



Endocrine Block
Pathology Practical



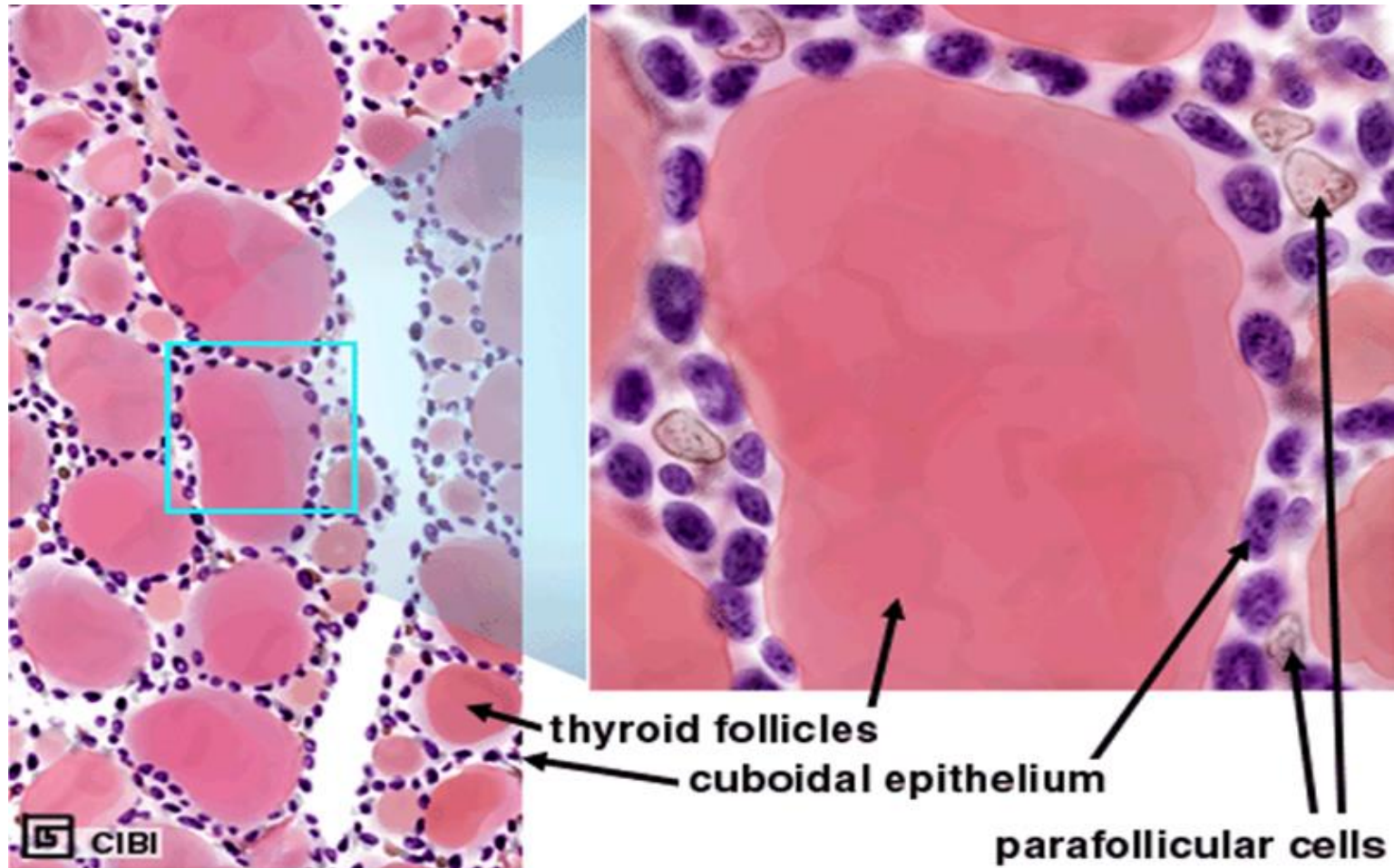
Normal Anatomy & Histology

Normal anatomy of thyroid gland



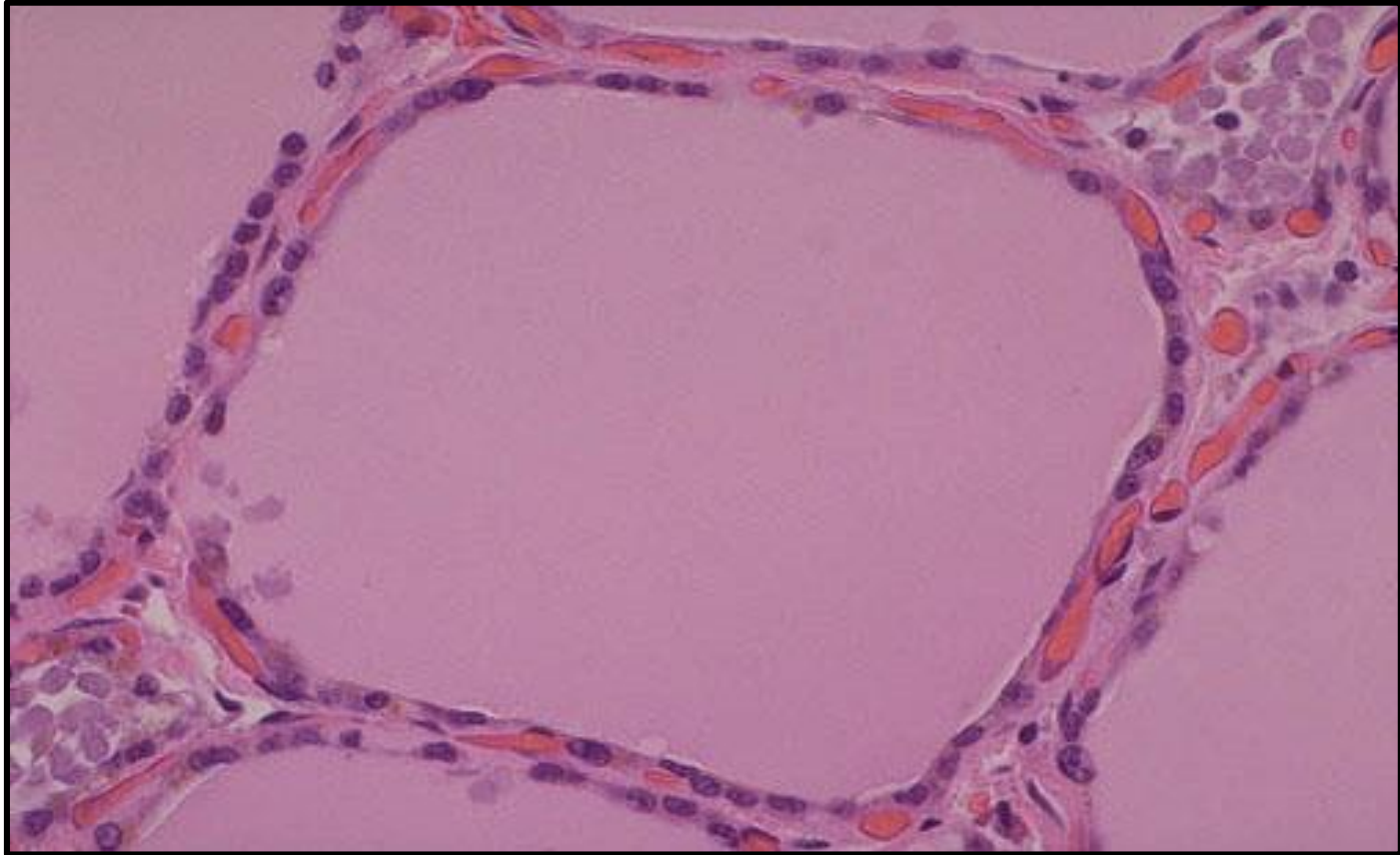
The normal appearance of the thyroid gland (15-25 g) on the anterior trachea of the neck. The thyroid gland has a right lobe and a left lobe connected by a narrow isthmus. A normal thyroid cannot easily be palpated on physical examination

Normal Histology of Thyroid gland – LPF&HPF



Normal thyroid seen microscopically consists of follicles lined by a cuboidal epithelium and filled with pink, homogenous colloid. The follicles vary somewhat in size. The interstitium, which may contain "C" cells, is not prominent.

Normal Histology of Thyroid gland - HPF



This normal thyroid follicle is lined by a cuboidal follicular epithelium with cells that can add or subtract colloid depending upon the degree of stimulation from TSH (thyroid stimulating hormone) released by the pituitary gland. As in all endocrine glands, the interstitium has a rich vascular supply into which hormone is secreted.



Gross and Histopathology



1- Multinodular Goiter

Multinodular Goiter – in situ



Etiology:

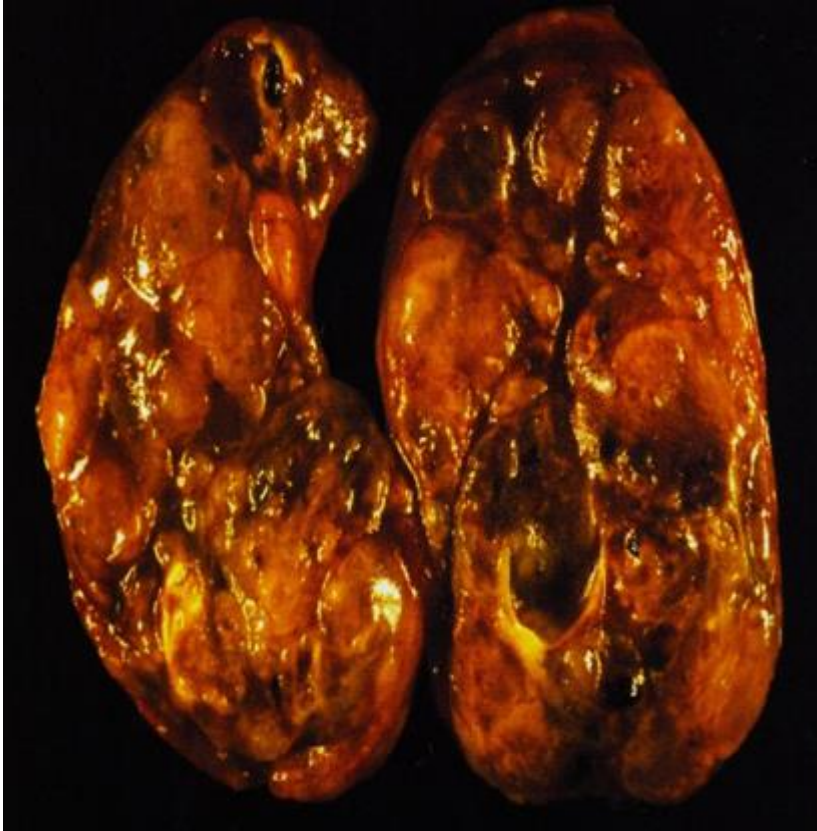
- *Endemic goitre is caused by iodine deficiency in certain areas.*
- *Hereditary enzymatic defects leading to dyshormonogenetic goitre.*

Complications

- *Airway obstruction*
- *Dysphagia*
- *Compression of large vessels in the neck*

- Markedly **enlarged and nodular** thyroid gland

Multinodular Goiter - Gross



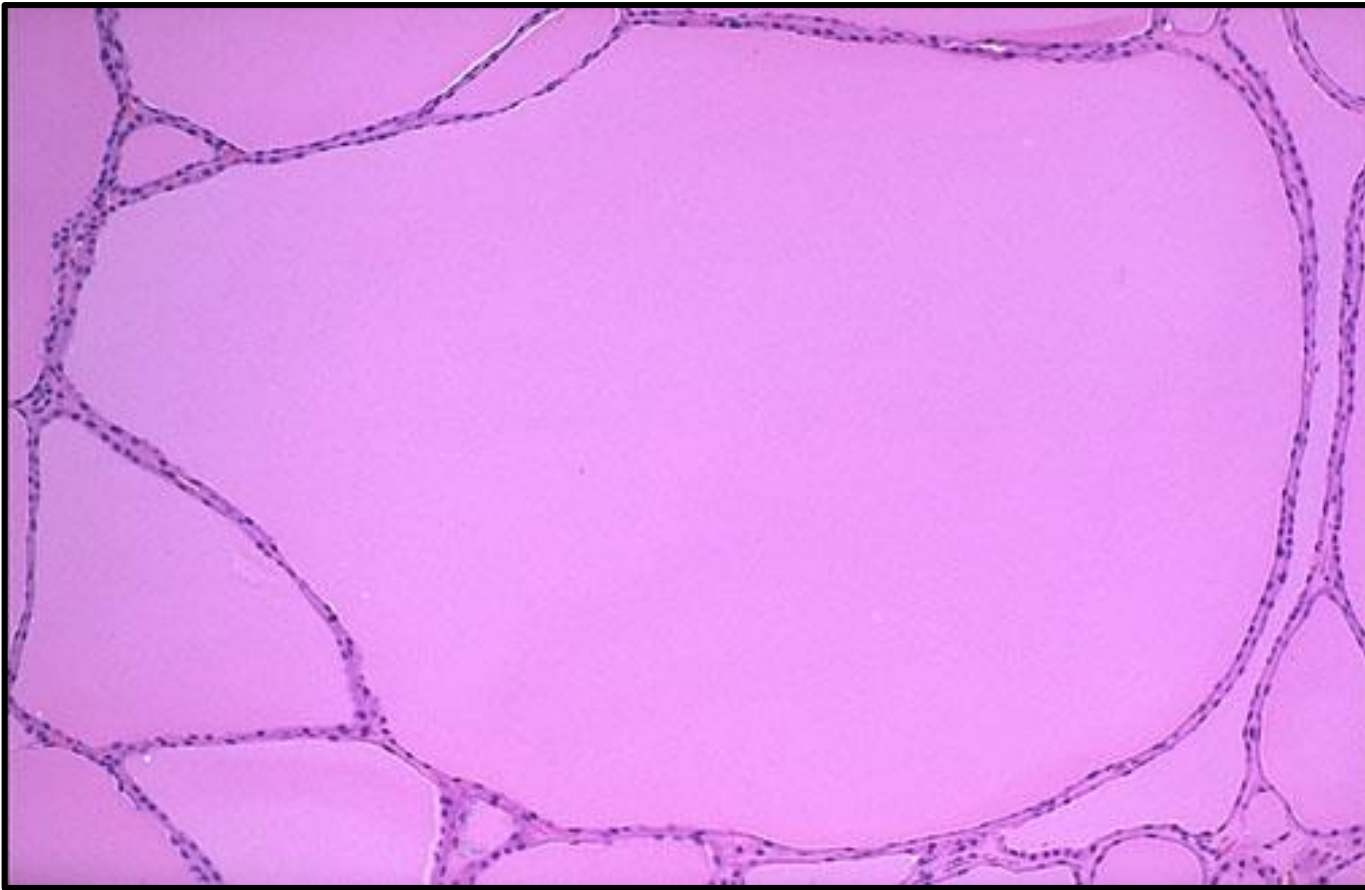
This diffusely asymmetric enlarged thyroid gland is nodular with haemorrhage and cystic degeneration. This patient was euthyroid. This represents the most common cause for an enlarged thyroid gland and the most common disease of the thyroid

Multinodular Goiter - LPF



Numerous follicles varying in size filled with colloid. We can also see : Recent haemorrhage , Haemosiderin , Calcification & Cystic degeneration

Multinodular Goiter - LPF



- ***Enlarged thyroid follicles.***
- ***Follicles are lined by flat epithelium and contains colloid***



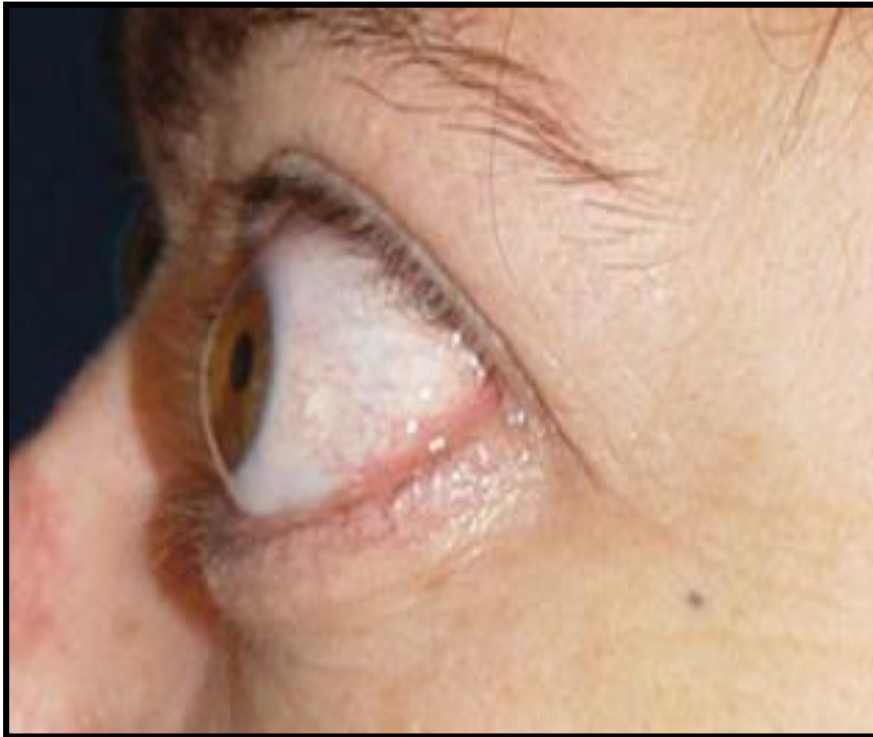
2- Hyperthyroidism & Grave's Disease

HYPERTHYROIDISM

CLINICALLY:

- ***Hypermetabolism***
- ***Tachycardia, palpitations***
- ***Increased T₃, T₄***
- ***Goiter***
- ***Exophthalmos***
- ***Tremor***
- ***GIT hypermotility***
- ***Thyroid "storm", life threatening***

Exophthalmos – Sign of Grave's Disease



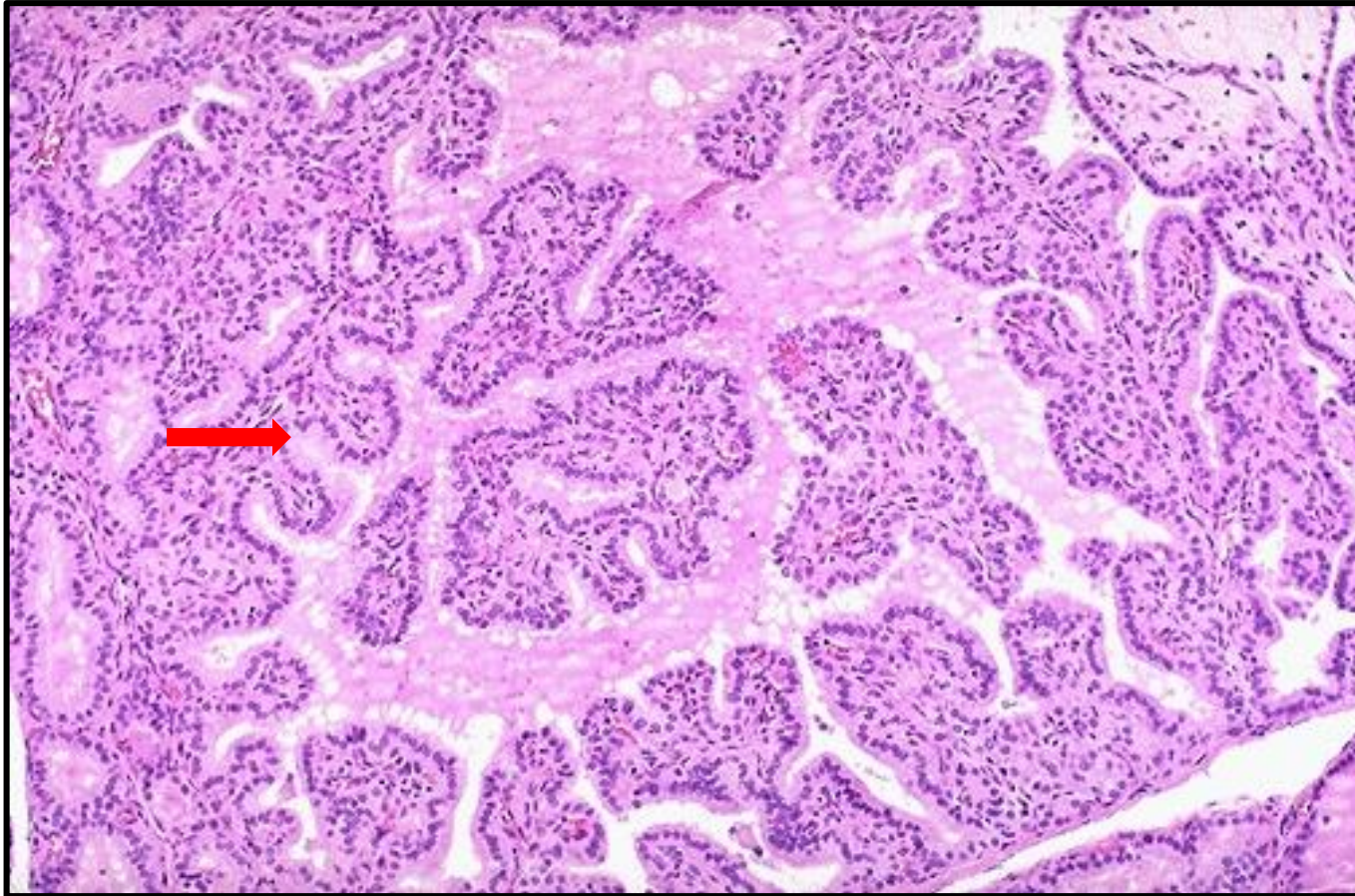
*Proptosis, Lid lag , Lid retraction , Peri-ocular fat deposition
and Scleral rim above the iris*

Grave's Disease - Gross



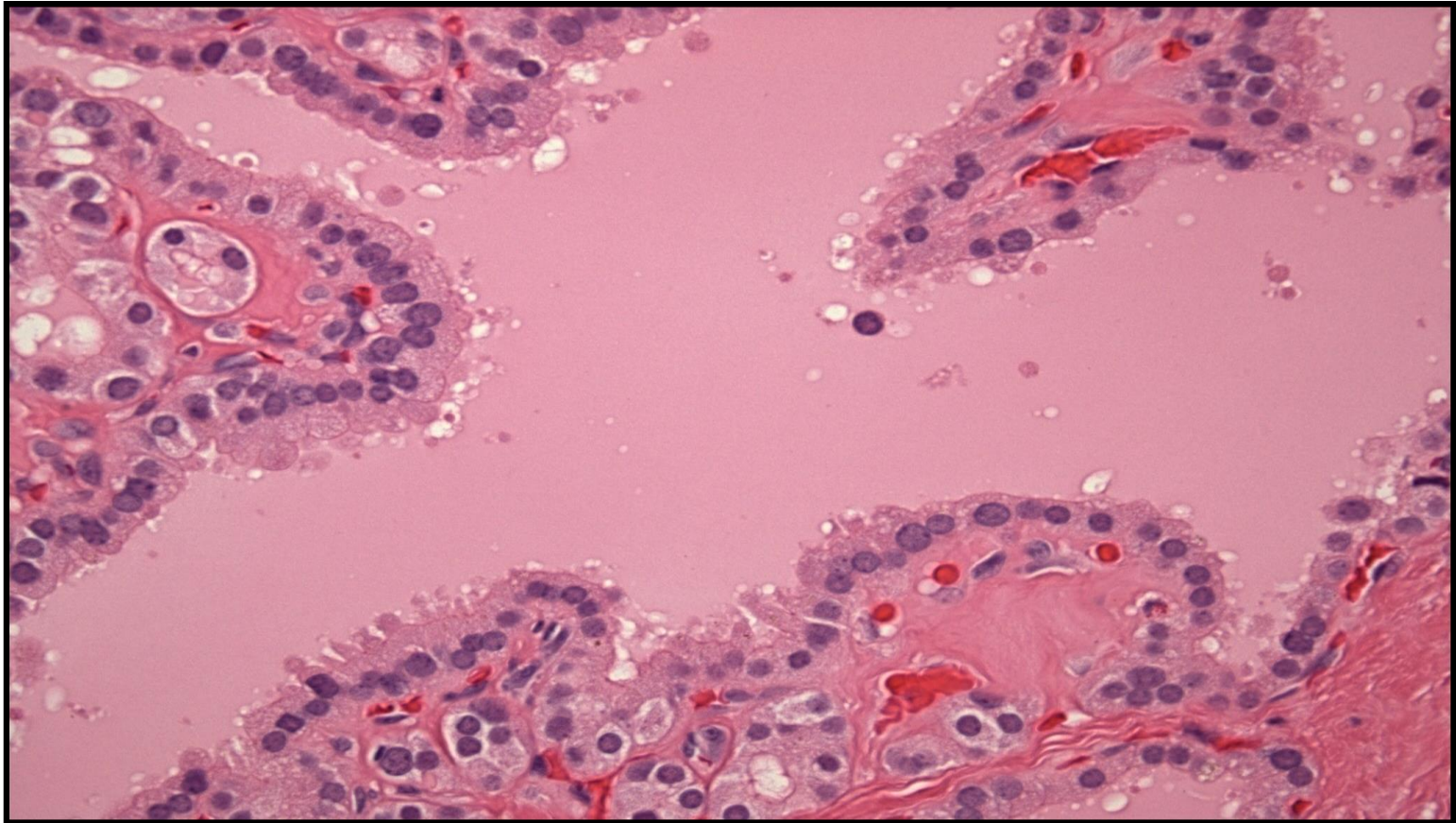
- *Symmetrical enlargement of thyroid gland*
- *Cut-surface is homogenous, soft and appear meaty*
- *Hyperplasia and hypertrophy of follicular cells*

Grave's Disease - LPF



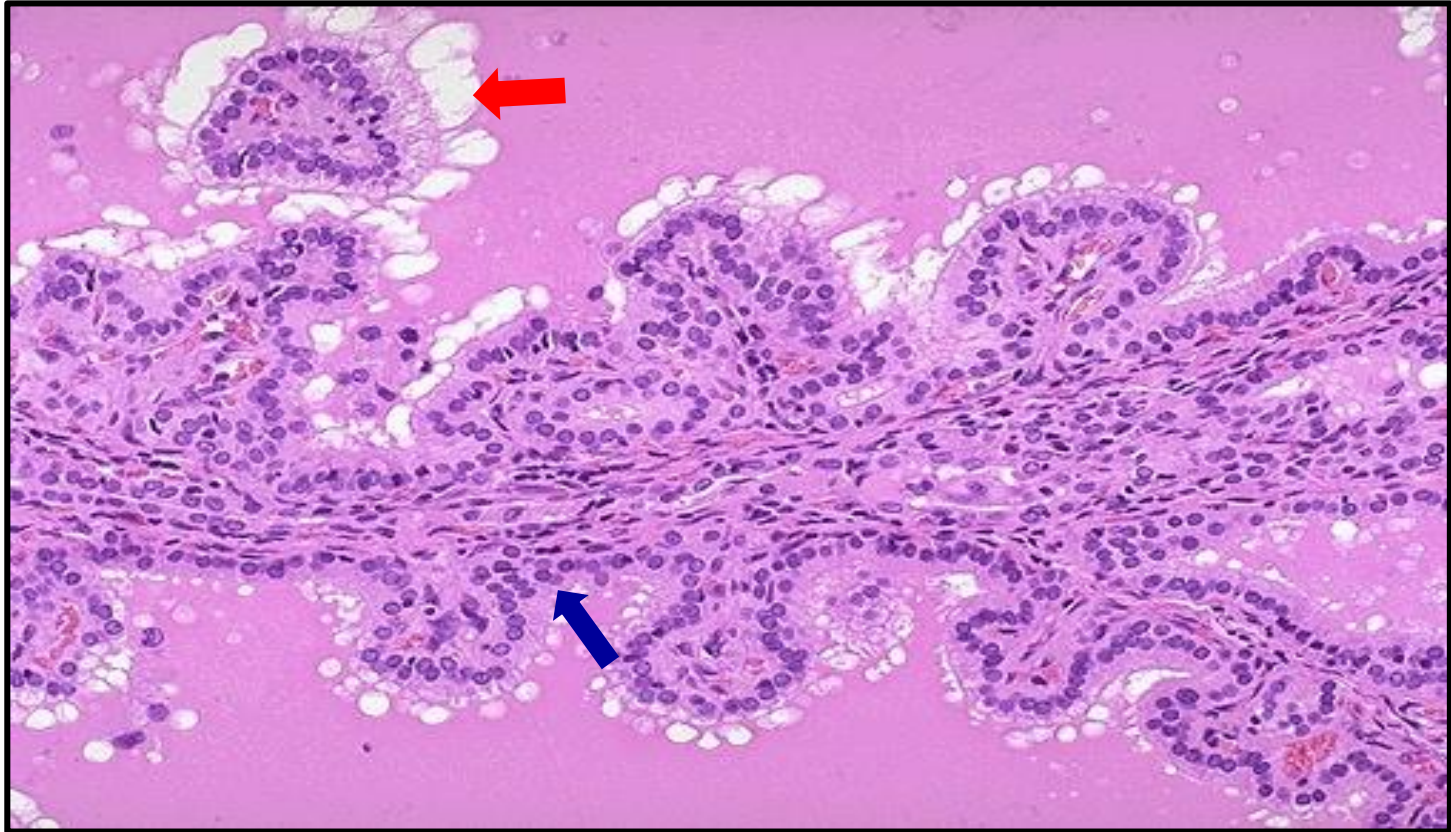
*A diffusely enlarged thyroid gland associated with hyperthyroidism is known as Graves disease. At LPF, note the prominent **infoldings** of the hyperplastic follicular epithelium*

Grave's Disease - HPF



Section shows thyroid follicles lined by columnar and high cuboidal cells with evidence of peripheral vacuoles within the intrafollicular colloid material . Note the presence of peripheral smaller thyroid follicles devoid of colloid but lined by similar cells

Grave's Disease - HPF



*The tall columnar thyroid epithelium with Graves disease lines the **hyperplastic infoldings** into the colloid. Note the **clear vacuoles** in the colloid next to the epithelium where the increased activity of the epithelium to produce increased thyroid hormone has led to scalloping out of the colloid in the follicle.*



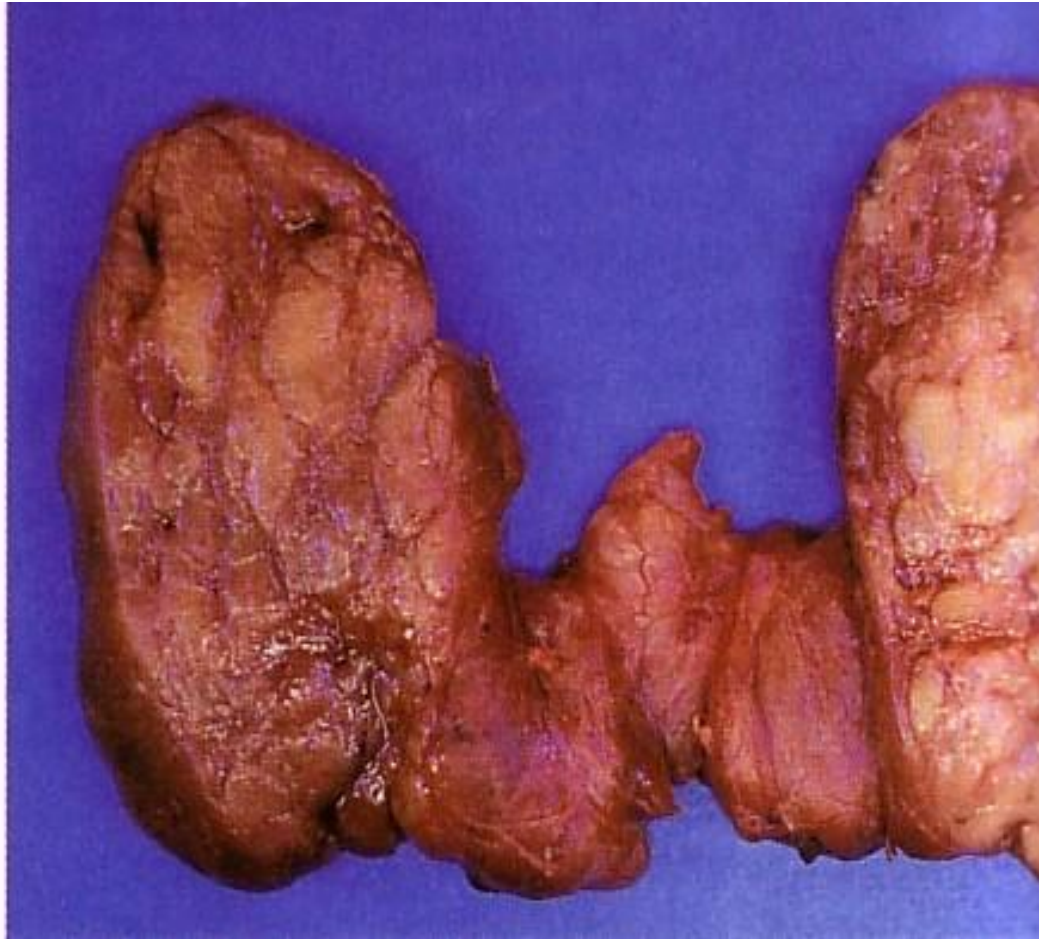
3- Hashimoto's Thyroiditis

Hashimoto's Thyroiditis, Gross



This symmetrically small thyroid gland demonstrates atrophy. This patient was hypothyroid. This is the end result of Hashimoto's thyroiditis. Initially, the thyroid is enlarged and there may be transient hyperthyroidism, followed by a euthyroid state and then hypothyroidism with eventual atrophy years later.

Hashimoto's Thyroiditis - Gross

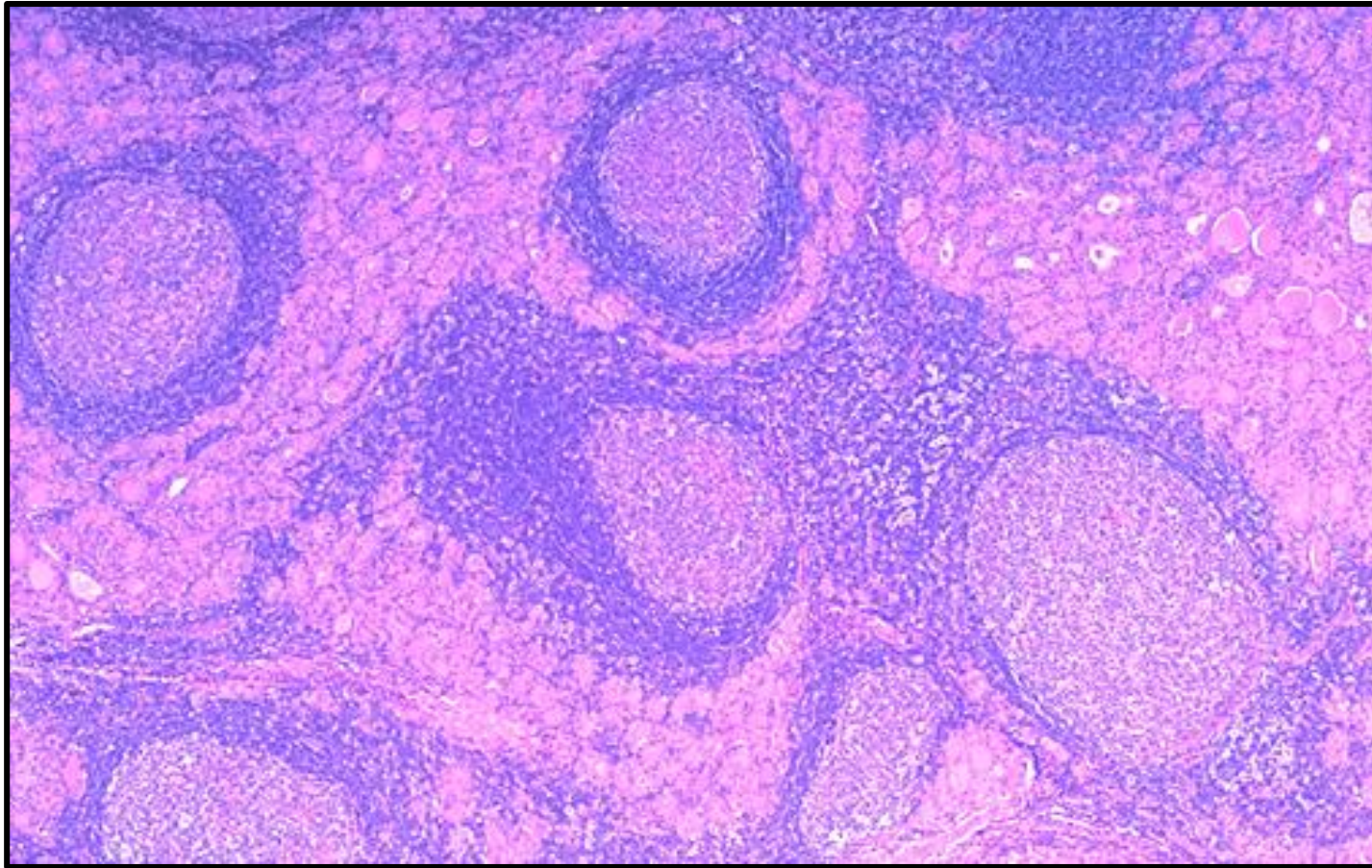


Complications

- a. *B cell lymphoma*
- b. *Papillary carcinoma*

- *Diffuse enlargement.*
- *Firm or rubbery.*
- *Pale, yellow-tan, firm & somewhat nodular cut surface*

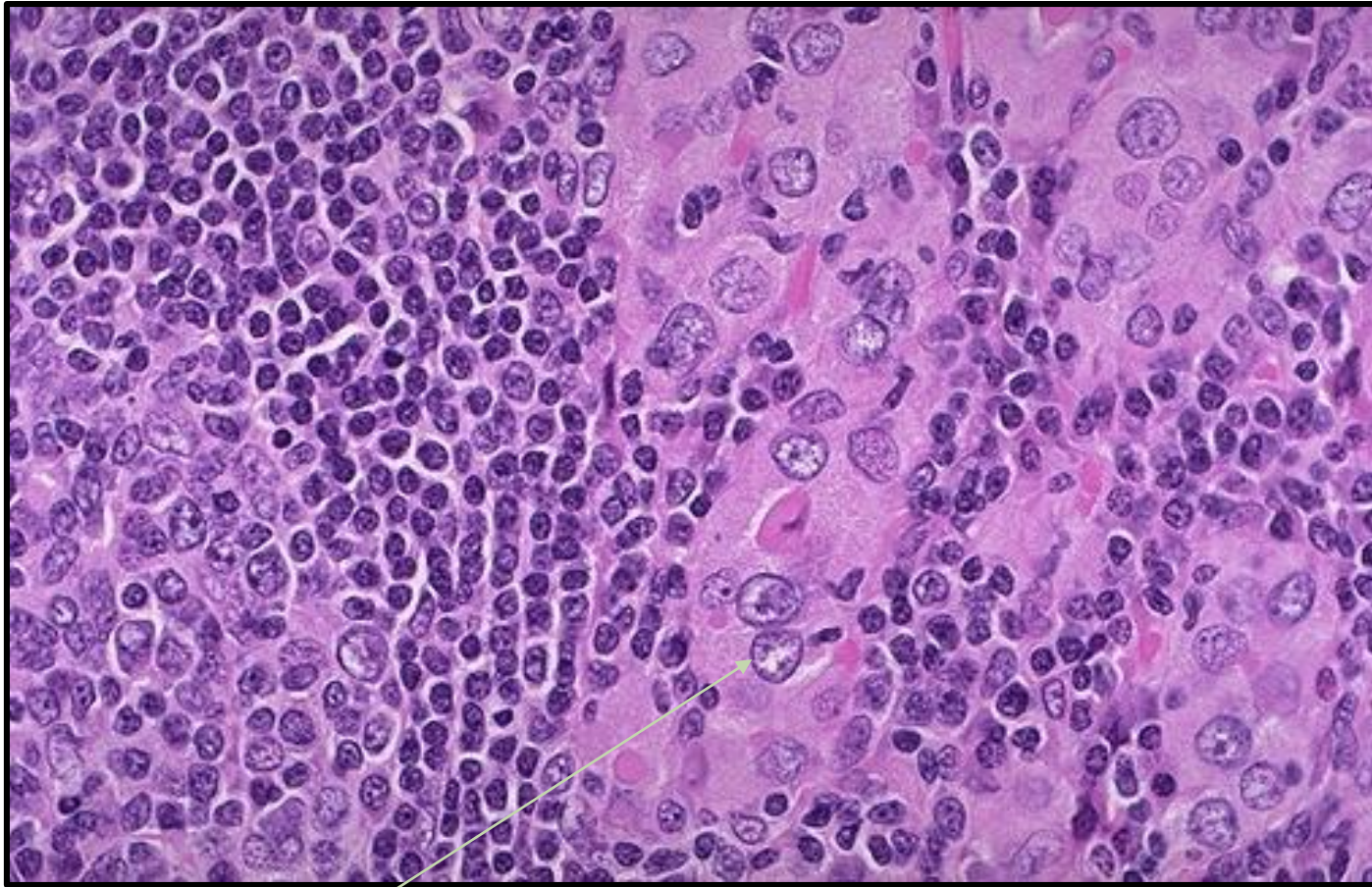
Hashimoto's Thyroiditis - LPF



This view shows an early stage of Hashimoto thyroiditis with prominent lymphoid follicles containing large, active germinal centers.

Etiology: Autoimmune ;T cell mediated disease, antithyroglobulin and antimicrosomal (thyroid peroxidase) autoantibodies can often be detected in serum.

Hashimoto's Thyroiditis - HPF



- *Hurthle cell or oxyphil cell change.*
- *Lymphocytic infiltration with lymphoid follicles formation.*



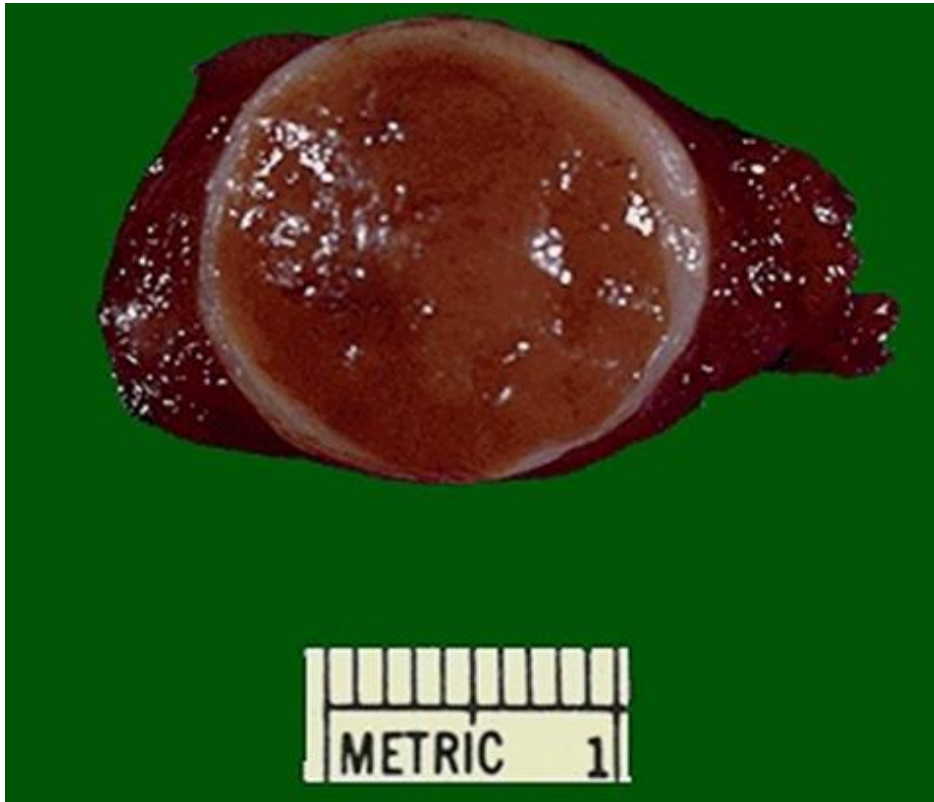
4- Follicular Adenoma

Solitary Thyroid nodule



Central and slightly left sided thyroid nodule.

Follicular Adenoma – Gross cut section

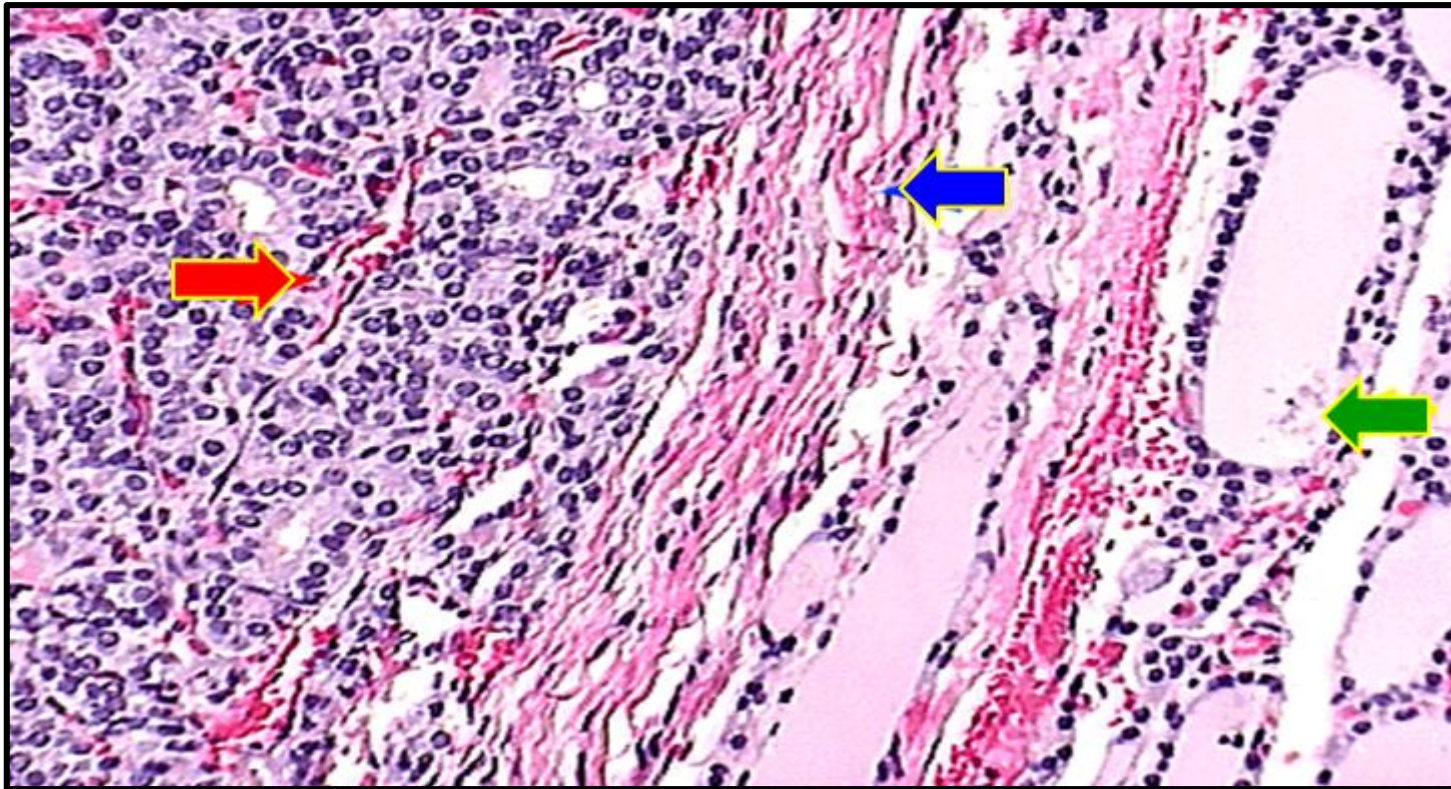


Well circumscribed and encapsulated tumour nodule.

Pale and yellowish cut-surface

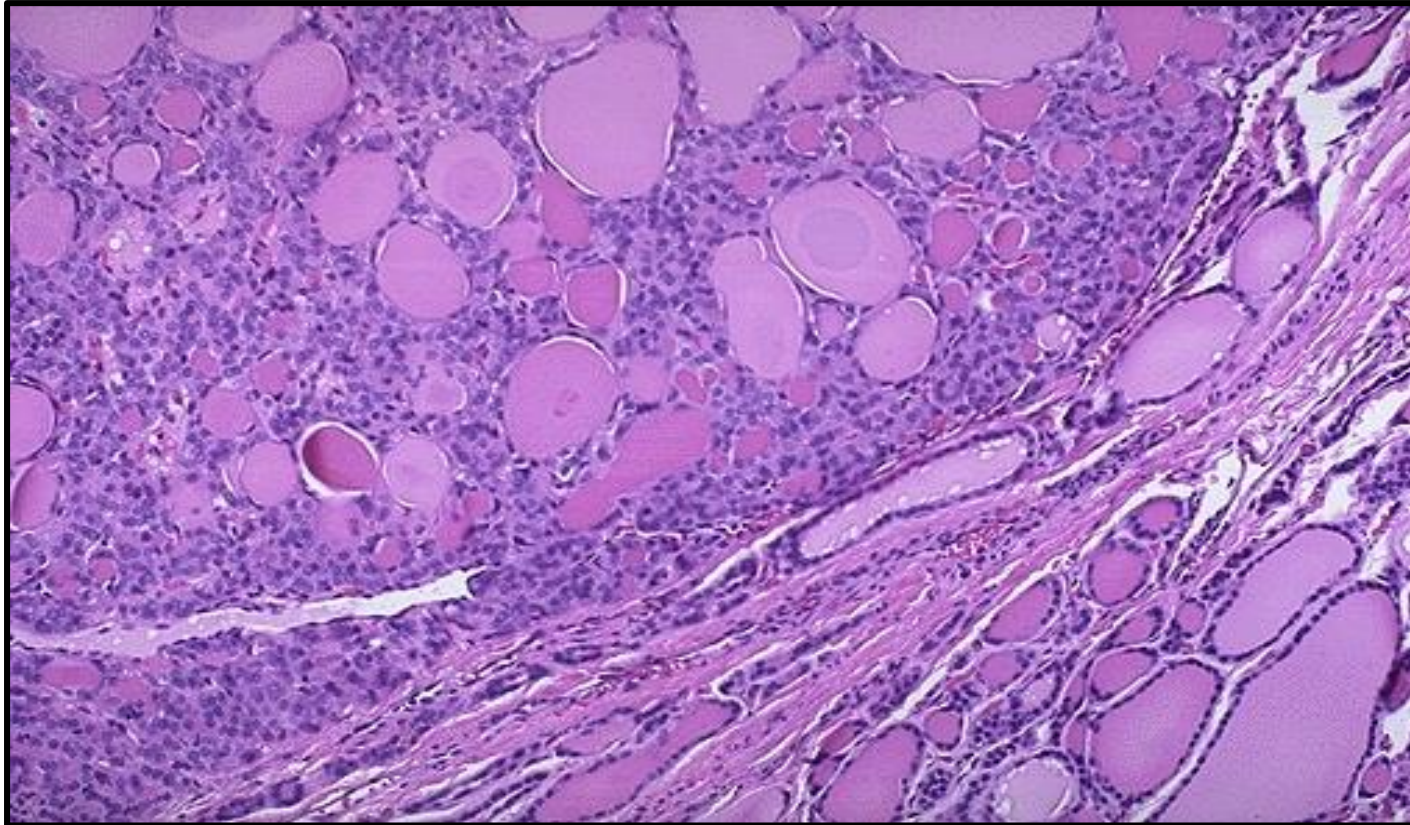
The surrounding thyroid tissue is unremarkable .

Follicular Adenoma – LPF



- **Red arrow:** Small neoplastic follicles with little colloid material.
- **Blue arrow:** Capsule.
- **Green arrow:** Normal thyroid follicles outside the tumour


Follicular Adenoma – HPF



Normal thyroid follicles appear at the lower right. The follicular adenoma is at the center to upper left.

Pathologic features that if present they will indicate malignant transformation in this case.

- ***Capsular invasion.***
- ***Vascular invasion***



5- Papillary Thyroid Carcinoma

Papillary Thyroid Carcinoma



Huge thyroid swelling due to papillary thyroid carcinoma

Papillary Thyroid Carcinoma– Gross



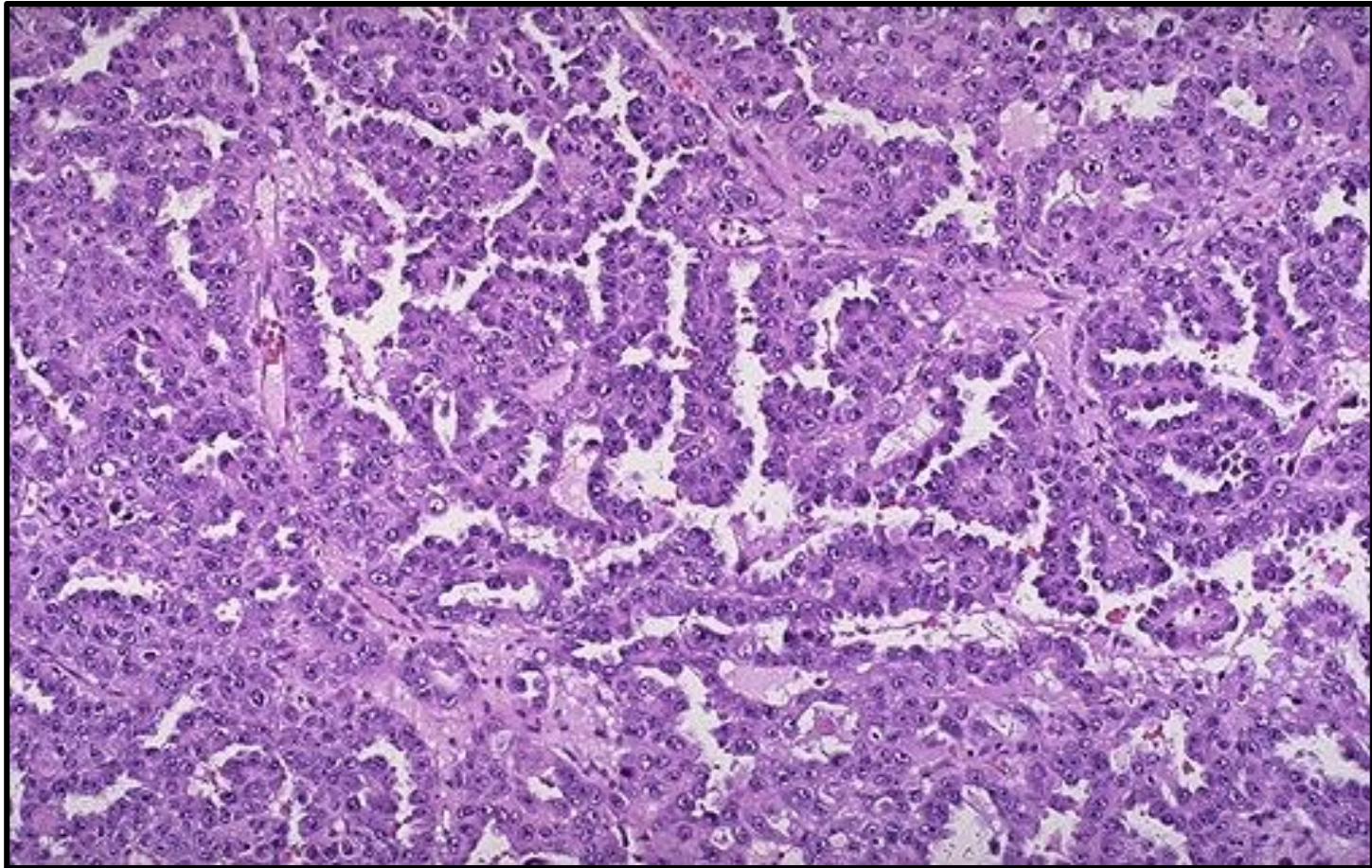
A relatively well circumscribed pale and firm nodule showing a whitish cut surface with vague scattered papillary areas .

Multifocal Papillary Thyroid Carcinoma– Gross cut section



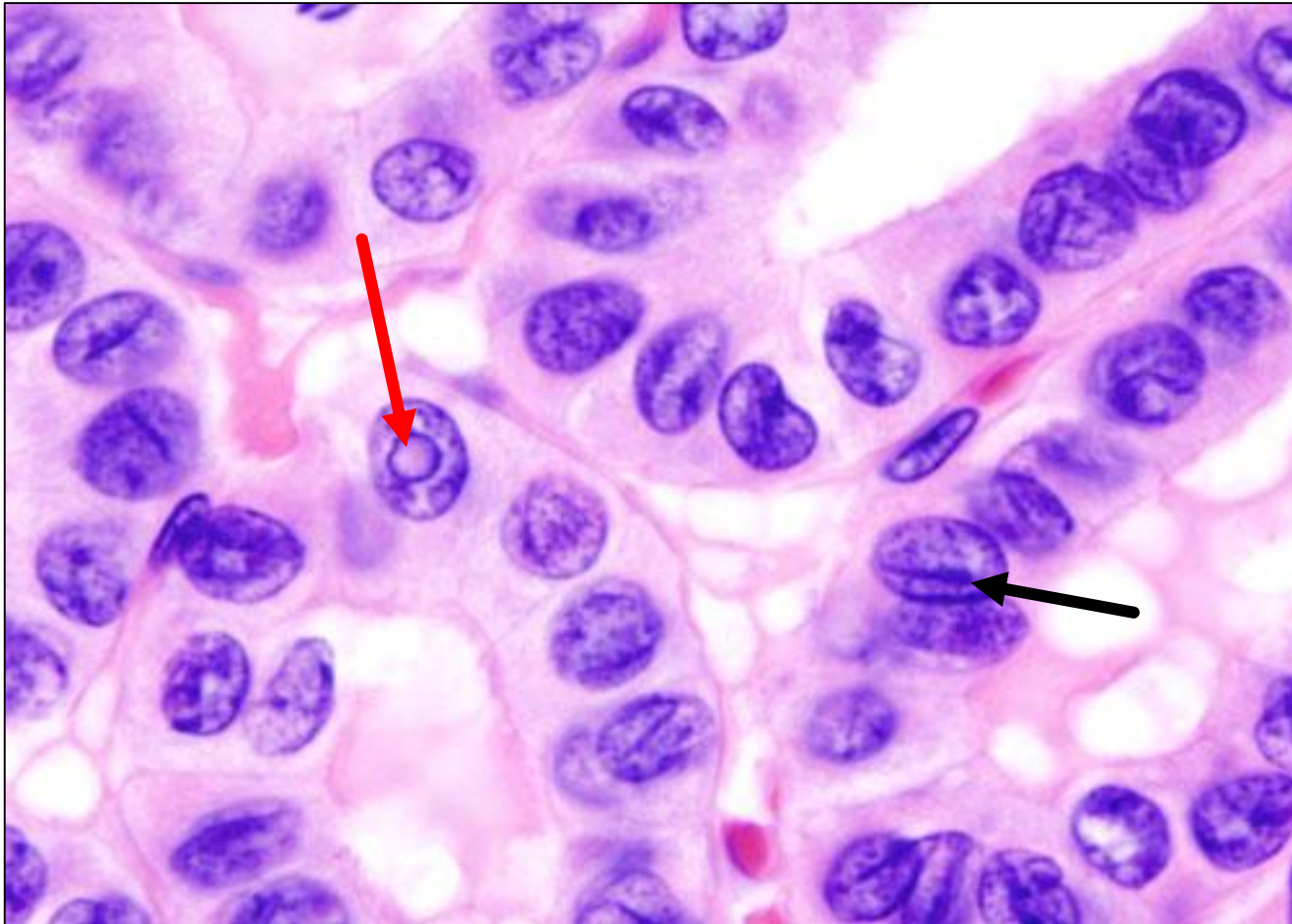
*Sectioning through a lobe of excised thyroid gland reveals a papillary carcinoma. This neoplasm can be multifocal, as seen here, because of the propensity of this neoplasm to invade lymphatics within thyroid, and lymph node metastases are also common. The larger mass shown here is cystic and contains **papillary excrescences***

Papillary Thyroid Carcinoma– LPF



*Sections show a papillary neoplasm consisting of papillary fronds lined by overlapping clear nuclei (Orphan Annie nuclei).
Calcified Psammoma bodies are also seen*

Papillary Thyroid Carcinoma– HPF



High power microscopic field showing a classical papillary carcinoma of the thyroid gland. Note the presence of intranuclear inclusion (red arrow) and coffee bean nucleus with prominent nuclear groove (black arrow)

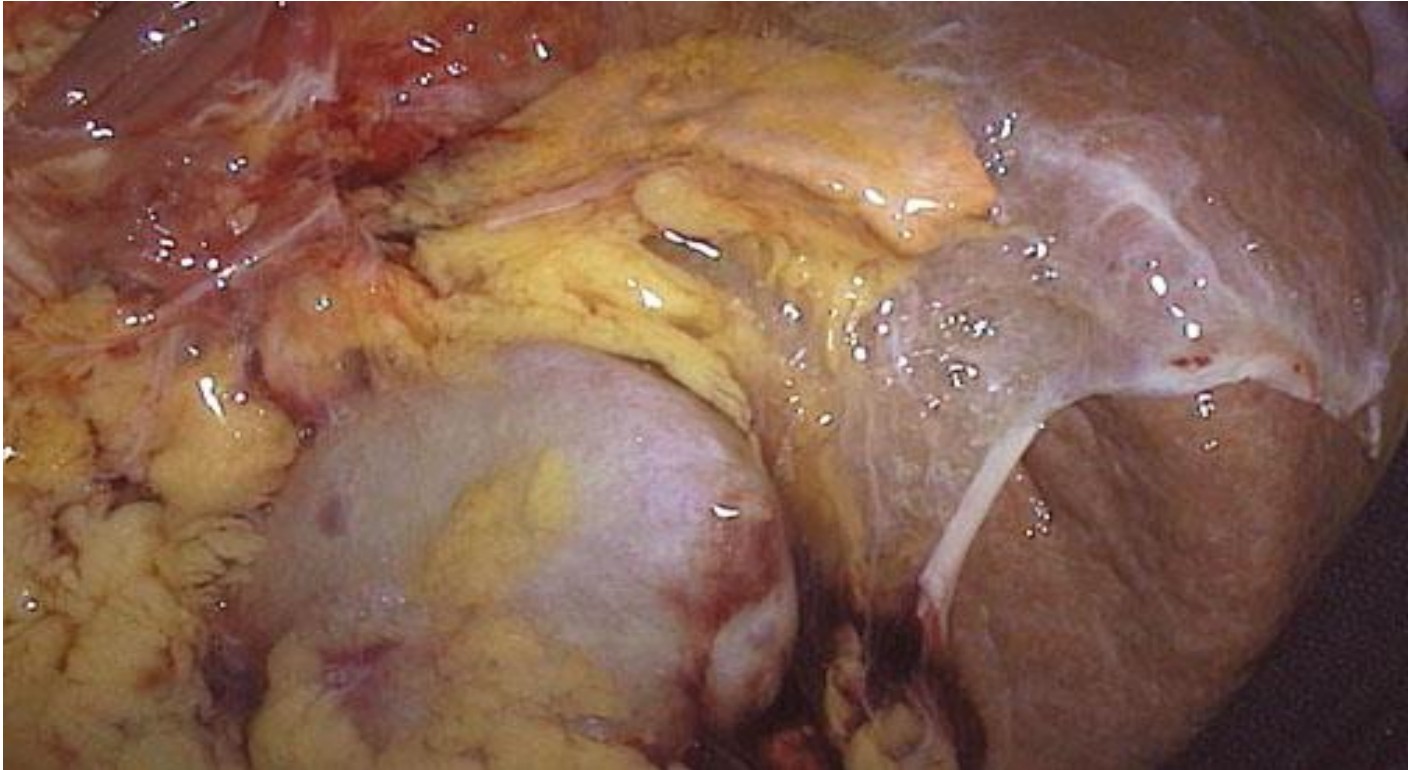


ADRENAL GLAND



Pheochromocytoma

Adrenal Gland – In situ



A normal right adrenal gland is shown here positioned between the liver and the kidney in the retroperitoneum. Note the amount of adipose tissue, some of which has been reflected to reveal the upper pole of the kidney and the adrenal.

Adrenal Gland – Normal Gross & Cross section

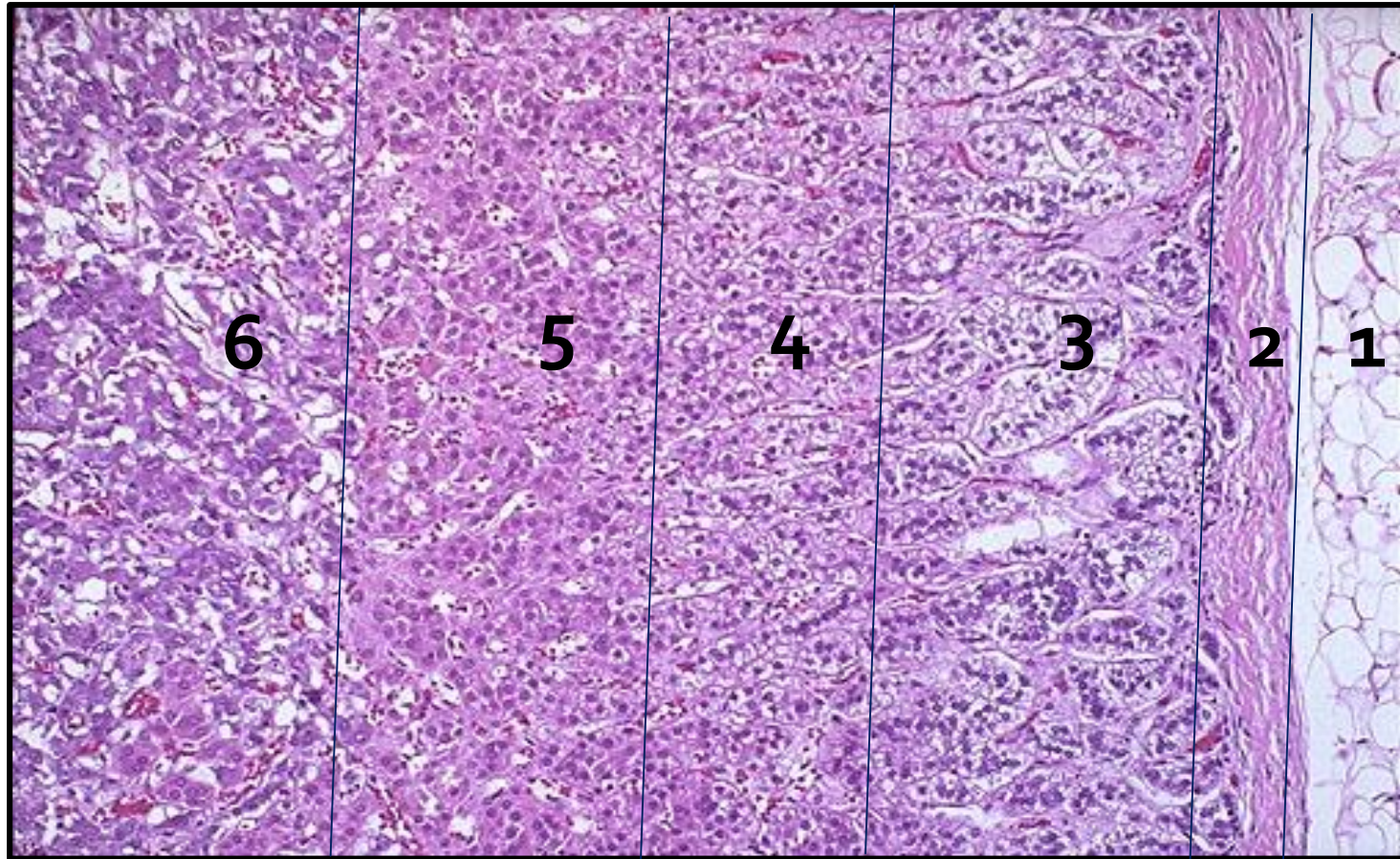


***Here are normal adrenal glands.
Each adult adrenal gland
weighs from 4 to 6 grams.***



***Sectioning across the adrenals
reveals a golden yellow outer
cortex and an inner red to grey
medulla.***

Normal Adrenal Gland Histology



1 – Periadrenal fat
3- Zona Glomerulosa
5- Zona Reticularis

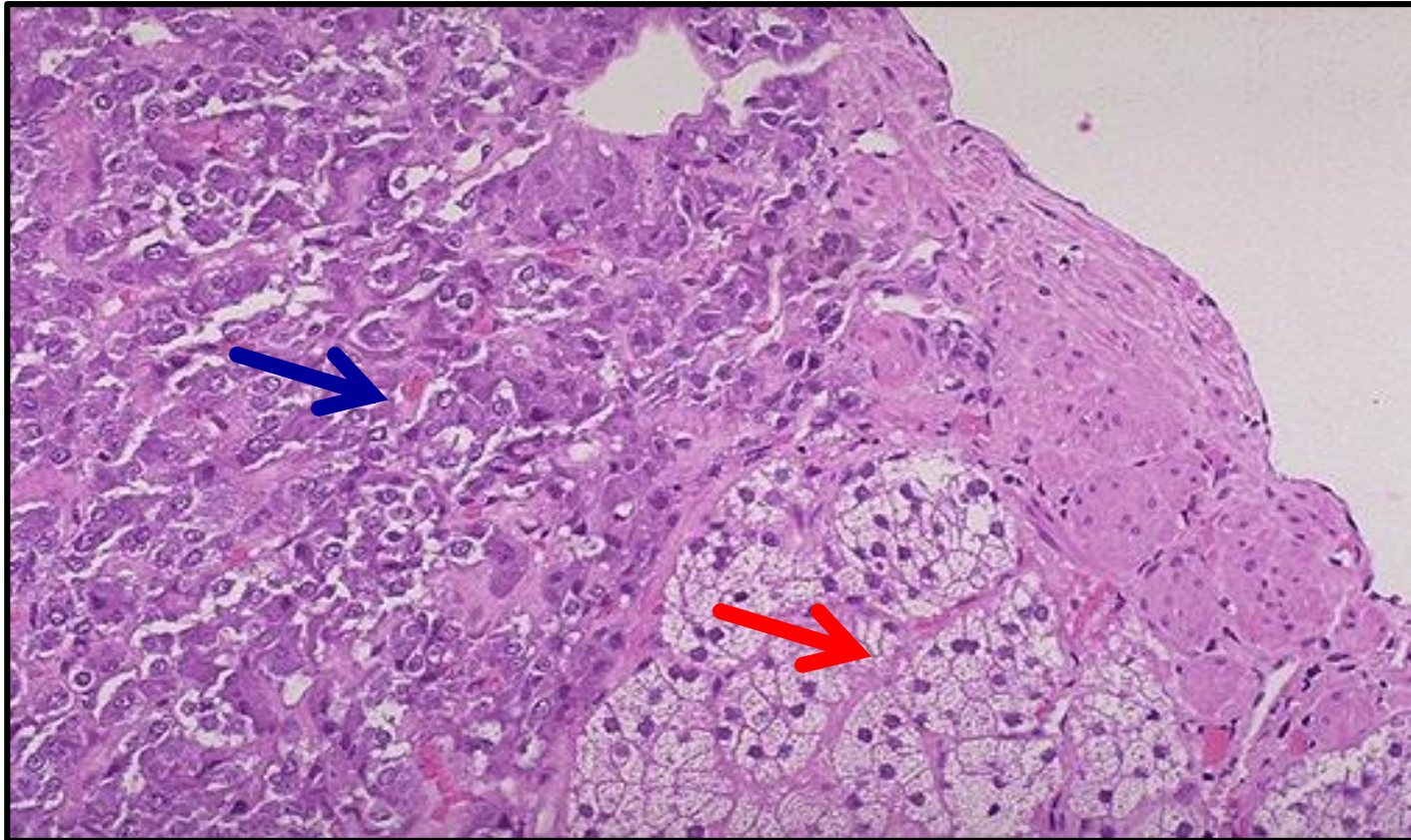
2- Adrenal Capsule
4- Zona Fasciculata
6- adrenal Medulla

Pheochromocytoma – Gross cut section



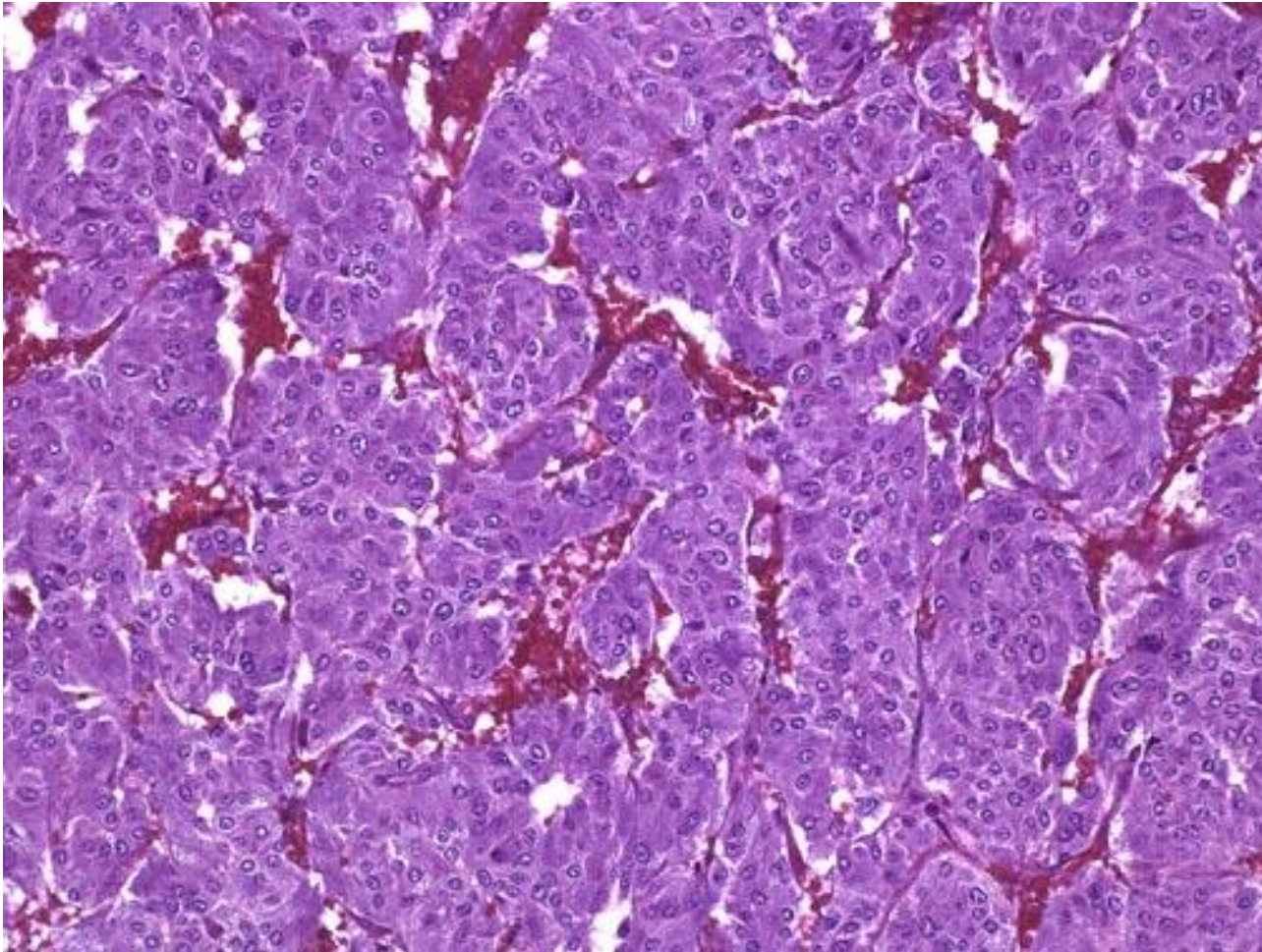
A single partly pale and partly hemorrhagic adrenal medullary mass . Note the grey-tan color of the tumor compared to the yellow cortex stretched around it and a small remnant of remaining adrenal at the lower right ([arrow](#))

Pheochromocytoma – LPF



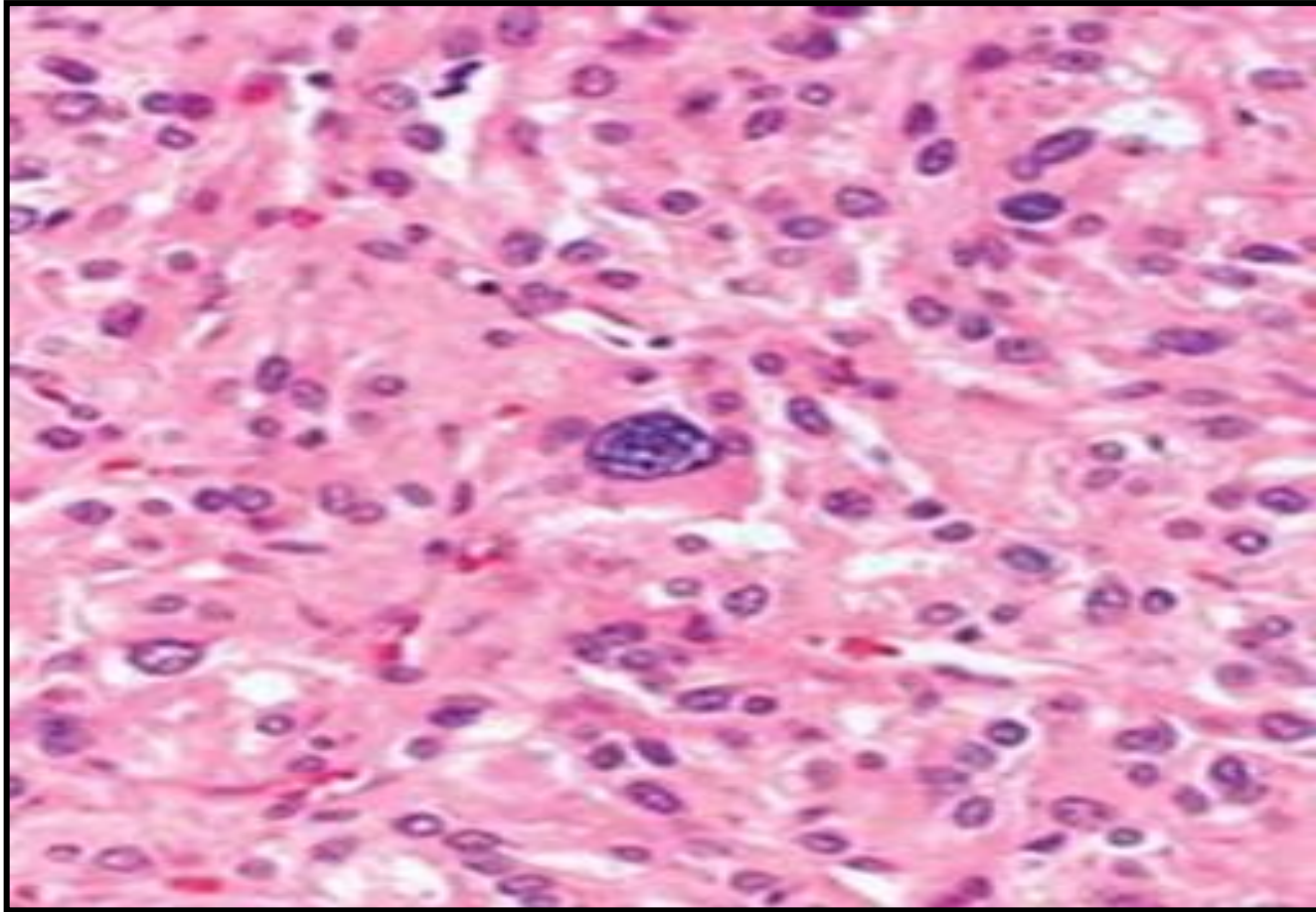
There is some **residual adrenal cortical tissue** at the lower center right, with the darker cells of the **pheochromocytoma** seen above and to the left.

Pheochromocytoma – LPF



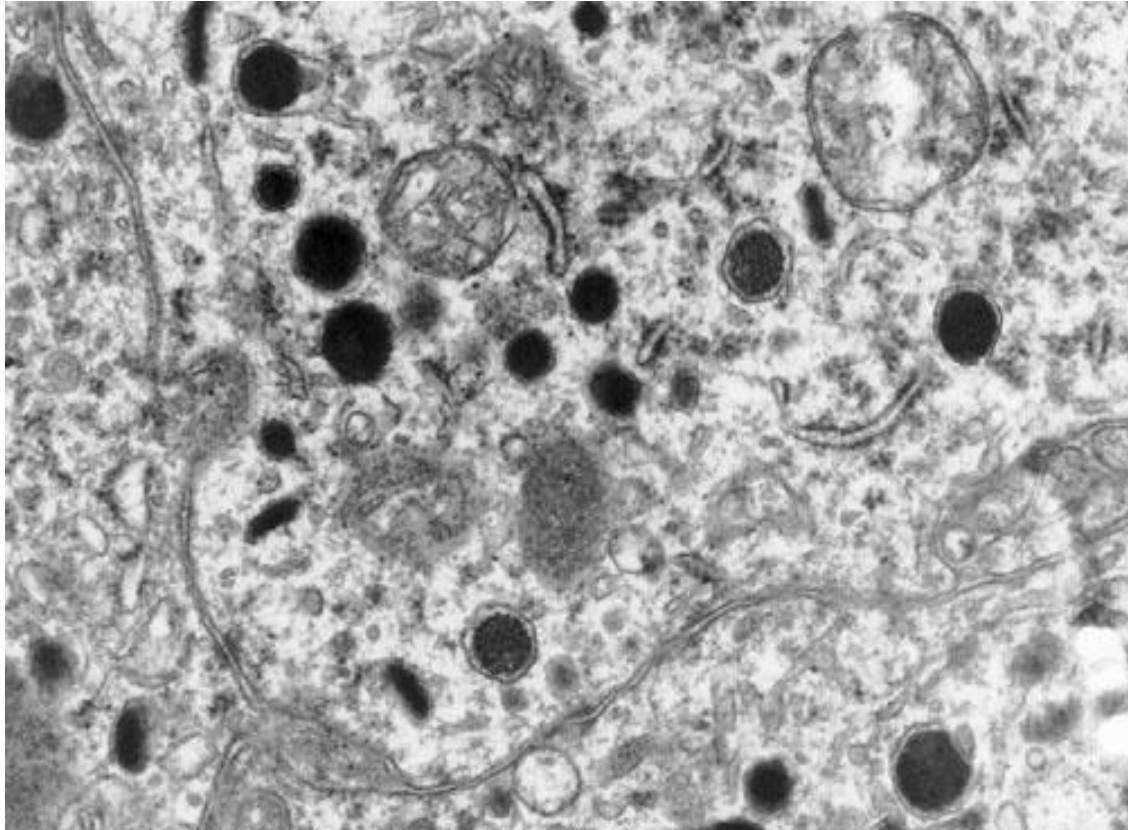
Microscopic view of pheochromocytoma consisting of circular balls of cells with trabecular areas. Note the presence of numerous blood vessels between the tumor cells

Pheochromocytoma – HPF



*High power view of pheochromocytoma consisting of cells with granular nuclear chromatin . Note the presence of **a large polymorphic cell** near the center of the picture .*

Pheochromocytoma – Electron Microscopy view



By electron microscopy, the neoplastic cells of the pheochromocytoma contain neurosecretory granules. It is these granules that contain the catecholamines. The granules seen here appear as small black round objects in the cytoplasm of the cell. The cell nucleus is at the upper left.



Cushing Syndrome

Cushing Syndrome – Clinical Case



A child with Cushing syndrome as a result of Long-term corticosteroids treatment. Note the classical Moon face appearance



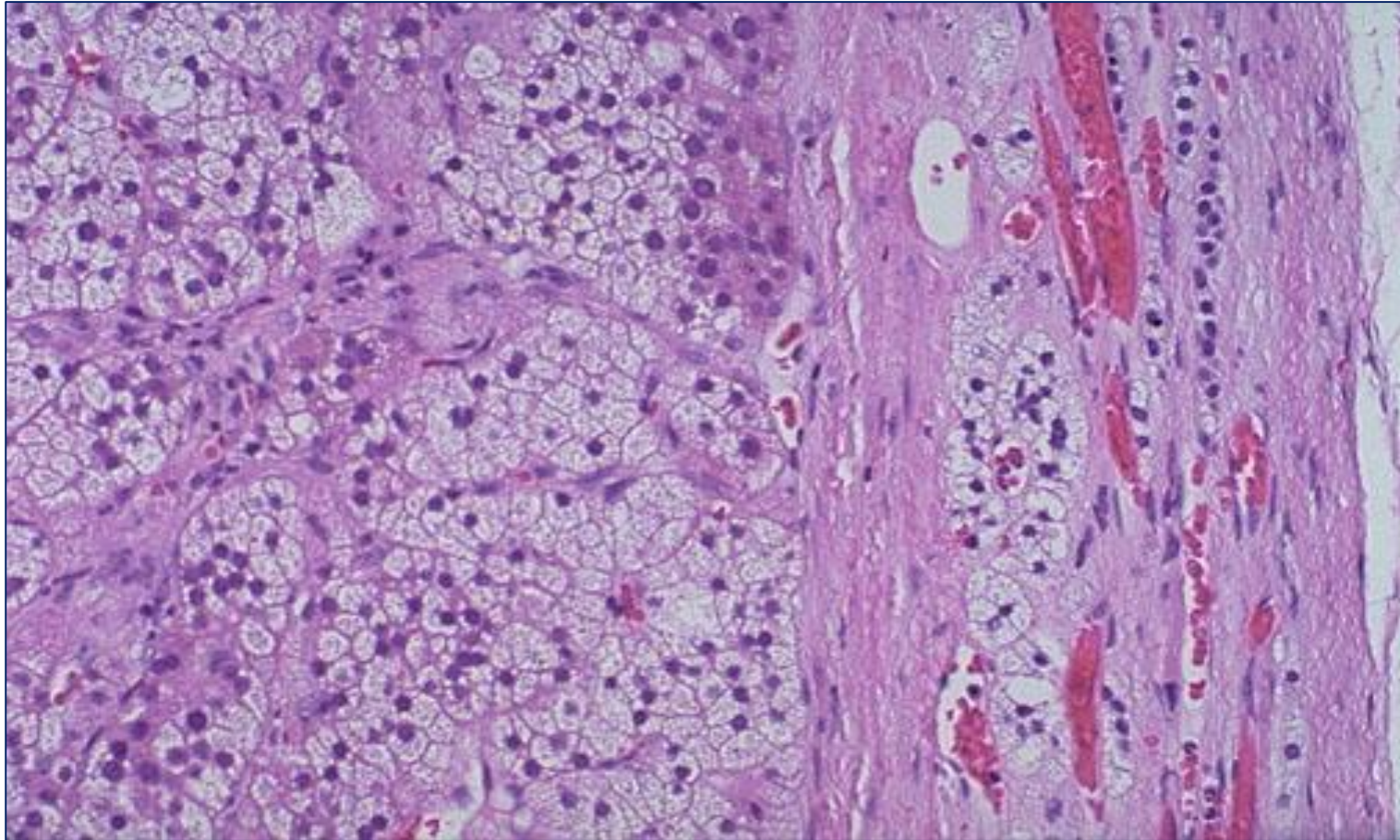
A patient with Cushing syndrome. Note the truncal obesity and purple striae.

Cushing syndrome with Cortical Adenoma - Gross



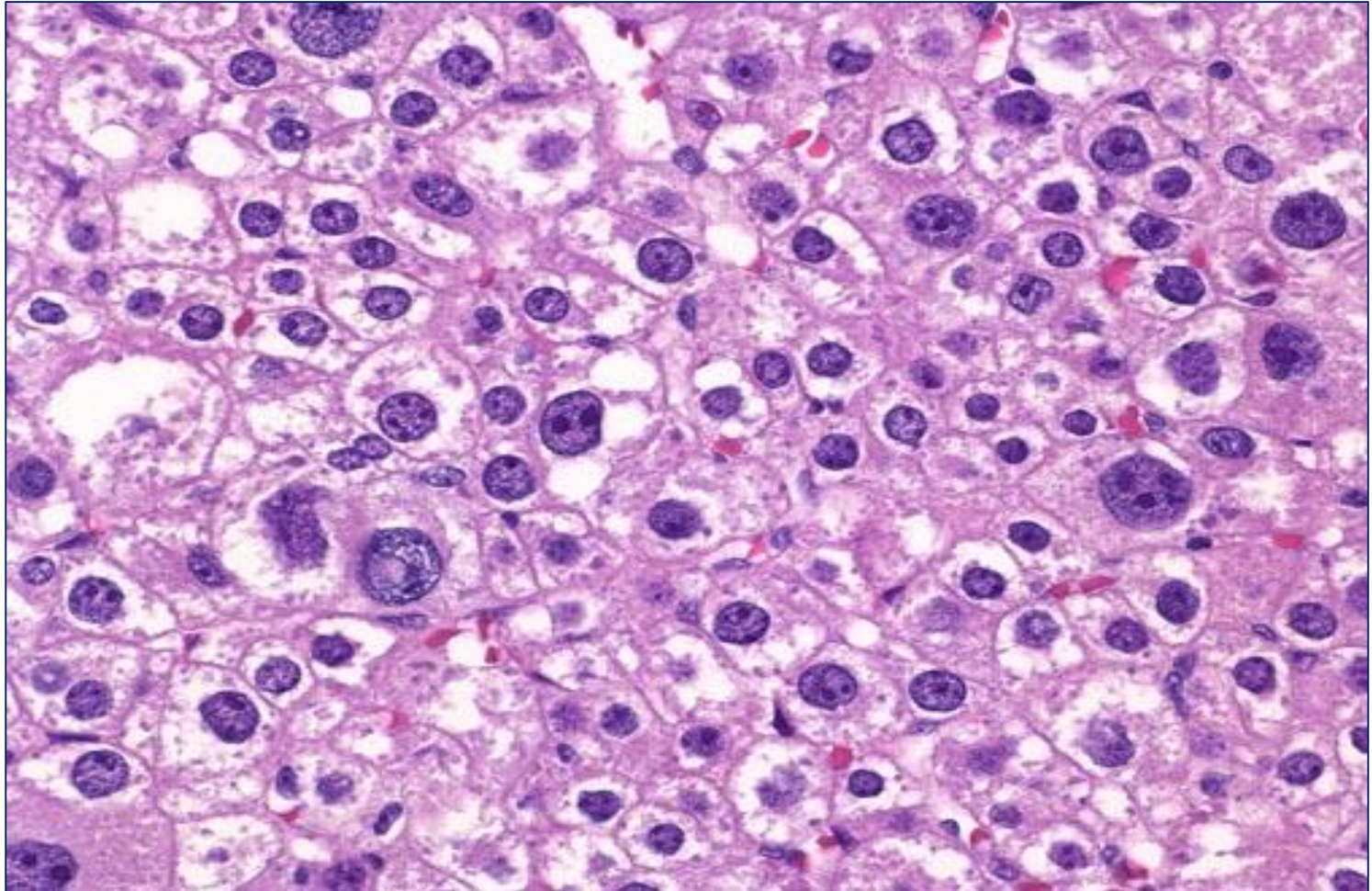
This adrenal gland, removed surgically from a patient with Cushing syndrome, has been sectioned in half to reveal a **cortical adenoma**. Some remaining **atrophic adrenal** is seen at the right. The adenoma is composed of yellow firm tissue, just like adrenal cortex. This neoplasm is well-circumscribed. Histologically, it is composed of well-differentiated cells resembling the normal cortical fasciculata zone. It is benign.

Cortical Adenoma - MPF



*Microscopically, the adrenal cortical adenoma at the left resembles normal adrenal zona fasciculata. The **capsule** of this benign neoplasm is at the right. There may be minimal cellular pleomorphism within adenomas.*

Adrenal Gland – Cortical Adenoma - HPF



There were occasional enlarged hyperchromatic nuclei with one or more prominent nucleoli.

GOOD LUCK

