

Pituitary

SESSION OBJECTIVES:

Use these session objectives to test your knowledge of the important concepts presented in this chapter and as study topics to return to prior to your exams.

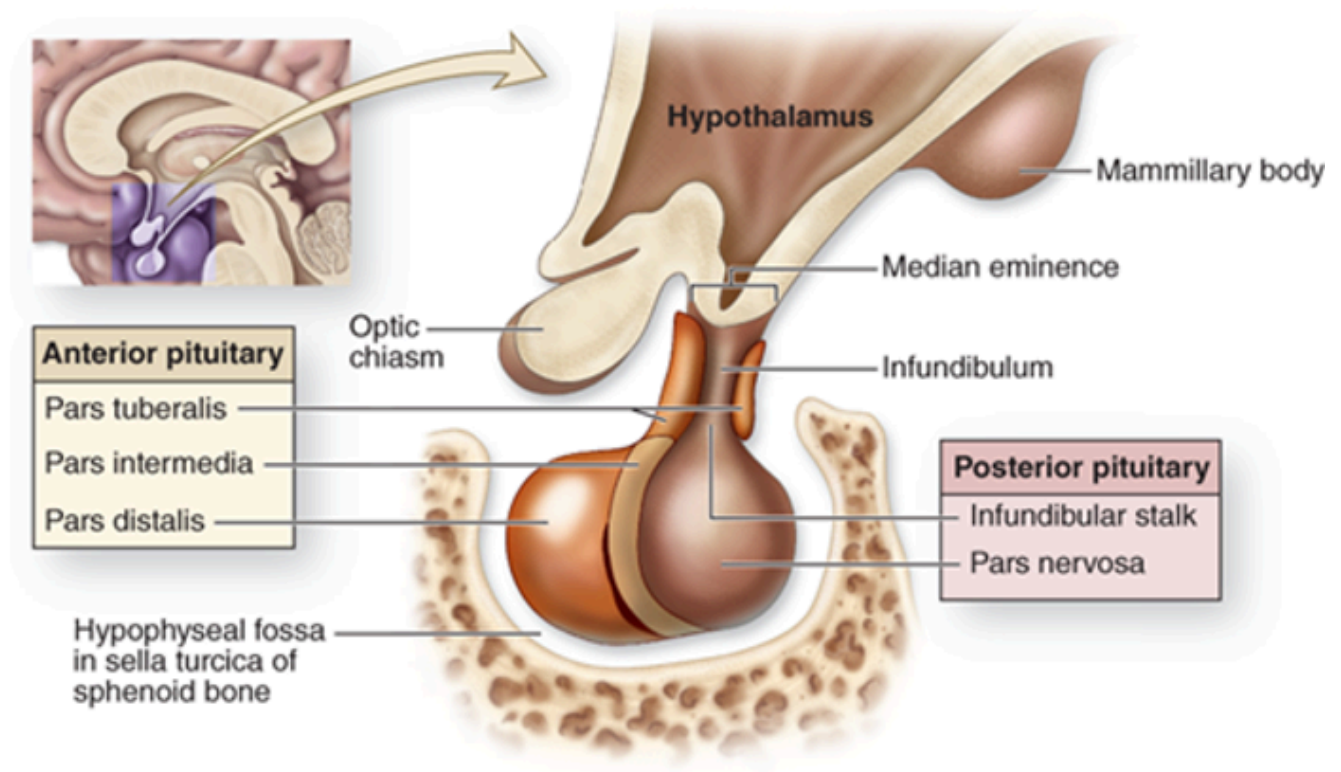
1. Describe histology of normal anterior pituitary.
2. Describe histology of normal posterior pituitary.
3. Describe the pathologic differences between a normal anterior pituitary gland and a pituitary adenoma.

OPTIONAL PRE-CLASS MATERIALS FOR THIS SESSION:

- Skim the **section titles**, **bolded terms**, and **image captions** from Robbin's & Kumar 11th edition, [Chapter 18](#) to fill in any knowledge gaps you need.
- In class exercise: [PathPresenter](#)

OVERVIEW:

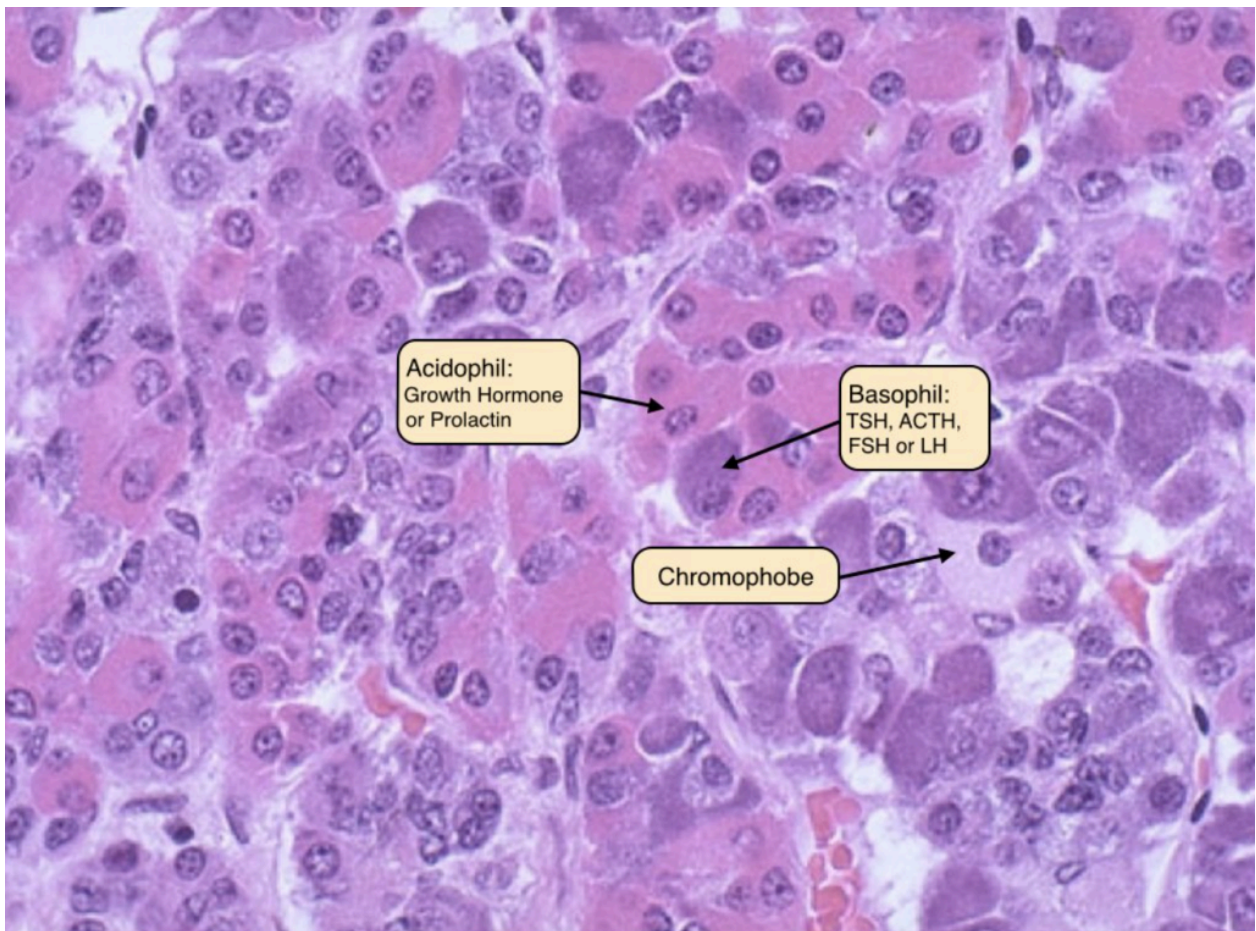
The pituitary gland, often referred to as the “master gland,” plays a crucial role in regulating the endocrine system. Located in the **sella turcica** of the skull, it has two distinct lobes—**anterior** and **posterior**—each with unique functions and histological features.



NORMAL HISTOLOGY OF THE PITUITARY GLAND:

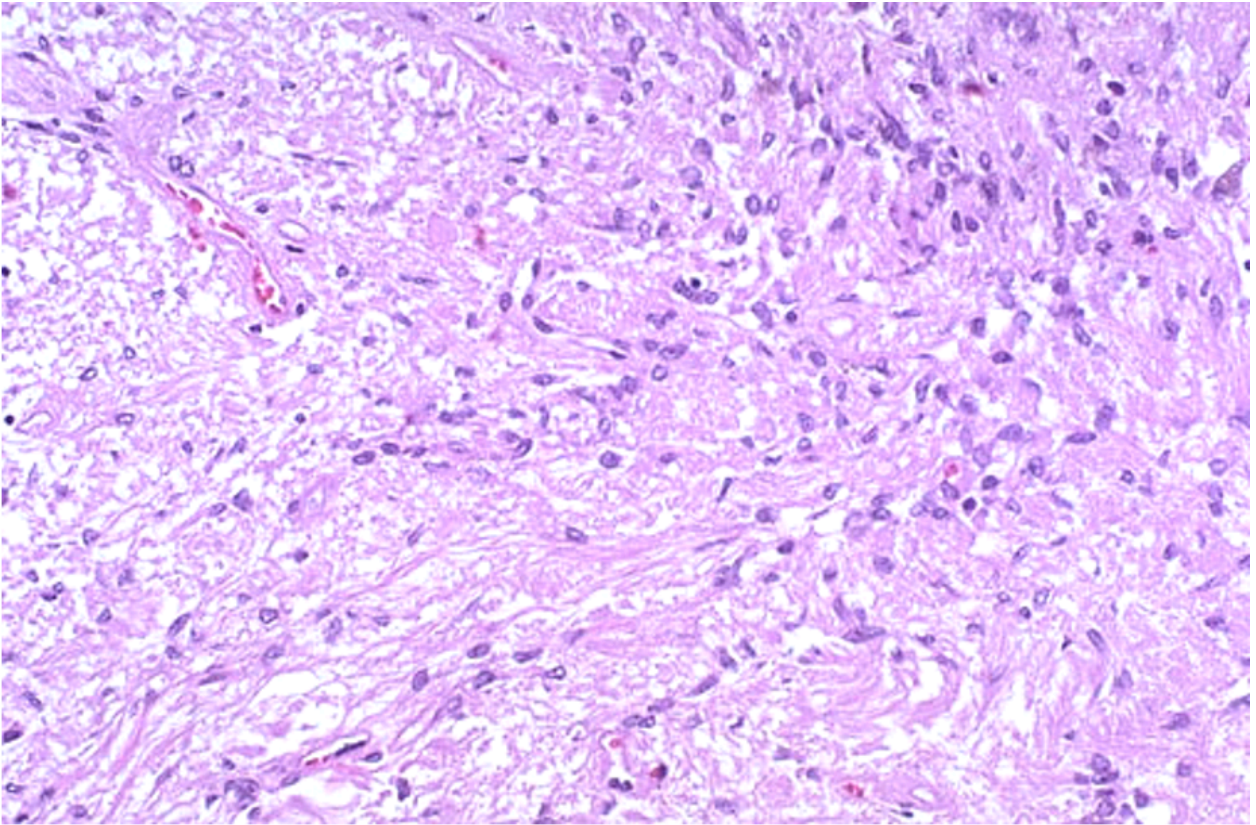
- **Anterior Pituitary (Adenohypophysis):** The anterior pituitary consists of hormone-secreting cells (which are responsible for producing key hormones) such as:
 - **Somatotrophs – Growth hormone (GH):** Promotes growth and metabolism.
 - **Lactotrophs – Prolactin (PRL):** Important for lactation.
 - **Corticotrophs – Adrenocorticotrophic hormone (ACTH):** Stimulates the adrenal cortex.
 - **Thyrotrophs – Thyroid-stimulating hormone (TSH):** Regulates thyroid function.
 - **Gonadotrophs – Luteinizing hormone (LH) and Follicle-stimulating hormone (FSH):** Regulate reproductive function.
 - **Chromophobes** – These cells appear pale because they are depleted of secretory hormones, which limits their ability to take up stain.

Histology: Somatotrophs and lactotrophs are acidophiles (preferentially stain with eosin) while corticotrophs, thyrotrophs, and gonadotrophs are basophiles (preferentially stain with hematoxylin); chromophobes are pale by comparison.



- **Posterior Pituitary (Neurohypophysis):** Unlike the anterior pituitary, the posterior pituitary does not produce hormones but stores and releases hormones synthesized by the hypothalamus:
 - **Oxytocin:** Involved in milk ejection and uterine contractions.
 - **Anti-diuretic hormone (ADH):** Regulates water balance by acting on the kidneys.

Histology: The posterior pituitary appears more like nerve tissue, consisting of axonal projections from the hypothalamus that store and release hormones.

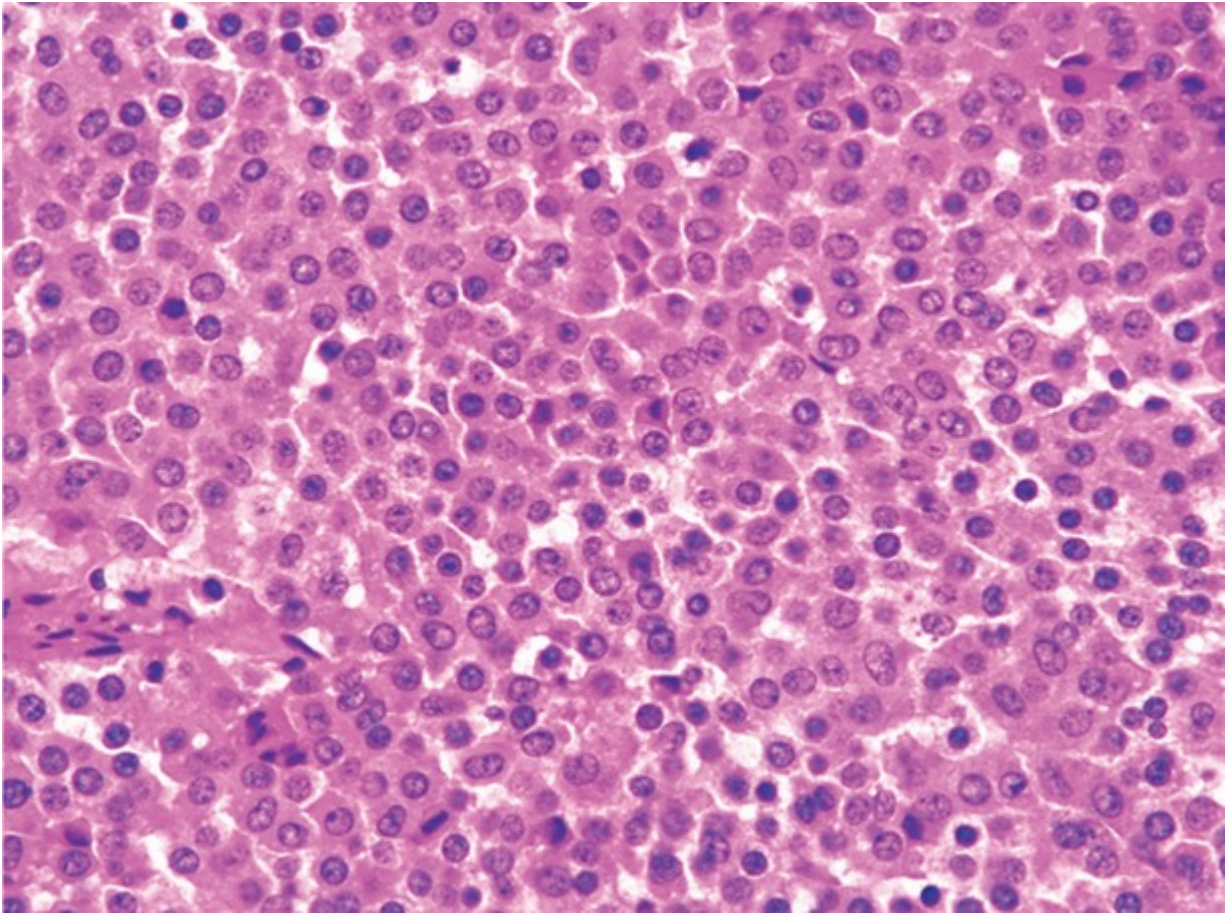


PATHOLOGY OF THE PITUITARY GLAND:

- **Pituitary Adenoma:**

- **Overview:** Pituitary adenomas are benign neoplasms of the anterior pituitary gland. They can be either functional (hormone-producing) or non-functional (non-hormone-producing).
- **Functional Adenomas:** These typically produce excessive amounts of hormones, leading to clinical syndromes:
 - **Prolactinomas:** Excess prolactin causes galactorrhea, infertility, and amenorrhea.
 - **Growth Hormone Adenomas:** Cause **acromegaly** in adults or **gigantism** in children.
 - **ACTH-producing Adenomas:** Lead to **Cushing's disease**, characterized by overproduction of cortisol.

Histology: Pituitary adenomas are composed of uniform cells with loss of the normal heterogeneity seen in the anterior pituitary. Microadenomas (<10mm) can often be asymptomatic, while larger adenomas may cause symptoms from hormone overproduction or mass effect (e.g., headaches, vision problems due to pressure on the optic chiasm).



- **Pituitary Apoplexy:**
 - **Overview:** This is an endocrine emergency caused by the sudden hemorrhage or infarction of a pituitary adenoma, leading to rapid onset of headache, visual disturbances, and hormone deficiencies.
 - **Clinical Presentation:** Patients may present with severe headache, vision loss, and signs of adrenal insufficiency due to decreased ACTH production.
- **Sheehan Syndrome:**
 - **Overview:** This rare condition occurs due to postpartum pituitary infarction, often after significant blood loss during childbirth. It results in hypopituitarism, leading to symptoms like difficulty with lactation and other hormone deficiencies.
 - **Histology:** The pituitary appears infarcted, with loss of normal gland architecture.
- **Diabetes Insipidus:**
 - **Overview:** A deficiency of ADH leads to **central diabetes insipidus**, characterized by excessive urination and thirst. In contrast, **nephrogenic diabetes insipidus** is caused by the kidneys' failure to respond to ADH.
 - **Histology:** The posterior pituitary remains histologically normal, as the defect is functional.
- **Syndrome of Inappropriate ADH Secretion (SIADH):**
 - **Overview:** In SIADH, there is excessive secretion of ADH, often due to paraneoplastic syndromes (e.g., small cell carcinoma of the lung), leading to water retention and hyponatremia.

This Chapter's PDF

LINK

- Note: The interactive features of this chapter are not reproducible in this PDF format.