

# THYROID GLAND

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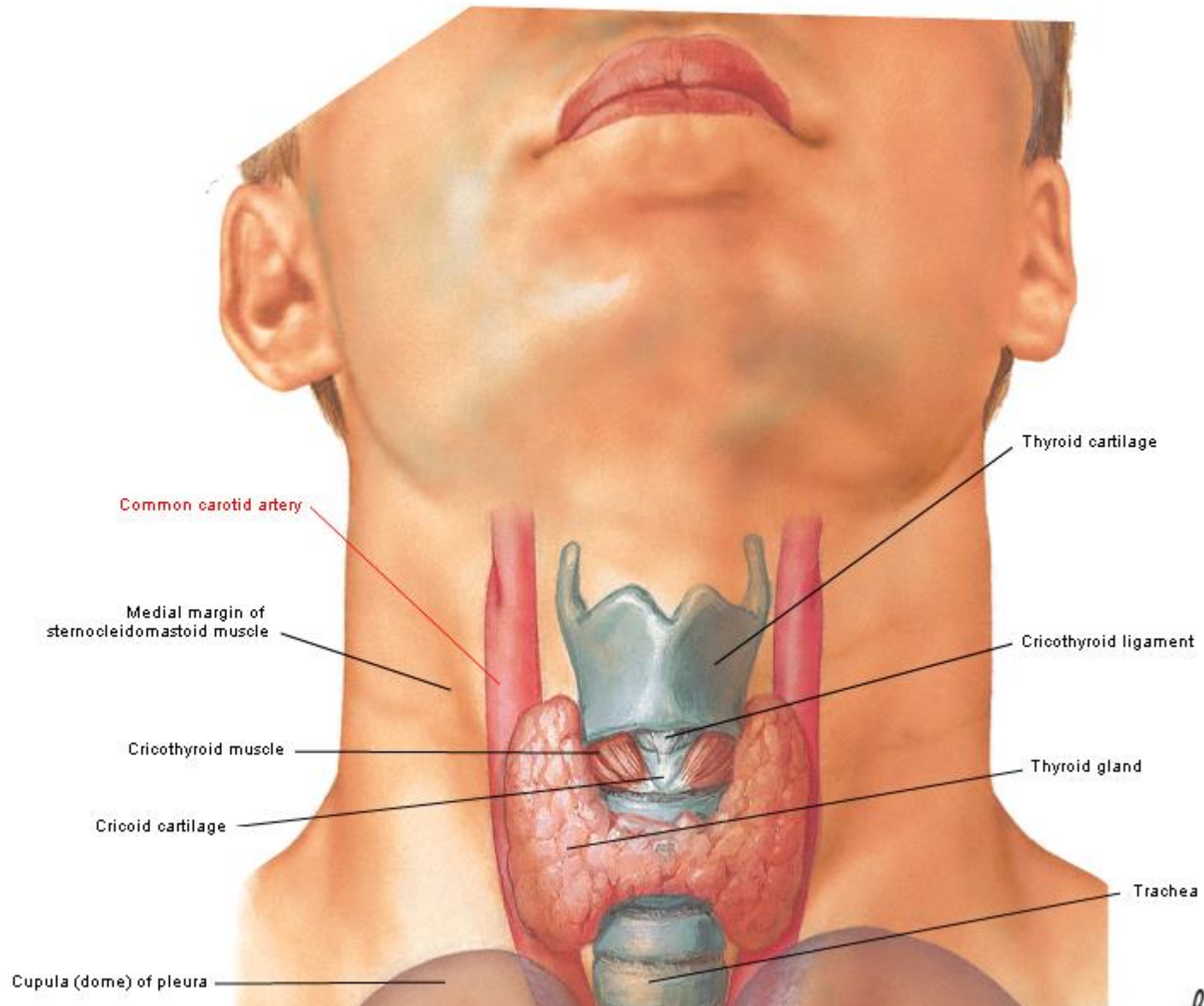


# THYROID GLAND

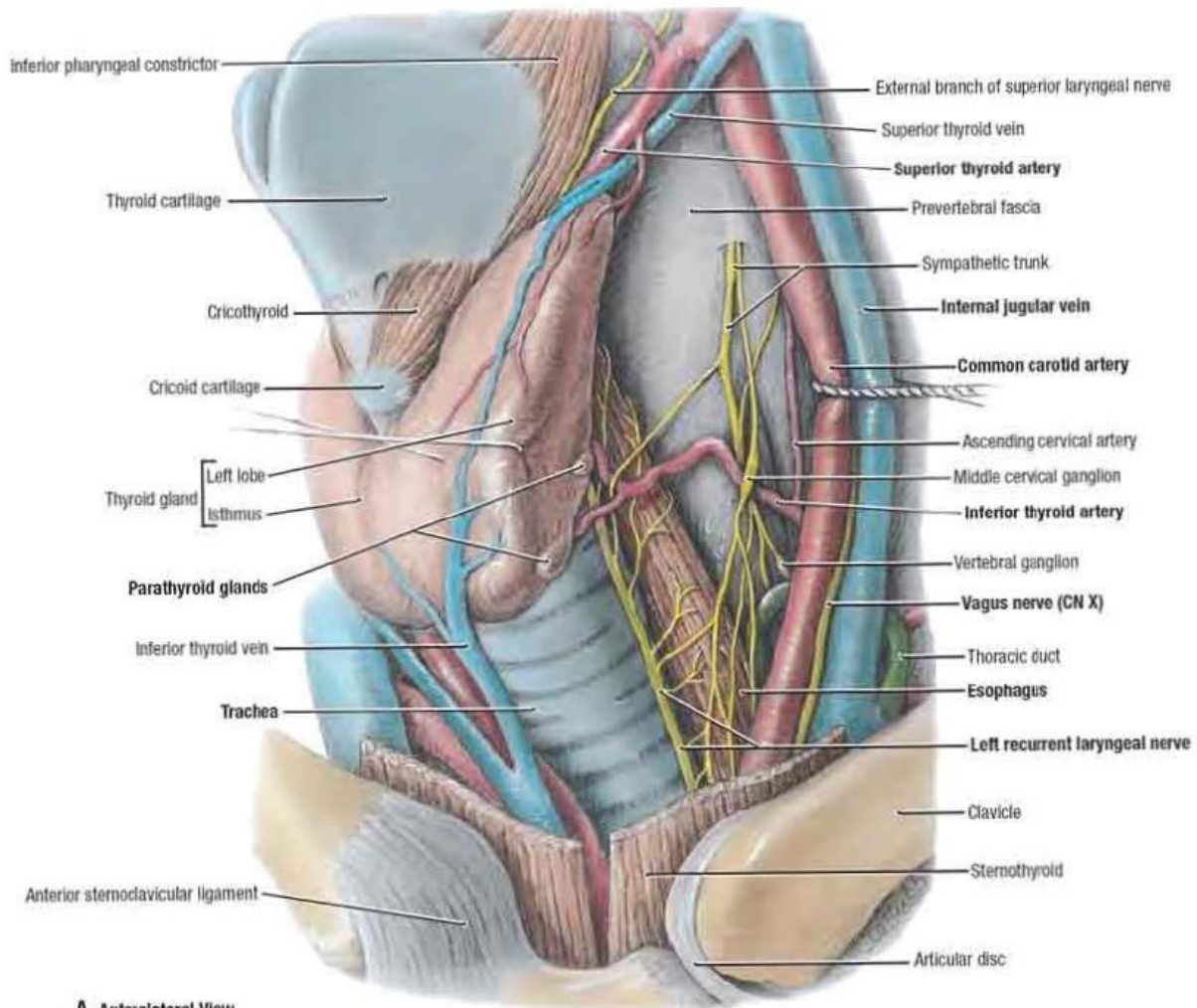
It is an endocrine gland which produce thyroxin , it lies In front of the neck ,it has h-shape .it has two lateral lobes blunted below and tapered above. The isthmus joins it .it is covered by the sternothyroid m., superiorly it is limited by the oblique line , inferiorly descends up to the 6<sup>th</sup> trachea ring. The isthmus situated across the 2<sup>nd</sup> ,3<sup>rd</sup> ,4<sup>th</sup> tracheal ring .the pyramidal lobe extended upwards from the isthmus

# Thyroid Gland In Situ

## Anterior View



*H. Nitter*



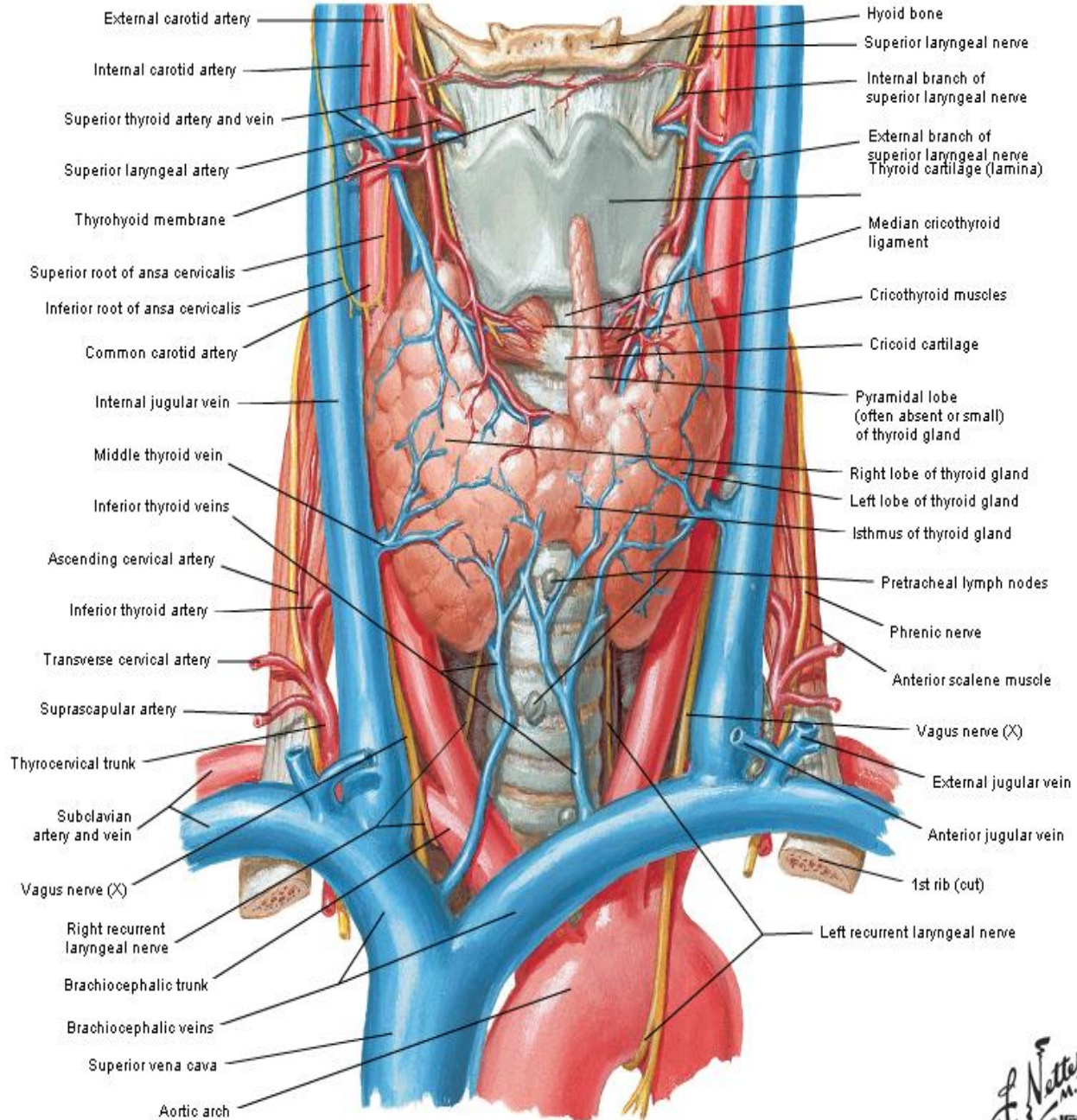
**A. Anterolateral View**



The thyroid gland is developed from a median diverticulum of the ventral wall at the pharynx. This connection with the pharynx called thyroglossal duct which appear in foramen cecum of the tongue . this duct later on fibrosed and form a band of connection tissue from a band of connection tissue from apex of pyramidal lobe as far as the hyoid bone . the thyroid gland is overlain by infrahyoid ms .and their fascia . the gland arches across the trachea ,esophagus ,and cricoid of thyroid cartilage posterolaterally it is related to the carotid sheath.

# Thyroid Gland

## Anterior View



*F. Netter M.D.*



# Blood supply :

Thyroid is highly vascular

## 1-superior thyroid artery

## 2-inferior thyroid artery :

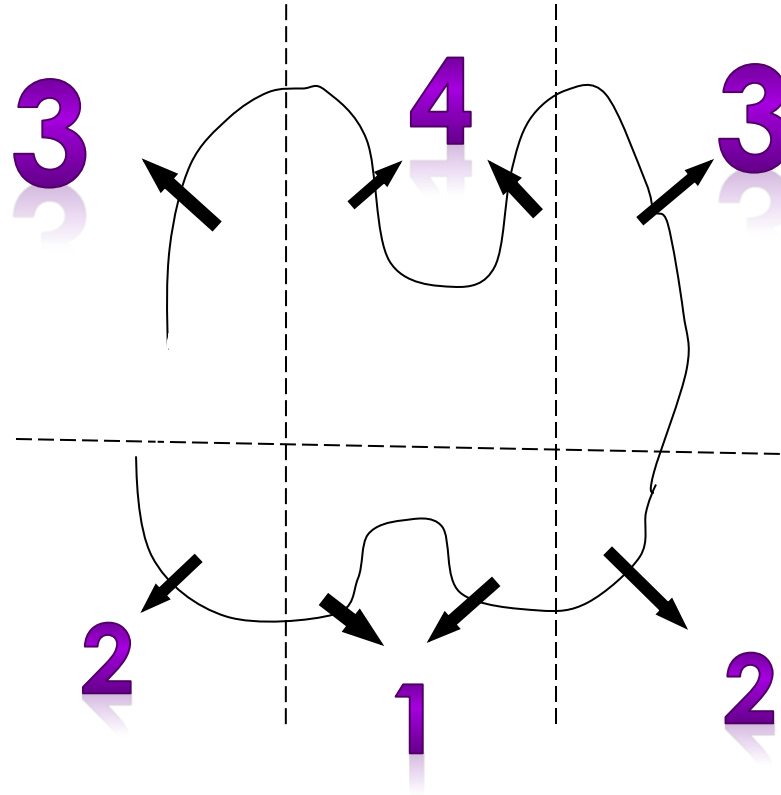
it is the largest branch of thyrocervical trunk of 1th part of the subclavian artery it ascends along the medial border of scalenus anterior m , it turns medial wards behind the carotid sheath and sympathetic trunk opposite the lower border of cricoid cartilage and then descend to the inferior pole of the lateral lobe . it give ascending cervical branch , pharyngeal , tracheal and esophagus , inferior laryngeal b and glandular.

## 3-thyroidea ima arteries :

variable ,if present it may arise from brachiocephalic artery or from arch of aorta .it ascends on the trachea and distributed to isthmus.



# Lymphatic drainage of thyroid



1. Pretracheal nodes  
3. Upper deep cervical nodes

2. lower cervical nodes  
4. prelaryngeal nodes



Abdurrahman lugman

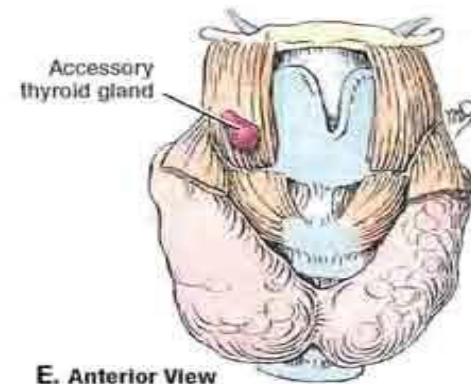
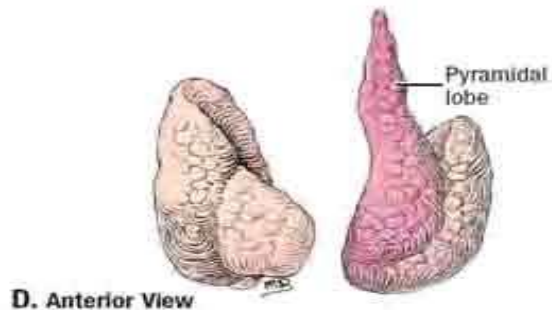
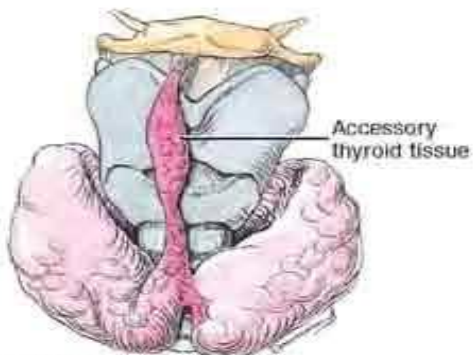
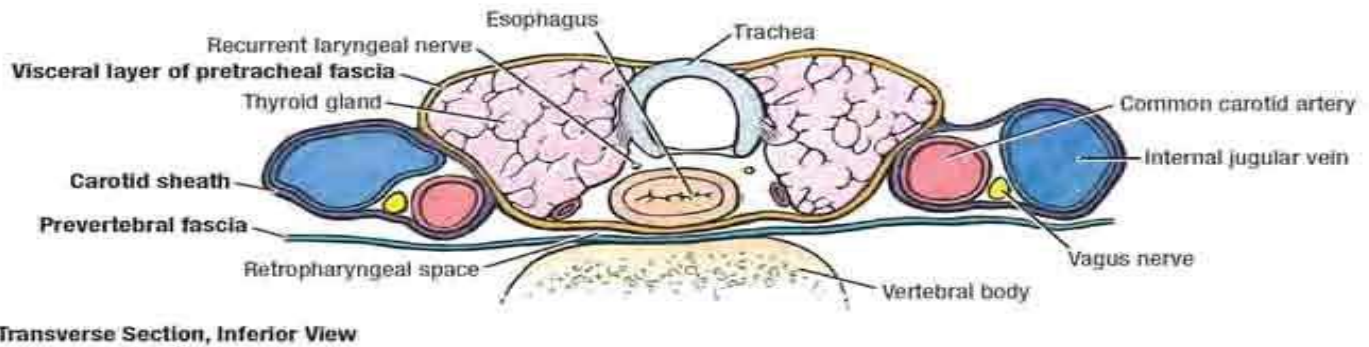
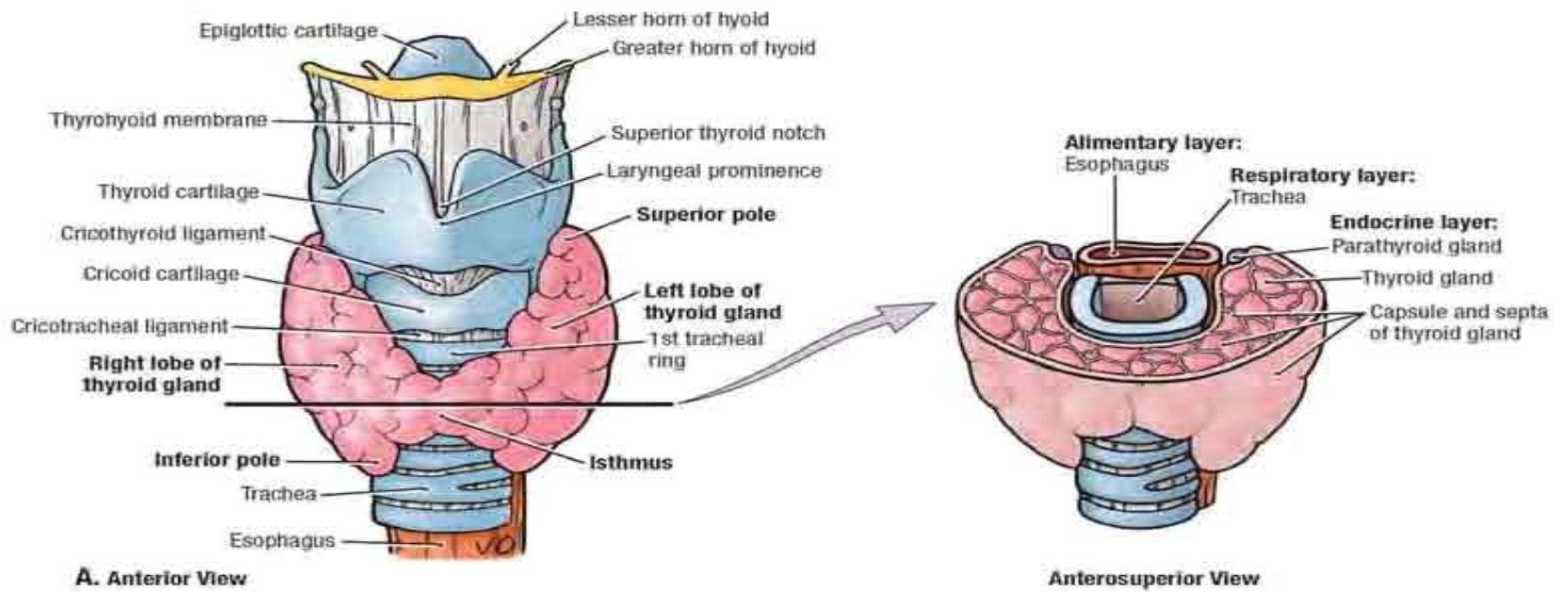


# HISTOLOGICAL STRUCTURE

Under middle layer of deep cervical fascia ◎  
(pretracheal) → thyroid inner true capsule →  
thin and closely adherent to the gland

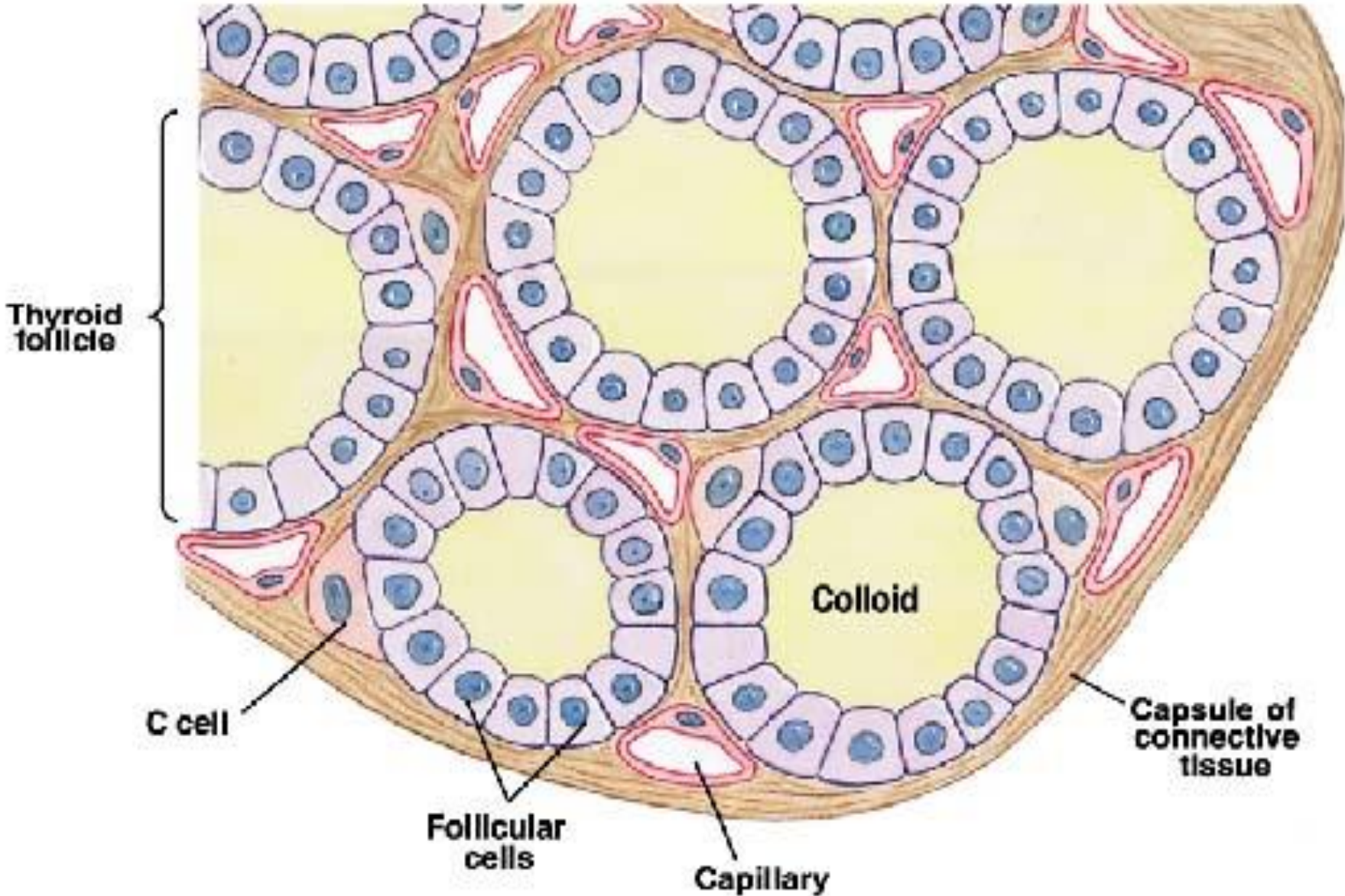
capsule extensions within the gland form septa, ◎  
dividing it into lobes and lobules

lobules are composed of follicles = structural ◎  
units of the gland → layer epithelium enclosing  
a colloid-filled cavity





**Section of thyroid gland**



◎ Each follicle is filled with pink-staining proteinaceous material called colloid.

◎ Follicles are variable size

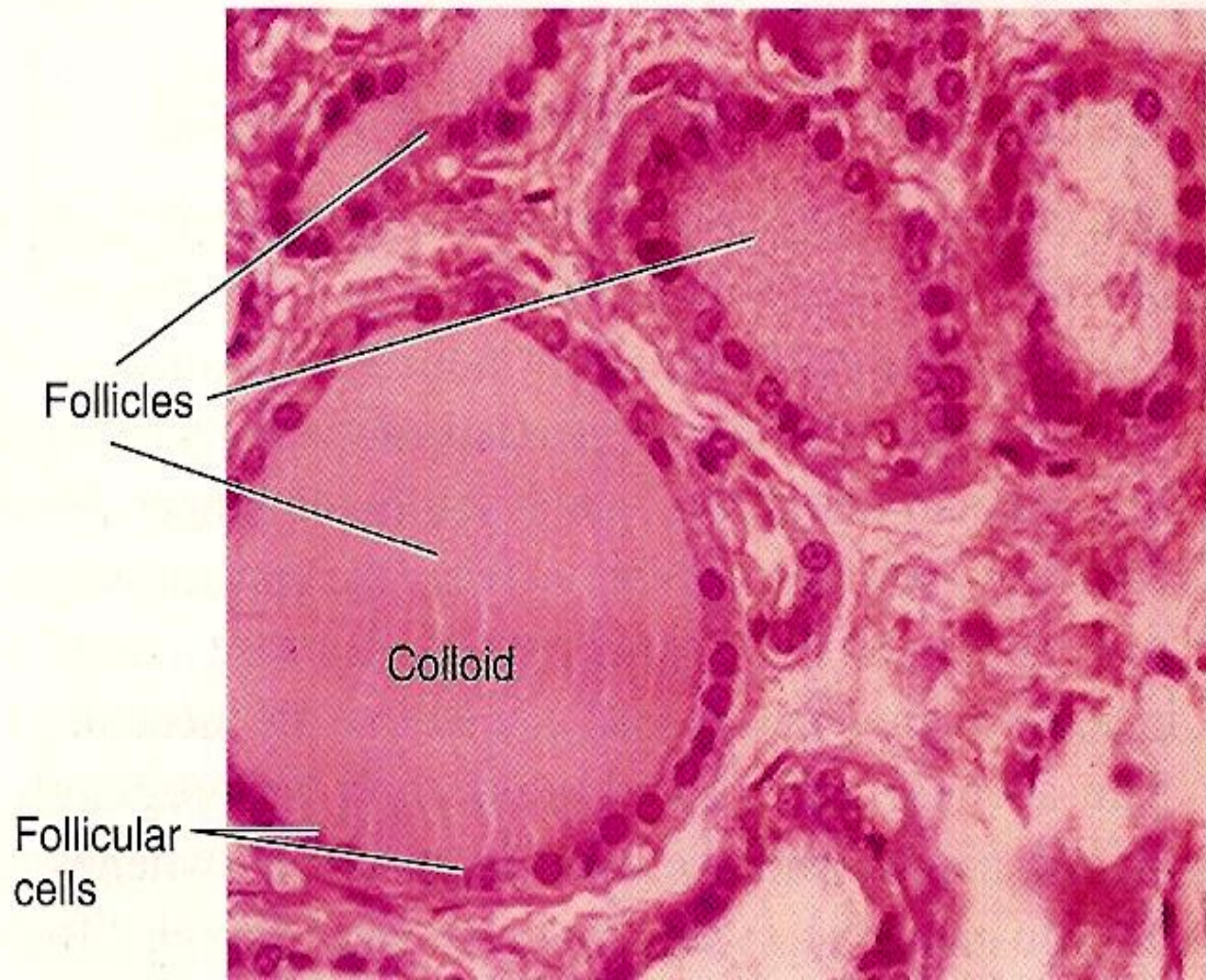
◎ surrounded by dense plexuses of fenestrated capillaries, lymphatic vessels, and sympathetic nerves.

◎ Epithelial cells are of two types:

➤ principal cells

➤ Parafollicular cells



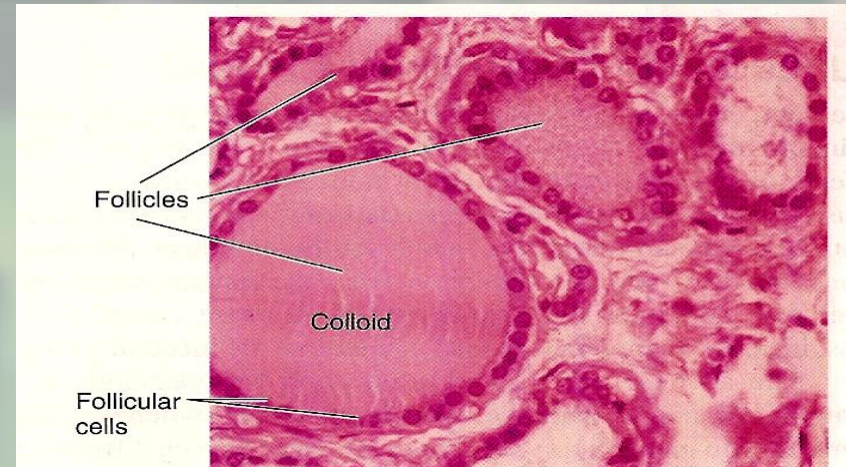




# Thyroid gland structure - Euthyroid (normal thyroid)

## Multiple Follicles (Acini):

- ◆ Are the functional unit.
- ◆ Thousands in no.
- ◆  $\approx 100$  to  $300 \mu\text{meters}$  in diameter.
- ◆ Each follicle is spherical in structure.
- ◆ Follicular wall is lined with a single layer of cuboidal epithelioid cells that secrete into the interior of the follicles.





## Development

The isthmus and major portion of lateral lobes of the thyroid gland develop from a median thyroid diverticulum (thyroglossal duct) which arises from the endodermal lining of the floor of the primitive pharynx just behind the tuberculum impar. The lower end of the diverticulum bifurcates and the cells proliferate to differentiate into the thyroid gland while the remaining portion of the diverticulum disappears.

**If the remnant of diverticulum persist ,they will give rise to the thyroglossal cyst or ectopic thyroid tissues in the neck. the lingual thyroid develops from the upper end of diverticulum as its origin from the floor of primitive pharynx Small portion of lateral lobes of thyroid are said to be formed from the lining cells of ultimobranchial or postbranchial body**

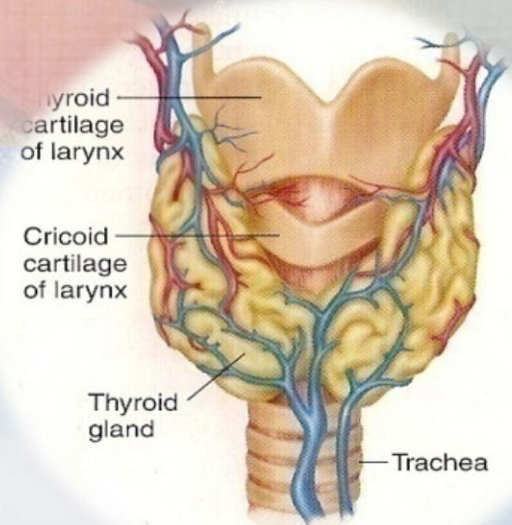


**DHAFAR**

# Thyroid Hormones

There are two important thyroid hormones:

- **Thyroxine (T4)** or tetraiodothyronine
- **Triiodothyronine (T3)**





- Secreted by Follicular cells.
- Can be stored in thyroid gland for couple of months (2-3 months).
- Having significant effect on metabolic rate of the body.

## Thyroid-Stimulating Hormone (TSH)

- ⊙ Regulates thyroid hormone production, secretion, and growth
- ⊙ Is regulated by the negative feedback action of  $T_4$  and  $T_3$

# Production of $T_4$ and $T_3$

- ◎  $T_4$  is the primary secretory product of the thyroid gland, which is the only source of  $T_4$
- ◎ The thyroid secretes approximately 70-90  $\mu\text{g}$  of  $T_4$  per day
- ◎  $T_3$  is derived from 2 processes
  - > The total daily production rate of  $T_3$  is about 15-30  $\mu\text{g}$
  - > About 80% of circulating  $T_3$  comes from deiodination of  $T_4$  in peripheral tissues
  - > About 20% comes from direct thyroid secretion



# Actions of Thyroid Hormone

## ACTIONS OF THYROID HORMONE

- Required for GH and prolactin production and secretion
- Required for GH action
- Increases intestinal glucose reabsorption (glucose transporter)
- Increases mitochondrial oxidative phosphorylation (ATP production)

**Increases activity of adrenal medulla (sympathetic; glucose production) ☉**

**Induces enzyme synthesis ☉**

**Result: stimulation of growth of tissues and increased metabolic rate. Increased heat production (calorigenic effect) ☉**



***Taha Ali***

***Taha Ali***

# Effects Thyroid Hormones in Growth and Tissue Development

## and tissue development

- ❖ Increase growth and maturation of bone
- ❖ Increase tooth development and eruption
- ❖ Increase growth and maturation of epidermis, hair follicles and nails
- ❖ Increase rate and force of skeletal muscle contraction
- ❖ Inhibits synthesis and increases degradation of mucopolysaccharides in subcutaneous tissue



# Effects of Thyroid Hormones on the Cardiovascular System

καρδιαγγειακό σύστημα

**Increase heart rate❖**

**Increase force of cardiac contractions❖**

**Increase stroke volume❖**

**Increase Cardiac output❖**

**Up-regulate catecholamine receptors❖**

# Effects of Thyroid Hormones on the Respiratory System

- ❖ Increase resting respiratory rate
- ❖ Increase minute ventilation
- ❖ Increase ventilatory response to hypercapnia and hypoxia

# Effects of Thyroid Hormones on the Renal System

- Increase blood flow
- Increase glomerular filtration rate



# Effects of Thyroid Hormones on the Nervous System

- ❖ Critical for normal CNS neuronal development
- ❖ Enhances wakefulness and alertness
- ❖ Enhances memory and learning capacity
- ❖ Required for normal emotional tone
- ❖ Increase speed and amplitude of peripheral nerve reflexes



Clinical significant  
by:

Taha Mohammad





Hypothyroidism occurs in two forms: cretinism in ☉ infants and myxedema in adults.

Cretinism ☉

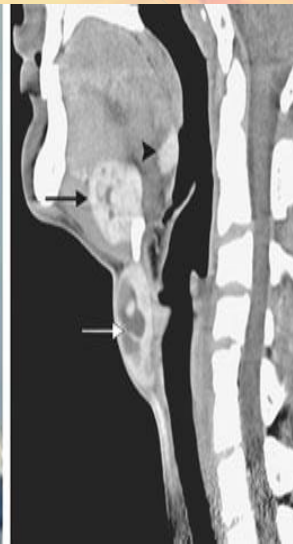
can occur as a result of a failure in the development of the thyroid gland.

The child is born with a normal appearance, caused by the mothers thyroid hormones having crossed the placenta. Soon after birth, the child shows signs of retarded mental and physical growth. If cretinism is diagnosed early and the child is given adequate, lifelong thyroid hormone therapy, he or she will develop normally and live a normal

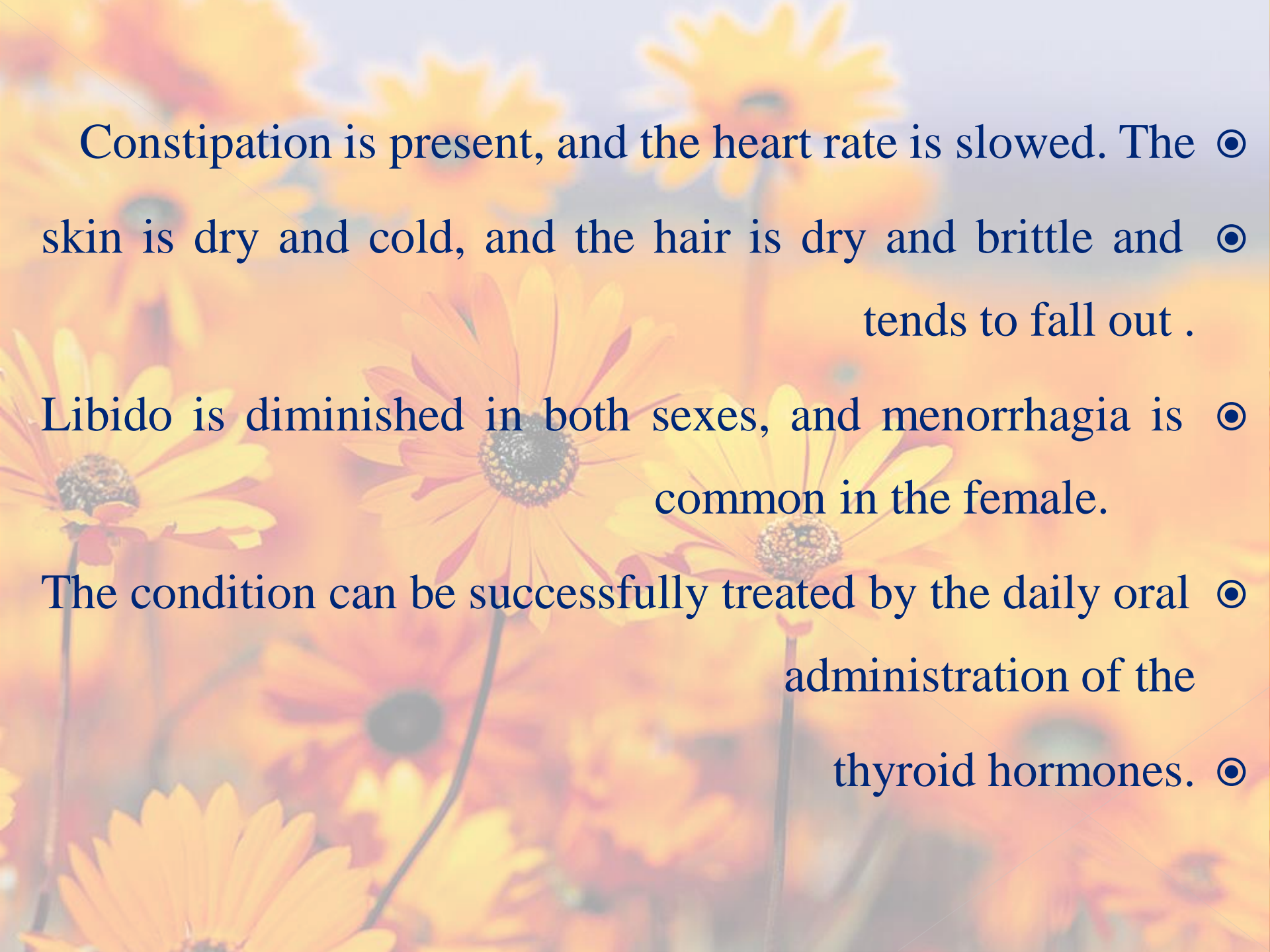


## Myxedema

may be caused in adults by many conditions ranging from spontaneous degeneration of the thyroid gland to hypopituitarism or hypothalamic failure. Excessive treatment of hyperthyroidism with drugs or surgery is another possible cause. The majority of the patients are female. The symptoms include the slowing of mental and physical processes of the individual. There is an increase in body weight and a preference for a warm environment.







Constipation is present, and the heart rate is slowed. The skin is dry and cold, and the hair is dry and brittle and tends to fall out .

Libido is diminished in both sexes, and menorrhagia is common in the female.

The condition can be successfully treated by the daily oral administration of the thyroid hormones.

A thyroidectomy is an operation that involves  the surgical removal of all or part of the thyroid gland. Surgeons often perform a thyroidectomy when a patient has thyroid cancer or some other condition of the thyroid gland (such as hyperthyroidism) or goiter.







Indication

Thyroid cancer

Toxic thyroid nodule (produces too much thyroid hormone)

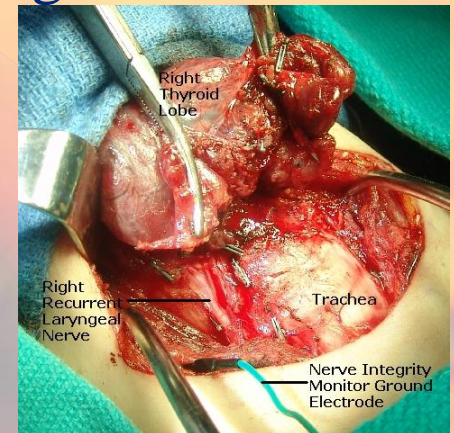
Multinodular goiter (enlarged thyroid gland with many nodules)

, especially if there is compression of nearby structures

Graves' disease, especially if there is exophthalmos (bulging eyes)

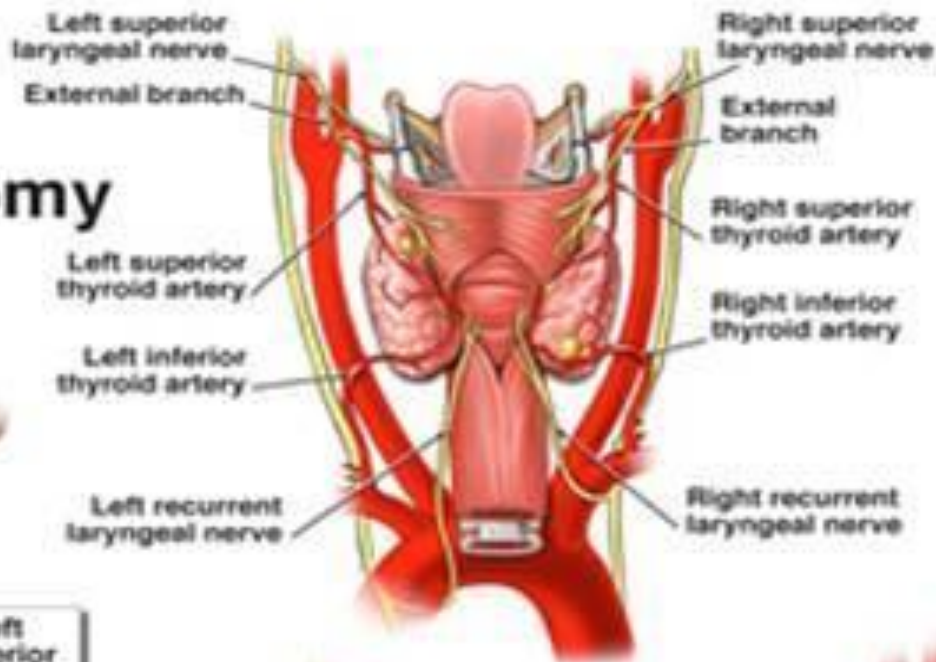
Thyroid nodule, if fine needle aspirate (FNA) results are unclear[1]

Thyroidectomy is a common surgical procedure that has ➤ several potential complications or sequela including: temporary or permanent change in voice, temporary or permanently low calcium, need for lifelong thyroid hormone replacement, bleeding, infection, and the remote possibility of airway obstruction due to bilateral vocal cord paralysis. Complications are uncommon when the procedure is performed by an experienced surgeon.

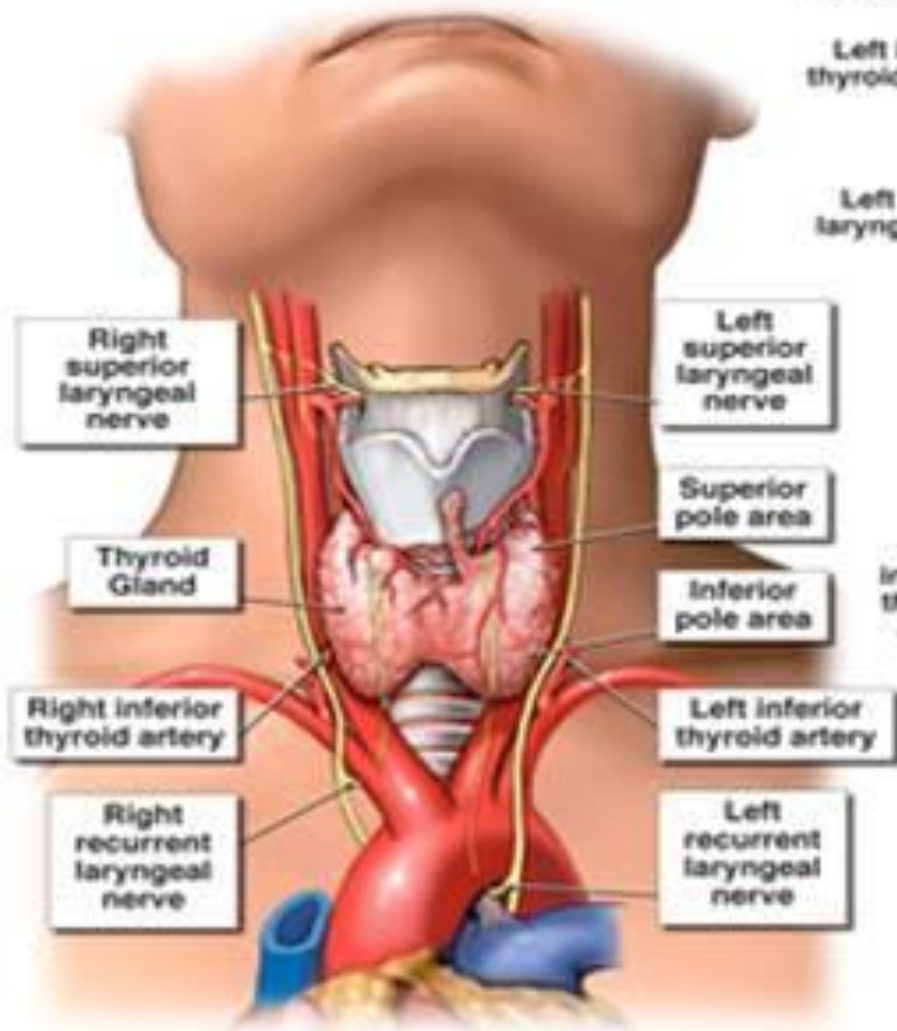




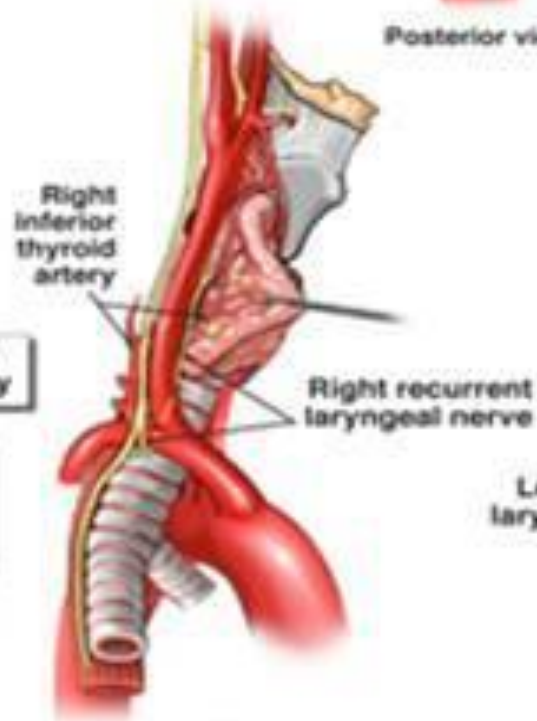
# Anatomy of the Thyroid Gland and Surrounding Anatomy



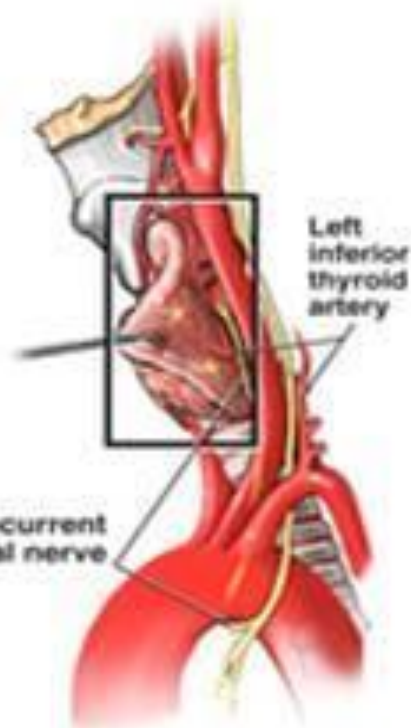
Posterior view



Anterior view



Right side view



Left side view

A hand is holding a blue, rectangular sign with rounded corners. The sign has the words "Thank you" written in a bold, red, sans-serif font. The sign is held against a background of a dark, textured surface, possibly asphalt, with some green leaves visible on the left side. The lighting is bright, creating a strong shadow of the hand and sign on the ground. There are some bright, sparkling light effects on the ground in the lower half of the image.

**Thank you**

**Made by:  
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