

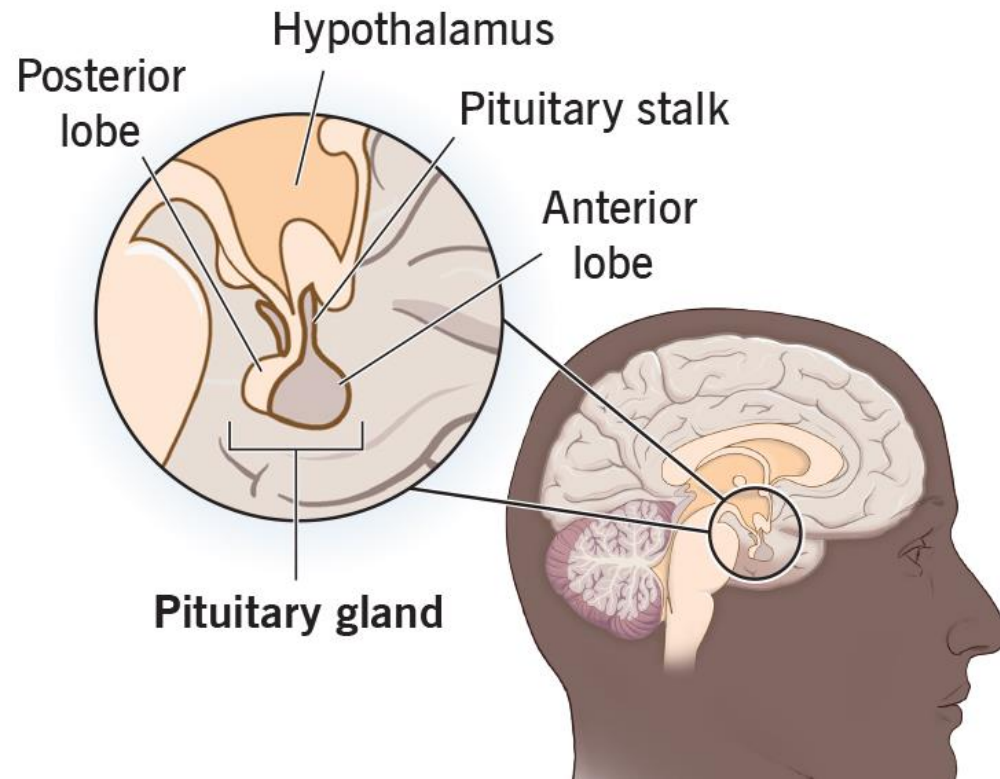
A microscopic image of the pituitary gland, showing the anterior pituitary (adenohypophysis) on the left and the posterior pituitary (neurohypophysis) on the right. The anterior pituitary consists of a cluster of large, polygonal cells with prominent nuclei and granular cytoplasm. The posterior pituitary consists of a layer of small, cuboidal cells (paraventricular nuclei) and a layer of larger, columnar cells (neurosecretory cells) that form the infundibular stem. The infundibular stem is a narrow, funnel-shaped structure that connects the hypothalamus to the pituitary gland.

# Endocrine pathology- pituitary gland

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7-5-2026.

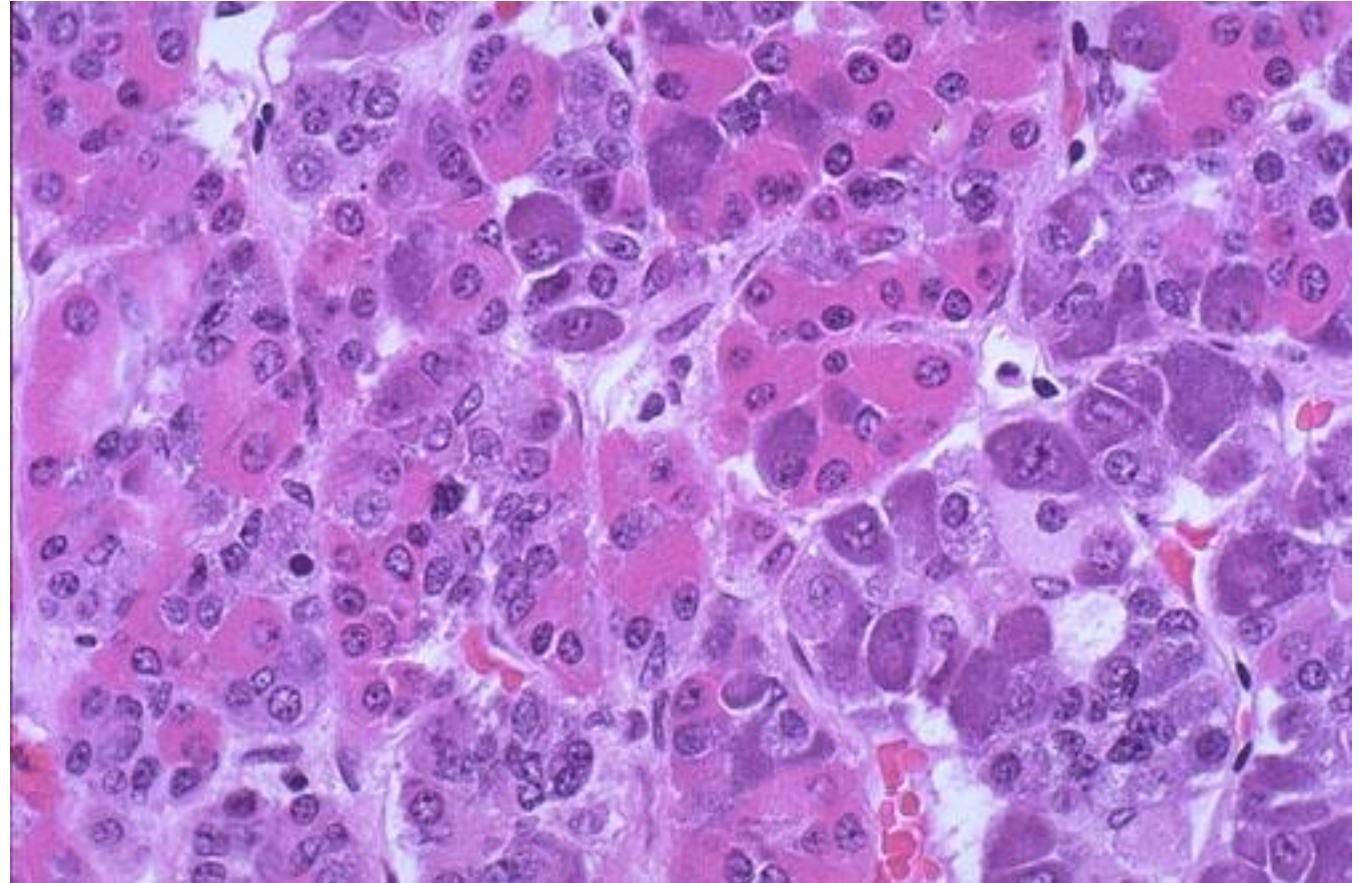
## Pituitary Gland



Anatomy

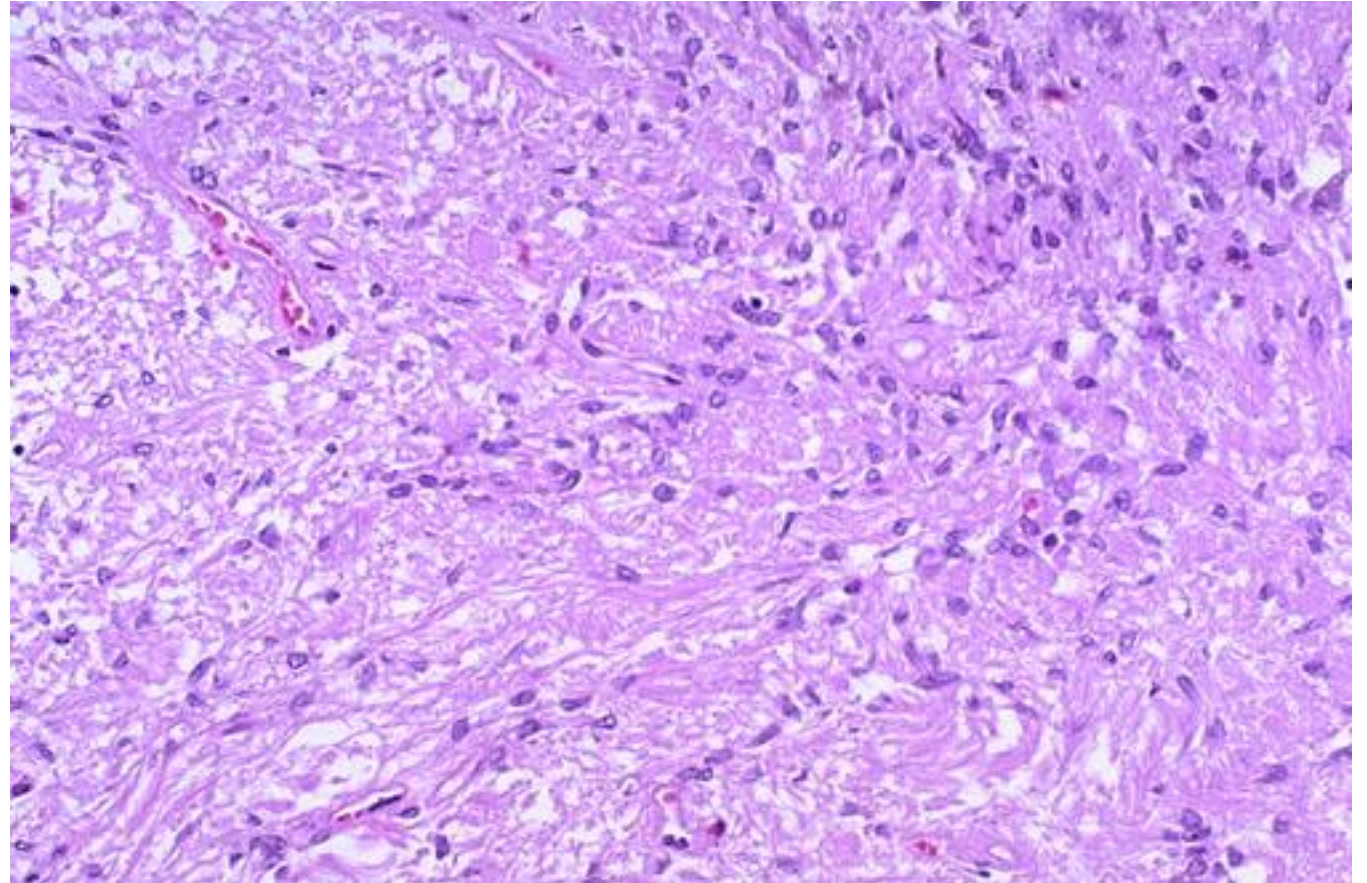
# Histology

- ▶ Anterior
  - ▶ Acidophils (40% of cells) = red or orange.
    - ▶ GH, PRL.
  - ▶ Basophils (10% of cells) = basophilic (light blue).
    - ▶ TSH, LH, FSH, ACTH.
  - ▶ Chromophobes (50% of cells) = amphophilic (purplish/grey), have secretory activity.

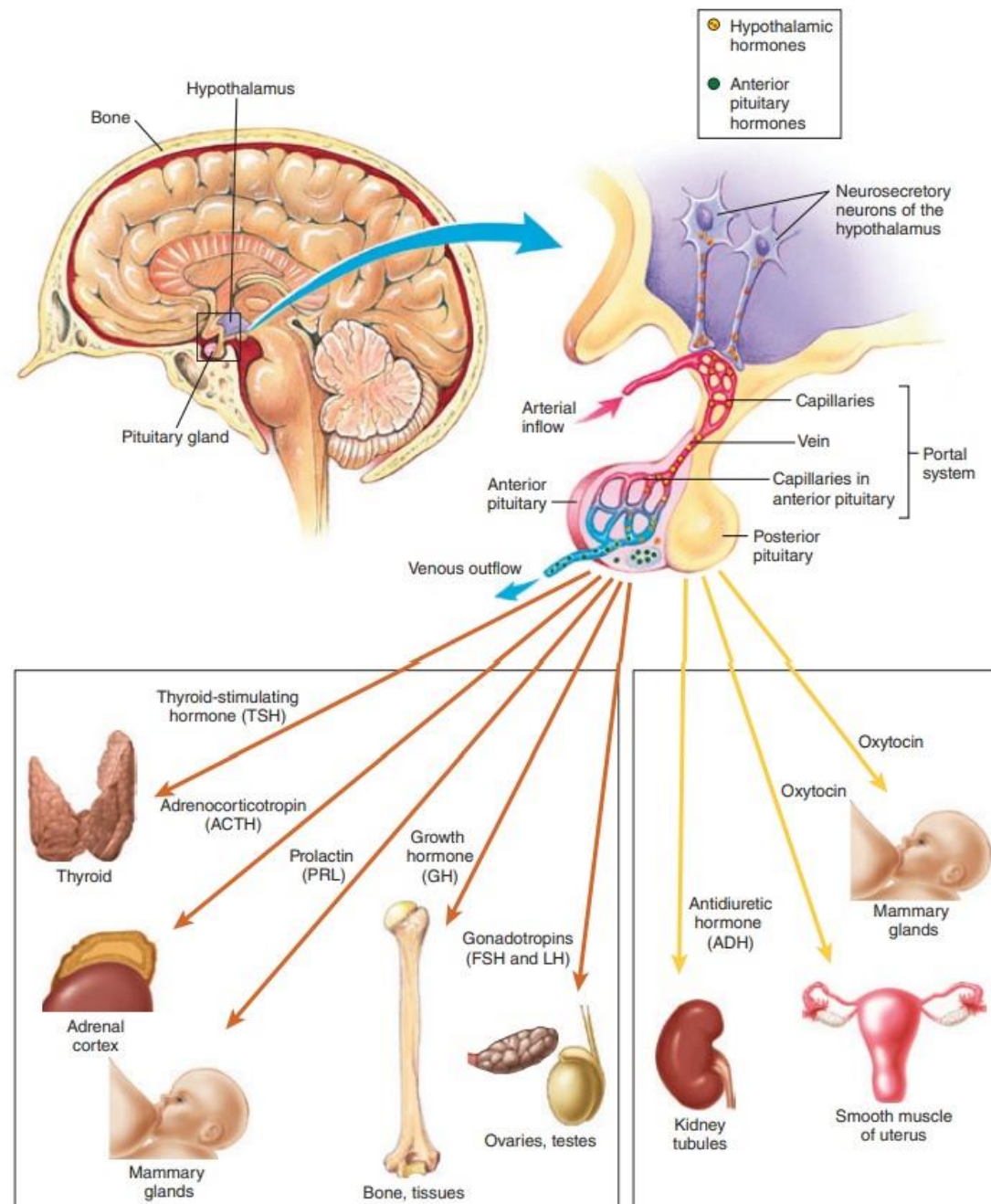


# Histology cont.

- ❖ Posterior:
  - resembles neural tissue, with glial cells, nerve fibers, nerve endings, and intra-axonal neurosecretory granules.
  - The hormones **vasopressin** (antidiuretic hormone, or ADH) and **oxytocin** made in the hypothalamus (supraoptic and paraventricular nuclei) are transported into the intra-axonal neurosecretory granules where they are released.

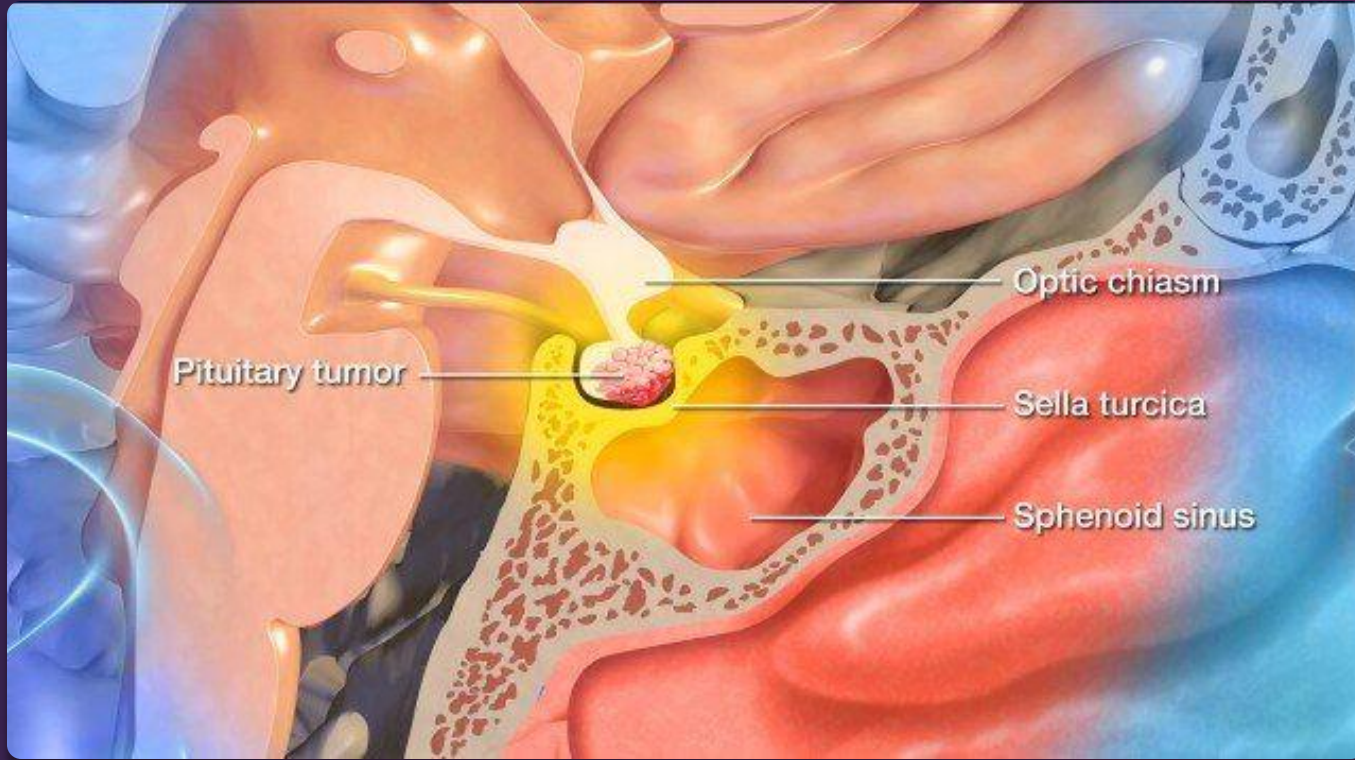
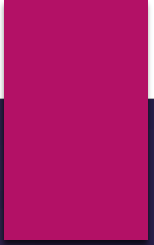


# Function



# 1. HYPERPITUITARISM

- ▶ Hyperpituitarism is defined as an excessive secretion or production of  $\geq 1$  of the hormones produced by the pituitary gland.
- ▶ The primary causes of Hyperpituitarism are various hormone-secreting pituitary tumors. In most cases, due to ADENOMA arising in the anterior lobe.
- ▶ Less common causes include :
  - \* Hyperplasia
  - \* Carcinoma
  - \* Ectopic hormone production
  - \* Some hypothalamic disorders



# Pituitary adenoma

# pituitary adenomas

- ▶ They are the most common suprasellar mass in adults (craniopharyngiomas are more common in children), **usually benign??**.
- ▶ Median age at diagnosis is 40 years.
- ▶ Majority occur in the sella turcica, originating within the adenohypophysis / anterior pituitary lobe.
- ▶ They are categorized based on size:
  - ❖ Microadenoma : less than 1 cm.
  - ❖ Macroadenoma : greater than 1 cm.

# Clinical features

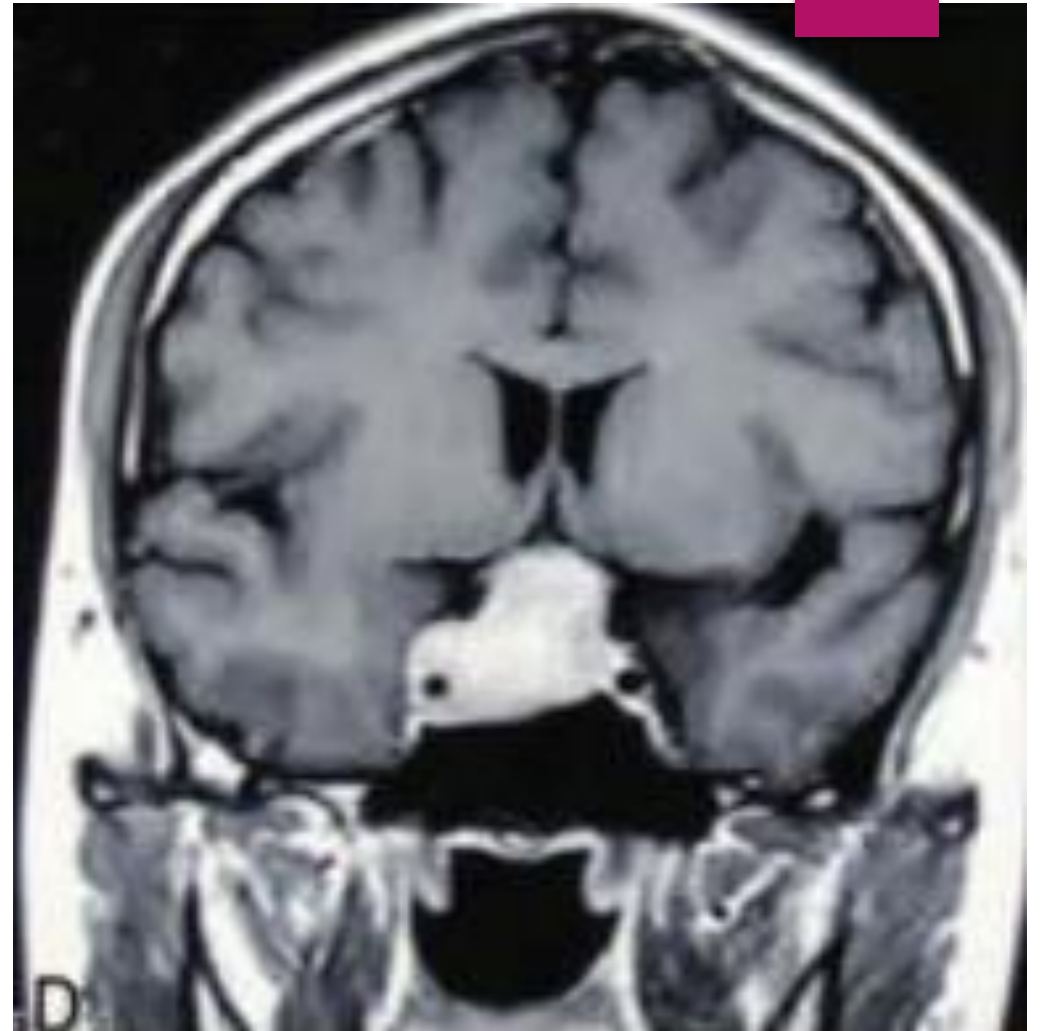
- ▶ Clinical features of hormone excess: acromegaly, gigantism, Cushing disease, sequelae of hyperprolactinemia, hyperthyroidism, rarely gonadotropin excess.
- ▶ Larger tumors (> 1 cm) can be associated with mass effects such as headache, visual disturbance and hypopituitarism.
- ▶ 3% occur with MEN syndrome.
- ▶ Hemorrhagic necrosis of large tumors (pituitary apoplexy) may be a surgical emergency

# Diagnosis

▶ **Radiology**

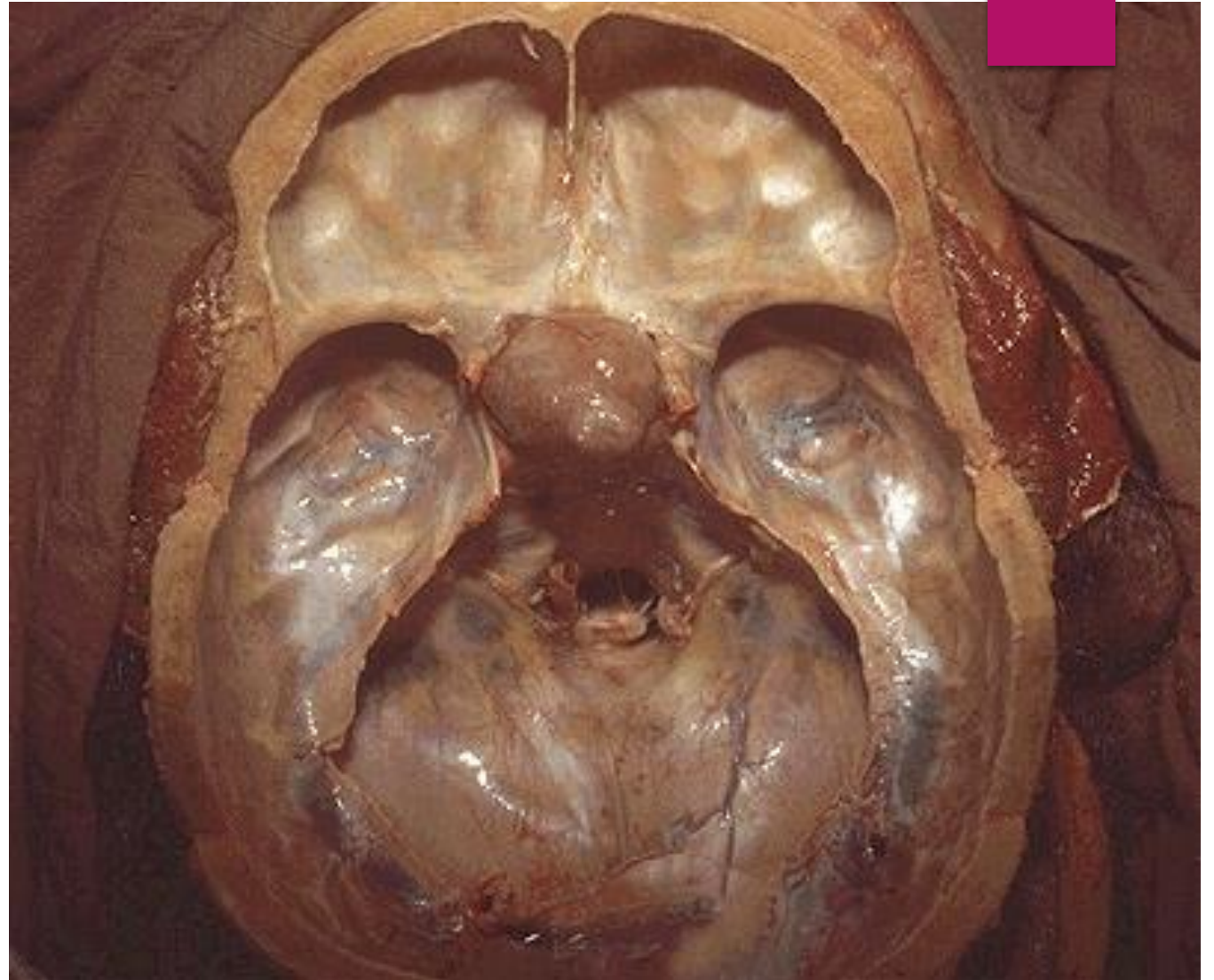
▶ **Laboratory:**

- Serum prolactin.
- Growth hormone and IGF1 are biomarkers of acromegaly or gigantism
- Cortisol and ACTH are elevated in Cushing disease



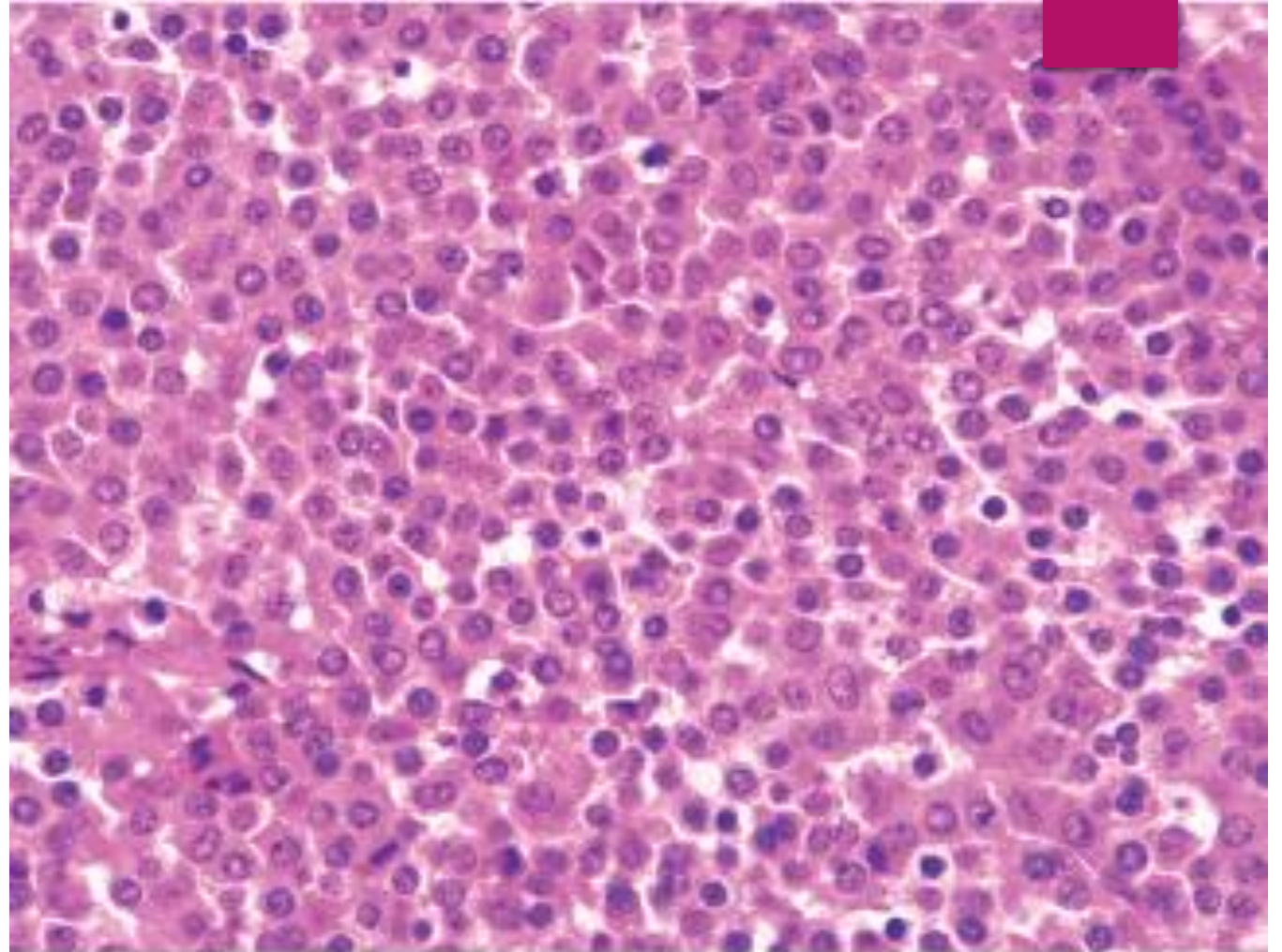
# Gross morphology

- ▶ Ranging from Well circumscribed tumor to invasive lesion in up to 30%.
- ▶ Hemorrhage & necrosis seen in large tumors



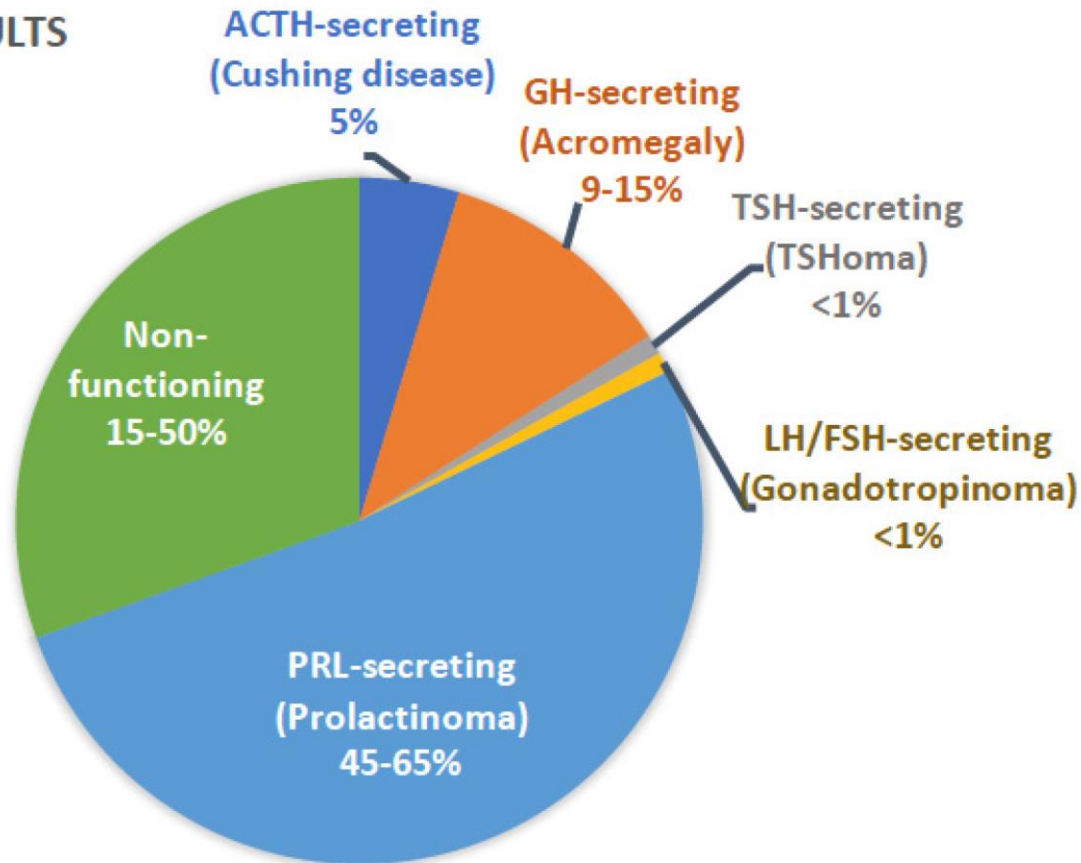
# Histologic features

- ▶ Cells may be classified as acidophilic, basophilic or chromophobic based on tinctorial differences; this usually correlates with content of hormone containing secretory cells



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ADULTS



Types and frequency of PAs based on their functional status in adult

# 1- PROLACTINOMA :

- ▶ The most common secretory tumors of the pituitary gland, accounting for up to 45 percent of pituitary adenomas.
- ▶ Prolactinomas can lead to a wide variety of symptoms, either due to mass effect or hypersecretion of prolactin.
- ▶ Hyperprolactinemia is not always due to prolactinoma, and other causes like pregnancy, drugs, hypothyroidism, and pituitary stalk effect due to other pituitary tumors.
- ▶ Prolactinomas arise from monoclonal expansion of pituitary lactotrophs that have undergone somatic mutation.

## Signs and Symptoms Due to Mass Effect:

- ❖ Headaches
- ❖ visual field deficits.
- ❖ Cranial nerve palsies.
- ❖ Seizures, hydrocephalus.

## Signs and Symptoms Due to hyperprolactinemia:

### **Males**

Decreased libido  
Impotence  
Erectile dysfunction  
Oligozoospermia (due to secondary hypogonadism).

### **Females**

Oligomenorrhea, amenorrhea  
Infertility, loss of libido  
Galactorrhea

# Treatment

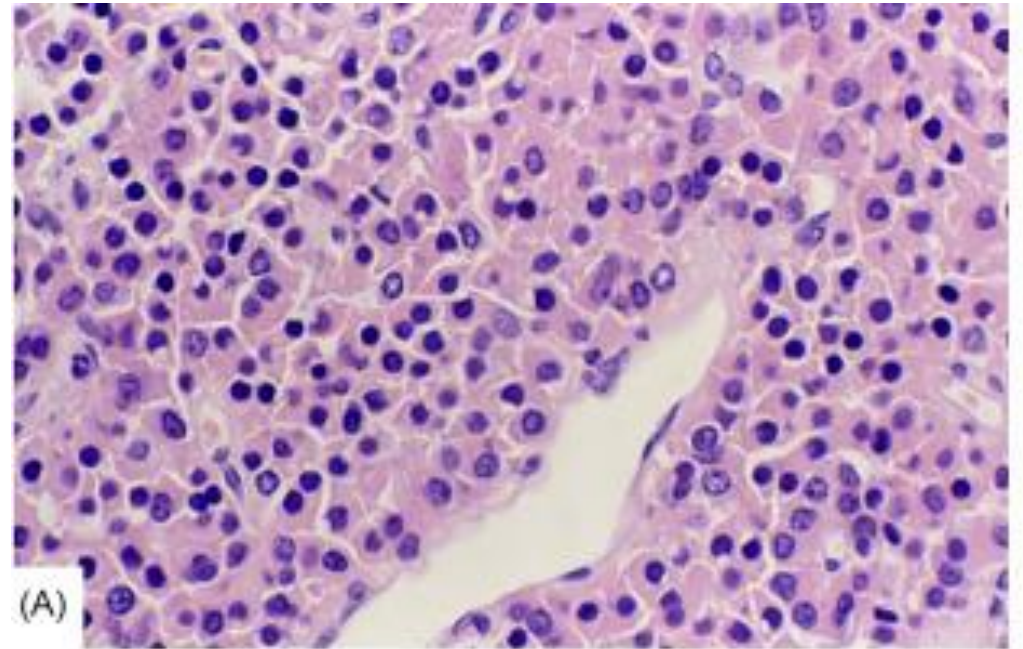
- ▶ Macroprolactinomas incidentally discovered without symptoms can be observed with periodic monitoring of the labs and imaging.
- ▶ Macroprolactinoma or symptomatic microadenoma should be treated with dopamine agonist therapy.

## 2. Growth hormone secreting adenoma

- ▶ Persistent secretion of GH stimulates the hepatic secretion of insulin-like growth factor I (IGF-I).
- ▶ 40% Associated with GNAS 1 gene mutation
- ▶ Symptoms :
  - ▶ May be delayed so adenomas are usually large
  - ▶ Produce GIGANTISM (children) or ACROMEGALLY (adults).
- ▶ Diagnosis:
  - measurement of GH & IGF-1.
  - Confirm by failure to suppress GH production in response to an oral load of glucose.

# Histology

- ▶ Composed of granular ACIDOPHILIC cells and may be mixed with prolactin secretion.



# 3- Corticotroph cell adenoma

- ▶ Composed of Chromophobe or basophilic cells, Usually microadenomas.
- ▶ Presentation:
  - Functionless .
  - Cushing 's Disease ( ↑ ACTH )
  - ↑ ICP .
- ▶ Higher chance of becoming malignant

# HYPOPITUITARISM.

A microscopic image of a plant vascular bundle, showing a cluster of xylem vessels on the left and a cluster of phloem cells on the right, separated by a vascular cambium. The xylem vessels are large and have thick, lignified walls, while the phloem cells are smaller and have thinner walls.

- ▶ Hypopituitarism is a medical condition characterized by insufficient hormone production in the pituitary gland.
- ▶ **Etiology**
- ▶ Hypopituitarism can originate from 2 primary sources :
  - pathology of the hypothalamus, which affects the production of tropic hormones that act on the pituitary.
  - direct pathology within the pituitary gland itself.
- ▶ The predominant cause of hypopituitarism is pituitary tumors, which account for 61% of cases.

A hand is shown holding a single green leaf against a blurred background of more green leaves. The lighting is soft, and the overall tone is natural and organic.

The symptoms associated with hormonal deficiencies are:

- ▶ ACTH deficiency: ACTH deficiency results in adrenal insufficiency.
- ▶ TSH deficiency: TSH deficiency leads to hypothyroidism.
- ▶ Gonadotropin deficiency: Gonadotropin deficiency leads to hypogonadism.
- ▶ GH deficiency: GH deficiency in children can result in poor growth and short stature, in adults, some individuals may experience fatigue and weakness.
- ▶ ADH deficiency: ADH deficiency leads to diabetes insipidus, characterized by symptoms such as polydipsia and polyuria.

# Craniopharyngiomas.

- craniopharyngiomas are specialized tumors with benign histology and malignant behavior. These lesions have a tendency to invade surrounding structures and to recur after a seemingly total resection.
- Craniopharyngiomas most frequently arise in the pituitary stalk and project into the hypothalamus
- Derived from remnants of Rathke's Pouch.
- The most common presenting symptoms are headache, endocrine dysfunction and visual disturbances.



THANK YOU