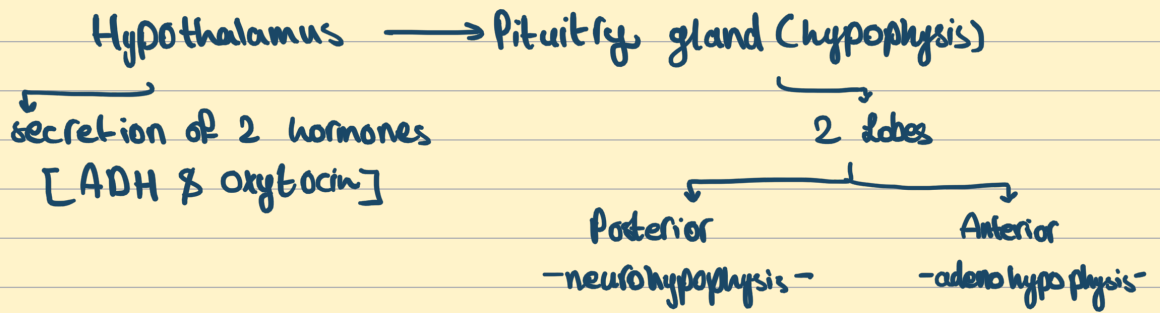


## Lec. 2 + 3 Endocrine



Anterior lobe → distalis (largest part) - intermedia (between the 2 lobes) - tuberalis (surrounds the infundibulum)

↳ no direct communication with the hypothalamus

Posterior lobe → nervosa - stalk of infundibulum (connects the hypothalamus to the pituitary)

↳ direct communication differentiate to form the stalk & pars nervosa infundibulum

Posterior lobe → originate from the floor of the diencephalon downward invagination maintain contact with its origin (neural origin)

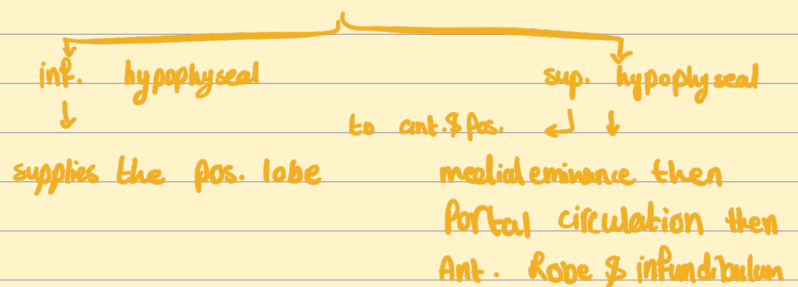
Anterior lobe → originate from the oropharynx upward direction of the oropharyngeal forming "Rathke's pouch" loses its connection with its origin (epithelial in origin)

begins during week 4 of fetal development [pituitary organogenesis]

Rathke's pouch constricts at its base and eventually separates altogether from the oral epithelium during week 6-8

↳ cells of the pouch differentiate to form different parts

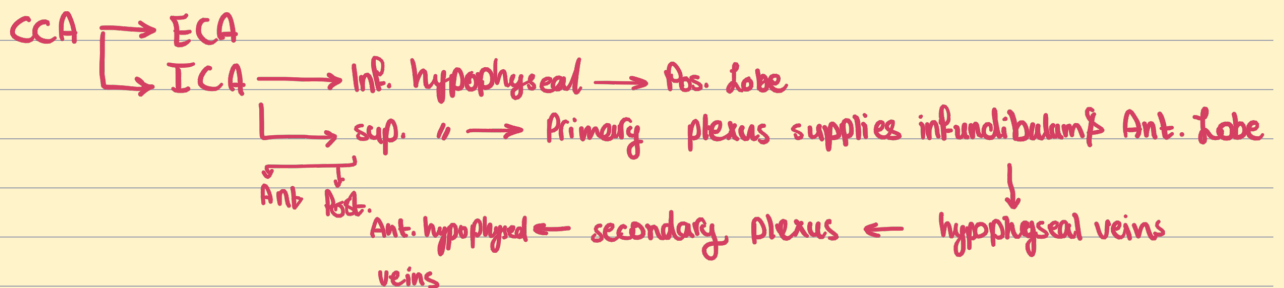
Main Blood supply → Internal carotid artery



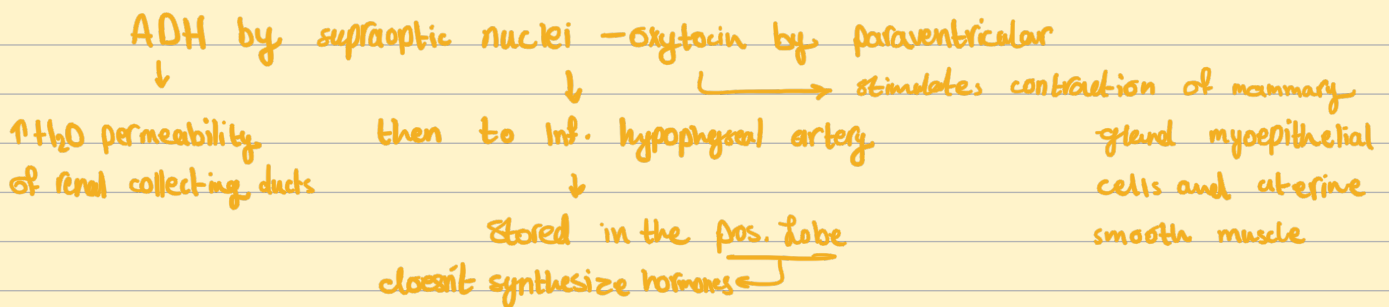
Ant. lobe can't take the hormone directly from the hypothalamus so the hormones must make the whole trip the systemic circulation - Portal circulation

systemic circulation [heart → artery → capillaries → veins → heart]

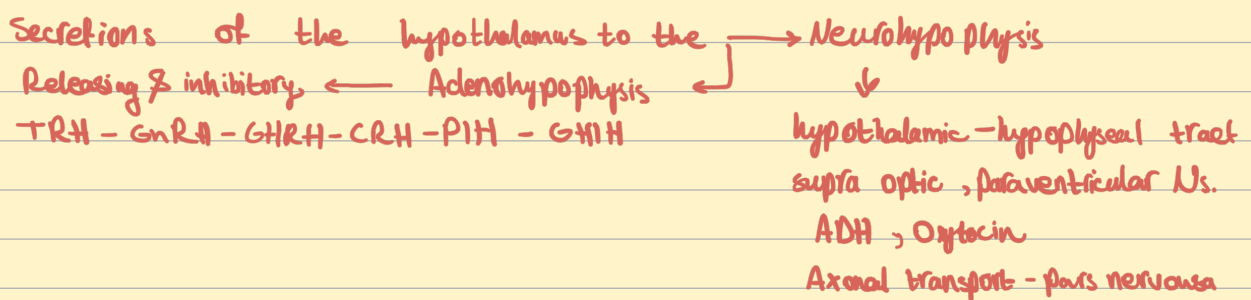
portal circulation [artery → capillaries → portal vein → capillaries → vein → heart]  
in the Ant. Lobe



hypothalamus contains many nuclei that synthesize the hormones of the hypothalamus that are transported to the pituitary gland



Managing hormones → released at the median eminence then to sup. hypophyseal



Neurohypophysis :

- contain unmyelinated axons of large secretory neurons with cell bodies in the supraoptic and paraventricular nuclei
- highly branched supportive cells [Pituicytes]
- Neurosecretory bodies contain ADH & oxytocin
- Nerve impulse
- Carrier proteins : neurophysin 1 & 2

# Adenohypophysis - major cell types

Cell Type	% of Total Cells	Hormone Produced	Major Function
Somatotrophs	50	Somatotropin (growth hormone, GH), a 22-kDa protein	Stimulates growth in epiphyseal plates of long bones via insulin-like growth factors (IGFs) produced in liver
Lactotrophs (or mammotrophs)	15-20	Prolactin (PRL), a 22.5-kDa protein	Promotes milk secretion
Gonadotrophs	10	Follicle-stimulating hormone (FSH) and luteinizing hormone (LH; interstitial cell-stimulating hormone [ICSH] in men), both 28-kDa glycoprotein dimers, secreted from the same cell type	FSH promotes ovarian follicle development and estrogen secretion in women and spermatogenesis in men; LH promotes ovarian follicle maturation and progesterone secretion in women and interstitial cell androgen secretion in men
Thyrotrophs	5	Thyrotropin (TSH), a 28-kDa glycoprotein dimer	Stimulates thyroid hormone synthesis, storage, and liberation
Corticotrophs	15-20	Adrenal corticotropin (ACTH), a 4-kDa polypeptide Lipotropin (LPH)	Stimulates secretion of adrenal cortex hormones Helps regulate lipid metabolism

## Pars tuberalis

- Small funnel-shaped region surrounding the infundibulum.
- Most of the cells of the are gonadotrophs.

## Pars distalis

- **Biggest (75%)**
- Has a thin fibrous capsule
- Cords of well-stained endocrine cells interspersed with fenestrated capillaries and supporting reticular connective tissue.
- Chromophils and chromophobes.
- Chromophils are secretory cells.
- Chromophils: hormone is stored in cytoplasmic granules... basophils and acidophils.
- Acidophils: somatotrophs and lactotrophs.
- Basophils: corticotrophs, gonadotrophs, and thyrotrophs

## Pars Intermedia

- A narrow zone lying between pars distalis and pars nervosa.
- Contains basophils (corticotrophs), chromophobes, and small, colloid-filled cysts derived from the lumen of the embryonic hypophyseal pouch.
- Best-developed and active during fetal life,
- Express POMC (pro-opiomelanocortin) but cleave it differently from cells in the pars distalis ((MSH),  $\gamma$ -LPH, and  $\beta$ -endorphin).

## Hypothalamic Hormones

Hormone	Chemical Form	Functions
<u>Thyrotropin-releasing hormone (TRH)</u>	3-amino acid peptide	<u>Stimulates release of thyrotropin (TSH)</u>
<u>Gonadotropin-releasing hormone (GnRH)</u>	10-amino acid peptide	<u>Stimulates the release of both follicle-stimulating hormone (FSH) and luteinizing hormone (LH)</u>
<u>Somatostatin</u>	14-amino acid peptide	<u>Inhibits release of both somatotropin (GH) and TSH</u>
<u>Growth hormone-releasing hormone (GHRH)</u>	40- or 44-amino acid polypeptides (2 forms)	<u>Stimulates release of GH</u>
<u>Dopamine</u>	Modified amino acid	<u>Inhibits release of prolactin (PRL)</u>
<u>Corticotropin-releasing</u>	41-amino acid polypeptide	<u>Stimulates synthesis of pro-opiomelanocortin (POMC) and release of both <math>\beta</math>-lipotropic</u>