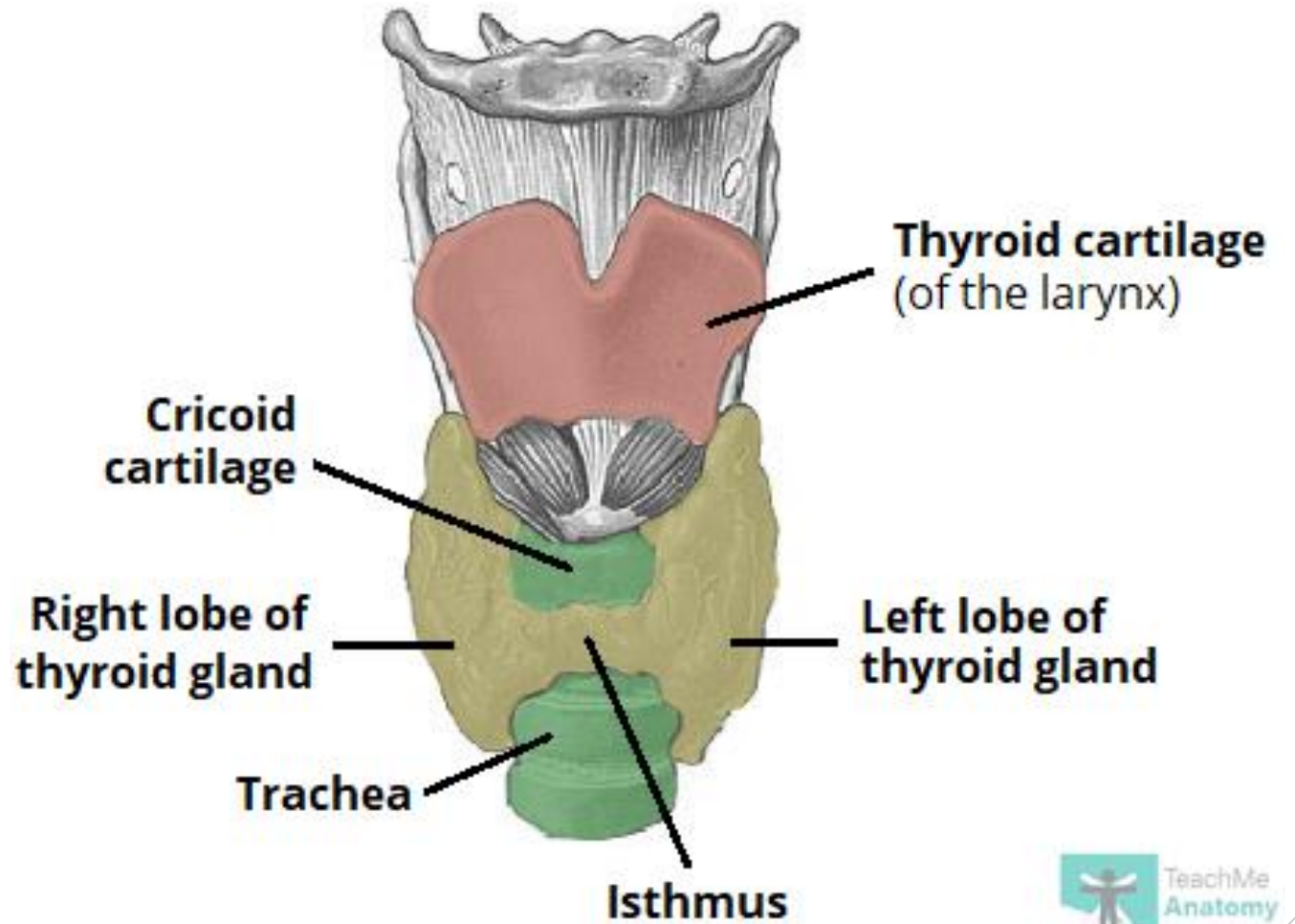


The background features a series of concentric, overlapping circles and lines in shades of purple and grey, creating a dynamic, abstract pattern. The text is centered within a dark purple rectangular area.

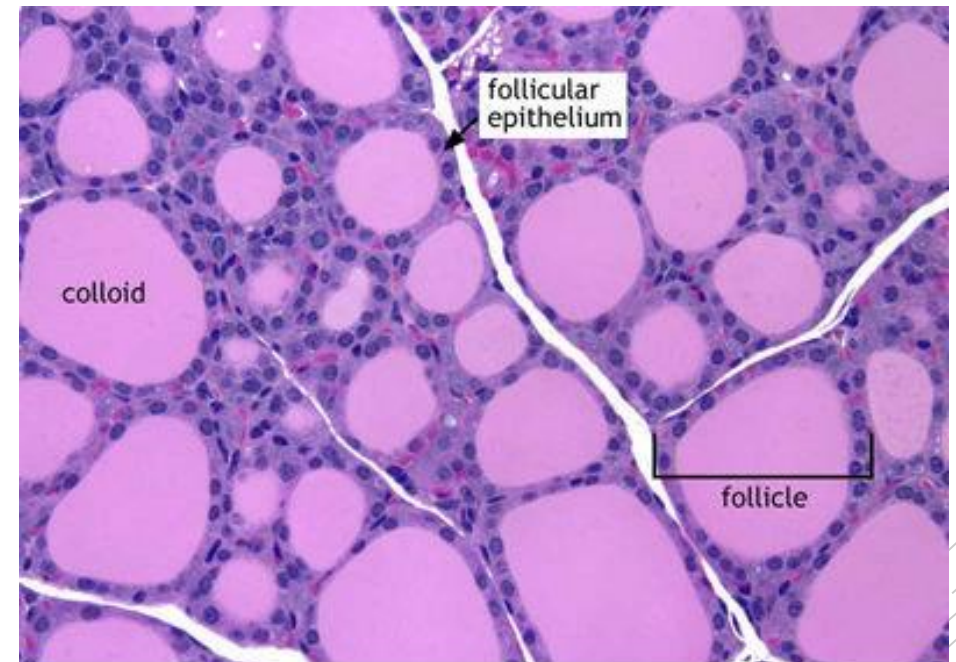
# Endocrine system. Thyroid gland pathology-1.

Dr. Omar Hamdan, M.D.

# Thyroid. Anatomy.



# Gross and histology

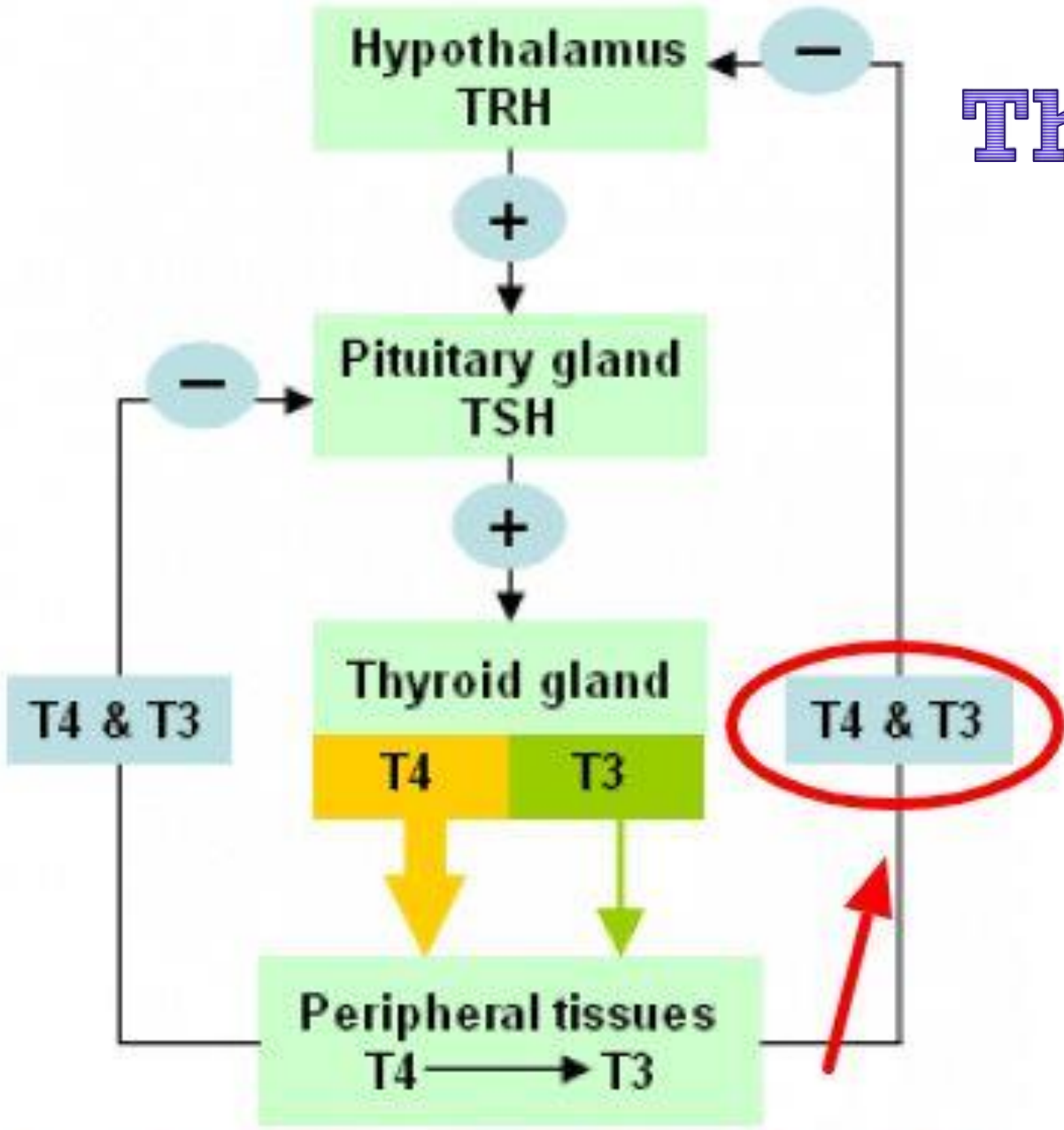


# Thyroid function test

**TSH**

**T3**

**T4**

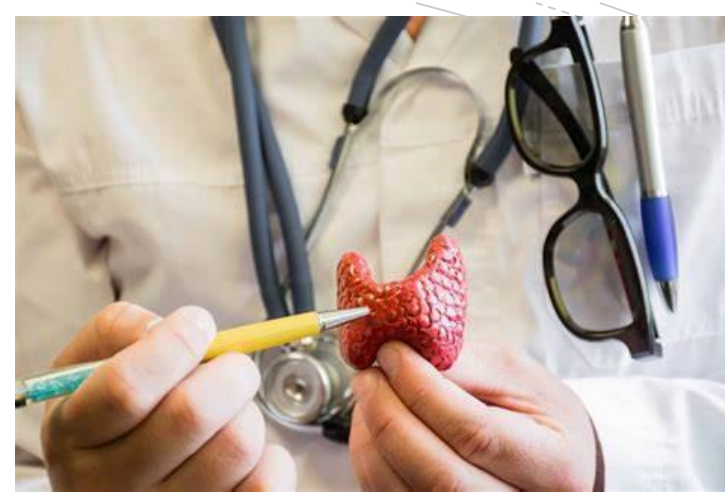


# Diseases of thyroid gland

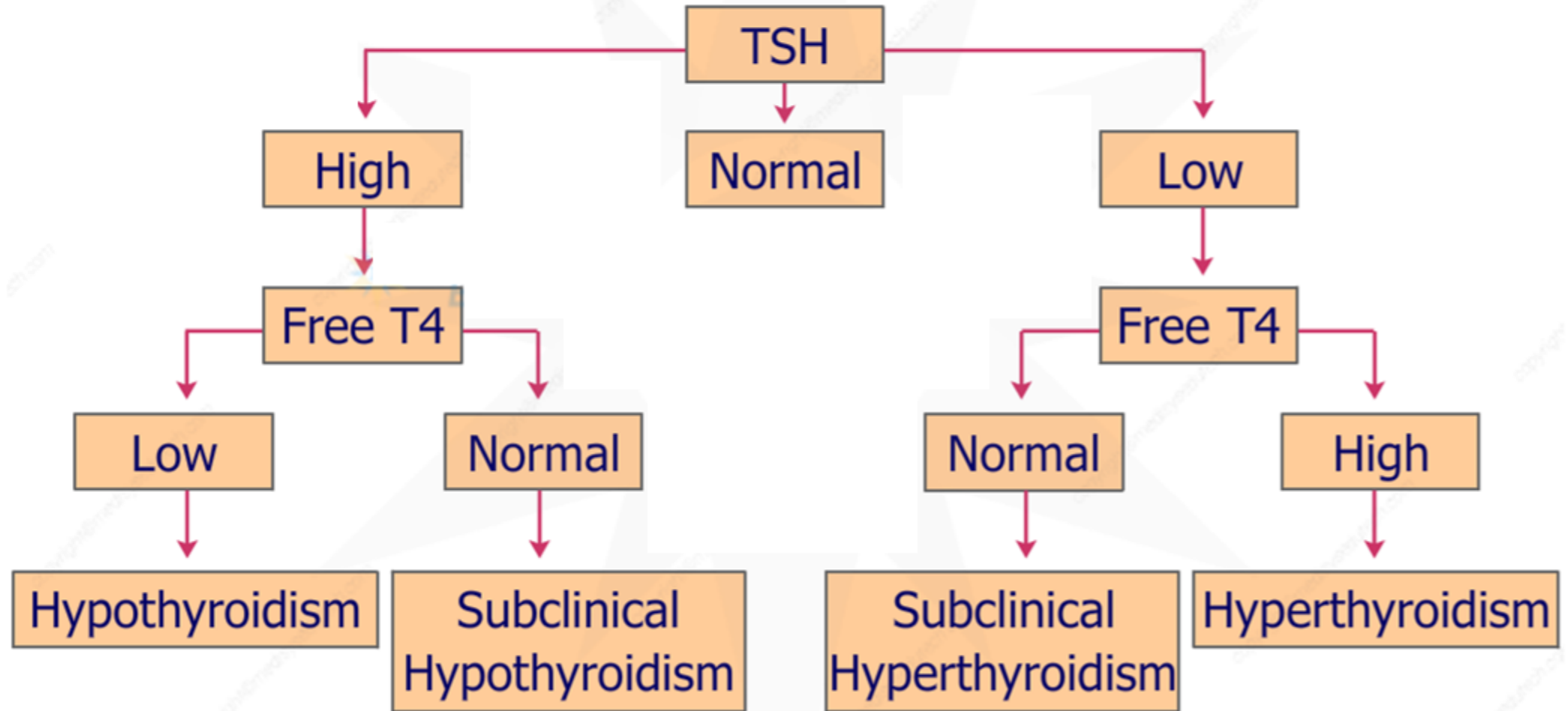
## ❖ Non-neoplastic:

- Hyperthyroidism.
- Hypothyroidism.
- Autoimmune Thyroid Disease
  - ✓ Hashimoto Thyroiditis .
  - ✓ de Quervain Thyroiditis.
  - ✓ Subacute Lymphocytic Thyroiditis
  - ✓ Graves Disease.
- Diffuse and Multinodular Goiter

## ❖ Neoplastic.



# My approach



# 1. THYROTOXICOSIS:

- Hypermetabolic state caused by elevated T4, T3.

**Table 20.2 Causes of Thyrotoxicosis**

<b>Associated With Hyperthyroidism</b>
<b>Primary</b>
Diffuse toxic hyperplasia (Graves disease)
Hyperfunctioning ("toxic") multinodular goiter
Hyperfunctioning ("toxic") adenoma
Iodine-induced hyperthyroidism
<b>Secondary</b>
TSH-secreting pituitary adenoma (rare)*
<b>Not Associated With Hyperthyroidism</b>
Granulomatous (de Quervain) thyroiditis ( <i>painful</i> )
Subacute lymphocytic thyroiditis ( <i>painless</i> )
Struma ovarii (ovarian teratoma with thyroid)
Factitious thyrotoxicosis (exogenous thyroxine intake)

clinical manifestations



hair loss

# HYPERTHYROIDISM

## symptoms



bulging eyes



sweating



enlarged thyroid



rapid heartbeat



nervousness



heat intolerance



irritability



tremor of fingers



difficulty sleeping



warm moist palms



scant menstrual period



infertility



muscle weakness



weight loss



frequent bowel



soft nails



Diagnosis????

## 2. HYPOTHYROIDISM

- Hypothyroidism is caused by structural or functional derangements that interfere with thyroid hormone production.

**Table 20.3 Causes of Hypothyroidism**

<b>Primary</b>
Postablative Surgery, radioiodine therapy, or external irradiation
Autoimmune hypothyroidism Hashimoto thyroiditis <sup>+</sup>
Iodine deficiency*
Drugs (lithium, iodides, p-aminosalicylic acid)*
Congenital biosynthetic defect (dyshormonogenetic goiter) (rare)*
Genetic defects in thyroid development (rare)
Thyroid hormone resistance syndrome (rare)
<b>Secondary (Central)</b>
Pituitary failure (rare)
Hypothalamic failure (rare)

# HYPOTHYROIDISM

## symptoms



dry hair



loss of eyebrow hair



puffy face



enlarged thyroid



slow heartbeat



arthritis



cold intolerance



depression



dry skin



fatigue



forgetfulness



menstrual disorders



infertility



muscle aches



weight gain



constipation



brittle nails



# CRETINISM

- **Cretinism refers to hypothyroidism developing in infancy or early childhood.**
- **common in areas of the world where dietary iodine deficiency is endemic.**
- **Clinical features:**
  - ✓ **impaired development of the skeletal system and central nervous system.**
  - ✓ **severe mental retardation.**
  - ✓ **short stature.**
  - ✓ **coarse facial features, a protruding tongue.**
  - ✓ **umbilical hernia**

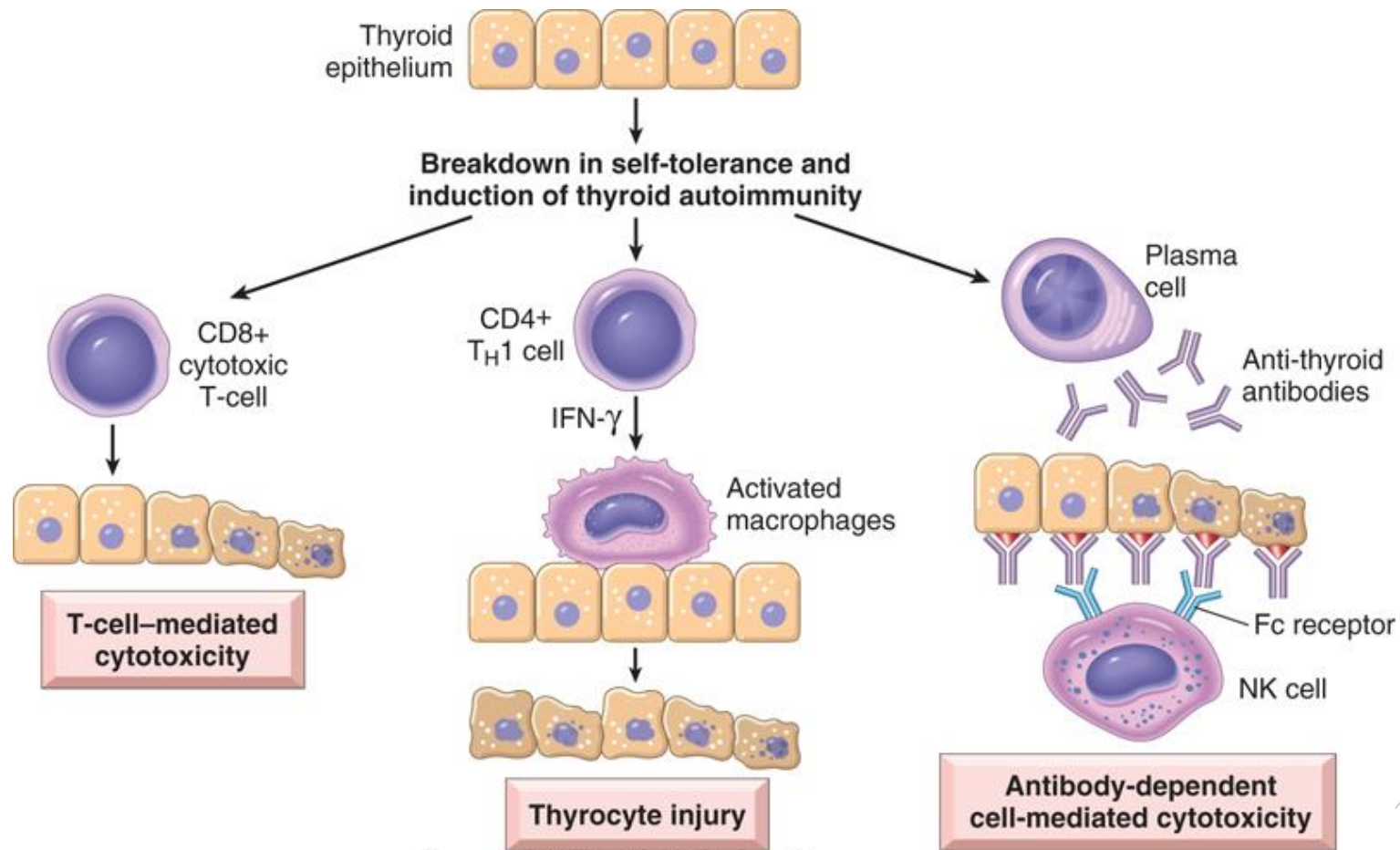


# Autoimmune thyroiditis.

## ■ **1. HASHIMOTO's THYROIDITIS :**

- ✓ Autoimmune disease characterized by progressive destruction of thyroid tissue
- ✓ Commonest type of thyroiditis
- ✓ Commonest cause of hypothyroidism in areas of sufficient iodine levels
- ✓ F:M = 10-20 :1, 45-65 yrs.
- ✓ Patient presented with Painless symmetrical diffuse goiter

# Hashimoto... Pathogenesis

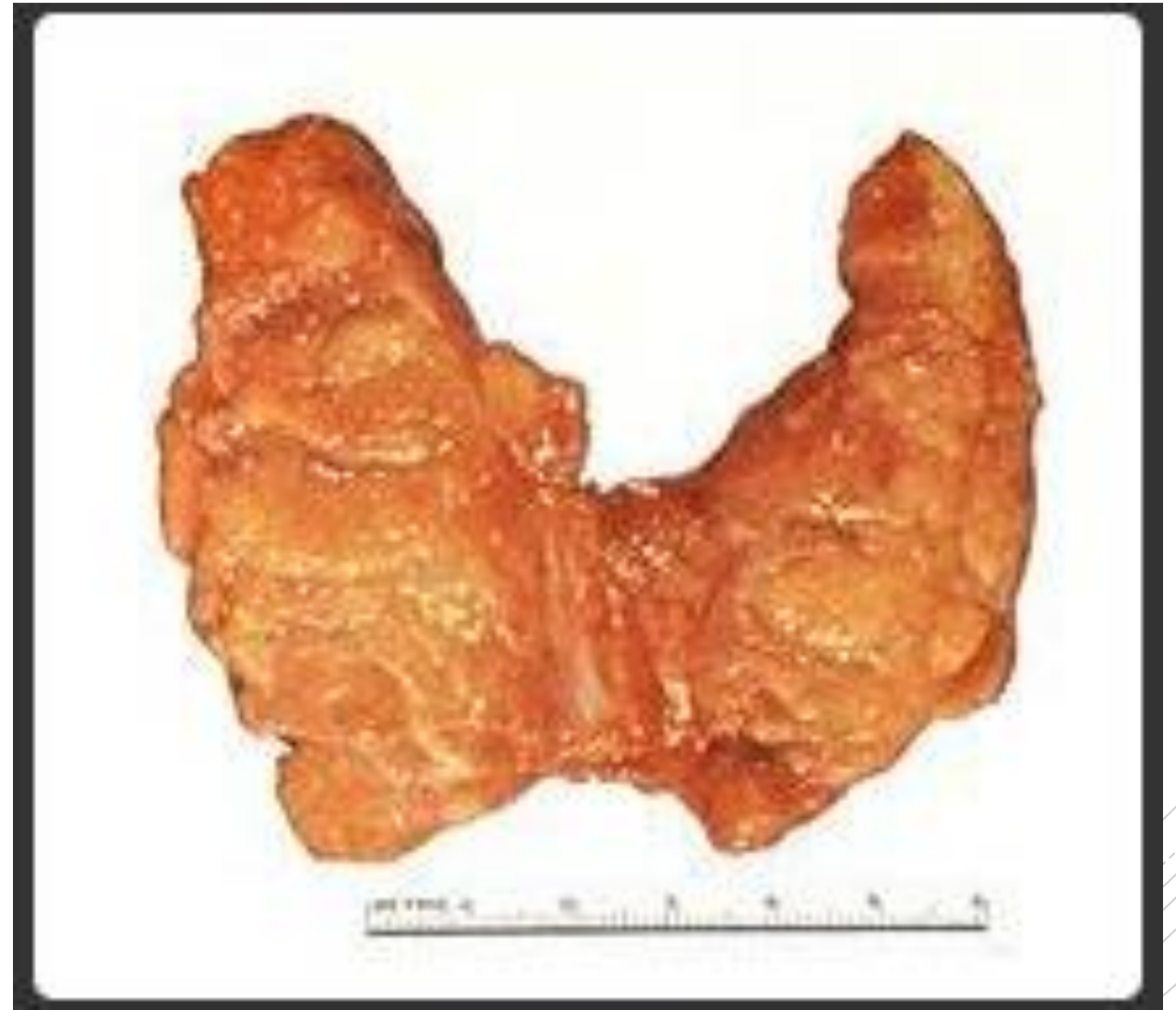


Kumar et al: Robbins Basic Pathology, 9e.  
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- Anti thyroglobulin
- antithyroid peroxidase

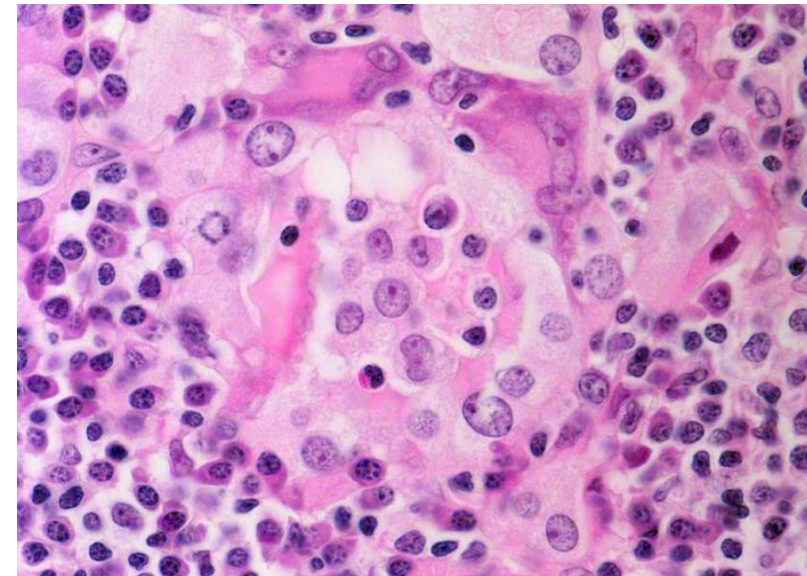
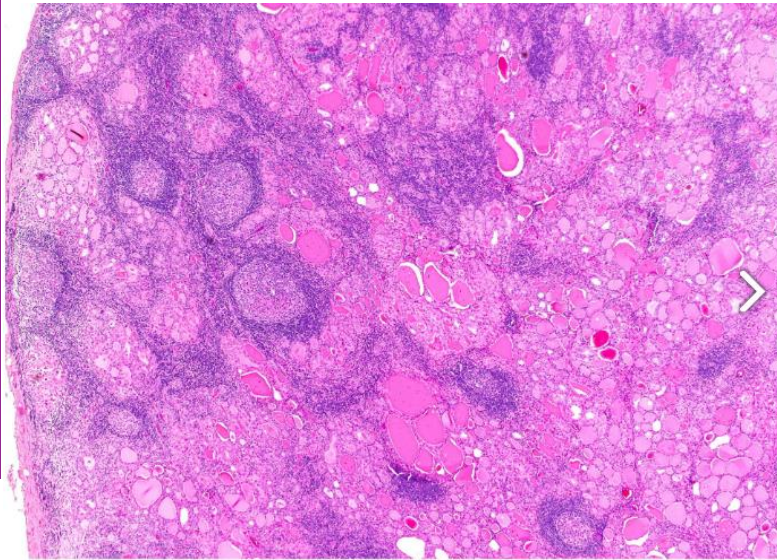
Gland is a smooth pale goiter, minimally nodular, well demarcated.

## Morphology



## Microscopic

- Dense infiltration by lymphocytes & plasma cells
- Formation of lymphoid follicles, with germinal centers
- Presence of HURTHLE CELLS

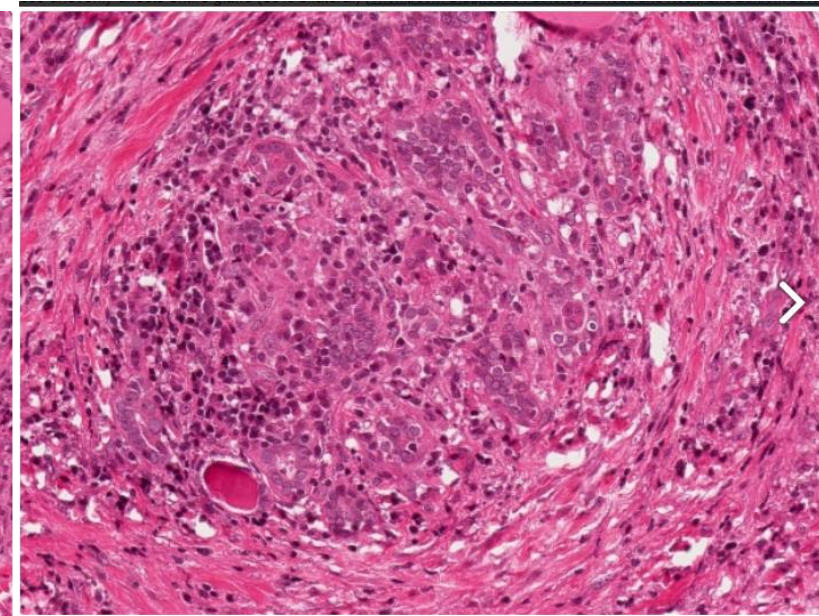
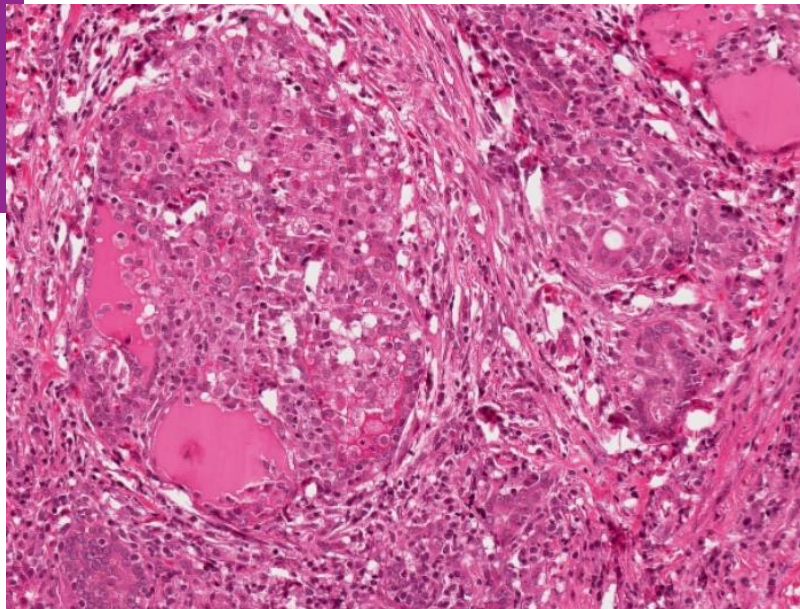


## 2. De Quervain Thyroiditis

- Also called subacute granulomatous thyroiditis .
- Middle aged , more in females. Viral etiology ?
- Self-limited (6-8w)
- Acute onset of pain in the neck , fever, ↑ ESR, ↑ WBC
- Transient thyrotoxicosis.

## Morphology

- Destruction of follicles leads to mixed inflammatory infiltrate.
- Neutrophils , Macrophages & Giant cells & formation of granulomas.

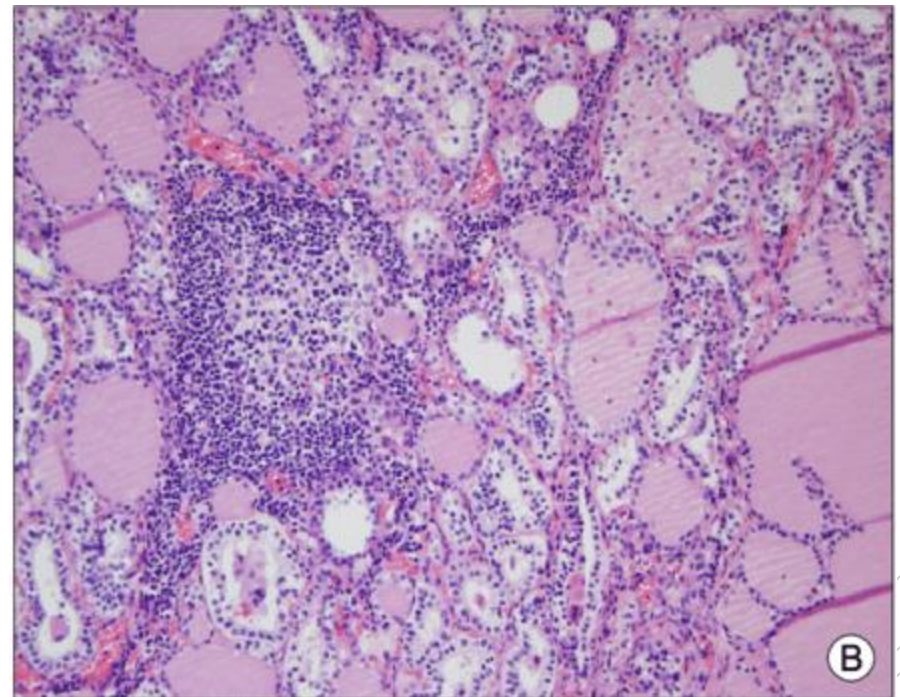


### 3. subacute lymphocytic thyroiditis : (silent)

- Middle aged females & post partum patients
- Probably autoimmune with circulating AB.
- May recur in subsequent pregnancies
- May progress to hypothyroidism

## Morphology

- Preserved lobular pattern with follicular destruction.
- variable lymphocytic infiltrate.
- rare / no oncocytic change.
- no / focal fibrosis

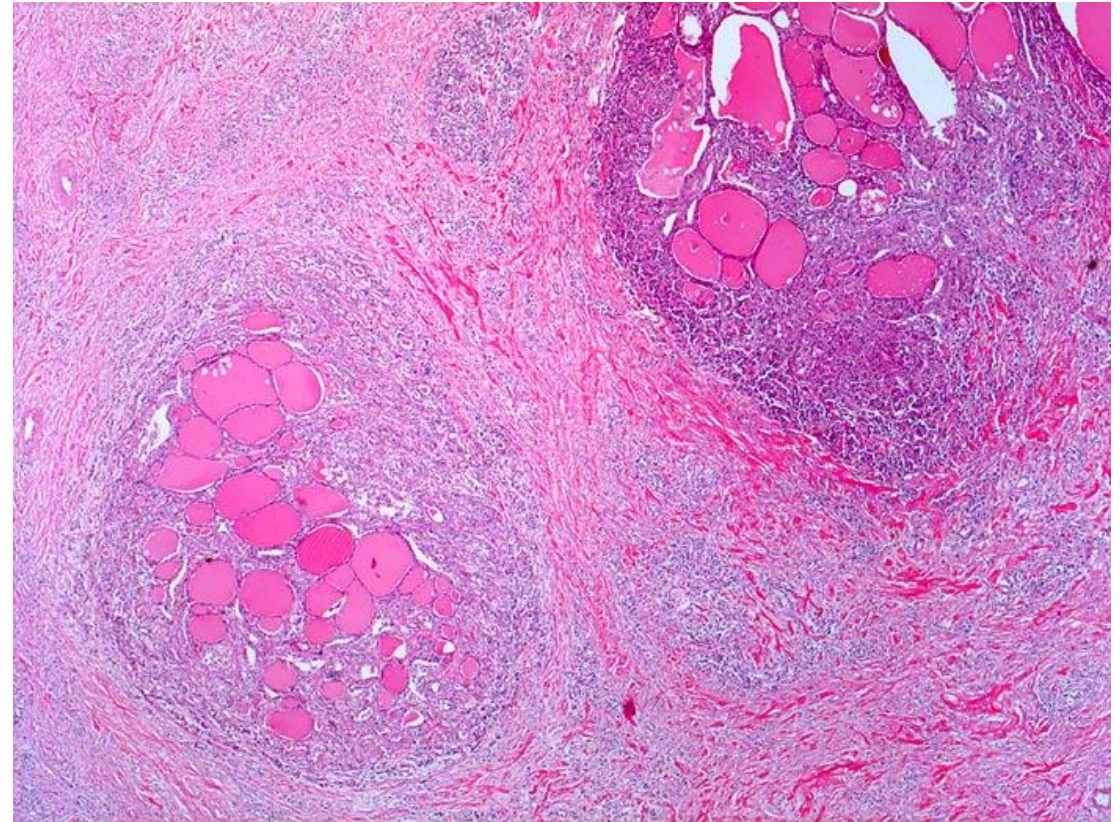


## 4. Reidel's Thyroiditis

- Densely fibrotic inflammatory process involving thyroid gland and adjacent neck tissue.
- 65% have antithyroid antibodies
- Clinically resembles carcinoma.

# \*\*Morphology

Follicles are obliterated or compressed by extensive dense fibrous tissue

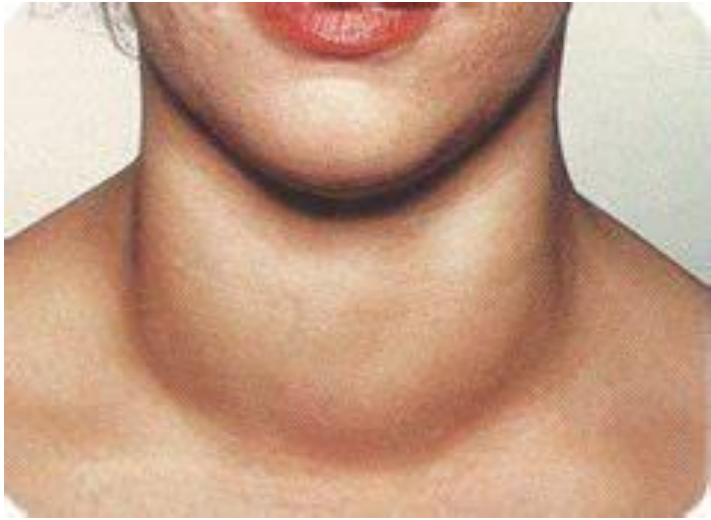


## 5. GRAVE'S DISEASE .

- Autoimmune disease characterized by hyperthyroidism due to circulating autoantibodies against thyrotropin (TSH receptor) that activates the receptor, leading to increased thyroid hormone synthesis and secretion and growth of the thyroid gland.
- Commonest cause of endogenous hyperthyroidism
- Age 20- 40 y.
- M: F ratio is 1: 7
- More common in western races

## Associated with...

- diffuse goiter.
- infiltrative ophthalmopathy .
- infiltrative dermopathy, including:
  - pretibial myxedema .
  - thyroid acropachy (extremity swelling, clubbing of fingers and toes due to periosteal new bone formation)



## Diagnosis

- clinically by symptoms.
- presence of laboratory markers of hyperthyroidism.

(Increased T3 / T4, increased uptake of radioactive iodine, decreased TSH).

- presence of serum anti-thyrotropin antibodies.

# Pathogenesis

- Exact cause is unclear.
- It is believed to involve a combination:
  - ❖ Genetic (Caused by B and T cell mediated immune responses leading to production of autoantibodies to thyrotropin/TSH receptor).
  - ❖ environmental factors (Onset of disease may be triggered by stress, infection or giving birth).
- May exist with other similar diseases e.g. SLE, Pernicious anemia, Diabetes type I, Addison's disease.

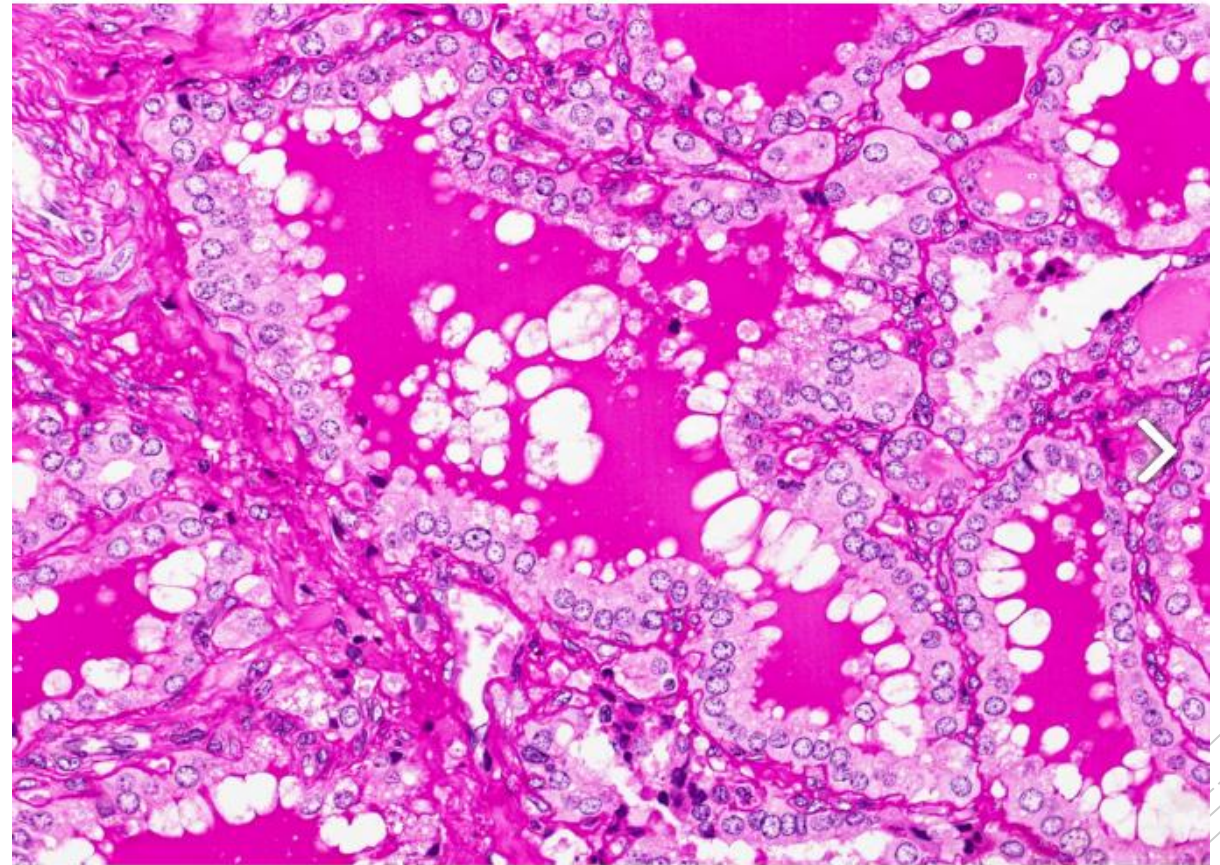
# Morphology.

- Diffuse and symmetrically enlarged thyroid gland with beefy red cut surface.



## Histology

- Hyperplastic thyroid follicles with papillary infolding.
- Colloid is typically decreased, when present shows peripheral scalloping



## DIFFUSE & MULTINODULAR GOITRE

- Goiter is clinical term meaning enlarged thyroid, which can be either diffuse or nodular (e.g. multinodular or solitary / dominant nodule).
- Multinodular goiter: irregular enlargement of thyroid gland due to repeated episodes of hyperplasia and involution (degeneration) .
- Iodine deficiency is most common cause worldwide.



## DIFFUSE & MULTINODULAR GOITRE

- 90% of those affected are women (F >>> M).
- Variable age; develops more frequently during adolescence and pregnancy.
- Increase in TSH secretion is the main cause in iodine deficiency related goiter.
- Causes:
  - ❖ Endemic: 10% of population have goiter.
  - ❖ Sporadic: 1- Physiological demand.  
2- Dietary intake of excessive calcium & cabbages.
  - 3- Hereditary enzyme defects.

## Clinical features

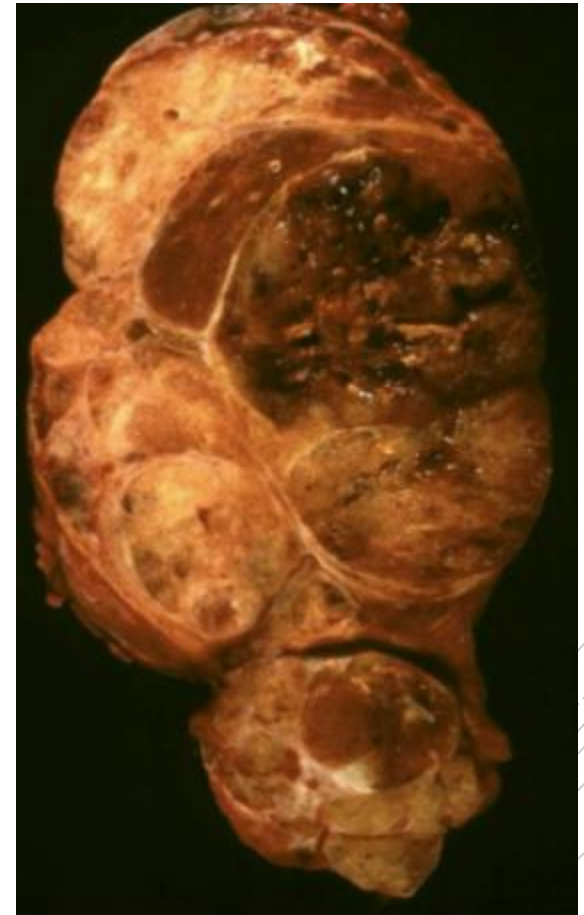
- Majority asymptomatic and euthyroid.
- Pressure symptoms due to compression of trachea and esophagus.
- neck mass

## Diagnosis

- Clinical examination
- Thyroid function tests: TSH, T3, T4  
(Usually normal T3 / T4, TSH, normal radioactive iodine uptake)
- Thyroid ultrasound
- CT or MRI to evaluate extent of goiter

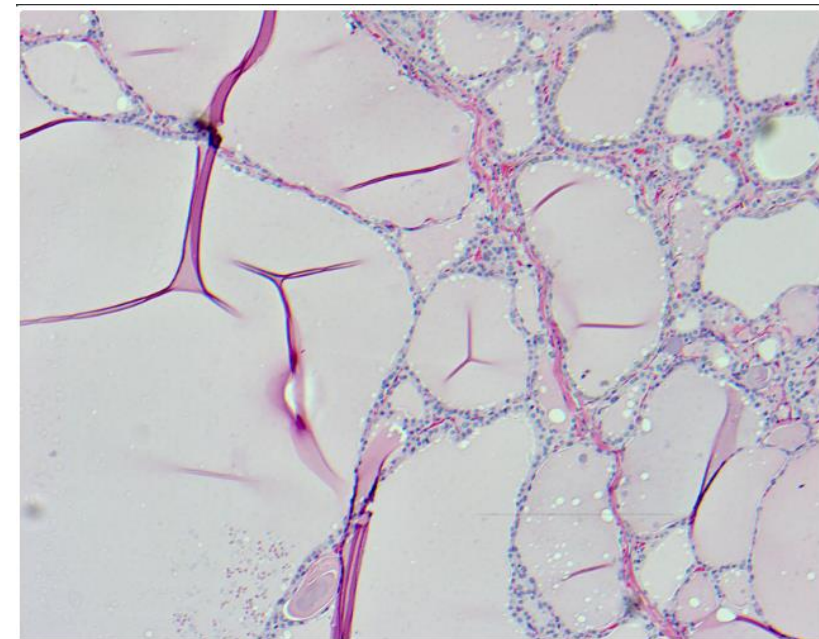
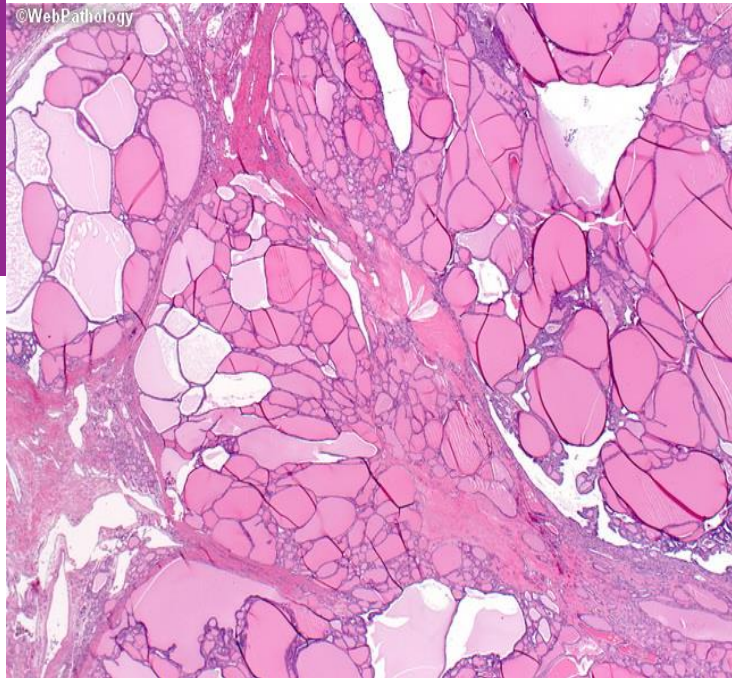
**\* Multinodular goiters are asymmetric, large  
Nodular, bumpy outer surface and variegated cut  
surface**

## Morphology



# Histology

- Variable sized dilated follicles with flattened to hyperplastic epithelium.
- Nodules may be present.



[https://www.osmosis.org/learn/Ketone body metabolism](https://www.osmosis.org/learn/Ketone%20body%20metabolism)