Pathology lab

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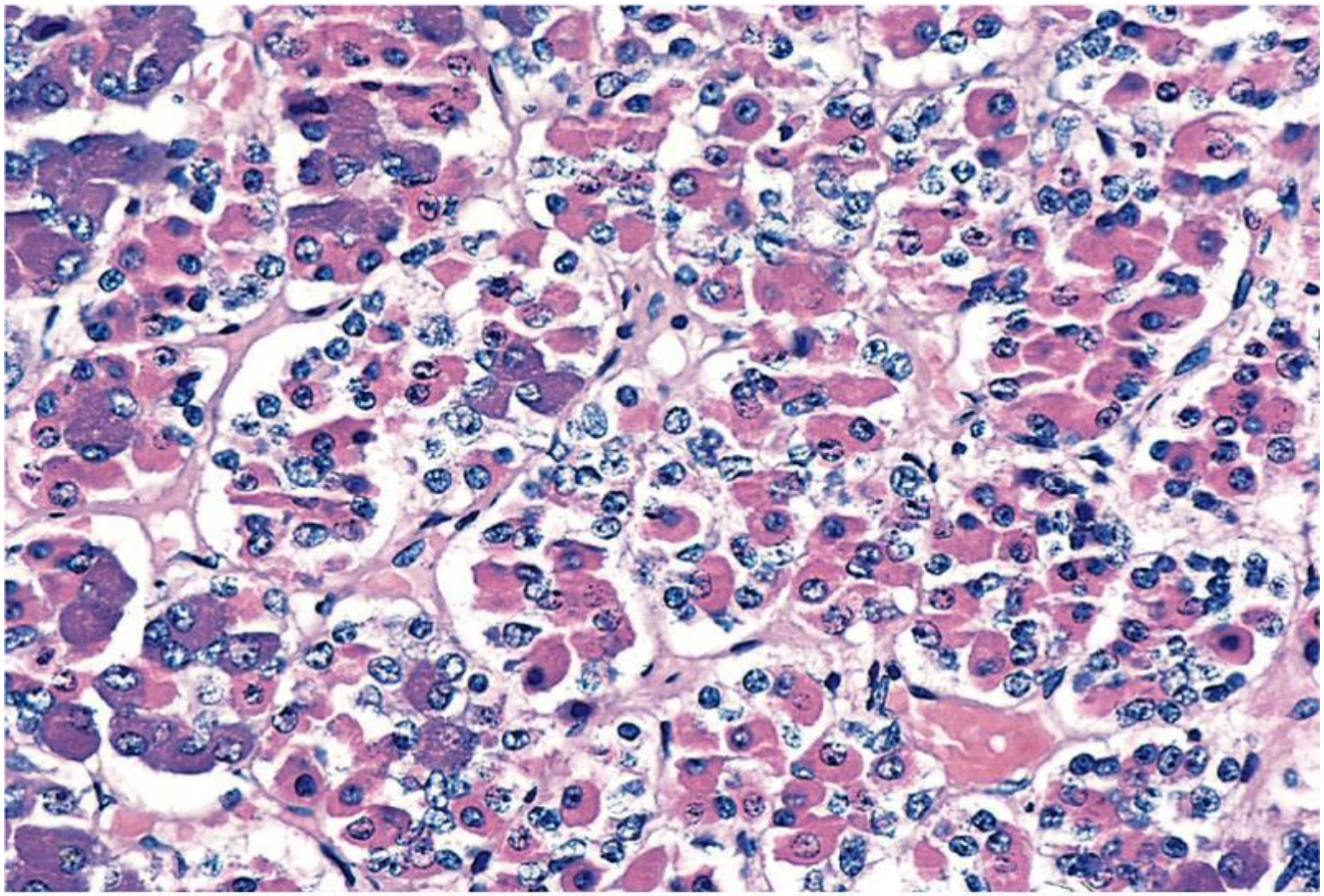
Anterior Pituitary…

Normal pituitary



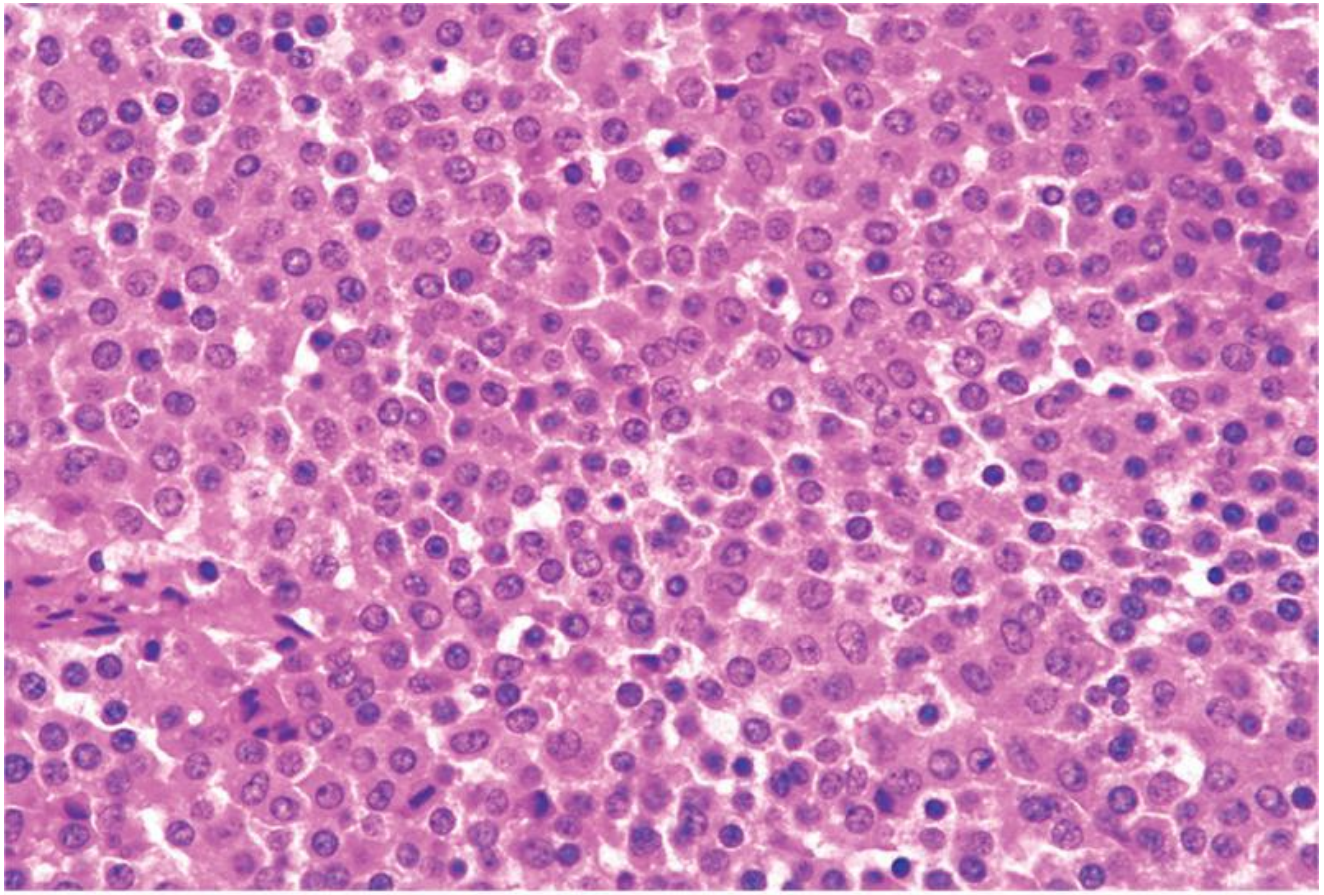
We see **pockets of cells**; group of cells together within a limited space and the cells *are mixture of basophil and acidophil cells*, the **border of the pockets contain reticulin fibers**.

Gross view of a pituitary adenoma

This massive, nonfunctional adenoma has grown far beyond the confines of the sella turcica and has distorted the overlying brain.

Nonfunctional adenomas tend to be larger at the time of diagnosis than those that secrete a hormone

Photomicrograph of pituitary adenoma



1-We **don’t see the pockets** which are found in normal tissue,
2- we see sheets of cells and the cells are uniform we don’t see the mixture. (**monomorphism**)
3 -We don’t see the the reticulin fibers

Thyroid gland …

Hyperthyroidism eyes

Normally, the white part of the eye around the iris is not obvious, but in case hyperthyroidism, they will develop exophthalmos **abnormal protrusion of the eyeball .So, you can easily see the white part below the iris.**

exophthalmos : most obvious in Grave's disease, **secondary to accumulation of soft tissue behind the eye globes.**

Chronic Lymphocytic (Hashimoto) Thyroiditis-1

1- Under microscope We have many inflammatory cells (dense infiltration of lymphocytes), **B-lymphocytes forming germinal centers**, plasma cells, T-lymphocytes and macrophages.

2-in Normal histology Follicular epithelium is cuboidal, single cell-like in each follicle.
In Hashimoto, follicular epithelium is **atrophic**, show metaplastic changes into large, pink cuboidal cells called **Hurthle cells** or oxyfil cells (similar to those in the stomach) (full of mitochondria).

3- With time we will have Fibrosis and Atrophy
Fibrosis; because always inflammation is followed by fibrosis.
Atrophy; so the patient will have hypothyroidism
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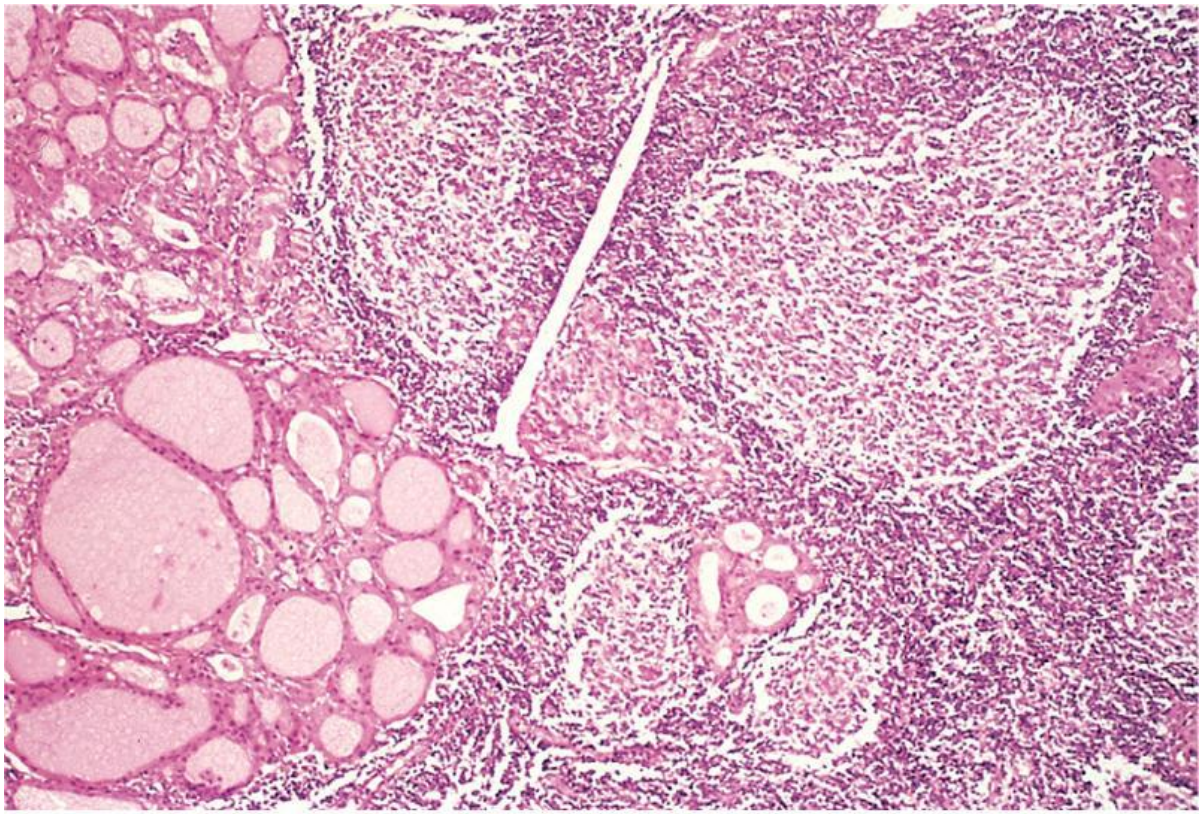
Chronic Lymphocytic (Hashimoto) Thyroiditis-2



Notice the **germinal centers** (sign of chronic inflammation) and **Hurthle cells** (abnormal metaplastic follicular cells)

Grave’s disease-1

1- Follicular epithelial cells are hyperplastic (*tall columnar, crowded, small papillae* as the cells project into the follicular lumen, and these papillae do not contain fibrovascular core "no vessels**", so they aren't true papillae**.
Note: True papillae is formed from epithelial cells that contain blood vessels inside.

2- The colloid is:
-**pale**; because most of it goes to the blood.
-**scalloped margins**: round, irregular, empty spaces like the oyster..
3- **Lymphoid infiltrate** (T > B-cells & plasma cells), germinal centers
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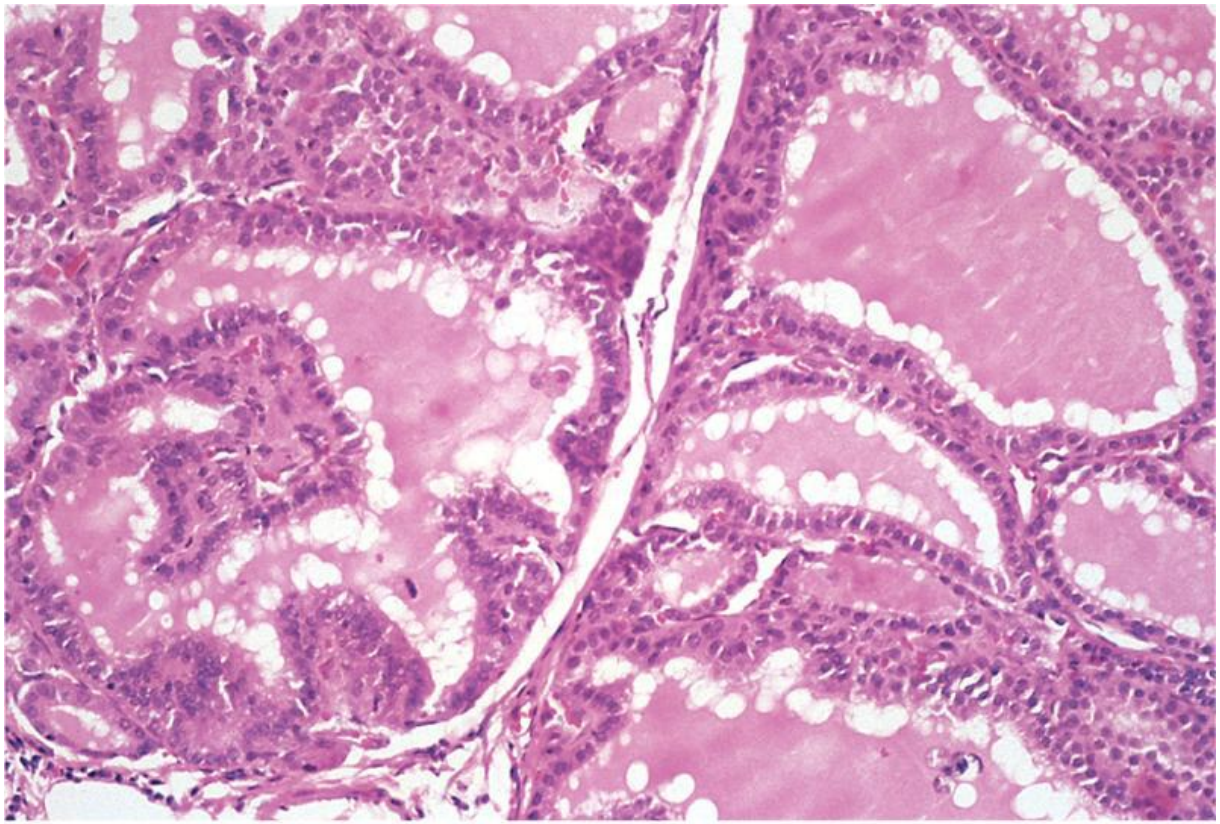
Grave's disease-2

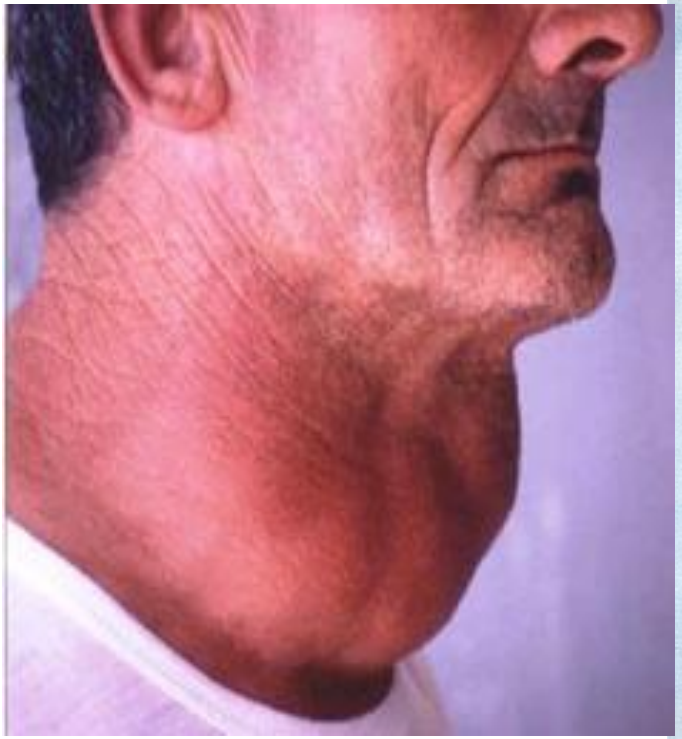


Notice that

1- follicular epithelial cells are hyperplastic (tall columnar, crowded, small papillae, project into follicular lumen, lack fibrovascular cores)

2- Colloid is pale, scalloped margins

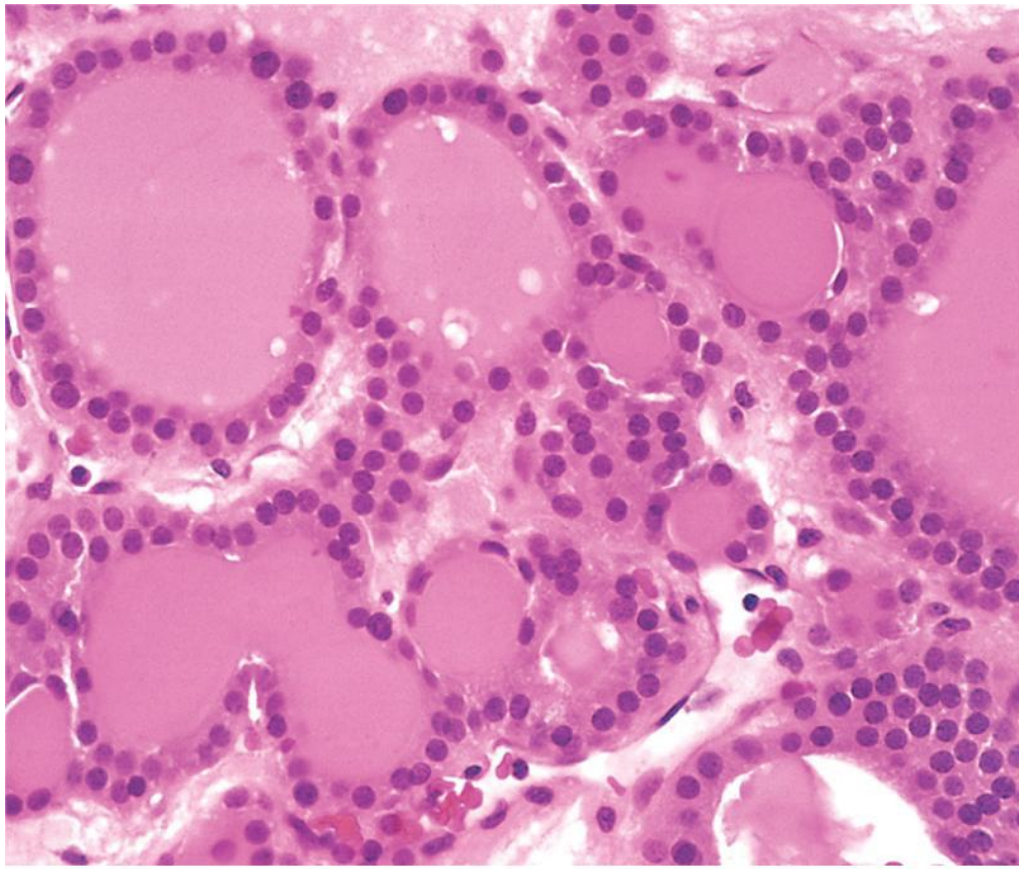
multinodular goiter



The gland is coarsely nodular and contains areas of fibrosis and cystic change. Note the brown gelatinous colloid characteristic of this condition ("colloid goiter").

Follicular thyroid adenoma-1

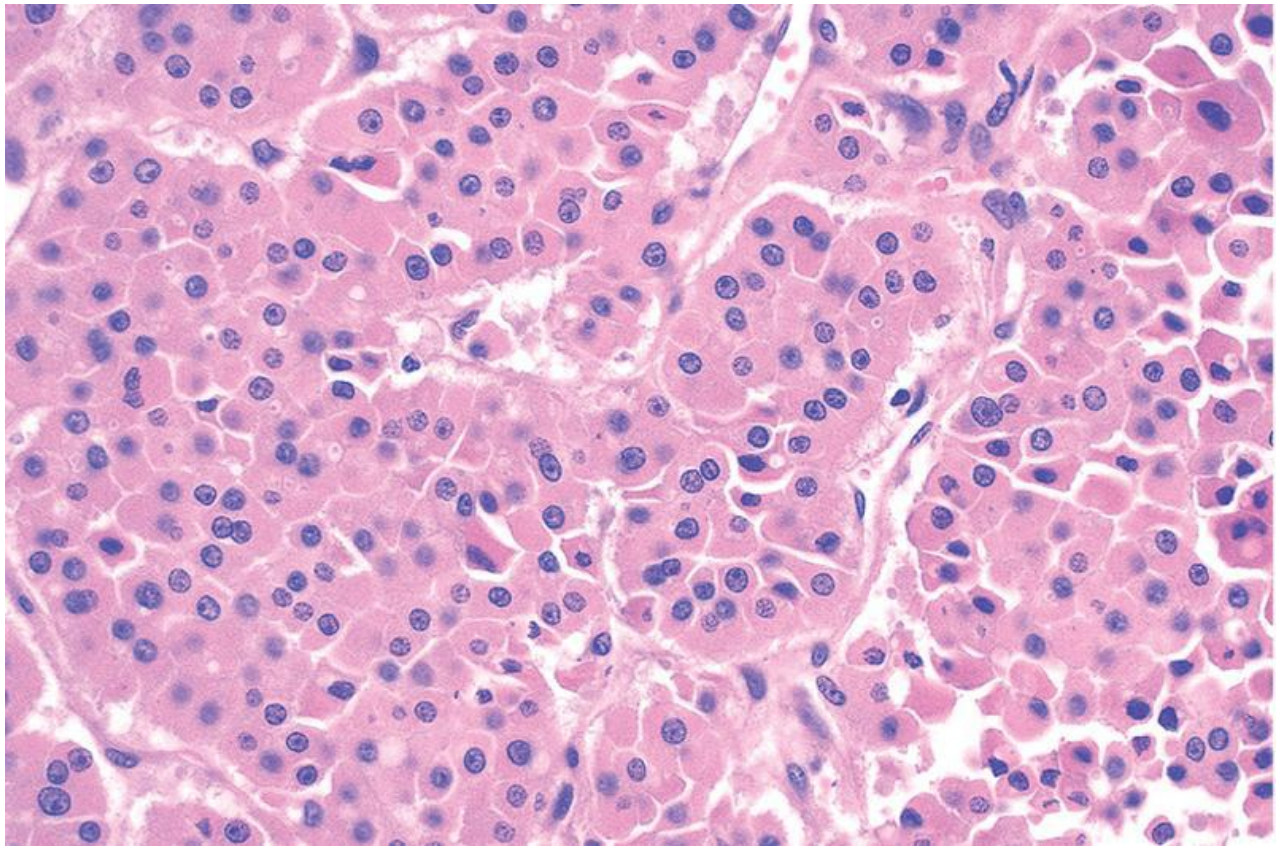
Follicular thyroid adenoma-2



1- It is benign, so it will be: well demarcated mass with intact thin capsule (not present in hyperplastic nodules)

2- Microscopically: uniform follicles contain colloid distinct from the rest of thyroid, cells are uniform, So they look like the **normal thyroid.**

Follicular thyroid adenoma-3

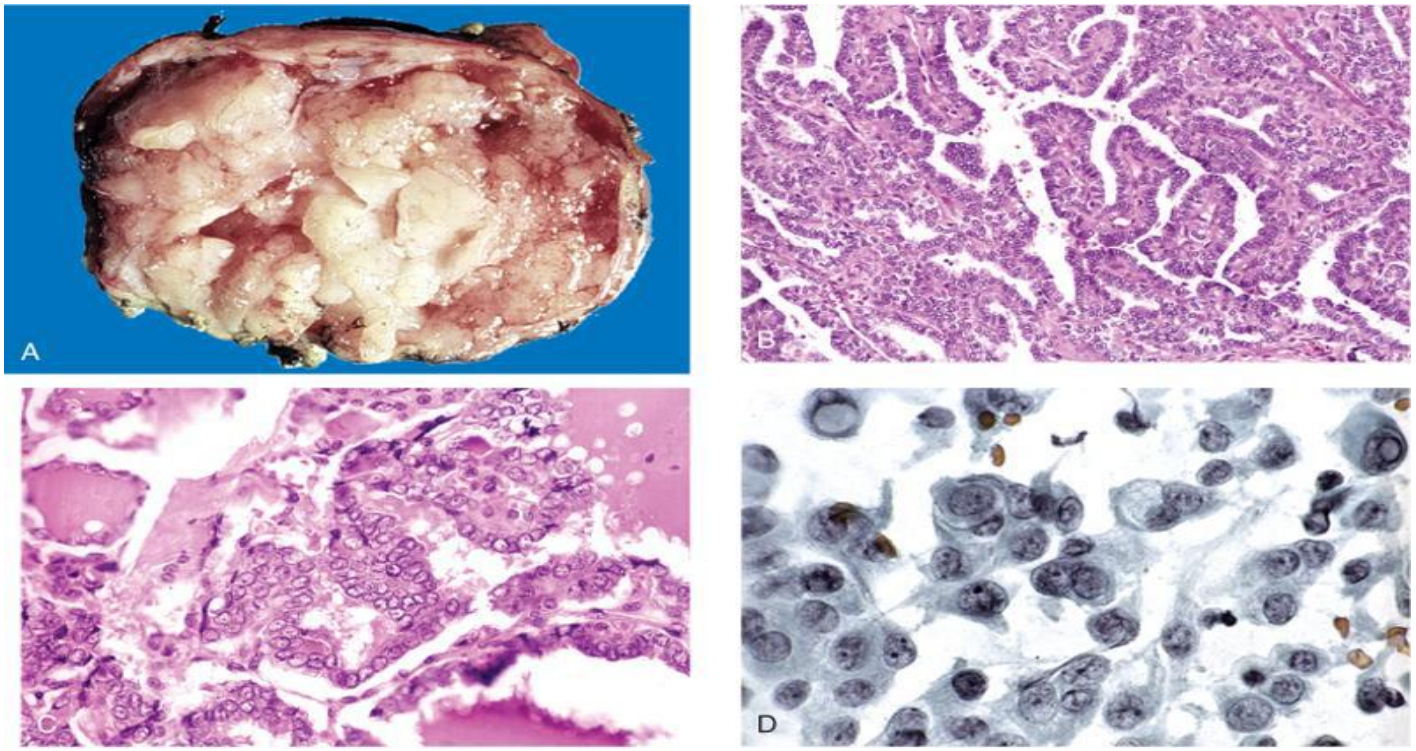


Sometimes cells show a degree of metaplasia, more specifically, Hurthle cell change. It is called in this case **Hurthle cell adenoma.**
But this change has no significance except in morphology.
note: Atypia might be present, but does **not mean malignancy**

Papillary carcinoma-1 (important)

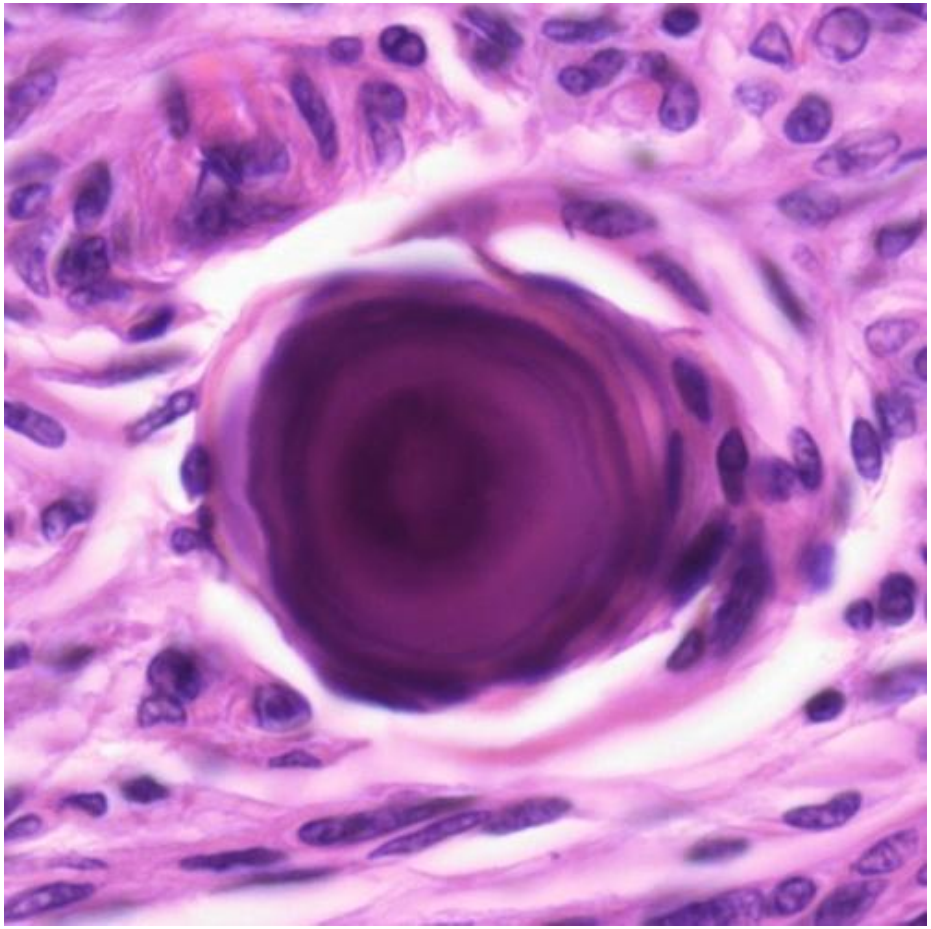
A. Special nuclear features that give this carcinoma a very special morphology:
1- Optically clear nuclei(Called ground glass or Orphan Annie eye):
-The nuclei are very white in color instead of blue like in the normal cases.
-Orphan Annie is a cartoon character was drawn with special eyes like the nuclei in the papillary carcinoma.
2- ***Nuclear grooves:***
- Secondary to the invagination of the cytoplasm into the nuclei in a sharp way
- Appears at low magnification like a line
-Called coffee beans or pseudoinclusions
B. Papillary architecture: there are true papillae which have blood vessels to support malignant cells.
C. Calcification: as cells at the tip of the papillae have least blood supply, so they die and are then calcified. This calcification forms masses known as **psammoma bodies.**
D. Cysts are common: cysts can develop in any tumor; benign or malignant.

Papillary carcinoma-2 (important)



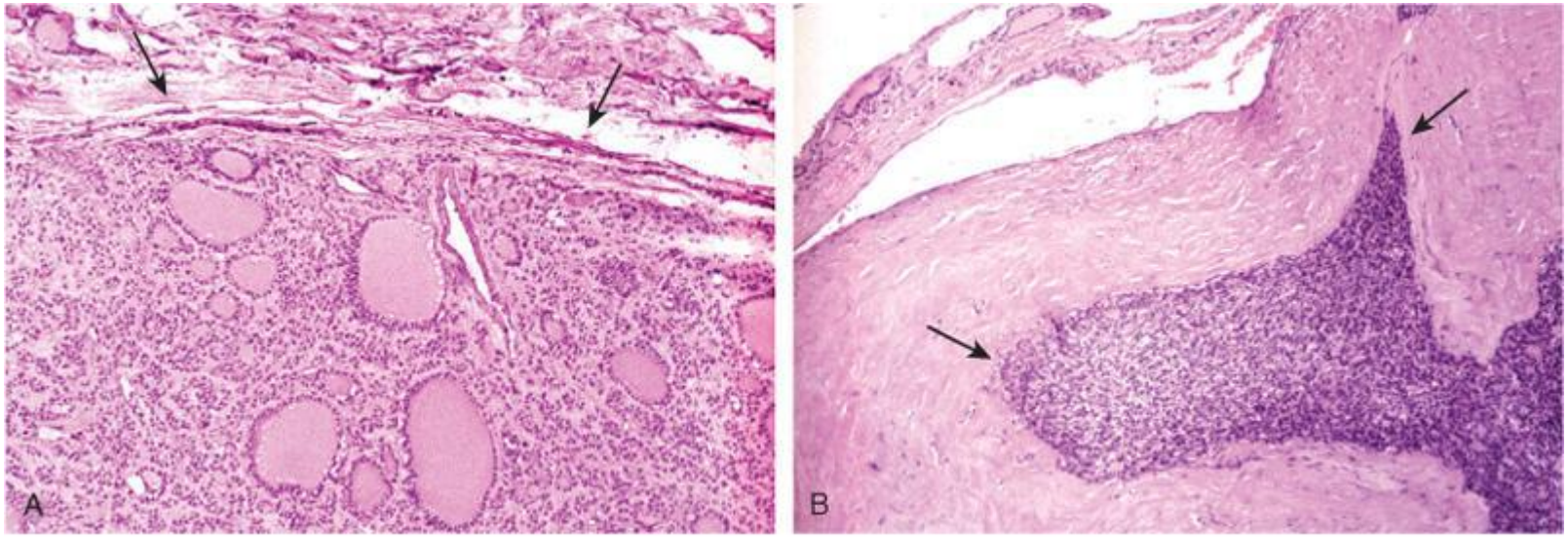
Papillary carcinoma of the thyroid. **A, A papillary carcinoma with grossly discernible papillary structures. This particular example contained well-formed papillae (B), lined by cells with characteristic empty-appearing nuclei, sometimes termed "Orphan Annie eye" nuclei (C). D, Cells obtained by fine-needle aspiration of a papillary carcinoma. Characteristic intranuclear inclusions are visible in some of the aspirated cells**

Papillary carcinoma-3 (important)



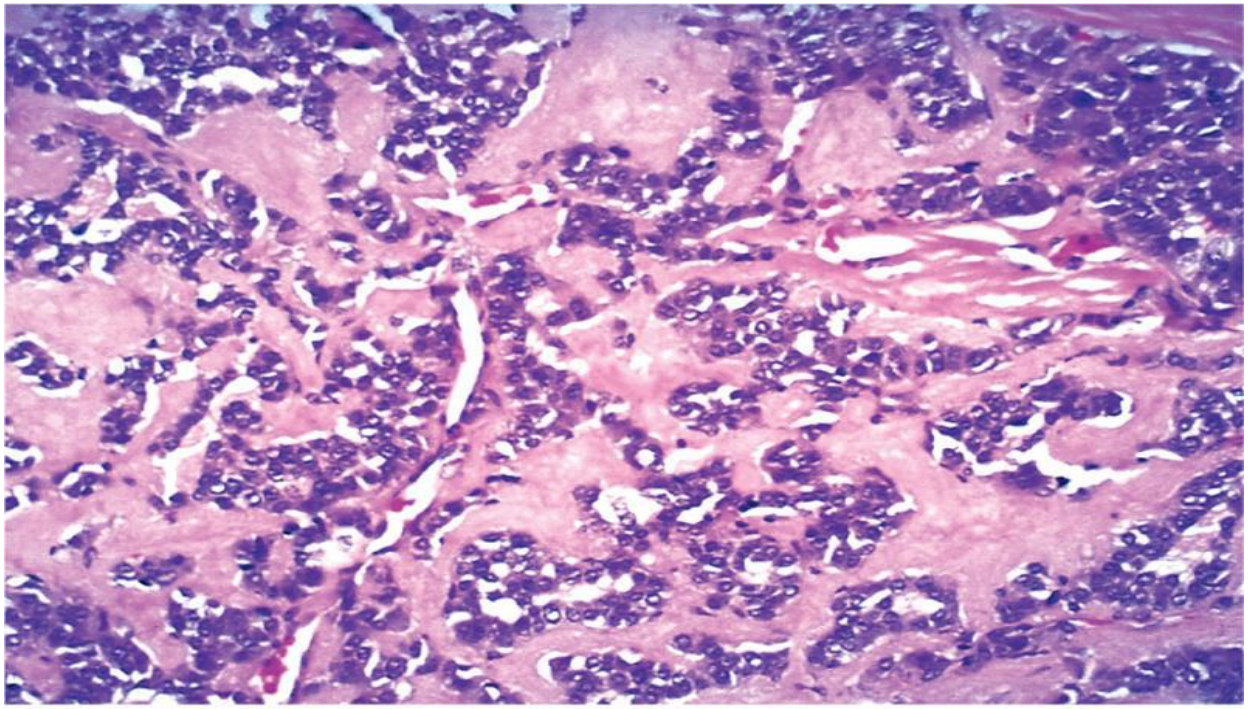
Psammoma body: concentric calcification

Follicular carcinoma



Capsular invasion in follicular carcinoma. Evaluating the integrity of the capsule is critical in distinguishing follicular adenomas from follicular carcinomas. In adenomas (**A), a fibrous capsule, usually thin but occasionally more prominent, surrounds the neoplastic follicles and no capsular invasion is seen** ***(arrows); compressed normal thyroid parenchyma is usually present external to the capsule (top).B, In contrast, follicular carcinomas demonstrate capsular invasion (arrows) that may be minimal, as in this case, or widespread with extension into local structures of the neck***

Medullary carcinoma-1 (L.M)

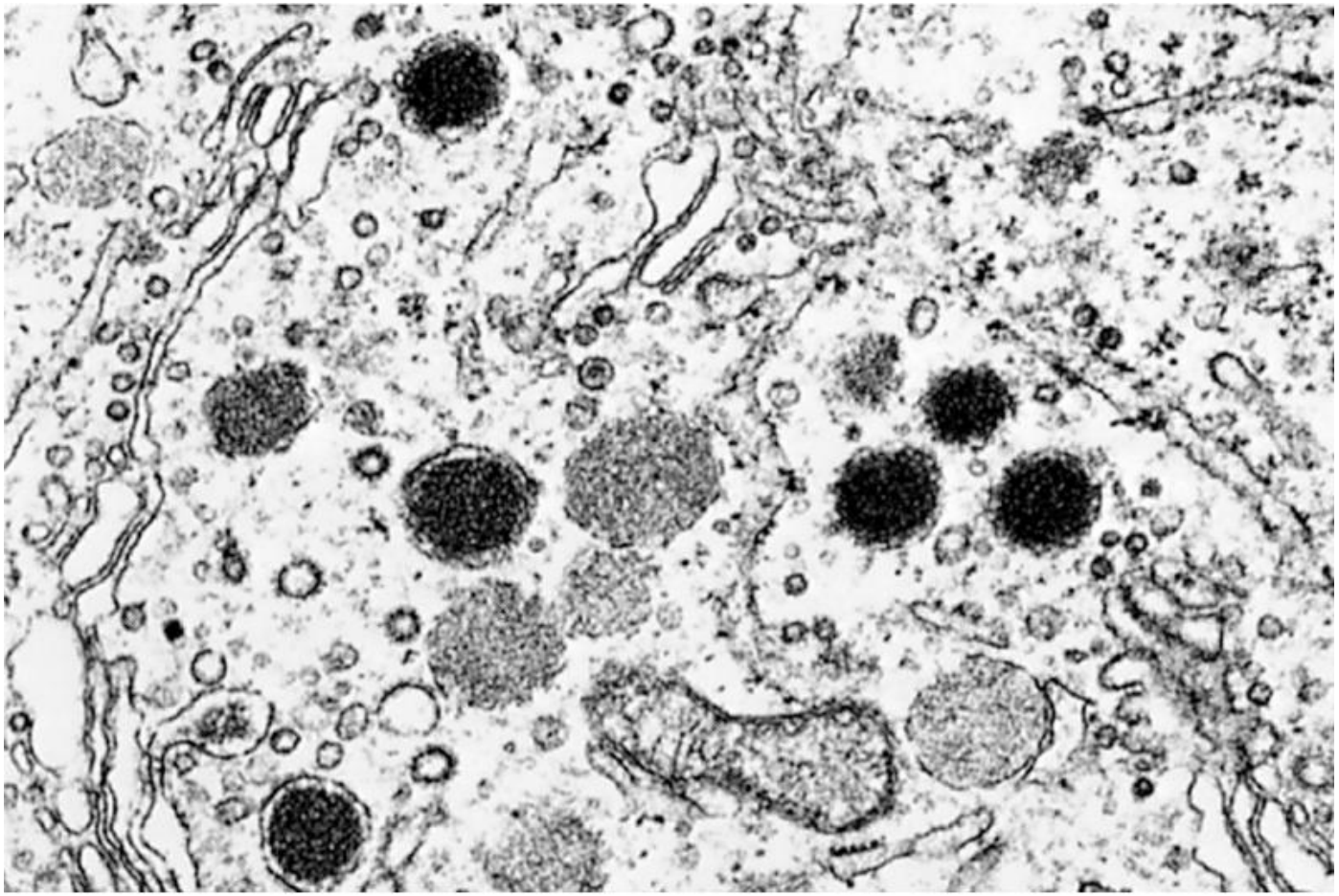


1- C-cells when they are malignant they still look like **normal (polygonal) or sometimes they become spindle cells. So they have a variable morphology.**

2- **Secrete amyloid (derived from calcitonin) which is positive for Congo red stain. This is the most important morphological feature. Used in diagnosis.**

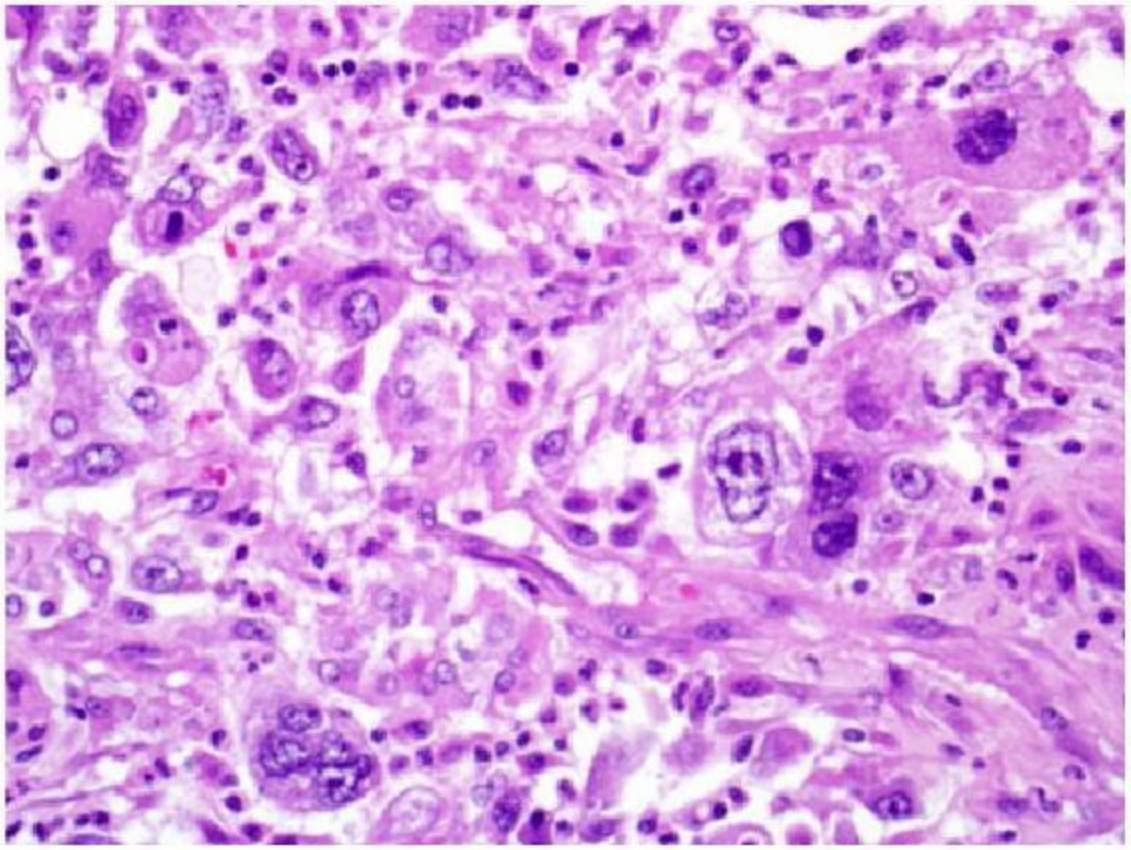
3- C-cell hyperplasia in non-tumorous areas: they appear crowded without follicles.

Medullary carcinoma-2 (E.M)



Notice the presence of membrane-bound granules containing calcitonin

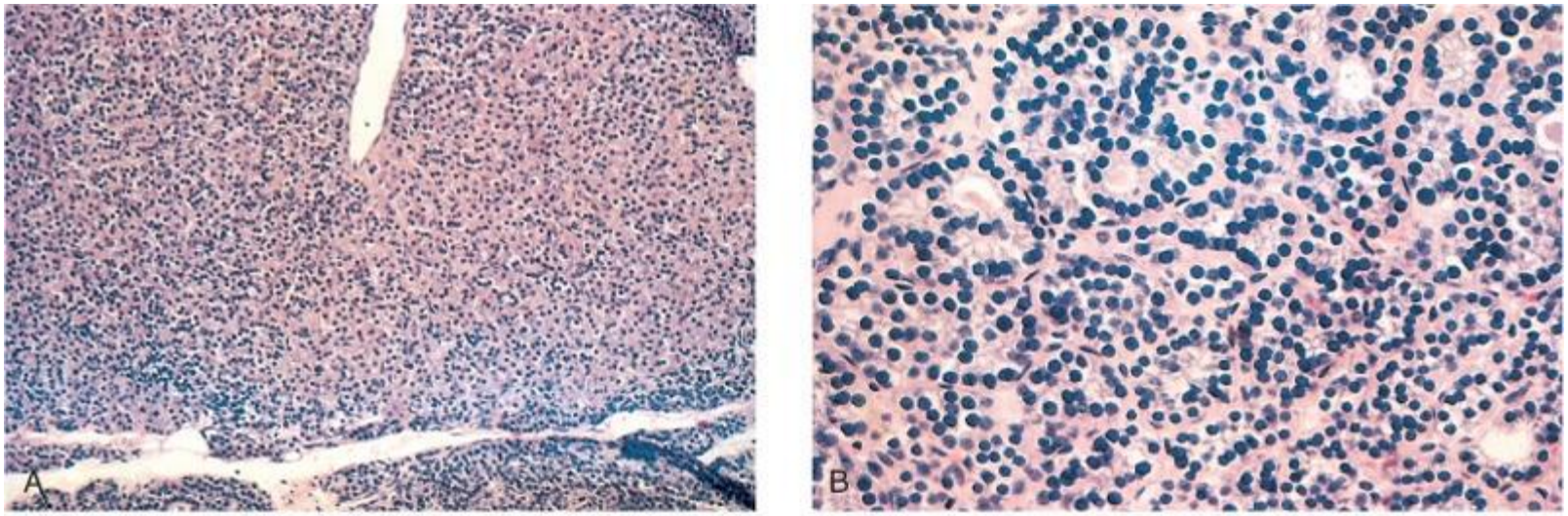
Anaplastic thyroid carcinoma



Cells are anaplastic, so they will be large, epithelioid or spindle, and pleomorphic.

parathyroid gland …

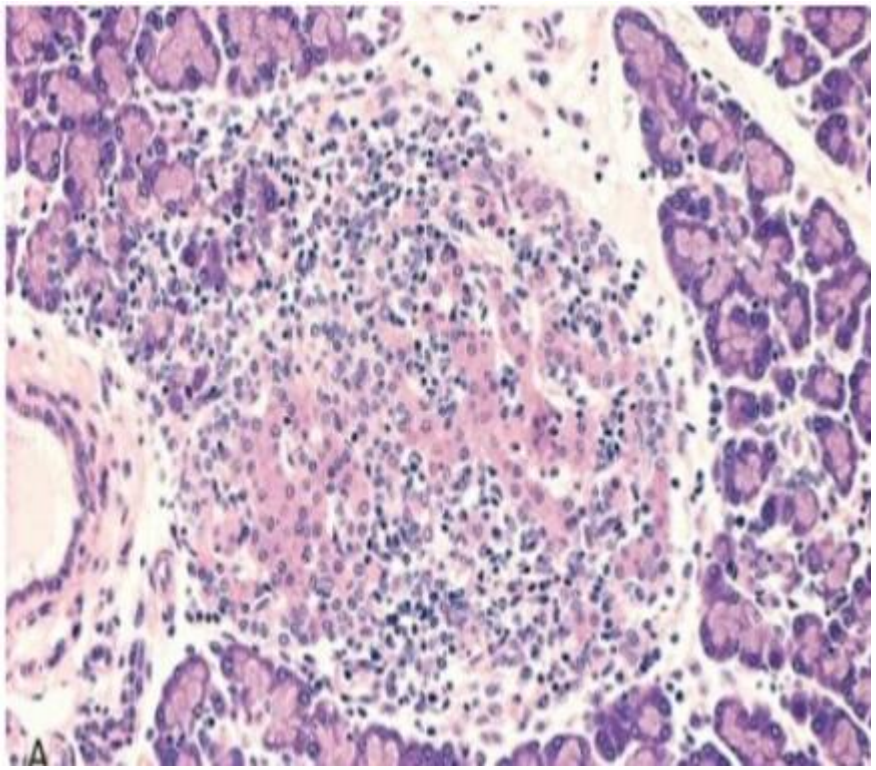
Primary hyperparathyroidism (adenoma)



Solitary chief-cell parathyroid adenoma *(low-power view) revealing clear delineation from the residual gland below.* ***B, High-power detail of chief-cell parathyroid adenoma. There is slight variation in nuclear size and tendency to follicular formation but no anaplasia (NO FAT cells***

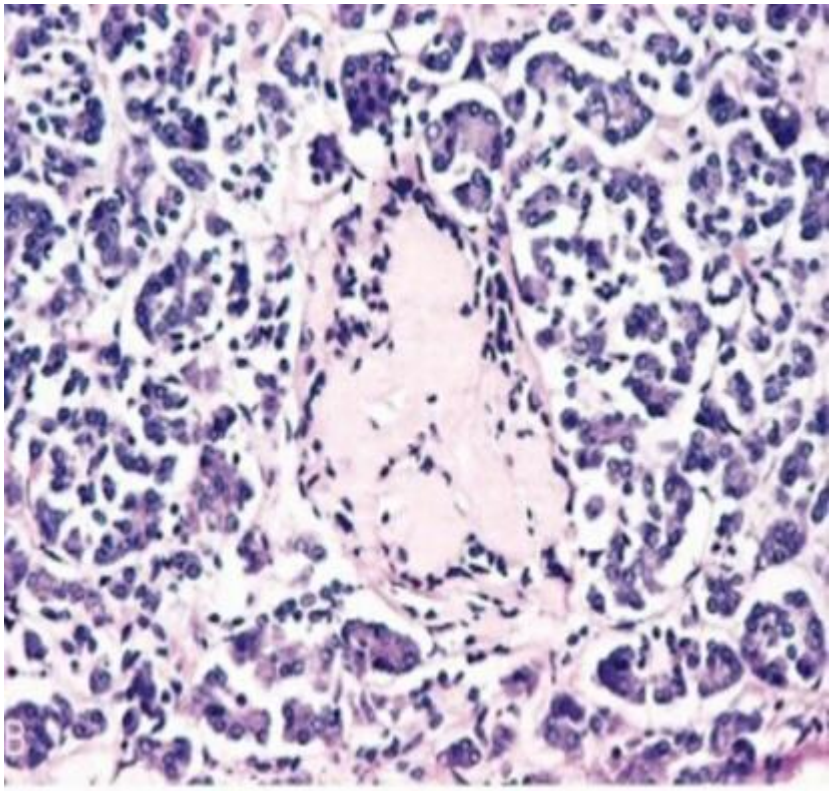
Endocrine pancreas …

Type 1 DM



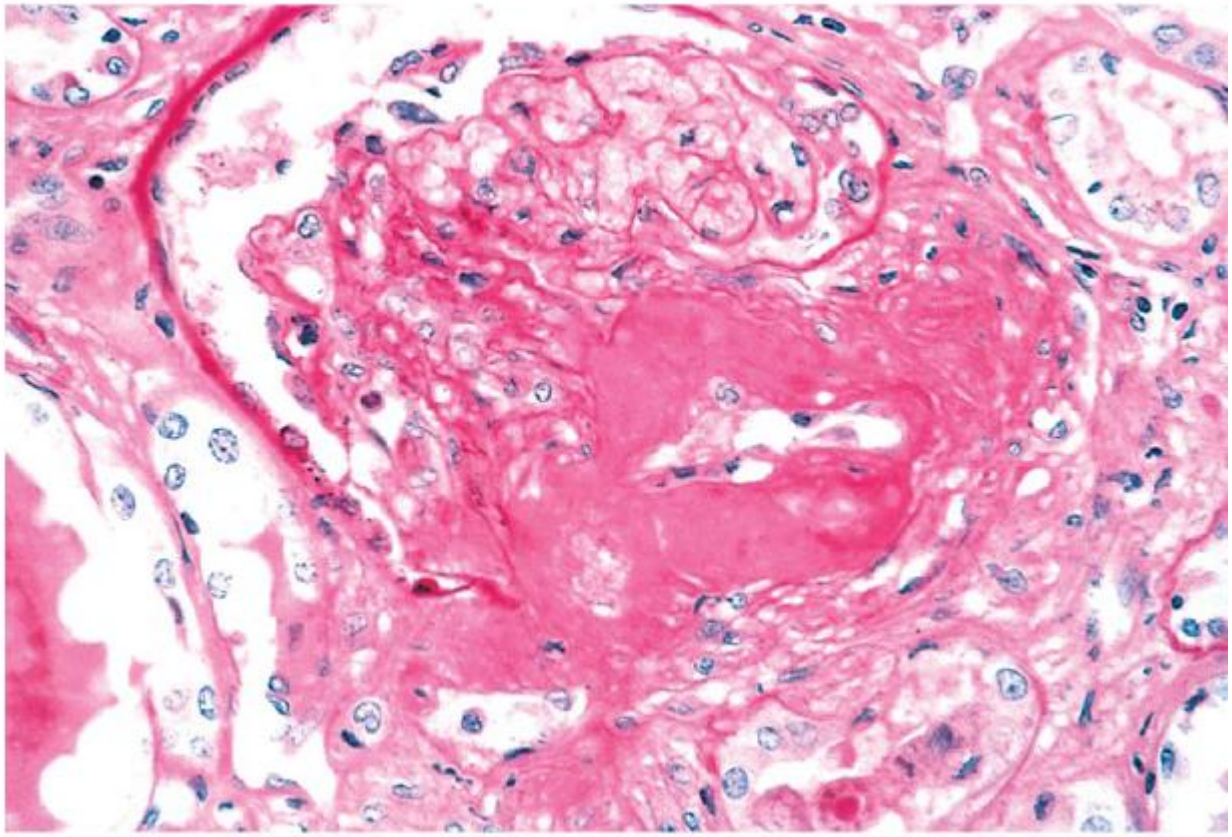
you can see in the rim the islet cells which is normal and in the middle we have a large area of plasma cells and lymphocytes cells and **destroyed islet cells. (insulitis)**

Type 2 DM



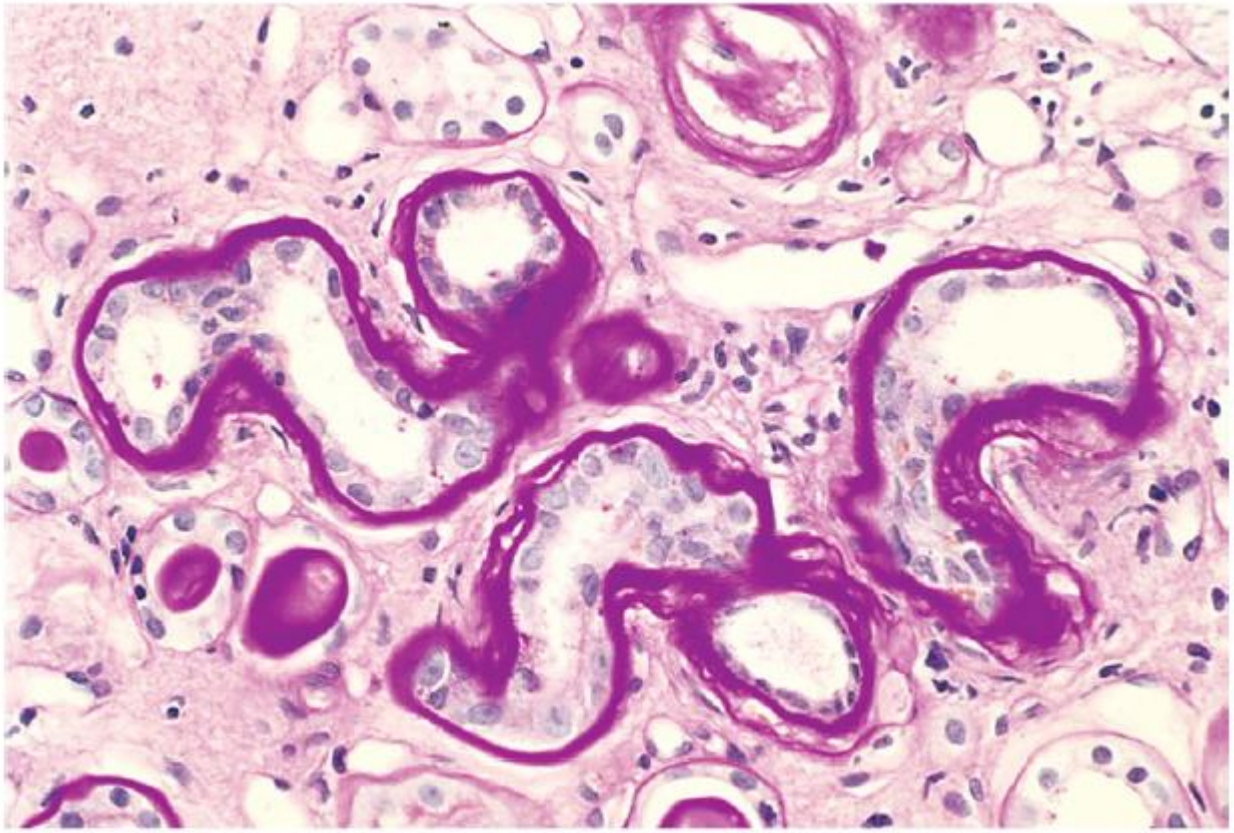
you see amorphous material (a: without, morph: morphology, shape) which is the **amyloid** and we don't have lymphocytes.
-The stain of the amyloid is Congo Red so the tissue in the right is positive but on the left is negative.

Effect of hyperglycemia



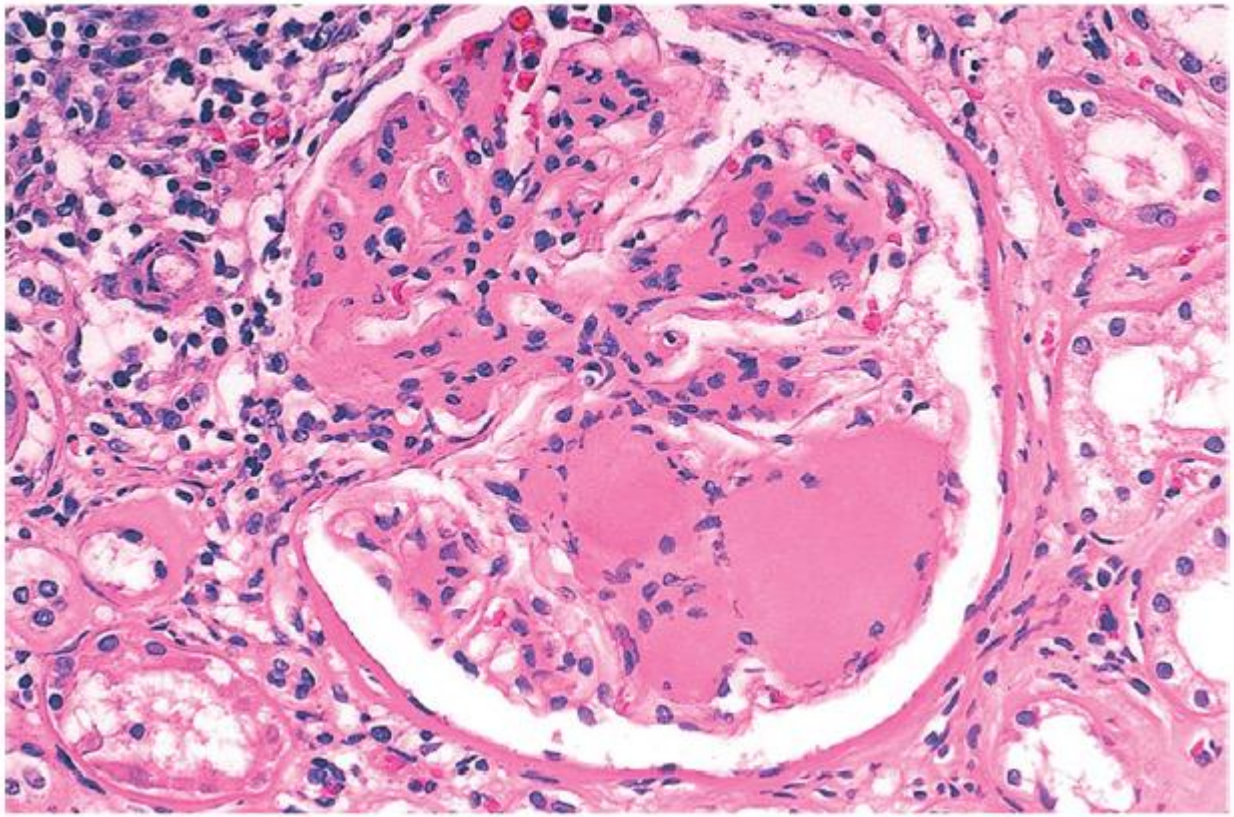
This is a glomerulus; we have blood vessels in the middle and the lumen inside, the blood vessels is very thick because of the deposition of the materials.

Effect of hyperglycemia



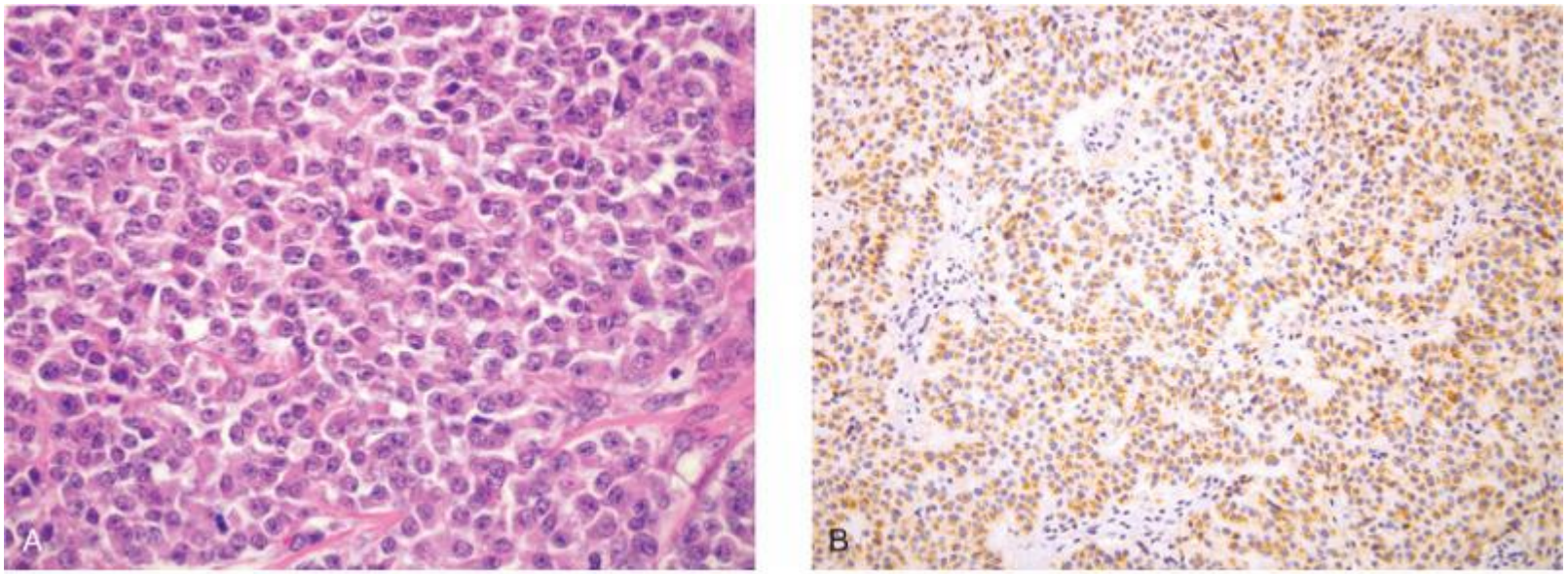
This figure presents kidney tubules, look at the walls(basement membrane)
They are very thick so the function is impaired…normal basement membrane appear as line.

Effect of hyperglycemia



This is another picture of the glomerulus: in the upper half there is a proliferation of the mesangial cells (there number is more than normal) … and in the lower half there is deposition of material and fibrosis; because of that the kidney stops working normally.

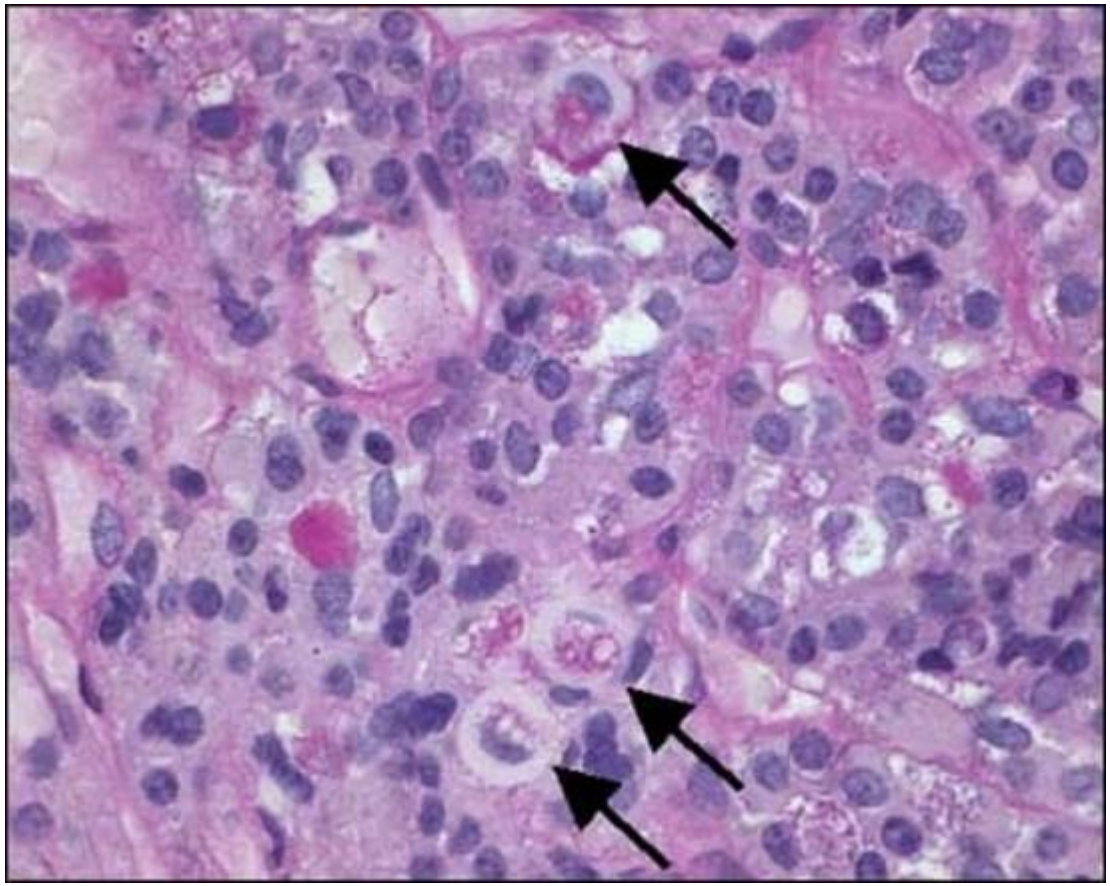
Pancreatic endocrine neoplasms



Proliferation of the islet cells (beta cells mostly but others as well).
Normally these cells are found as islets, meaning that they are scattered and separated by fat and pancreatic tissue but due to the proliferation of the cells in the insulinoma **we don't see fat or pancreatic tissue we see sheets of cells.**
Cells appear **monotonous, there is no polymorphism in both benign and malignant tumors.**
We cant differentiate between insulinoma, glucagonoma or gastrinoma from the morphology,

Adrenal gland …

Pituitary gland in Cushing syndrome

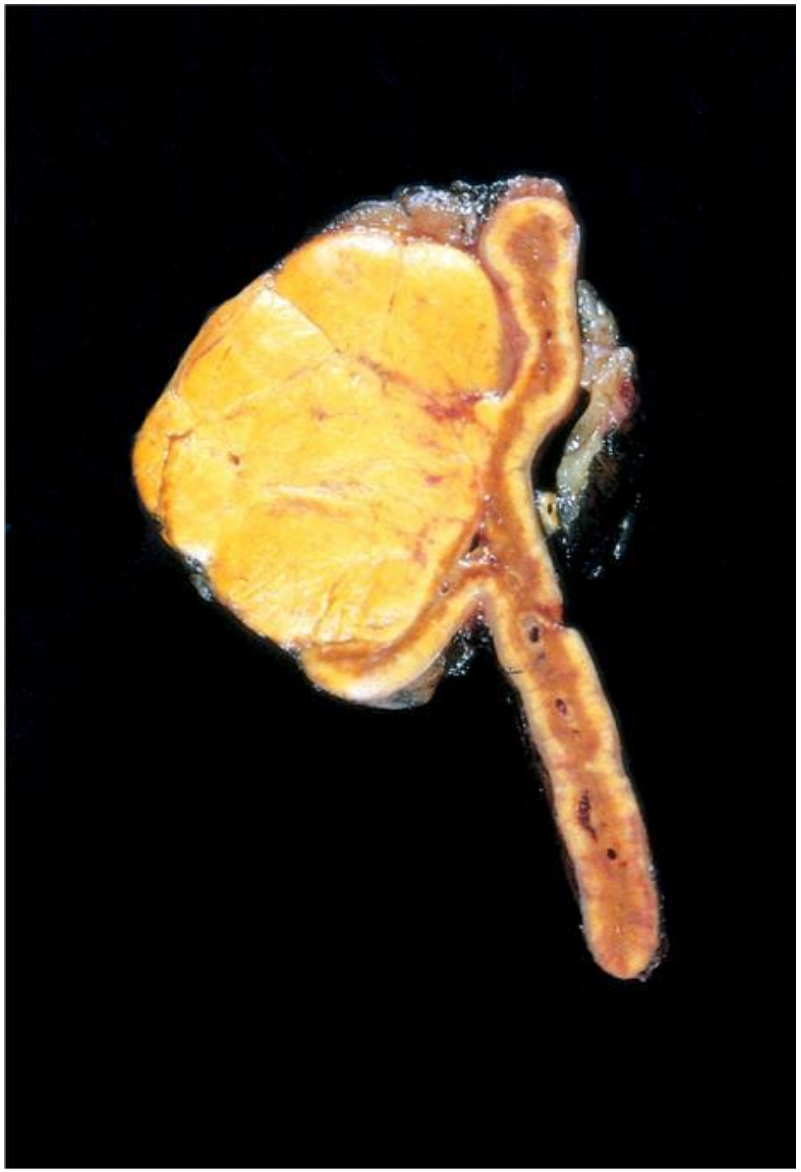


In situations of glucocorticoid excess, human corticotrophs (arrows) undergo accumulation of keratin filaments in the cytoplasm, resulting in a glassy hyaline appearance

Adrenal gland in ACTH dependent Cushing syndrome

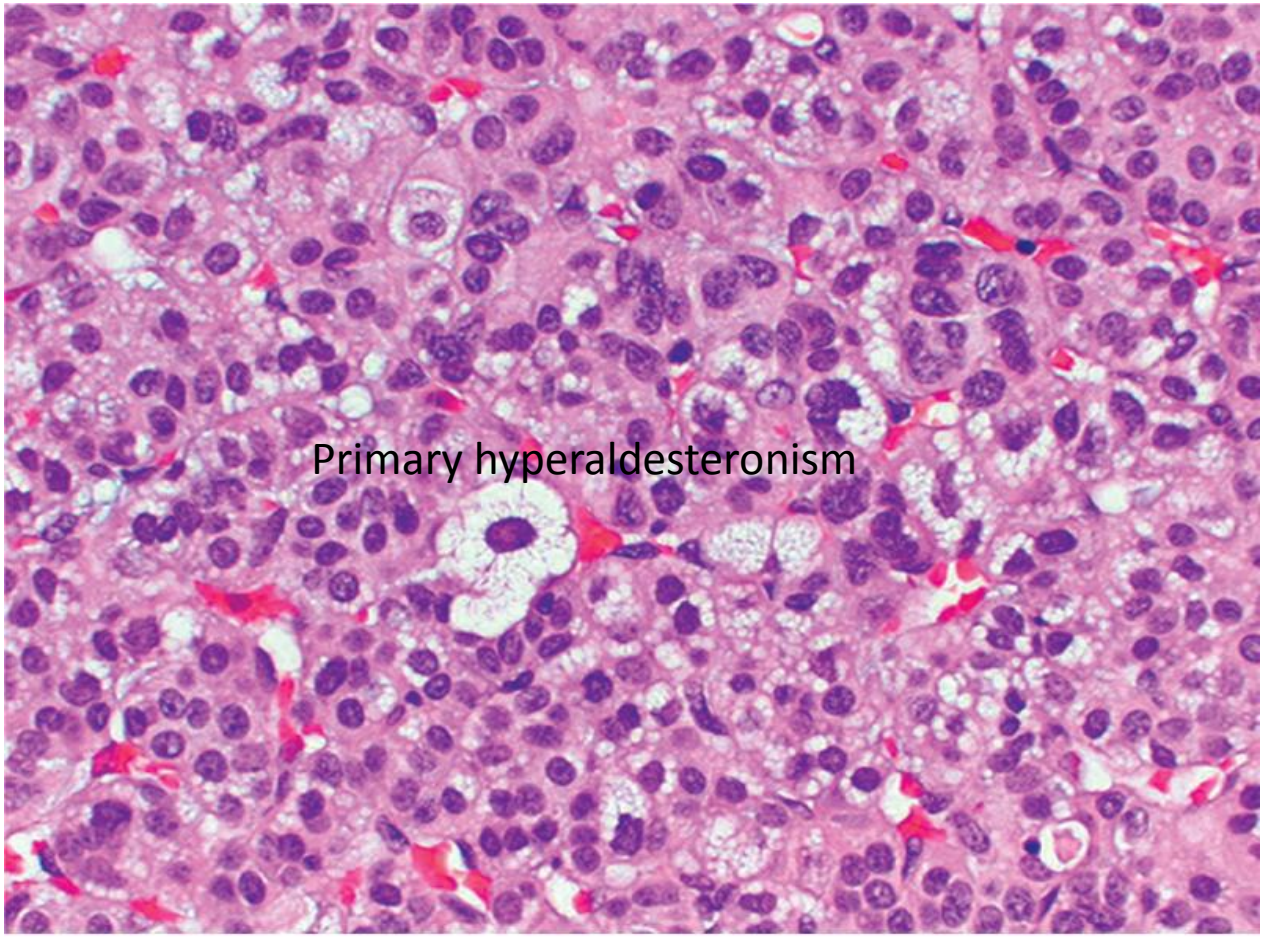
Adrenocortical hyperplasia. The adrenal cortex (bottom) is yellow, thickened, and multinodular as a result of hypertrophy and hyperplasia of the lipid-rich zonae fasciculata and reticularis. The top shows a normal adrenal for comparison

Adrenocortical adenoma-1



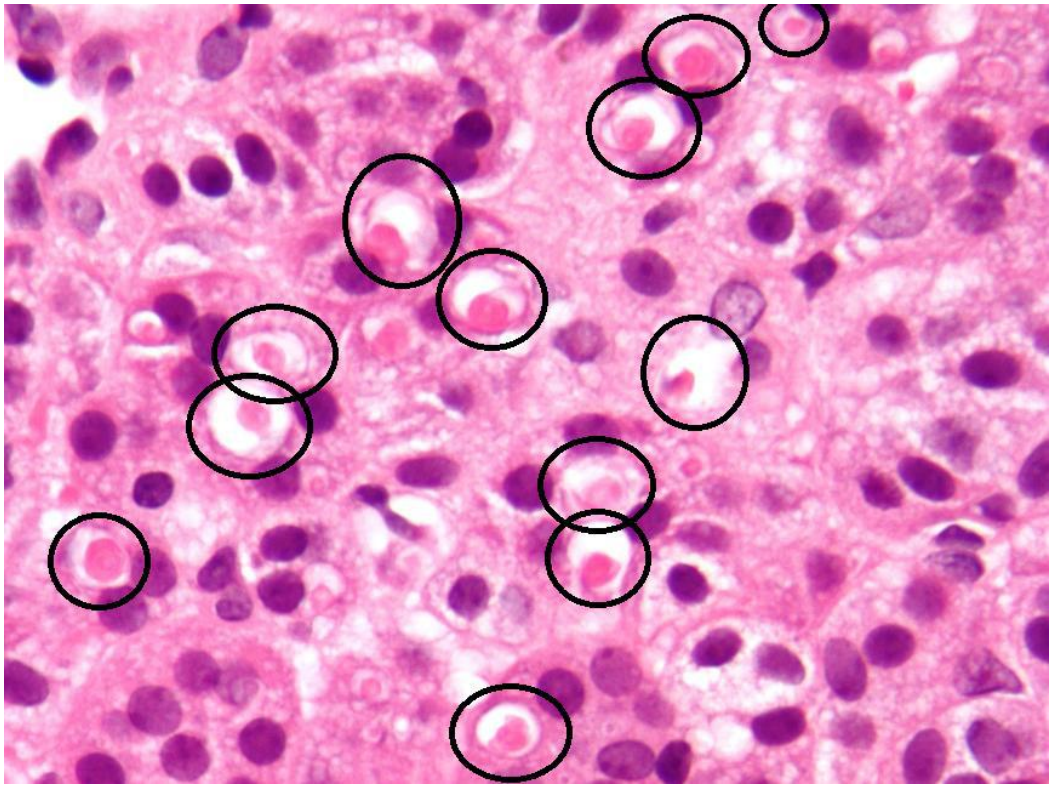
Adrenocortical adenoma. The adenoma is distinguished from nodular hyperplasia by its solitary, circumscribed nature. The functional status of an adrenocortical adenoma cannot be predicted from its gross or microscopic appearance

Adrenocortical adenoma-2



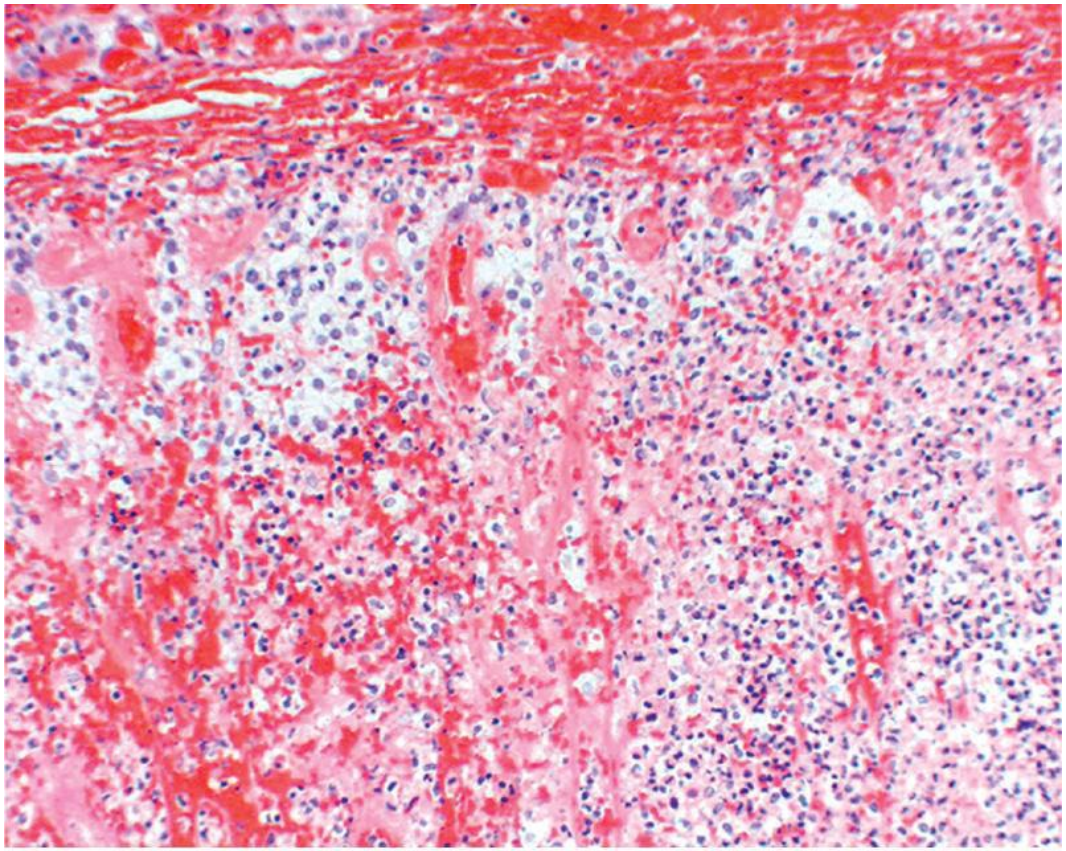
Histologic features of an adrenal cortical adenoma. The neoplastic cells are vacuolated because of the presence of intracytoplasmic lipid. There is mild nuclear pleomorphism. Mitotic activity and necrosis are not seen

Primary hyperaldesteronism



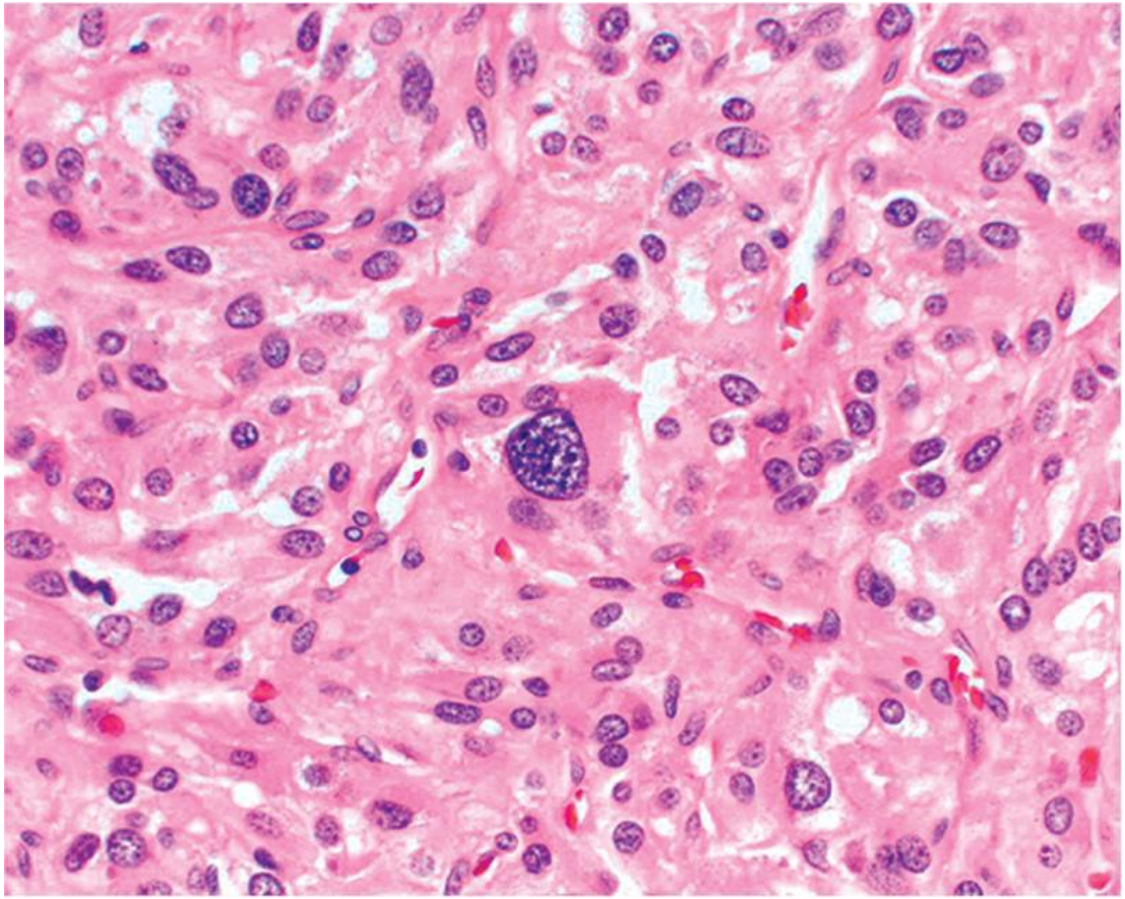
Micro: Adenoma: lipid laden (resemble fasciculata rather than granulosa), contain eosinophilic laminated cytoplasmic inclusions (spironolactone bodies)

Acute insufficiency



Acute adrenal insufficiency caused by severe bilateral adrenal hemorrhage in an infant with overwhelming sepsis (Waterhouse-Friderichsen syndrome). At autopsy the adrenals were grossly hemorrhagic and shrunken; microscopically, little residual cortical architecture is discernible

Pheochromocytoma



Photomicrograph of pheochromocytoma, demonstrating characteristic nests of cells ("Zellballen") with abundant cytoplasm. Granules containing catecholamine are not visible in this preparation. It is not uncommon to find bizarre cells even in pheochromocytomas that are biologically benign, and this criterion by itself should not be used to diagnose malignancy

The end ..