Non-Neoplastic Thyroid

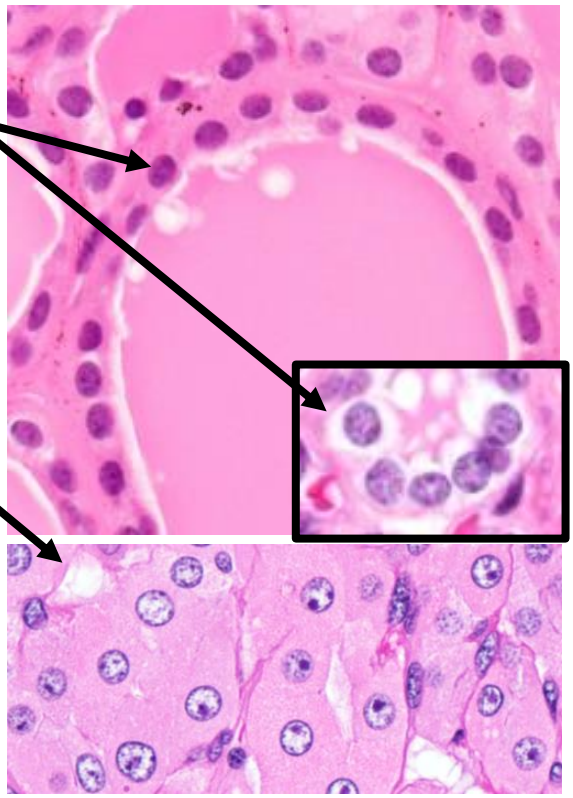
Normal Findings

Follicular epithelium: flat to columnar with round nuclei with finely granular chromatin.
IHC: (+) PAX8, TTF1, Thyroglobulin, CK7, etc..

Colloid: Bright pink. Frequent calcium oxalate crystals (seen best by polarization)(less common in parathyroid so potentially helpful during frozen section analysis)

Frequent metaplasia (often seen with chronic thyroiditis):
Oncocytic/Hürthle cells: larger cells with abundant eosinophilic granular cytoplasm and large nuclei with prominent nucleoli
Squamous metaplasia

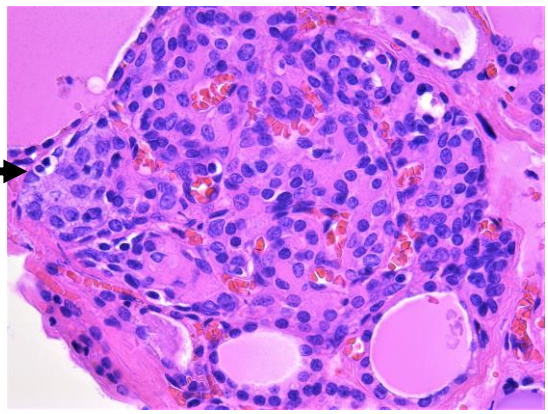
C cells: often hard to see on H&E.
Single cells or small clusters between follicles.
Stain with calcitonin and neuroendocrine markers
Release calcitonin (helps regulate calcium levels)



Incidental findings

Solid Cell Nests

Solid nests of cells with ovoid nuclei, finely granular chromatin, and frequent grooves. No keratinization.
Remnants of the ultimobranchial bodies. (+)p63, (-)TTF1

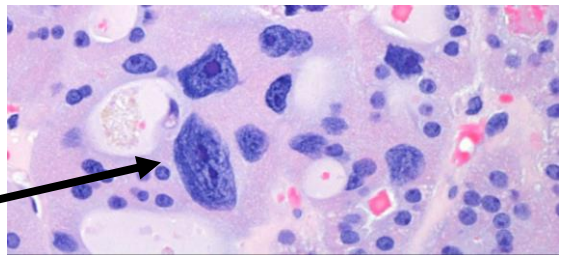


Ectopic thyroid: can be seen in any location from the tongue to the suprasternal notch, usually in the midline. Inclusions in lymph nodes are somewhat controversial, and most instances likely represent metastases.

Thymus, Parathyroid

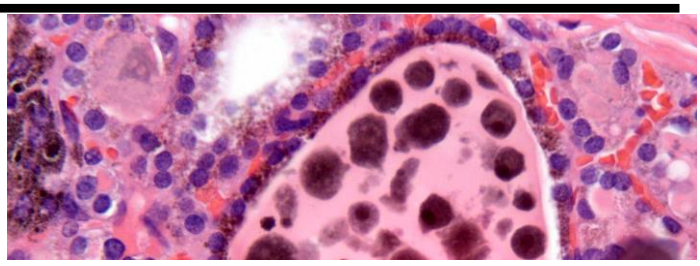
Skeletal Muscle: particularly around the isthmus, benign thyroid can intermingle with the skeletal muscle.

Endocrine Atypia: Random, usually focal nuclear pleomorphism. Thought to be degenerative. *Not* indicative of malignancy



"Black Thyroid"

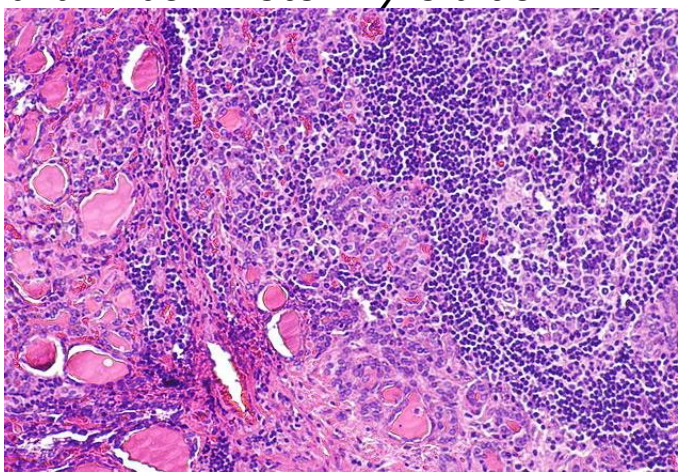
Abundant black pigment
Visible grossly and microscopically
Usually from minocycline/tetracycline administration
No impact on thyroid function



Thyroiditis

Chronic Lymphocytic Thyroiditis

aka "Hashimoto Thyroiditis"



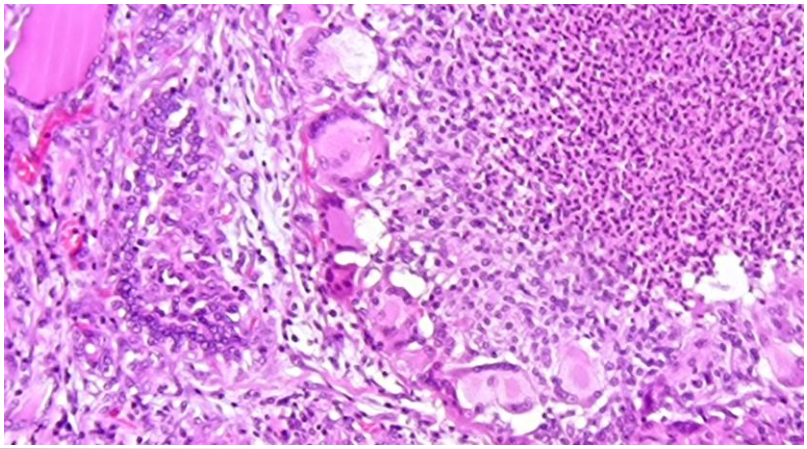
Most common autoimmune thyroiditis.
Hypothyroidism frequent. More common in women.
Autoantibodies (e.g., anti-thyroglobulin)
Treat with hormone replacement

Diffuse infiltration by lymphocytes, often with germinal centers.
Frequent Hürthle (oncocytic) cell change

Fibrosing variant: Dense fibrosis with keloid-like bands. Confined to thyroid (unlike Riedel's).

Subacute Granulomatous Thyroiditis

aka "de Quervain disease"



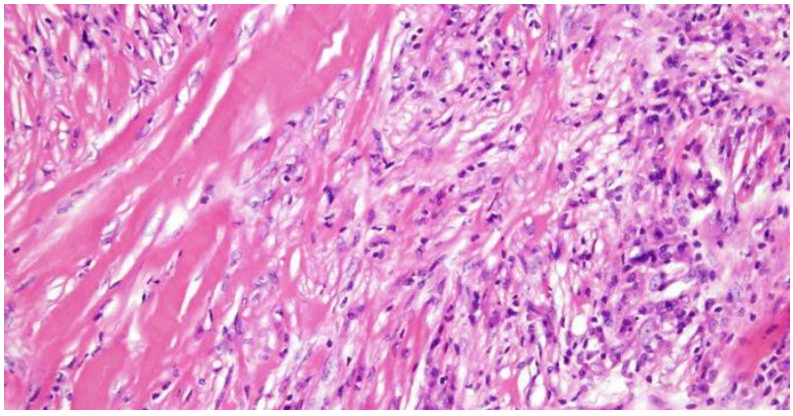
Self-limited inflammation.
More common in women, present with prodrome → **painful** thyroid gland
Can occur after viral infection.

Asymmetric, uneven inflammation

Early: Acute inflammation (hyperthyroid)

Later: **Epithelioid histiocytes, multinucleated giant cells**, chronic inflammation, and fibrosis (hypothyroid)

Riedel Thyroiditis

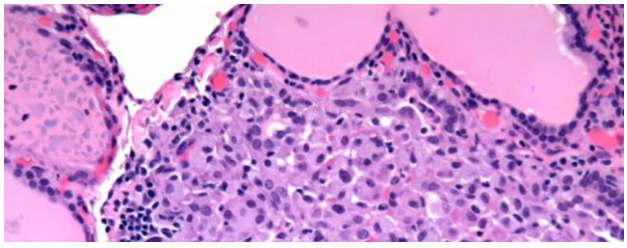


aka "Invasive Fibrous Thyroiditis"

Fibrosclerosing inflammation of the thyroid and adjacent soft tissues
Usually, **IgG4-related**

Destruction/replacement of gland by: dense collagen with keloidal-like bands.
Increased plasma cells, and phlebitis.
Very rare. Hard "wooden" thyroid.

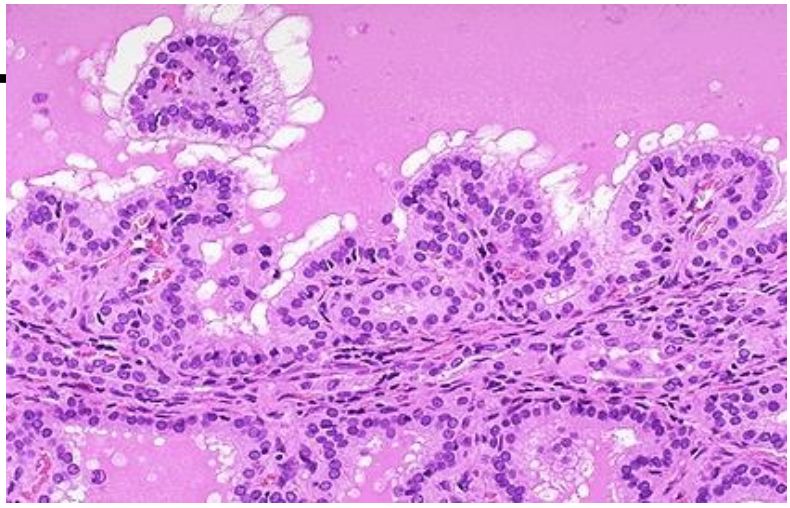
Palpation Thyroiditis



Scattered foci of giant cells, granulomas, and/or foamy macrophages with other inflammatory cells near ruptured follicles. Presumed to be due to vigorous **manipulation**.
Asymptomatic. **Incidental**

Hyperplasia

Graves Disease

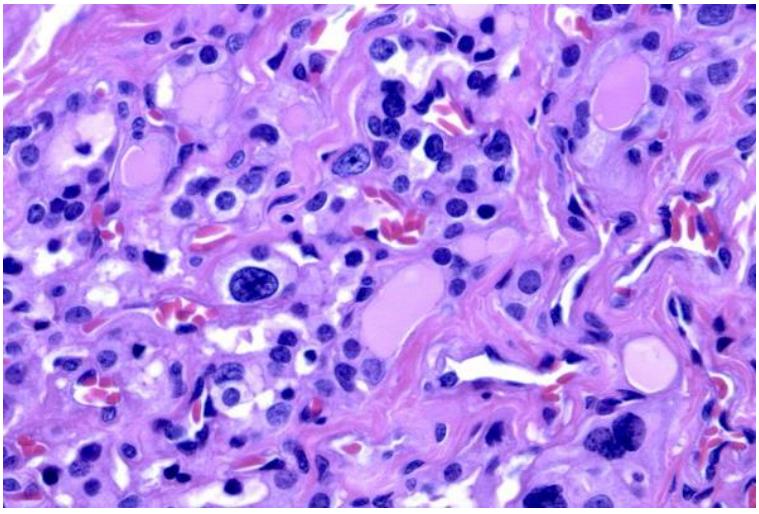


Thyroid stimulating antibodies → stimulates thyroid hormone synthesis → diffuse proliferation→ ***hyper*thyroid**

More common in women.

Diffuse follicular epithelium hyperplasia→ non-branching papillary projections
Scalloping of colloid.
Often tall, pink cells.
Frequent lymphocytic infiltration.

Dyshormonogenetic Goiter



Genetic defect in thyroid hormone production → Elevated TSH via feedback loop → causes **gland hyperplasia** (but no increase in production). Autosomal recessive.

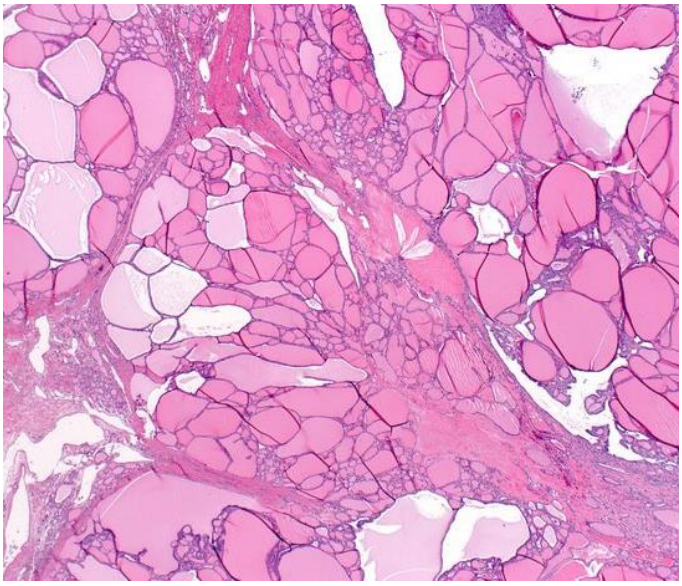
ALL thyroid tissue is abnormal.
Scant to **absent colloid**. Hypercellular nodules. Fibrosis. **Prominent cytologic atypia.**
IHC: (-) Thyroglobulin (+) PAX8, TTF1

Medically treat with hormone replacement, surgery for symptomatic goiter.

"Endemic" Goiter

Refers to thyroid hyperplasia in certain geographic areas, usually secondary to **dietary iodine deficiency** (Iodine is needed to make thyroid hormone). Pathologically, resembles adenomatous hyperplasia due to other causes.

Adenomatous Hyperplasia



Multinodular thyroid gland enlargement due to follicular epithelial hyperplasia.
Very common. More common in females.

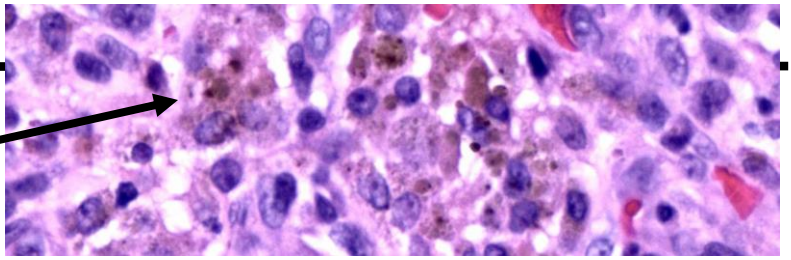
Mostly **Unencapsulated nodules** with pushing borders
Most nodules contain **abundant colloid**
Variably sized nodules, Some may be dominant
Epithelial metaplasia and hyperplasia common.
Can see cystic change, hemorrhage, calcifications.

"Goiter" is generally a clinical term, *not* a surgical pathology diagnosis.

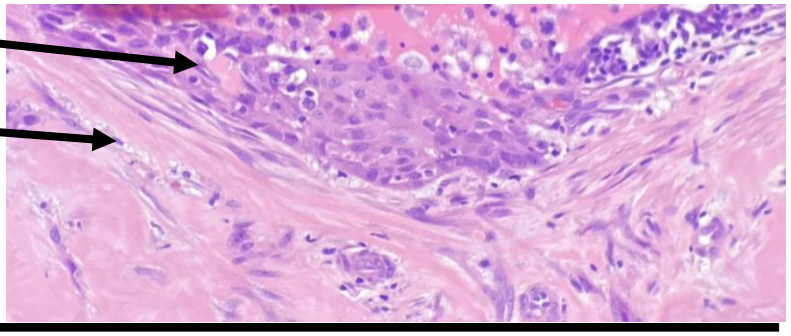
Total thyroidectomy for symptomatic disease

Other Lesions

Post-FNA Changes



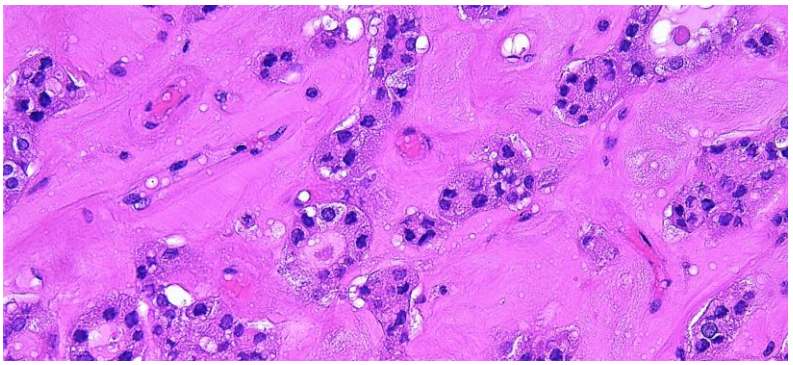
Hemorrhage and hemosiderin-laden macrophages. Granulation tissue.



Metaplasia (e.g., squamous)
Infarction
Fibrosis
Nuclear atypia

Capsular alterations—can mimic capsular invasion (hint is other changes above)

Amyloid Goiter

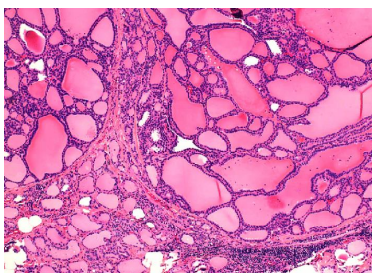


Mass enlargement due to amyloid deposition.
Usually diffuse throughout gland and angiocentric.
Compresses follicles.
Causes: 1° or 2 ° amyloidosis, medullary carcinoma
Stains**: (+) Congo Red** with "apple green birefringence"

Adenomatoid Nodule

Asymmetric nodular enlargement—usually part of adenomatous hyperplasia, with multiple nodules, but one nodule may be *dominant*.

Main DDX is a follicular adenoma. Since both are benign, and there is some interobserver variation, some people just say ***"Benign Follicular Nodule"***



Adenomatoid nodule	Follicular adenoma
Think: polyclonal growth	*Think: monoclonal neoplasm*
Unencapsulated. May have variable, incomplete, surrounding fibrosis	**Encapsulated**. Well-defined, fibrous, often with thick vessels
Multiple patterns of growth, resembling background thyroid	**Uniform** pattern of growth; distinct from surrounding thyroid
Relatively **abundant colloid**	Less colloid
Often multiple nodules	Single nodule
Usually Pushing border	Compresses nearby tissue