

B.Sc. 3rd Semester Zoology (Hons.)

Histology of thyroid gland and its hormones



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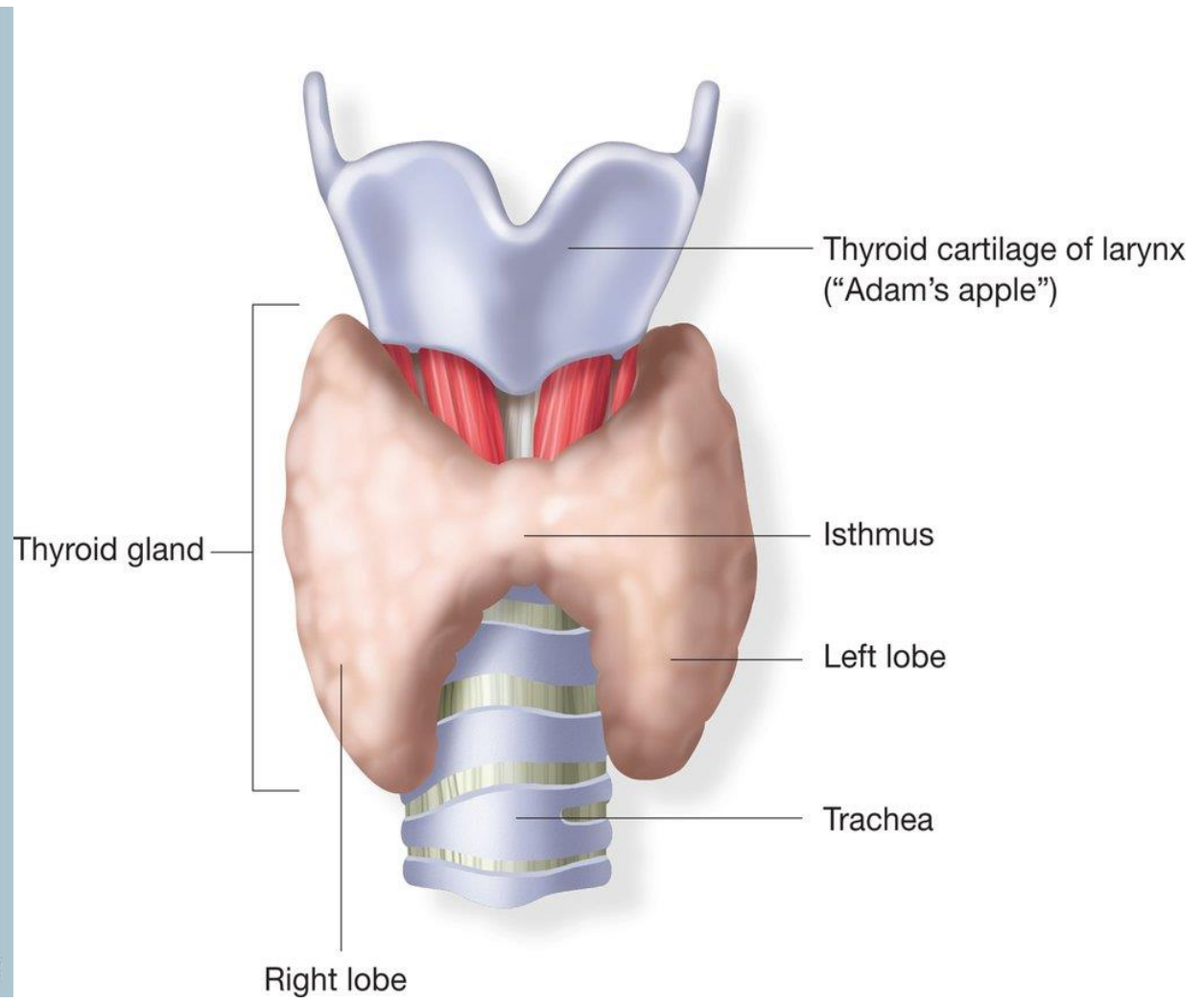
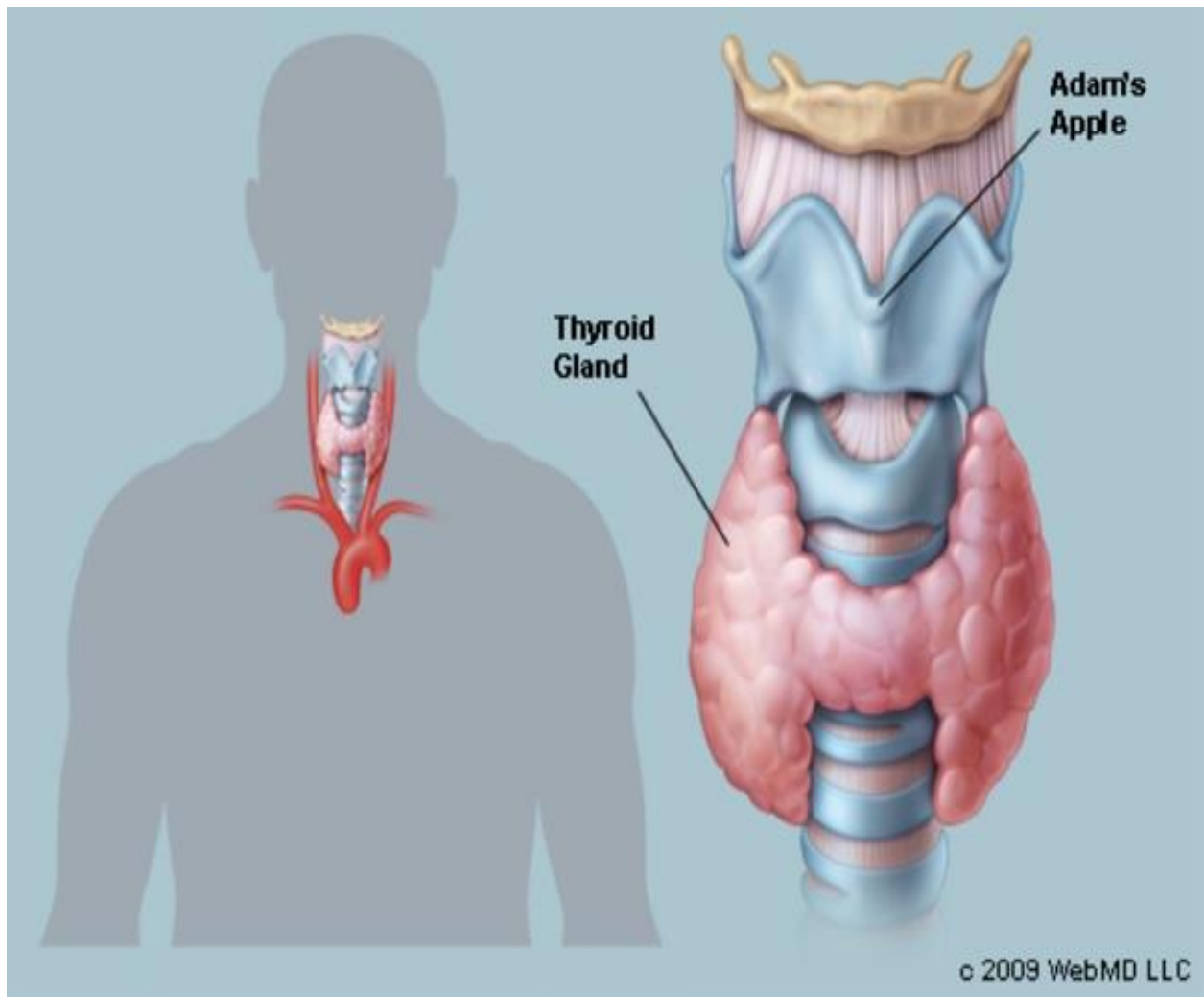


Fig. a) Location and b) Structure of thyroid gland.

Thyroid gland:-

- ❖ The thyroid gland is one of the largest endocrine glands, normally weighing 15 to 20 g in adult.
- ❖ It is located immediately below the larynx on each side of anterior and posterior to the trachea.
- ❖ The thyroid secretes two major hormones, **thyroxine** and **triiodothyronine**, commonly called T4 and T3, respectively. And thyrocalcitonin is secreted by the parafollicular cells.
- ❖ Thyroid secretion is primarily controlled by **thyroid-stimulating hormone** (TSH) secreted by the anterior pituitary.
- ❖ The thyroid gland also secretes **calcitonin**, an important hormone for calcium metabolism.
- ❖ The thyroid gland is composed of large numbers of closed **follicles** (100 to 300 micrometers in diameter) filled with secretory substance called **colloid**.
- ❖ It is lined with **cuboidal epithelial** cells.
- ❖ Colloid contains **thyroglobulin**, which contains the thyroid hormone within its molecule.

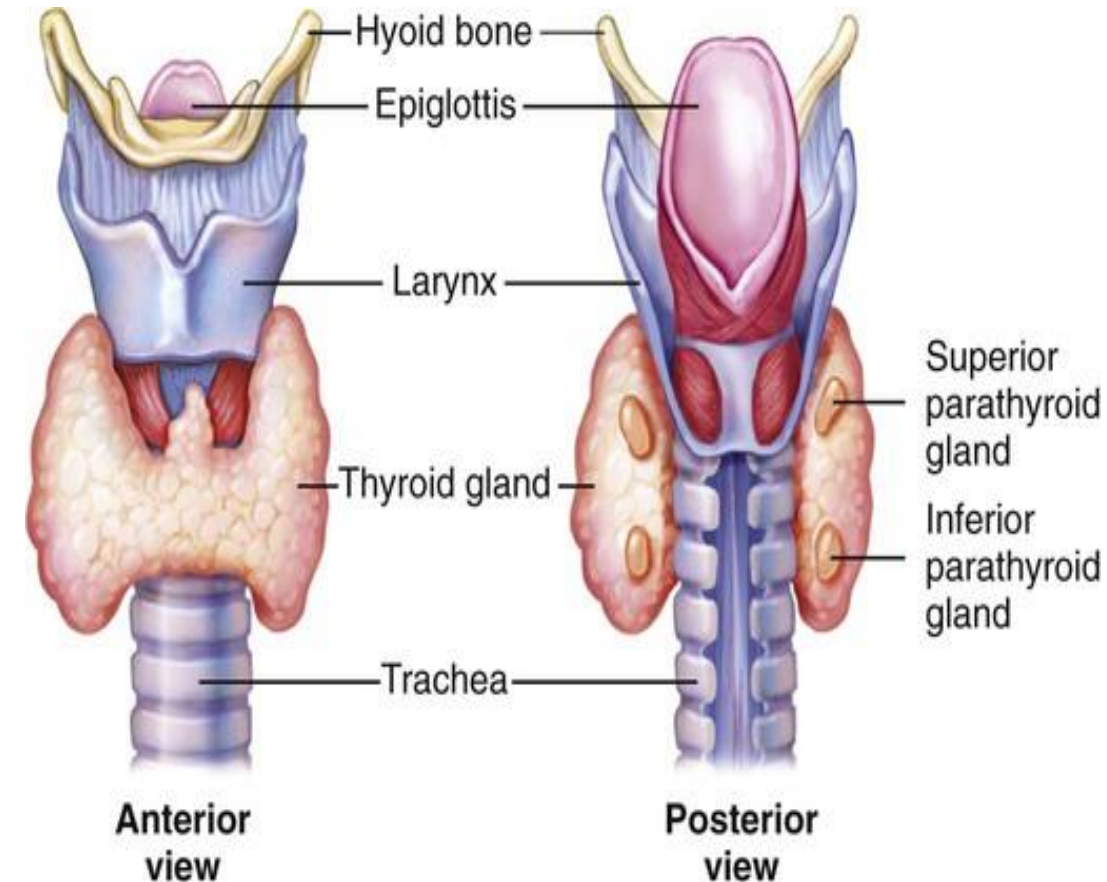


Fig. Thyroid gland anterior and posterior view.

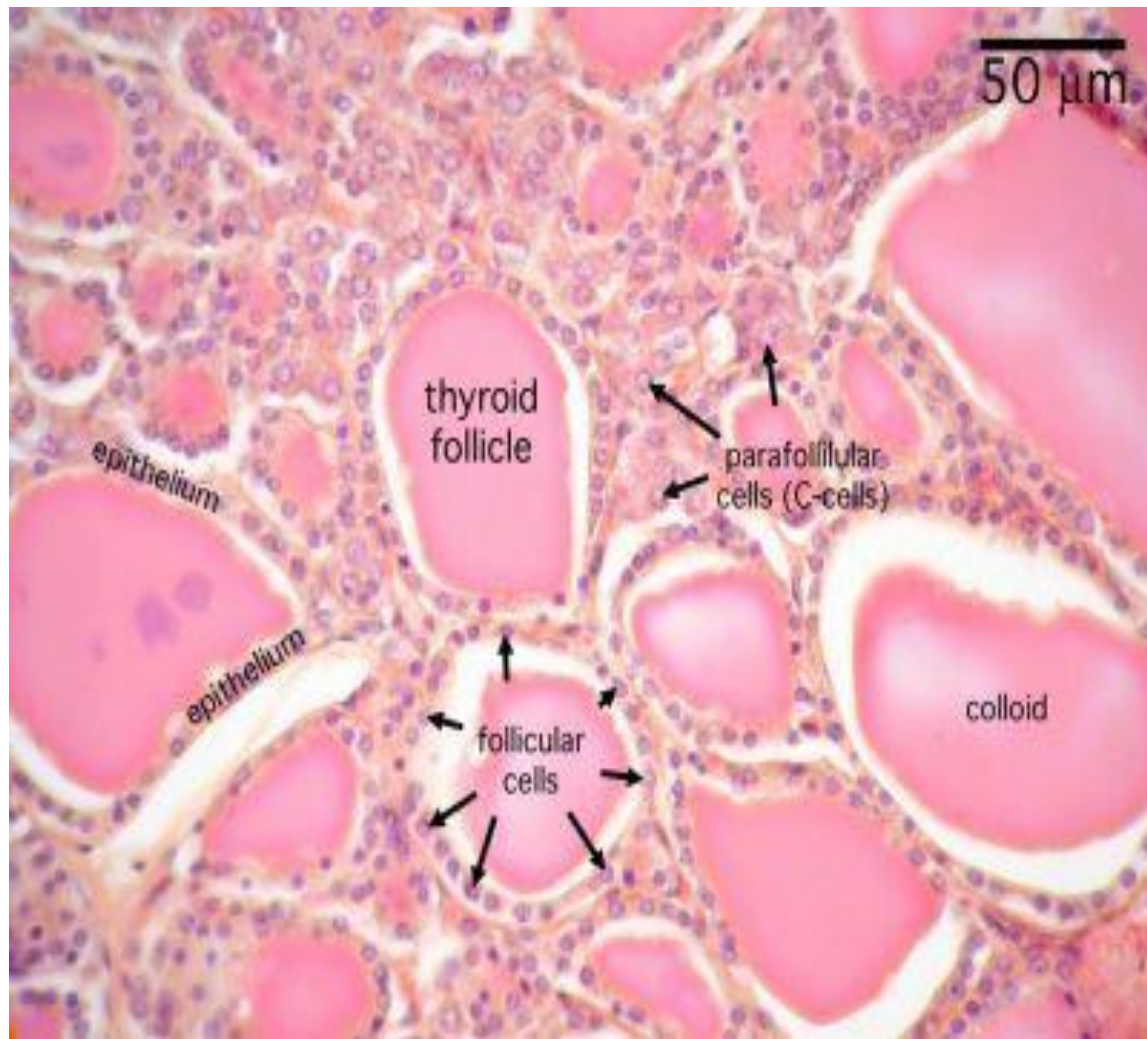


Fig. A) Histological structure of thyroid gland under microscope

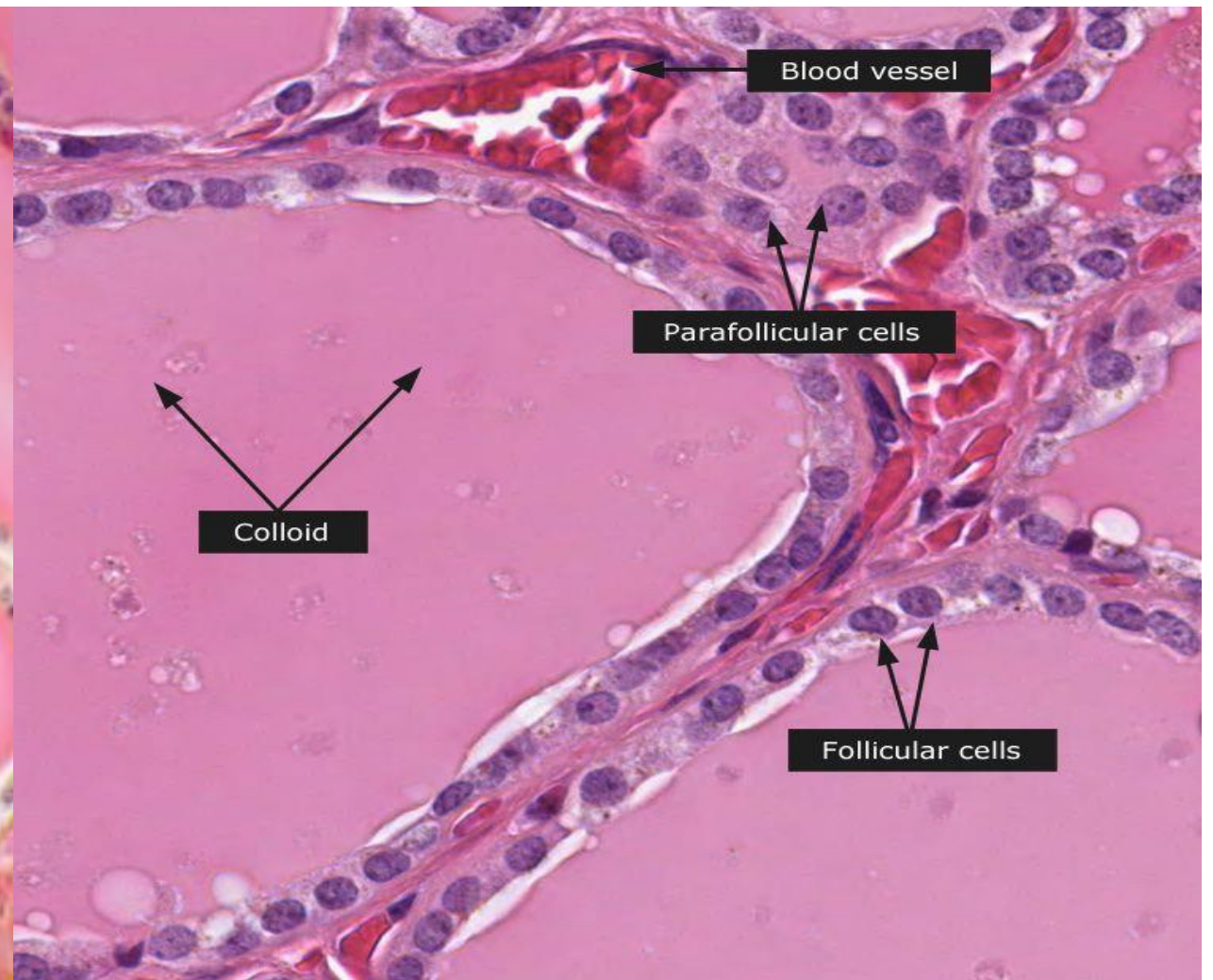


Fig. B) Histological Structure of thyroid gland under microscope at 100X magnification showing Blood cells, parafollicular cells and Colloid region.

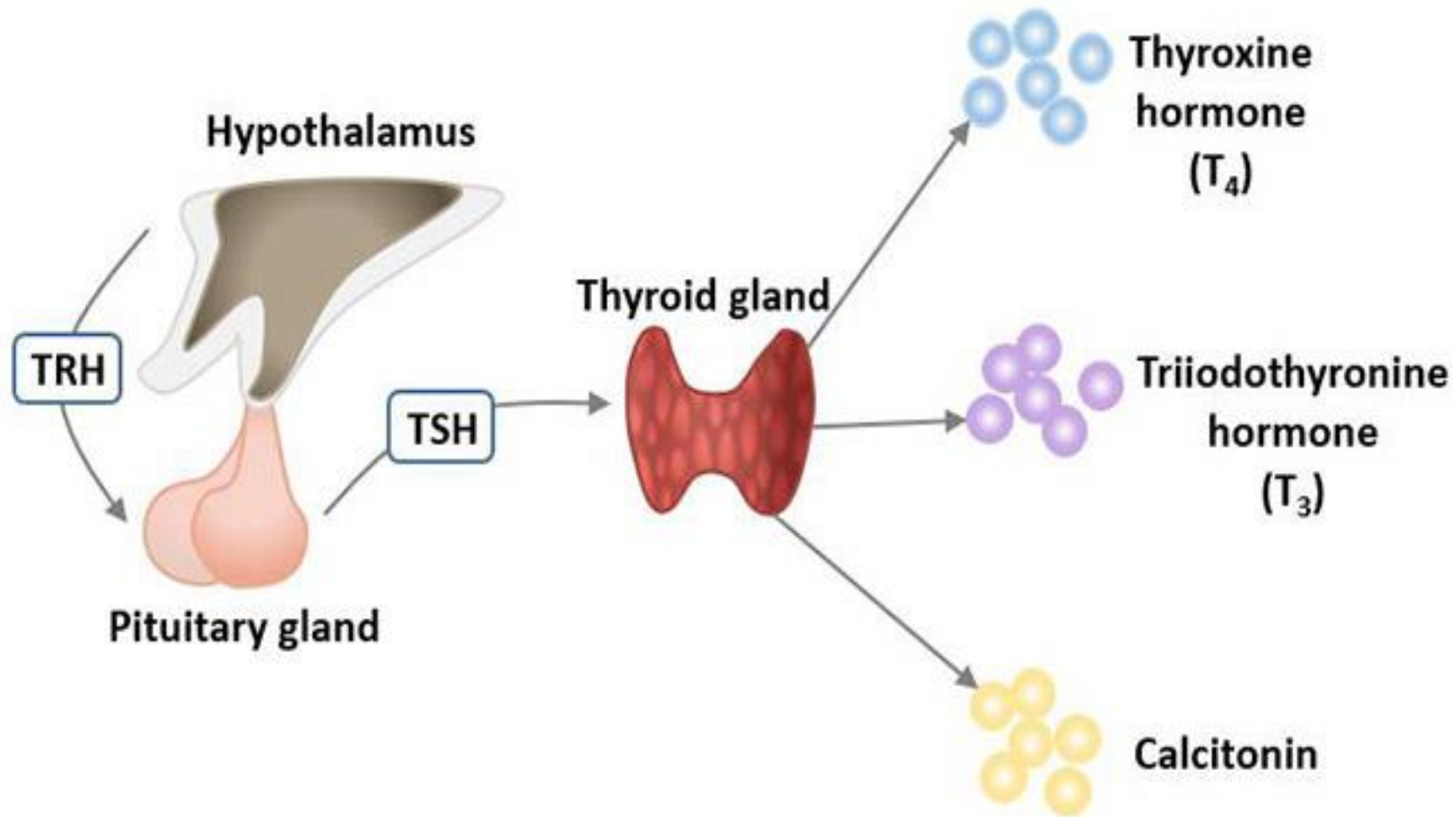


Fig. Hormones secreted by thyroid gland

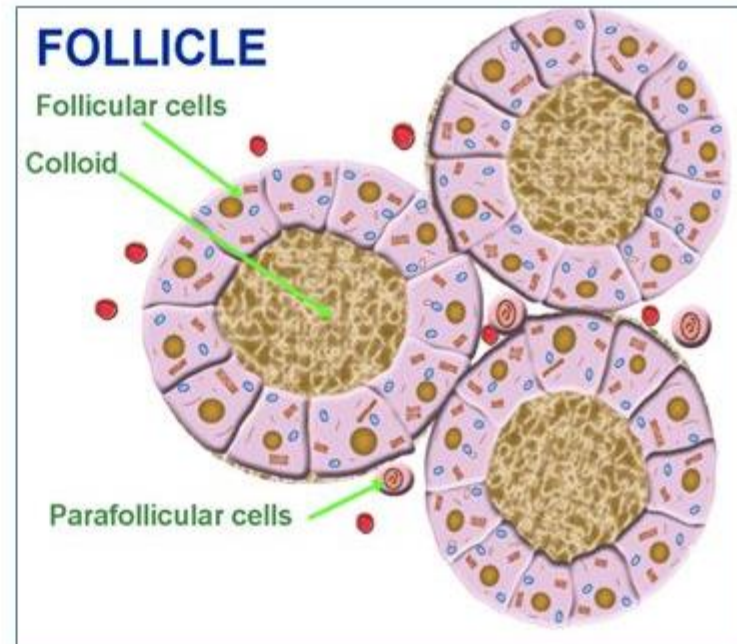
❑ Cells of Thyroid gland:

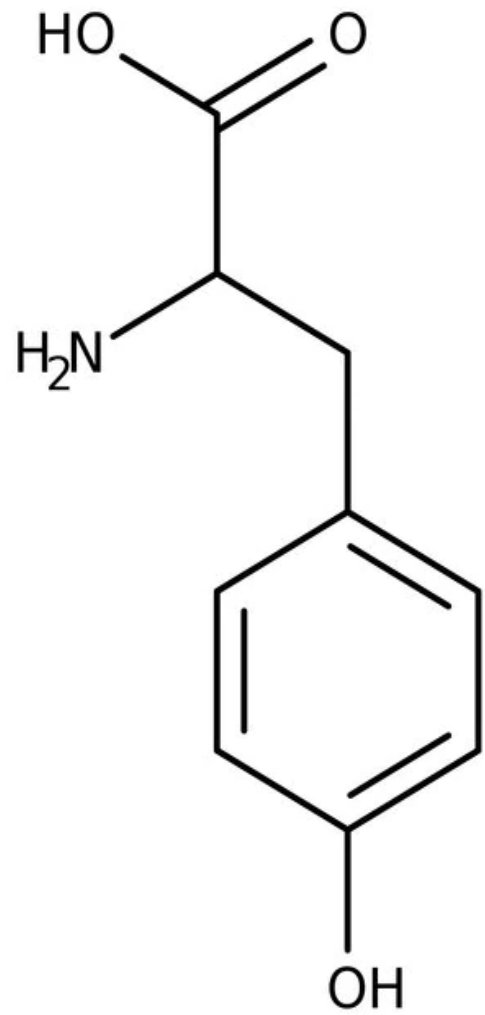
- 1- **Follicular A Cells** secrete Thyroxine (T_4) & Triiodothyronine (T_3).
- 2- **Parafollicular C Cells** secrete **ThyroCalcitonin**.

❑ Functions of Thyroid gland:

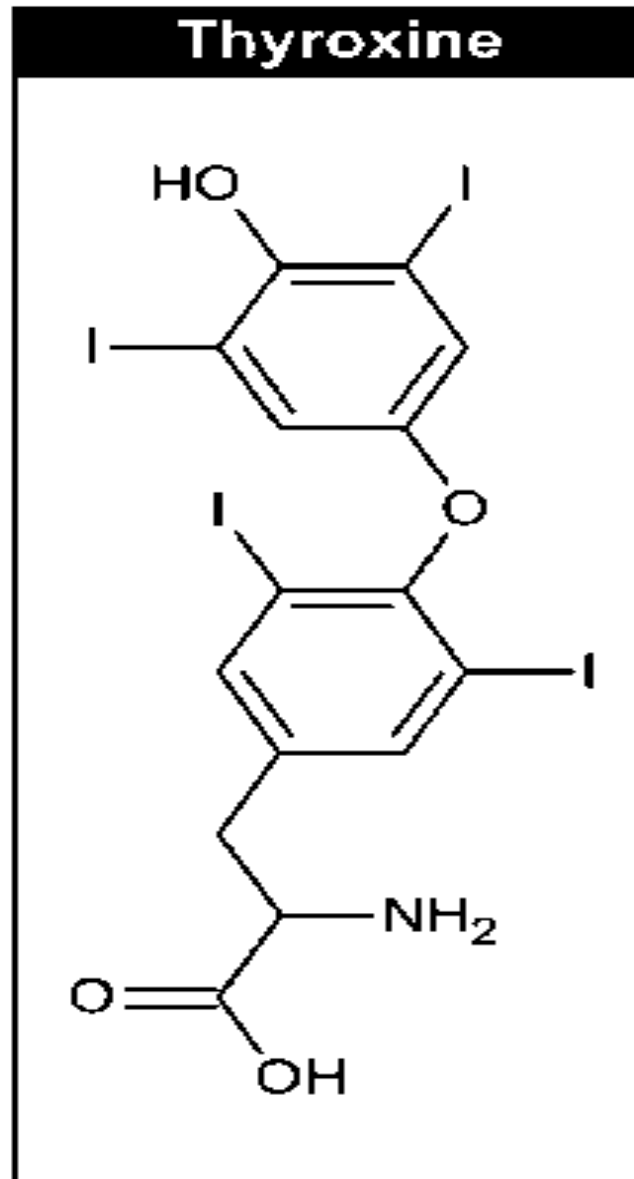
Required for

- 1- **Normal metabolism.**
- 2- **Growth & maturation.**
- 3- **Ca^{+2} regulation.**

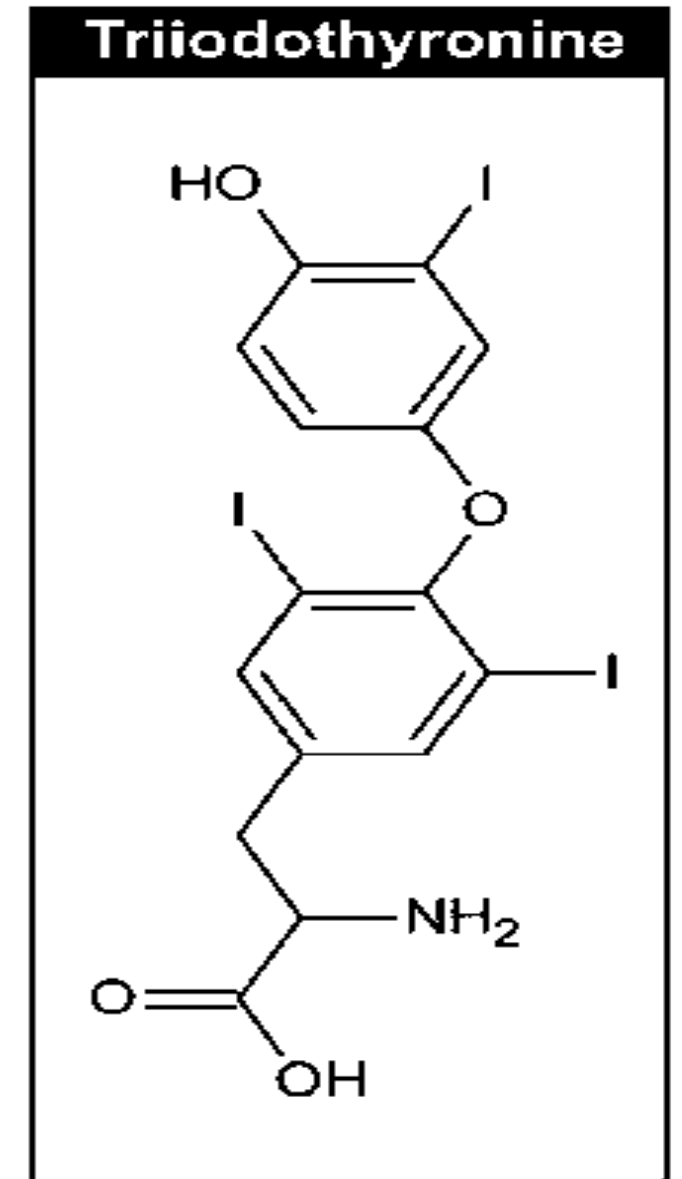




Tyrosine



T4



T3

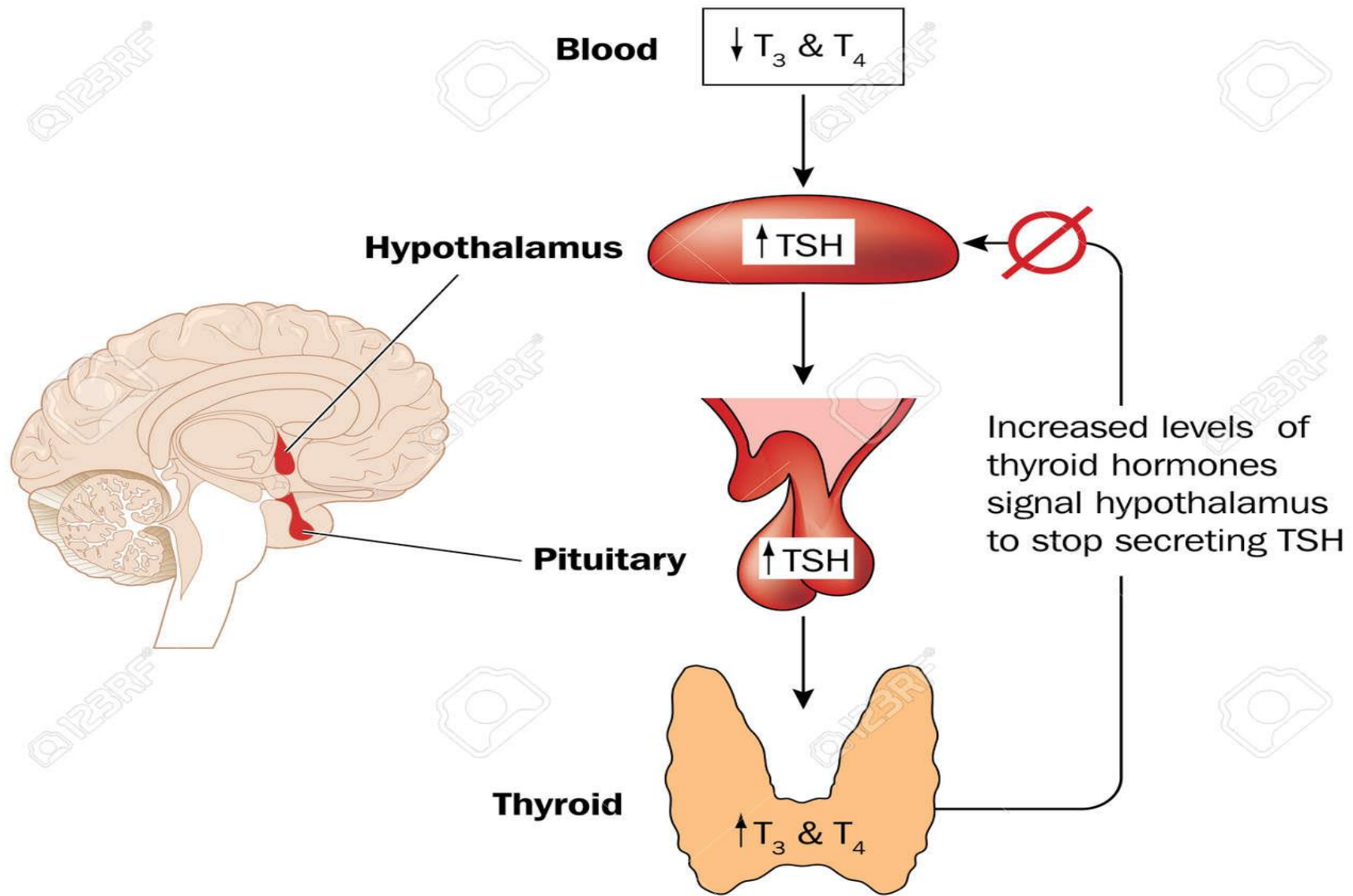
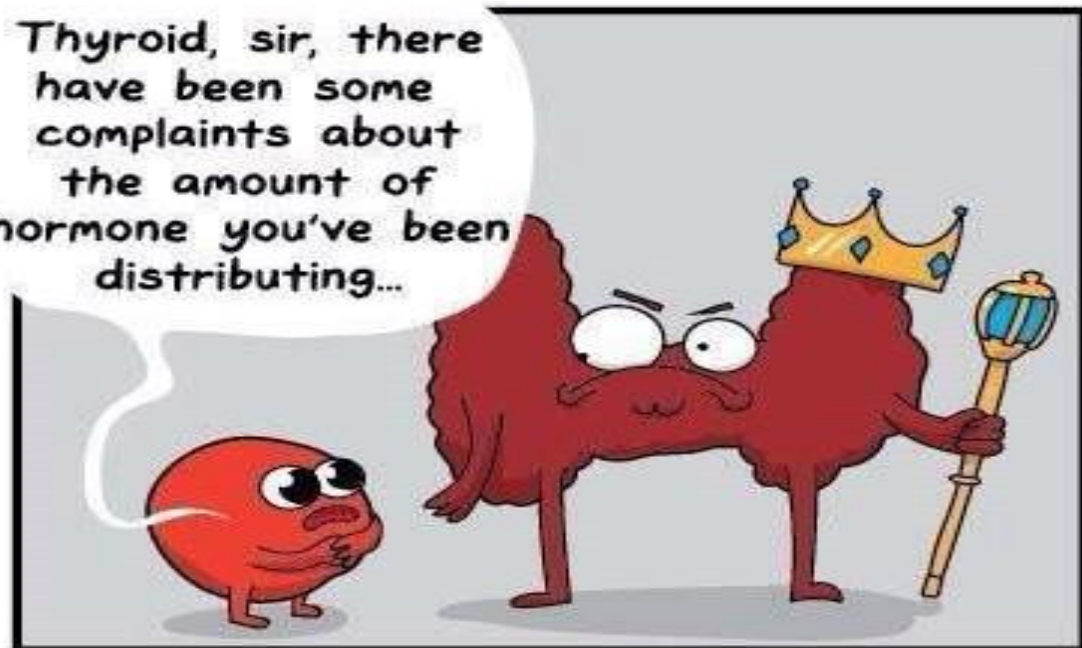
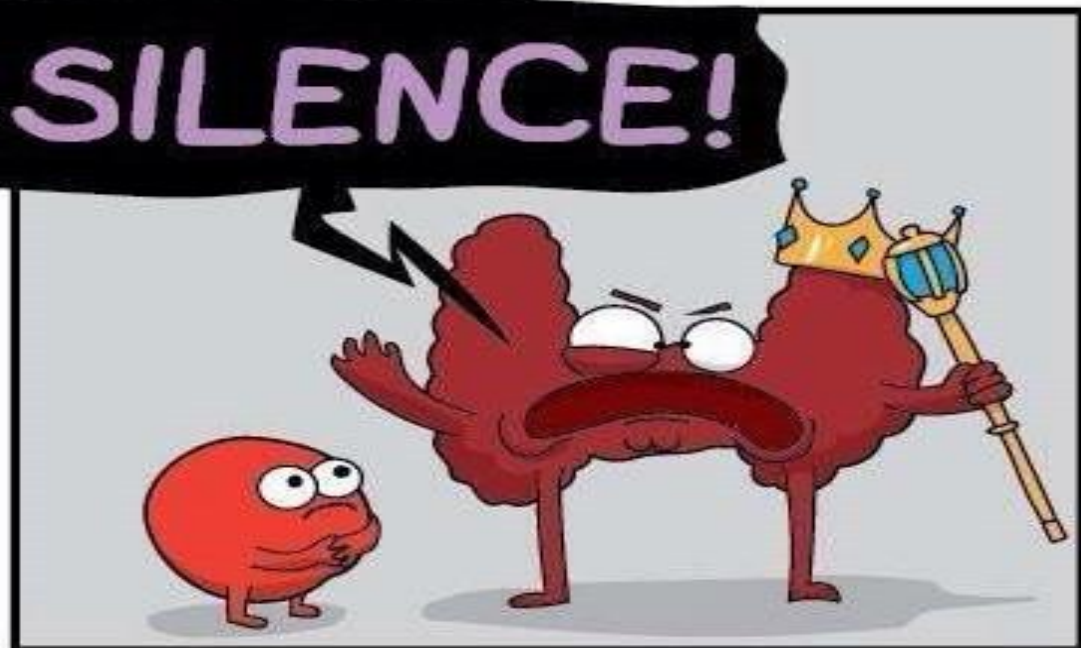


Fig. Regulation of thyroid hormone

Thyroid, sir, there have been some complaints about the amount of hormone you've been distributing...



SILENCE!



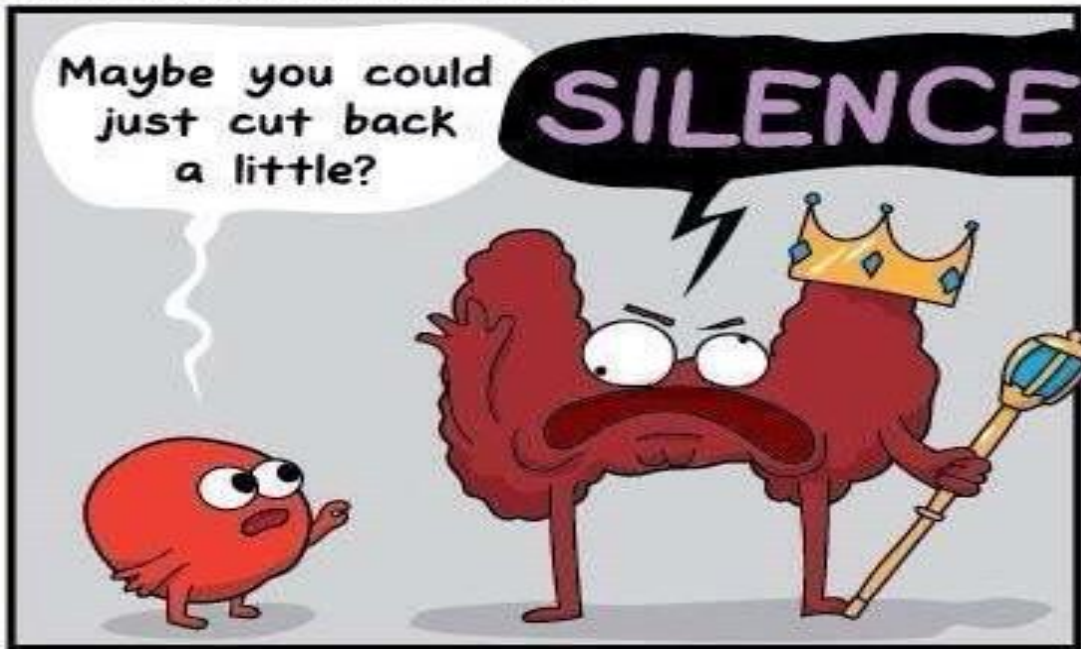
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MY REIGN WILL BE KNOWN FOR ITS LEGENDARY PRODUCTIVITY!



Maybe you could just cut back a little?

SILENCE!



Hyperthyroidism:-

Symptoms of Hyperthyroidism

- A high state of excitability
- Intolerance to heat
- Increased sweating
- Mild to extreme weight loss
- Varying degrees of Diarrhoea
- Muscle weakness
- Nervousness or other Psychic disorders
- Extreme fatigue but inability to sleep
- Tremor of the hands

Thyroid Adenoma-

Hyperthyroidism occasionally result from a localized adenoma (tumor) that develops in the thyroid tissue and secretes large amount of thyroid hormone.

Exophthalmos-

*People with hyperthyroidism develop protrusion of eye balls and this condition is called **exophthalmos**. The cause of protruding eyes is edematous swelling of the retro-orbital tissues and degenerative changes in the extraocular muscles. This causes the **Graves' disease** which is an autoimmune process.*

Treatment-

The most direct treatment for hyperthyroidism is surgical removal of most of the thyroid gland.



Grave's disease



Myxedema



Cretinism

Cretinism



Goiter

Images representing the symptoms of different disorders caused by hypo and hyper secretion of thyroid hormones.

Hypothyroidism-

Symptoms of Hypothyroidism-

- Changes in menstrual cycle
- Constipation and depression
- Dry hair and hair loss
- Elevated Cholesterol
- Fatigue
- Greater sensitivity to cold
- Hoarse voice and Puffy face
- Joint pain, stiffness and swelling
- Swelling of thyroid gland
- Unexplained weight gain

Treatment

Proper treatment of hypothyroidism is done by daily oral ingestion of a tablet or more containing thyroxine.

Goiter

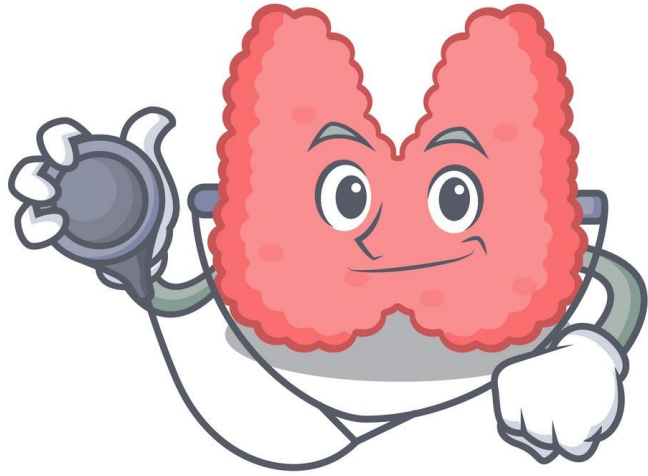
The term 'goiter' means a greatly enlarged thyroid gland. Hypothyroidism is often associated with development of enlarged thyroid gland. Lack of iodine prevents production of both T3 and T4 and this causes the follicles to enlarge in size leading to goiter.

Myxedema

Myxedema develop in person almost with total lack of thyroid hormone function. Patient develop bagginess under the eyes and swelling of the face.

Cretinism

Cretinism is caused by extreme hypothyroidism during fetal life, infancy or childhood. This condition is characterised by failure of body growth and by mental retardation.



THANK YOU