
(+)

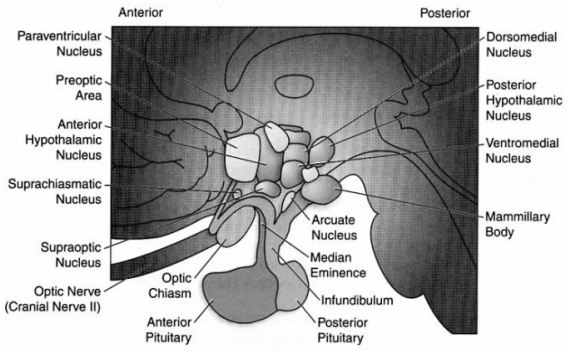
Hypothalamus

Chapter 6

"Master gland"

1) basal part of diencephalon
2) below thalamus
3) forms walls of 3**rd ventricle**





Hypophysiotropic Hormones ⟶ Regulate pituitary gland

I. Gonadotropin-Releasing Hormone (GnRH)

II. Thyrotropin-Releasing Hormone (TRH)

III. Growth Hormone Release Hormone (GHRH)

IV. Growth Hormone Release-Inhibiting Hormone ← Somatostatin (SST)

V. Prolactin Releasing Hormone (PRL)

VI. Melanocyte Stimulating Hormone Release Inhibiting Hormone

VII. Corticotropin Releasing Hormone (CRH)

VIII. Dopamine
- Prolactin Inhibiting Factor (PIF)
- Melanocyte Release Inhibiting Factor (MIF)

IX. Prolactin Releasing Factor (PRF) ???