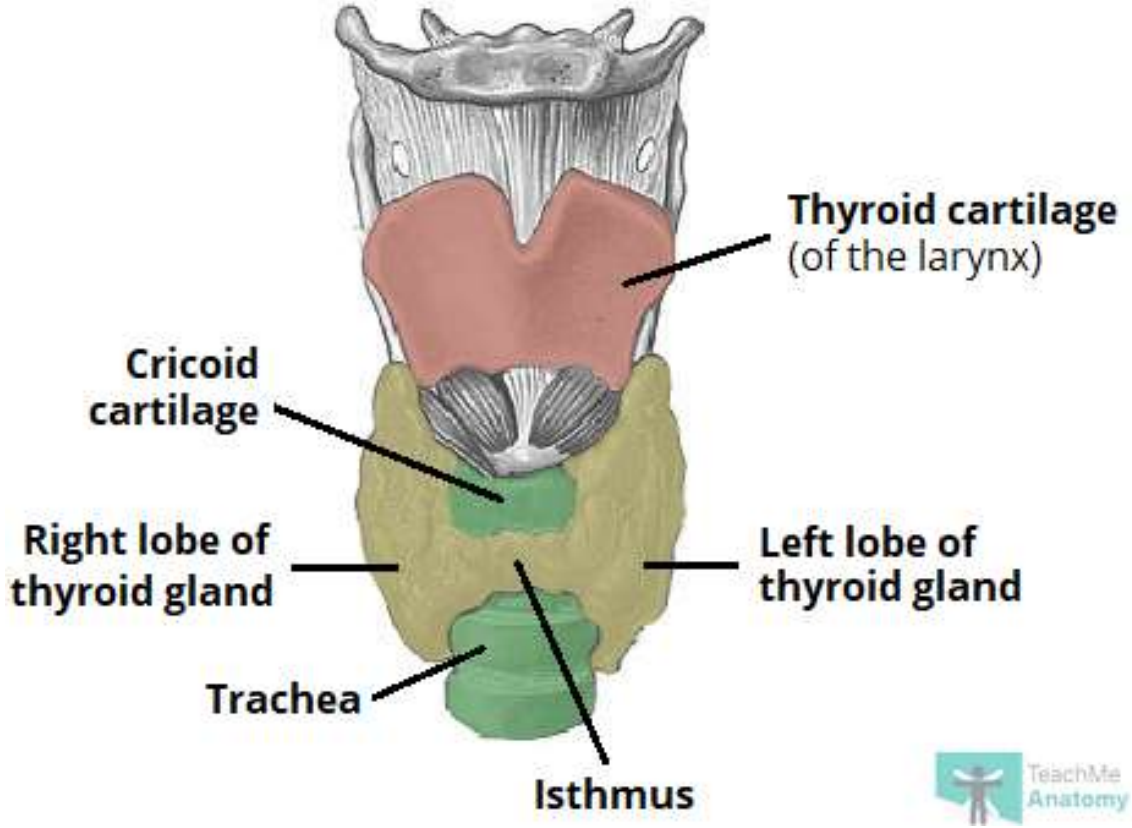
Endocrine system-I. Thyroid gland pathology.

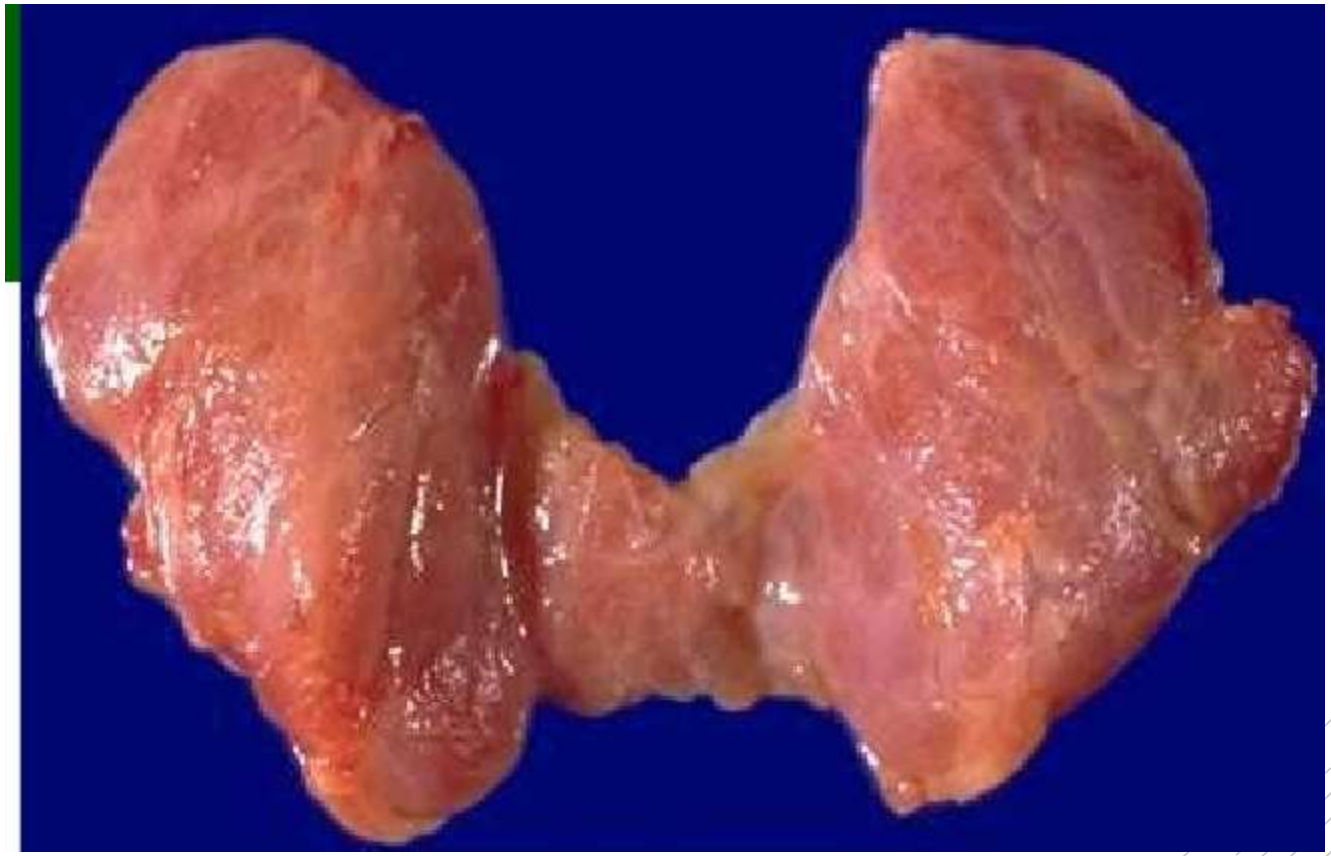
Dr. Eman Krieshan, M.D.

15-5-2022

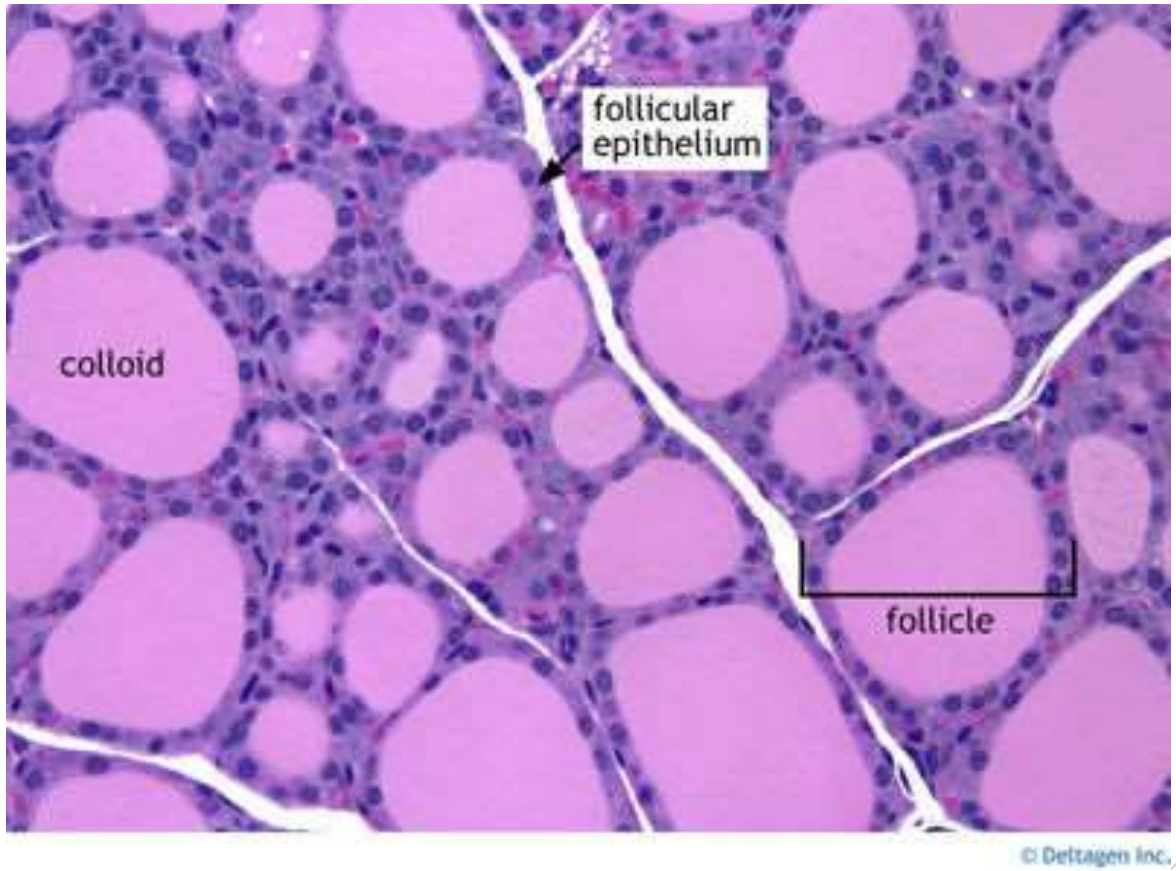
Thyroid. Anatomy.



Gross



Thyroid. Histology



Diseases of thyroid gland

❖**Non-neoplastic:**

- Hyperthyroidism.
- Hypothyroidism.
- Autoimmune Thyroid Disease

✓Hashimoto Thyroiditis .

✓de Quervain Thyroiditis.

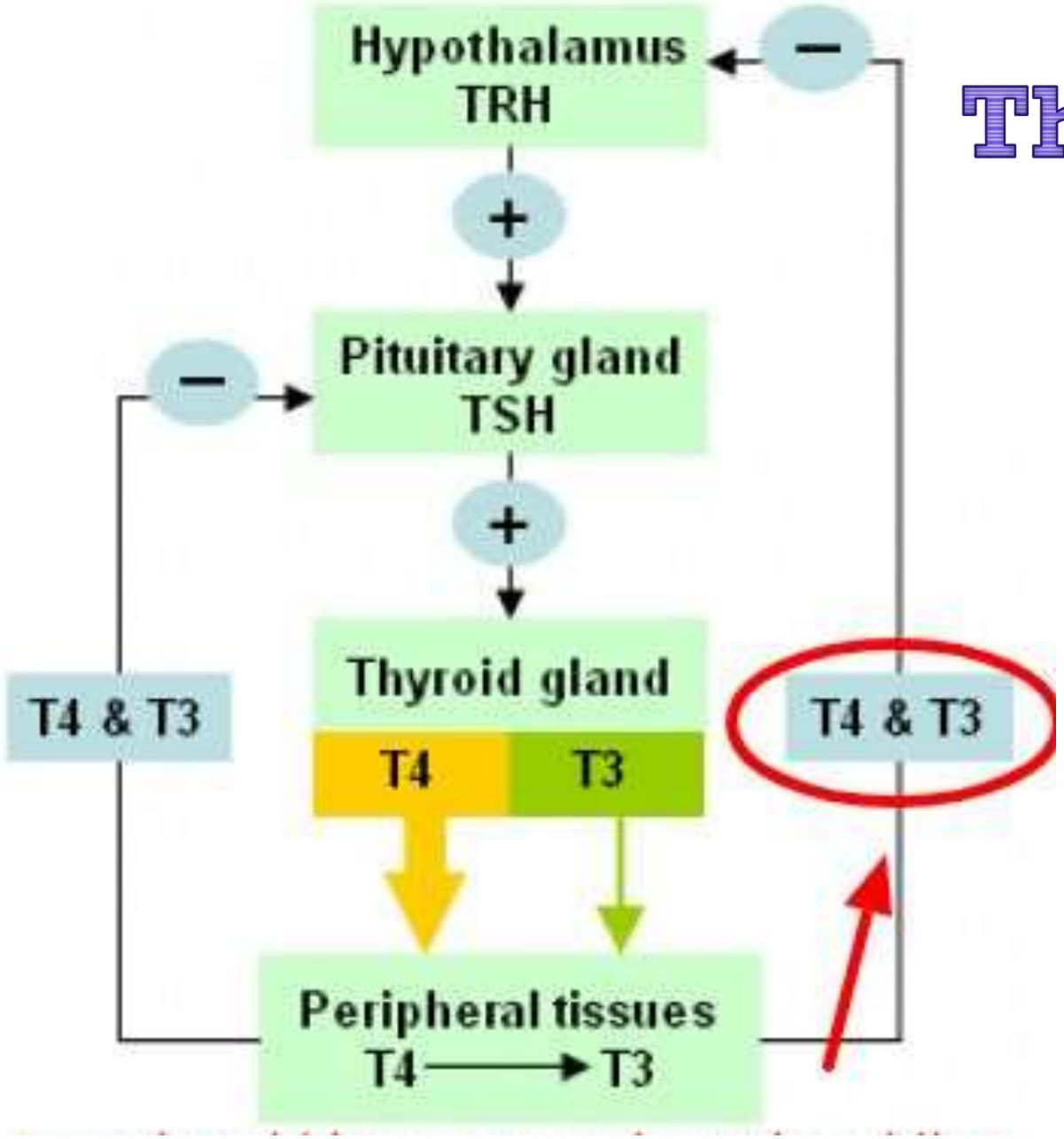
✓ Subacute Lymphocytic Thyroiditis

✓Graves Disease.

- Diffuse and Multinodular Goiter

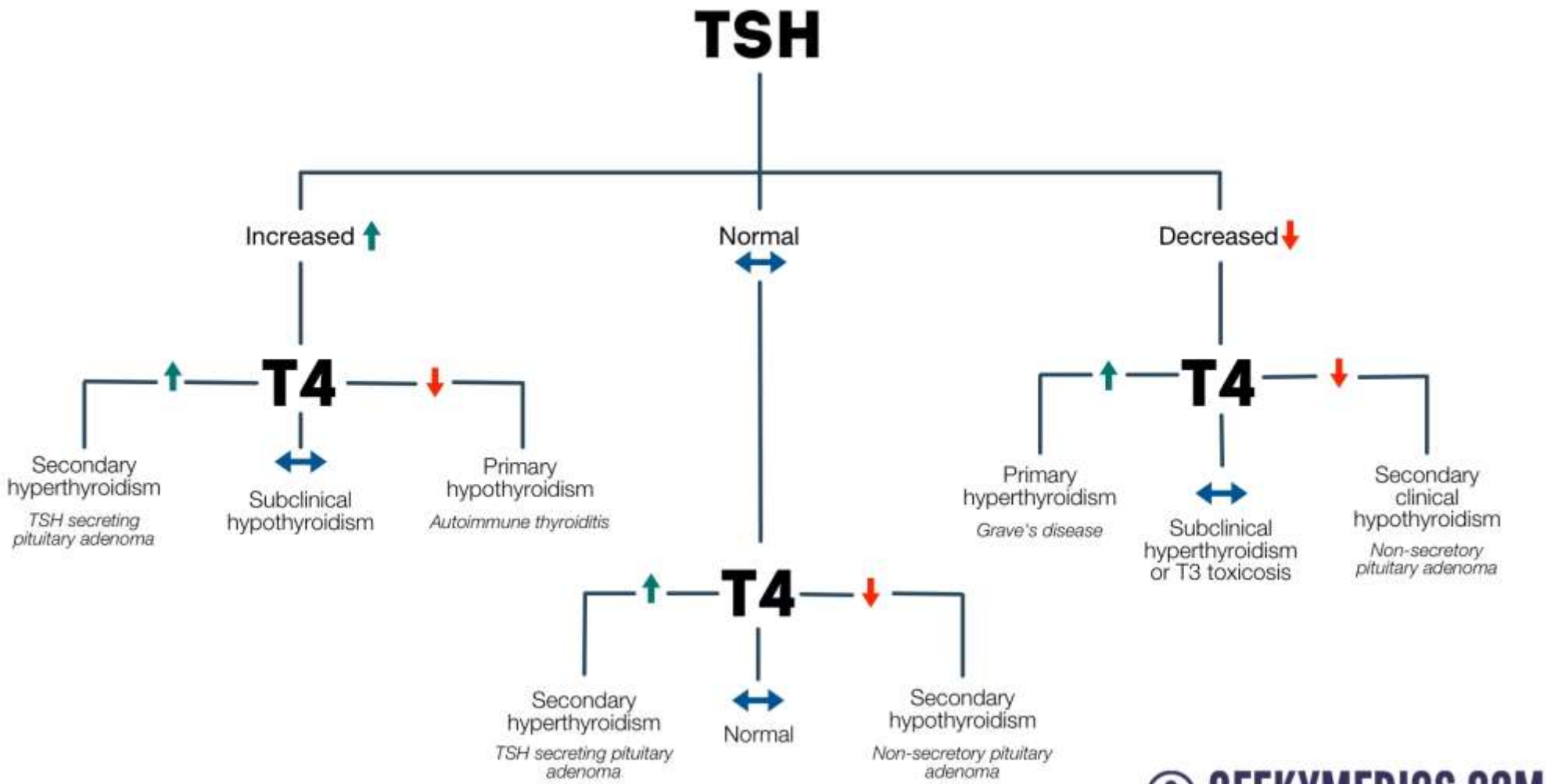
❖**Neoplastic.**

Thyroid function test



Normal Thyroid Levels

Test	Abbreviation	Typical Ranges
Thyroxine Serum	T4	4.6-12 ug/dl
Free Thyroxine	FT4	0.7-1.9 ng/dl
Triiodothyronine Serum	T3	80-180 ng/dl
Free Triiodothyronine 1	FT3	230-619 pg/d
Serum thyroglobulin 1	Tg	0-30 ng/m
Thyrotropin Serum	TSH	0.5-6 uU/ml



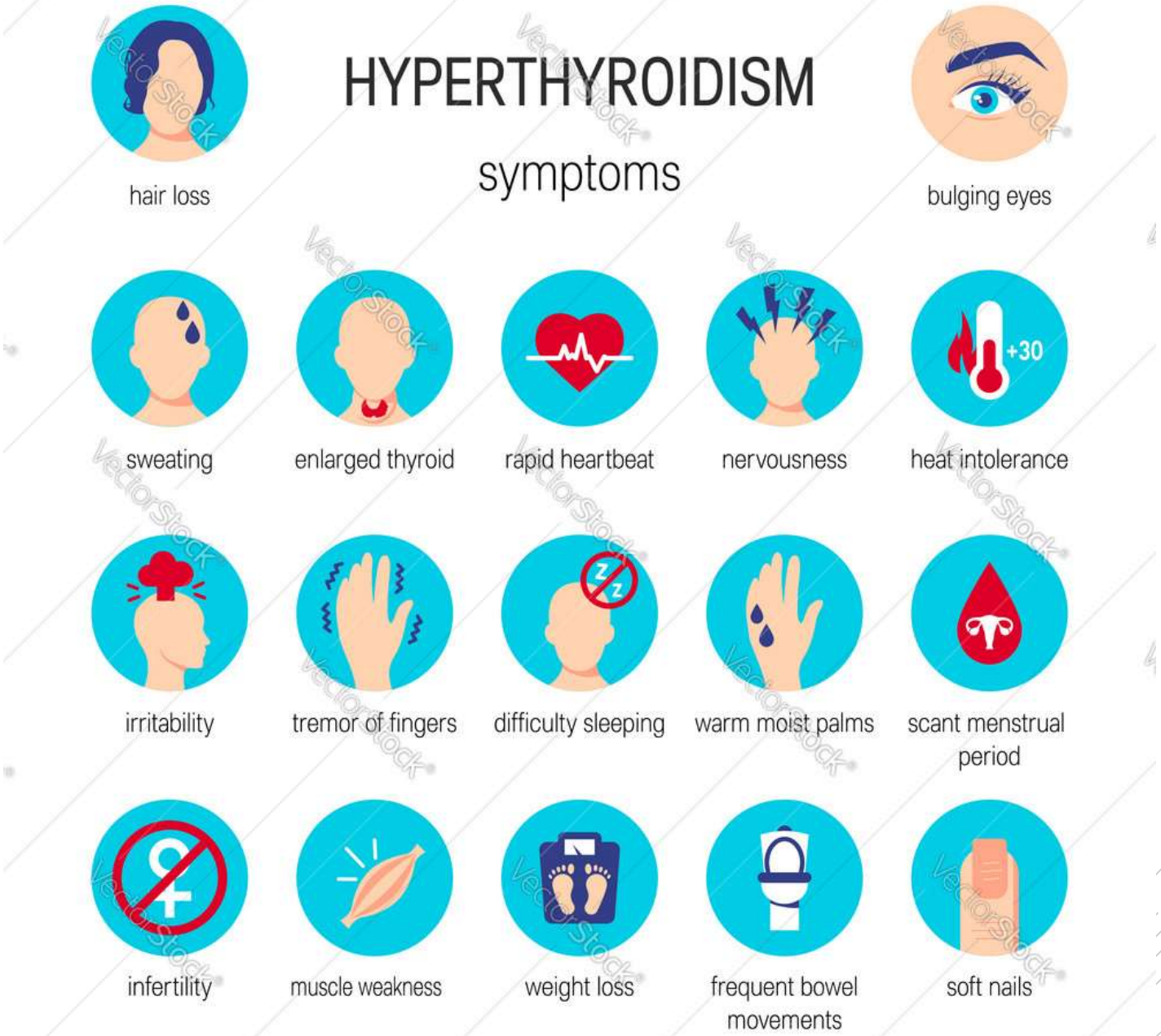
1. THYROTOXICOSIS:

- Hypermetabolic state caused by elevated T4, T3.

Table 20.2 Causes of Thyrotoxicosis

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

clinical manifestations



Diagnosis:

1. TFT.
2. Radioactive Iodine uptake

2. HYPOTHYROIDISM

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

Table 20.3 Causes of Hypothyroidism

Primary
Postablative
Surgery, radioiodine therapy, or external irradiation
Autoimmune hypothyroidism
Hashimoto thyroiditis*
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)
Secondary (Central)
Pituitary failure (rare)
Hypothalamic failure (rare)

@thewellnessjunction

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

Hypothyroid Face

Notice the apathetic facies, bilateral ptosis, and absent eyebrows

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

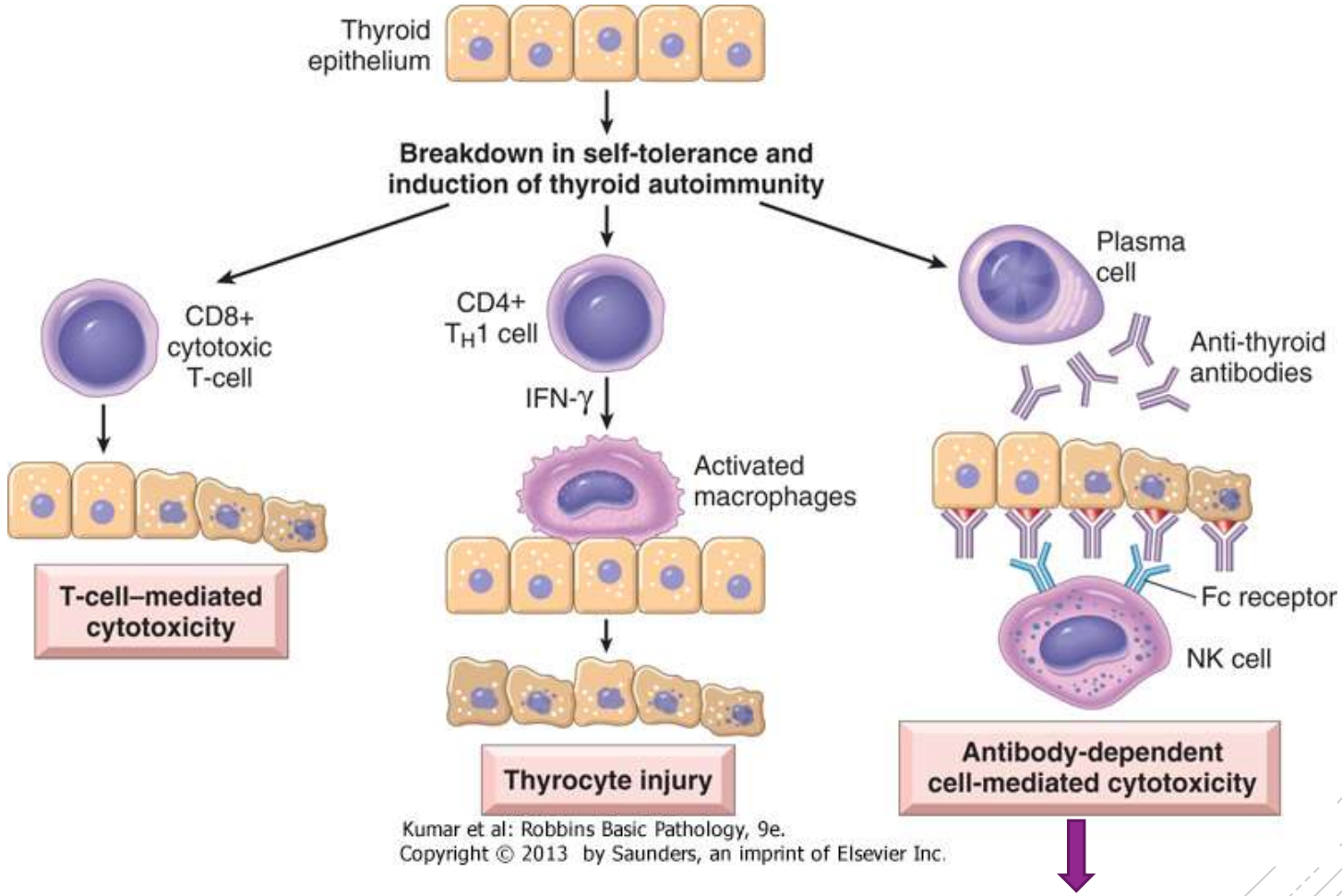
✓ Commonest type of thyroiditis

✓ 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

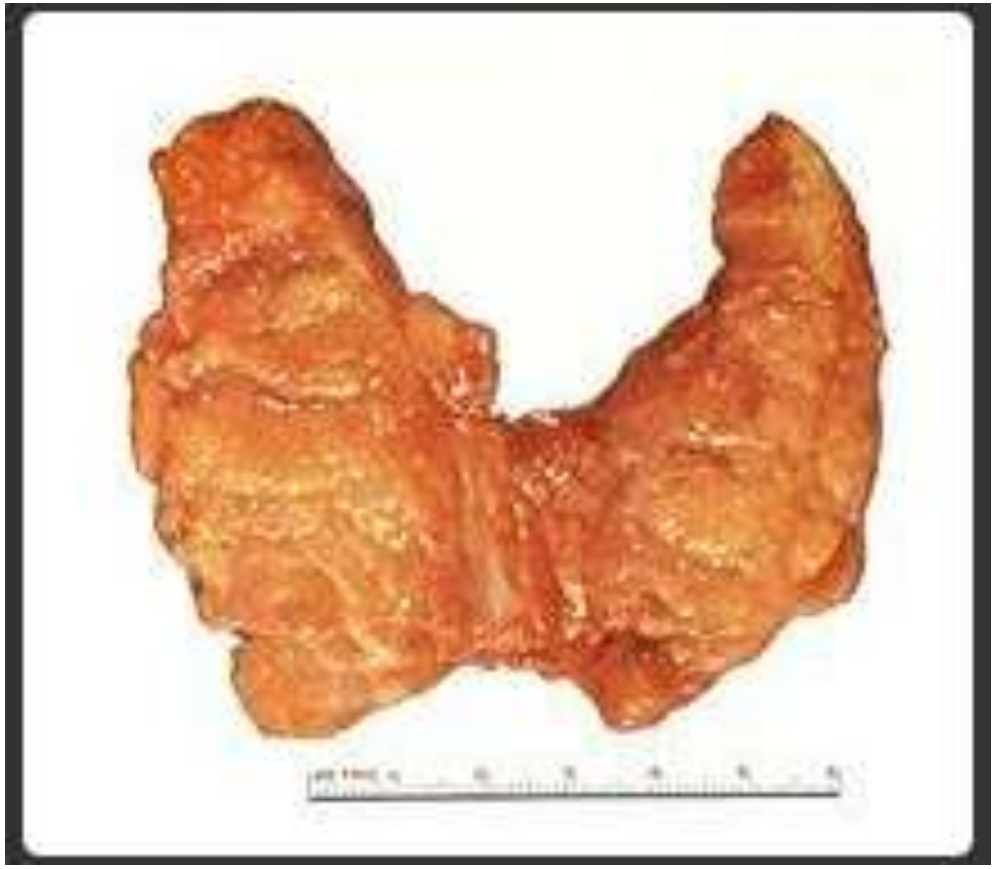
Hashimoto… Pathogenesis



- Anti thyroglobulin
- antithyroid peroxidase

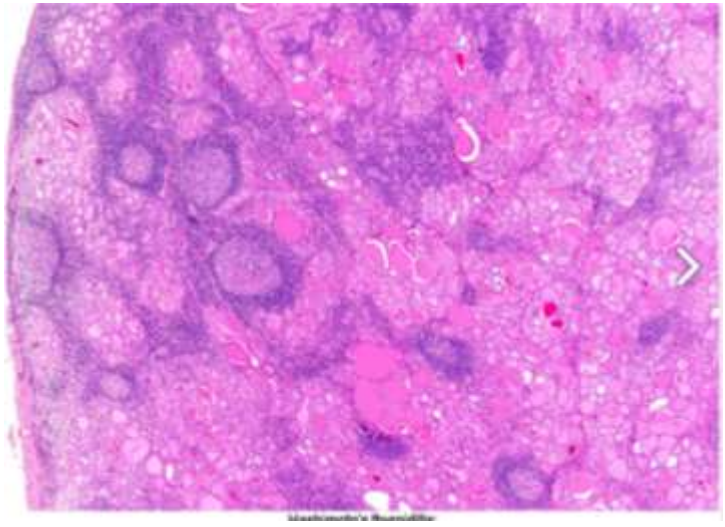
Morphology

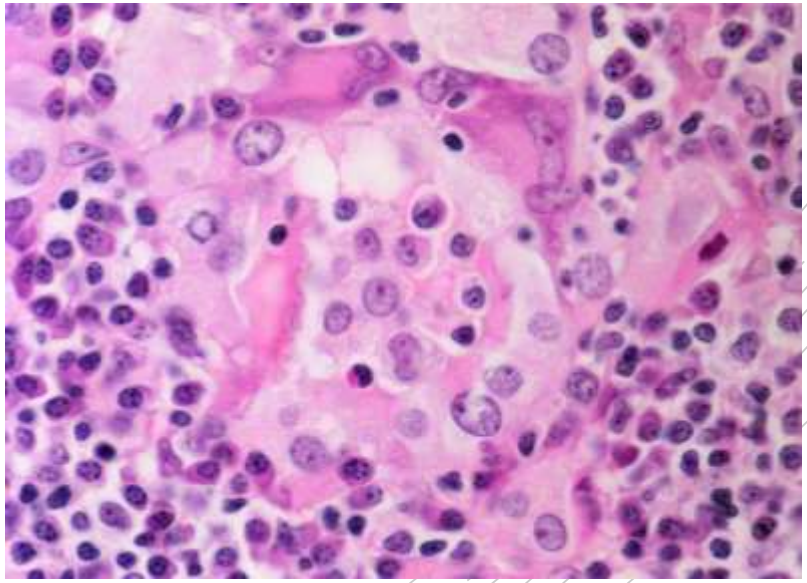
Gland is a smooth pale goiter, minimally nodular, well demarcated.



Microscopic

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



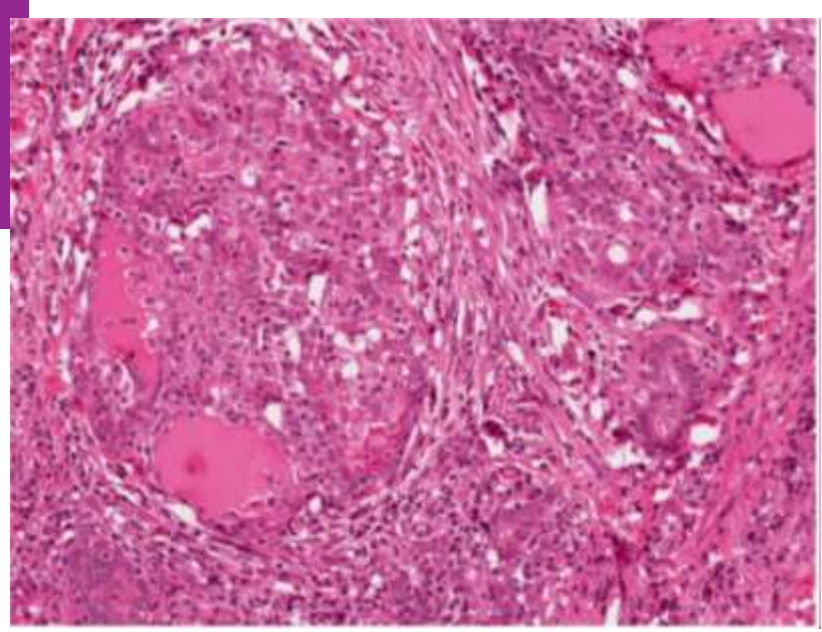


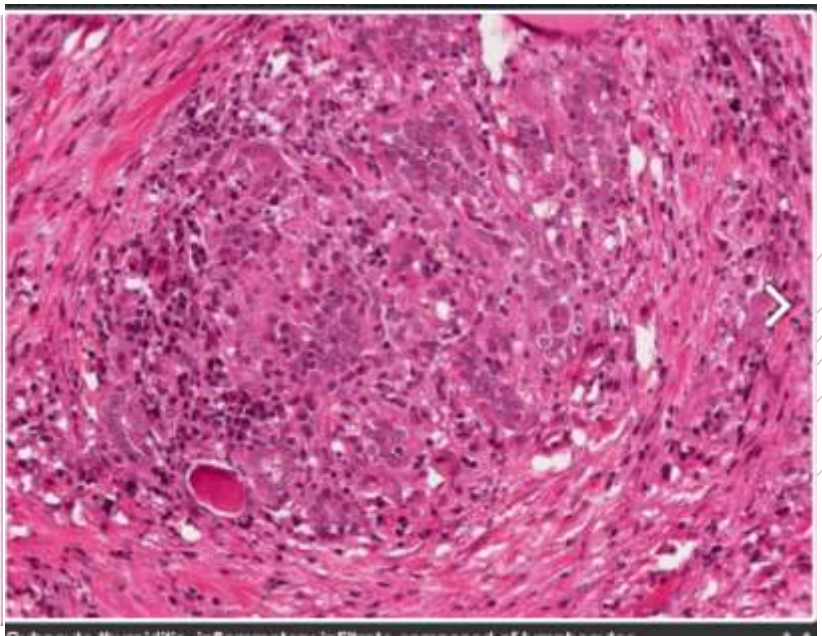
2. de Quervain Thyroiditis

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



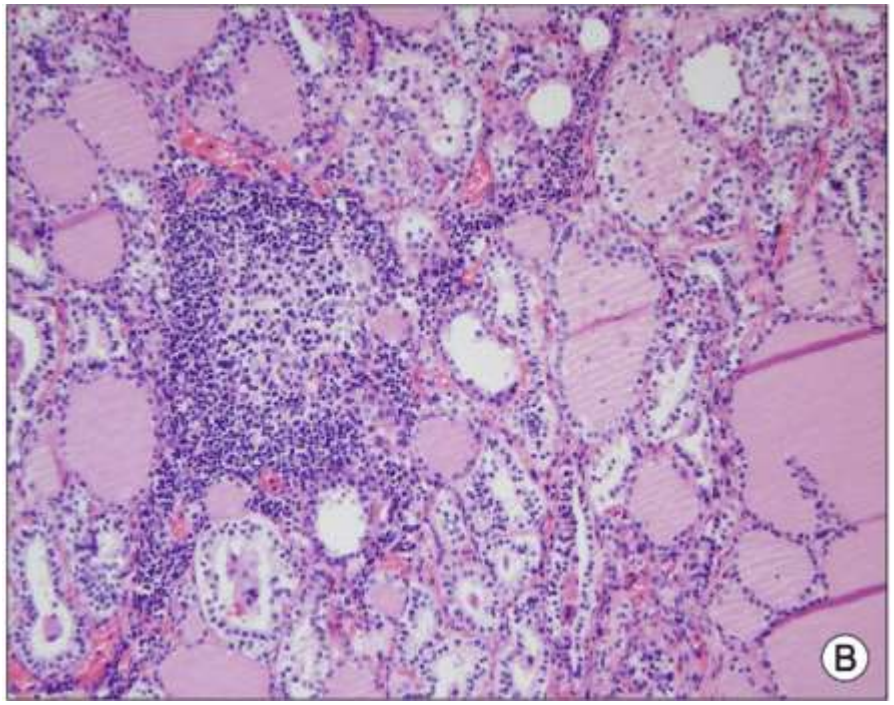


3. SUBACUTE LYMPHOCYTIC THYROIDITIS : (Silent)

- 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

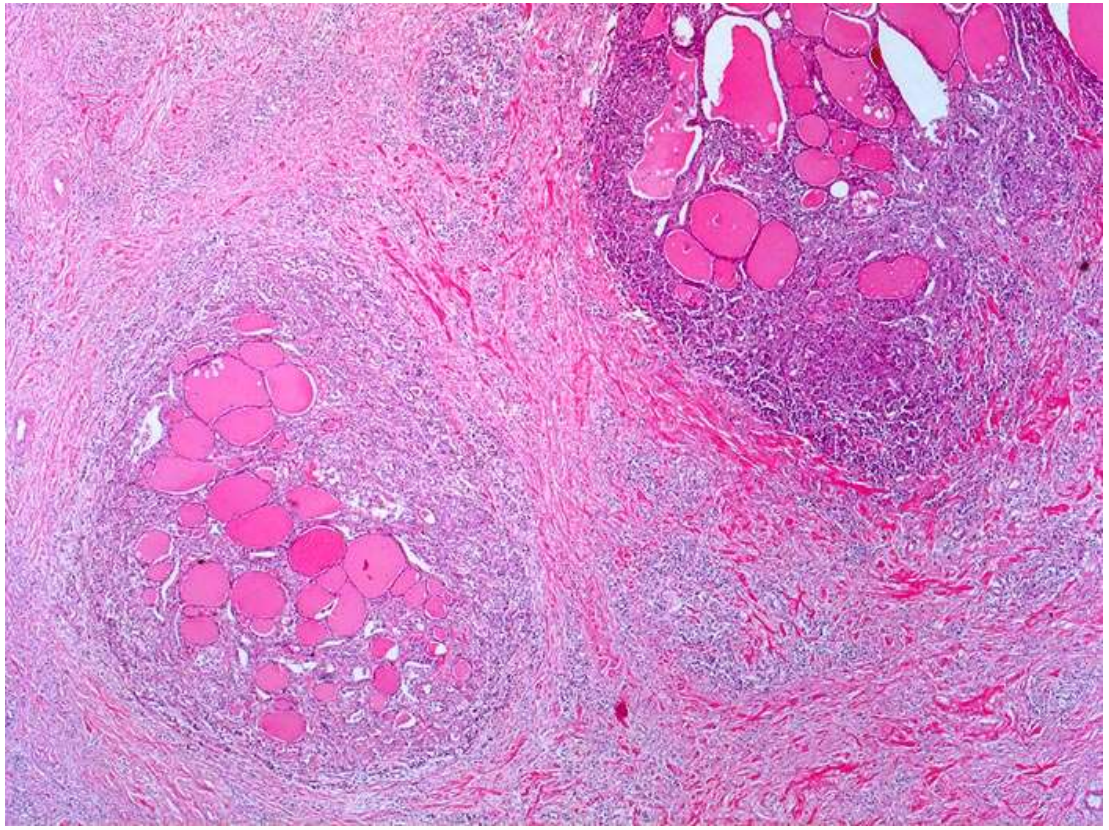


4. Reidel's Thyroiditis

- 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



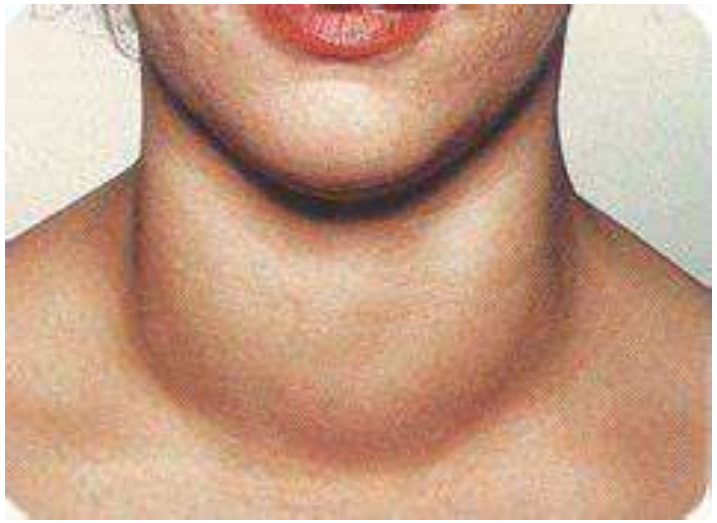
5. GRAVE'S DISEASE .

- 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.

(thyroglobulin, thyroid peroxidase, sodium iodide symporter and thyrotropin / TSH receptor).

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 dis.

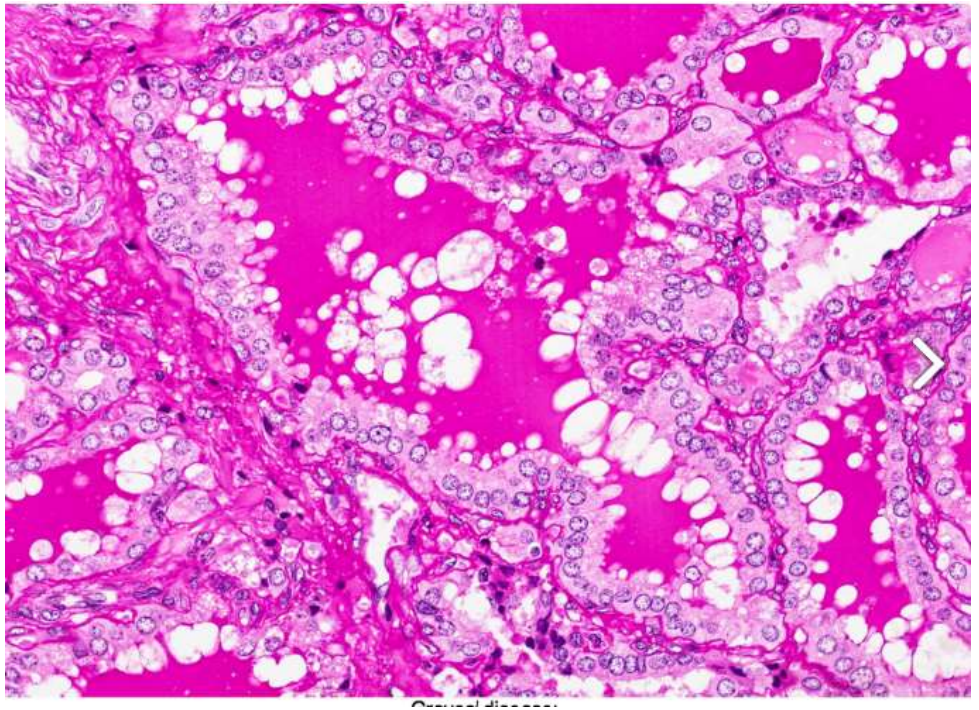
Morphology.

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

Histology

•Hyperplastic thyroid follicles with papillary infoldings

•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.

❖ Endemic : 10% of population have goiter

❖ Sporadic : 1- Physiological demand

2- Dietary intake of excessive calcium & cabbages.

3- Hereditary enzyme defects

Clinical features

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

Diagnosis

- Clinical examination
- Thyroid function tests: TSH, T3, T4

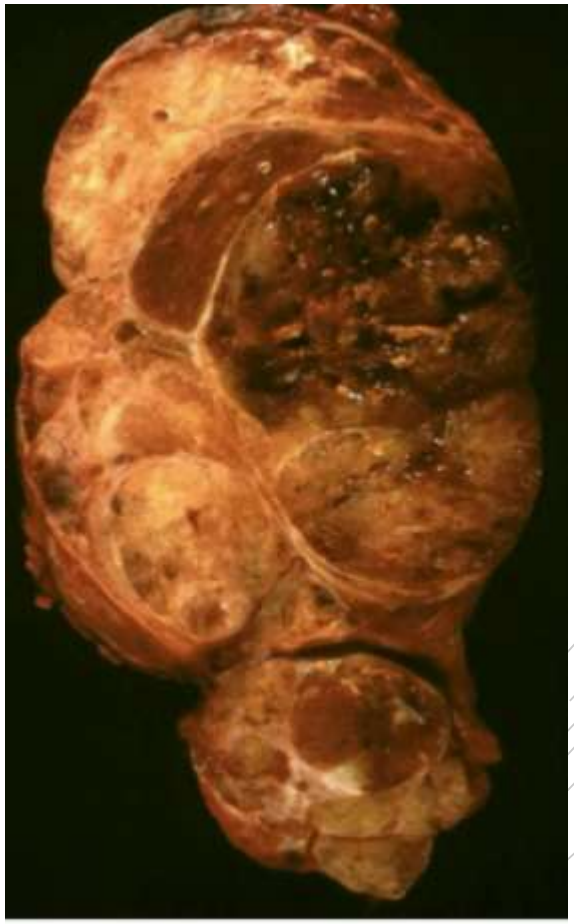
(Usually normal T3 / T4, TSH, normal radioactive iodine uptake)

- Thyroid peroxidase antibodies
- Thyroid ultrasound
- CT or MRI to evaluate extent of goiter

Morphology

Multinodular goiters are asymmetric, large

Nodular, bumpy outer surface and variegated cut surface



Histology

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