

MODULE 1 L05

Thyroid Gland

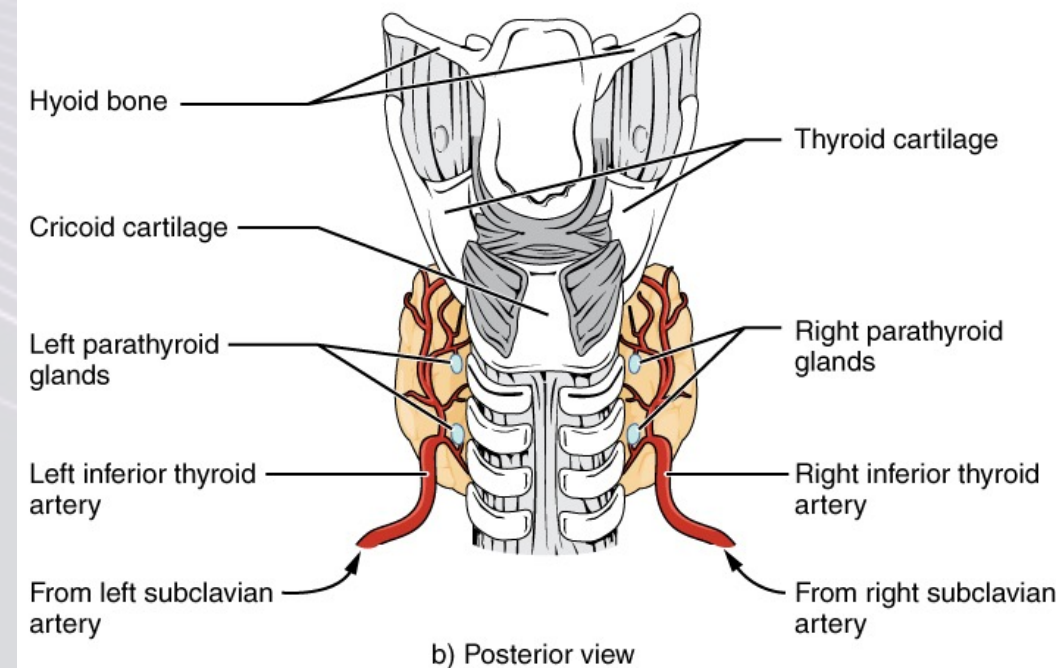
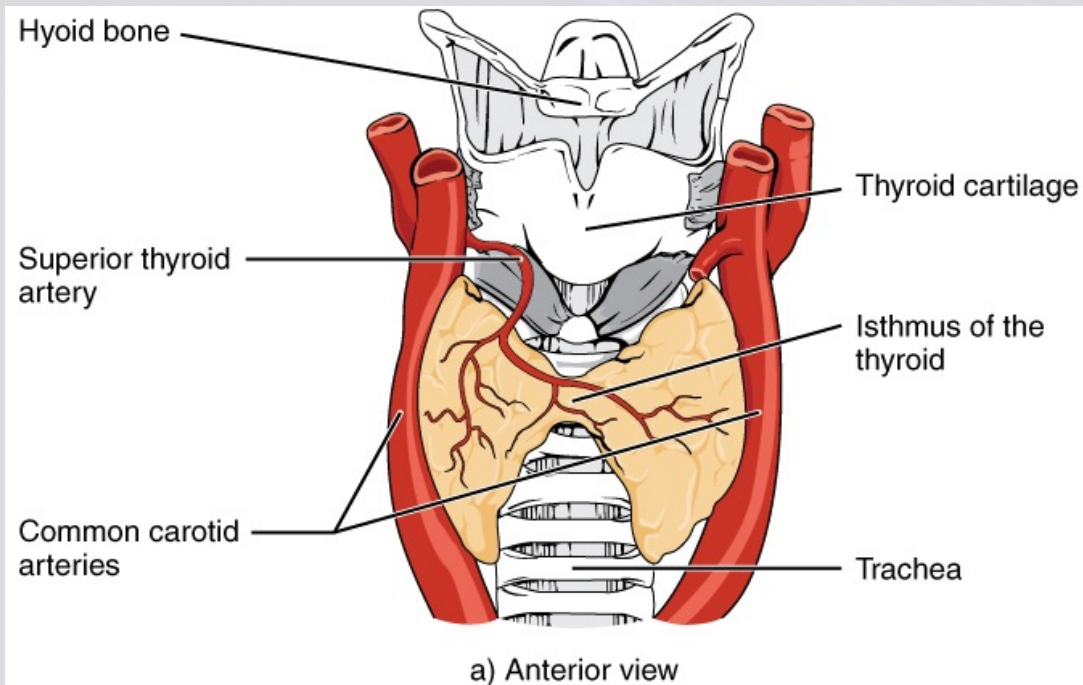
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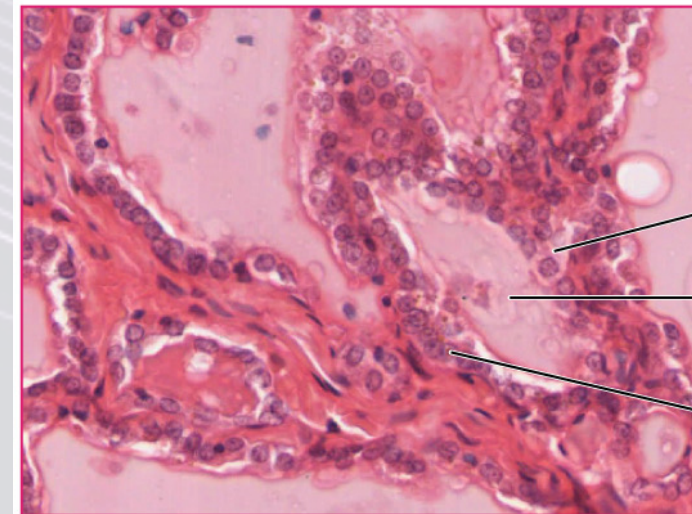
5. Thyroid Gland

- Located: anterior to the trachea; inferior to the thyroid cartilage
- Hypothalamus secretes thyrotropin-releasing hormone →
 - ❖ Causes anterior pituitary to secrete TSH (thyrotropin) →
 - Regulates the activity of the thyroid gland



Functions of Thyroid Hormones

- TSH stimulates thyroid follicle cells to produce triiodothyronine (T_3) and thyroxine (T_4)
- Referred to as metabolic hormones
 - ❖ Their levels influence the body's basal metabolic rate
- 1. Produce ATP
 - ❖ Bind to intracellular receptors on mitochondria
 - ❖ \uparrow in nutrient breakdown and use the oxygen = ATP
- 2. \uparrow body temperature (calorigenic effect)
 - ❖ Initiate the transcription of genes involved in glucose oxidation
 - ❖ = production of ATP \rightarrow inefficient = \uparrow heat release
- 3. Protein synthesis
- 4. Fetal and childhood tissue development and growth
 - ❖ Nervous system
- 5. Influence reproductive hormones
 - ❖ \downarrow = libido, fertility
- 6. \uparrow sensitivity to catecholamines
 - ❖ $\uparrow T_3$ and T_4
 - \uparrow heart rate
 - \uparrow heartbeat
 - \uparrow blood pressure



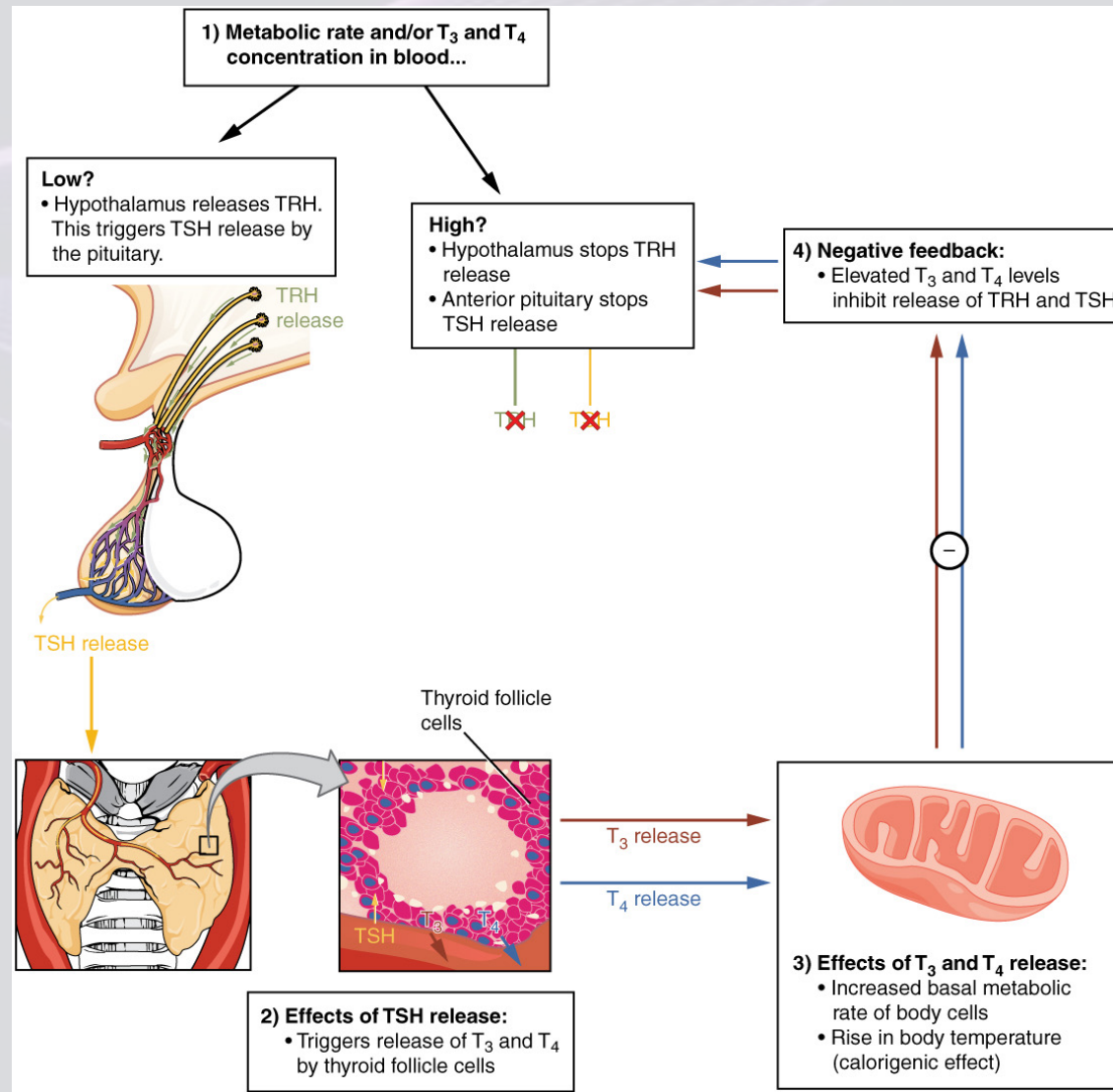
Parafollicular cell

Colloid-containing follicle

Follicle cells (cuboidal epithelium)

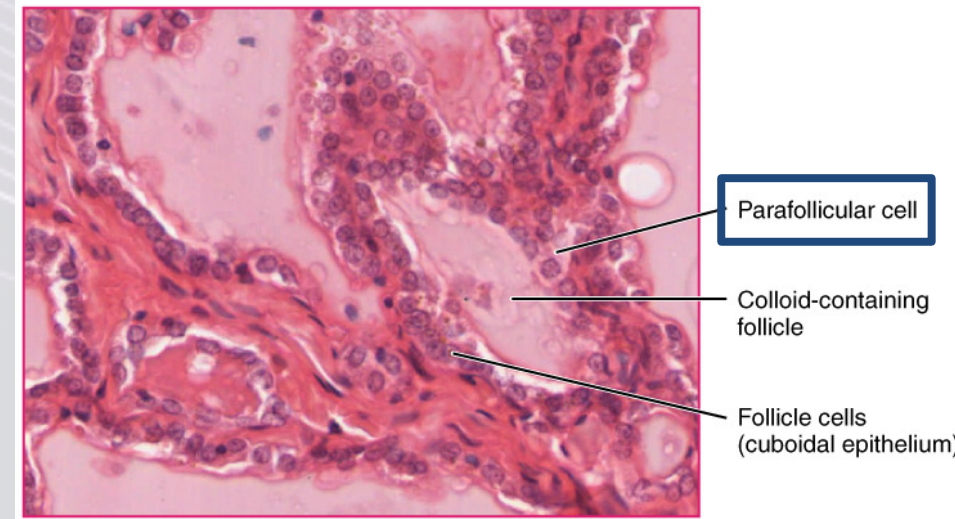
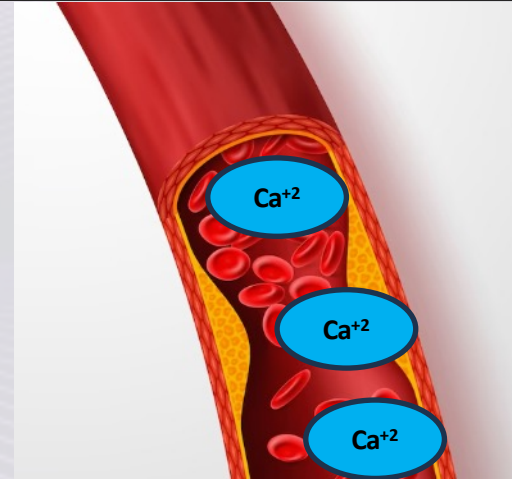
c) Thyroid follicle cells

Regulation of Thyroid Hormone Synthesis

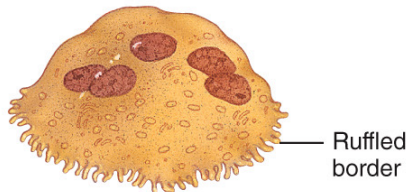


Calcitonin

- Secreted from thyroid gland
 - ❖ Produced by parafollicular cells
 - ❖ In response:
 - \uparrow blood Ca^{+2}
- Function:
 - ❖ Responsible for calcium homeostasis
 - \downarrow Ca^{+2} levels
 - \rightarrow inhibits osteoclasts activity
 - \uparrow osteoblastic activity
 - \downarrow intestinal Ca^{+2} absorption
 - \uparrow Ca^{+2} loss in urine



From white blood cell lineage

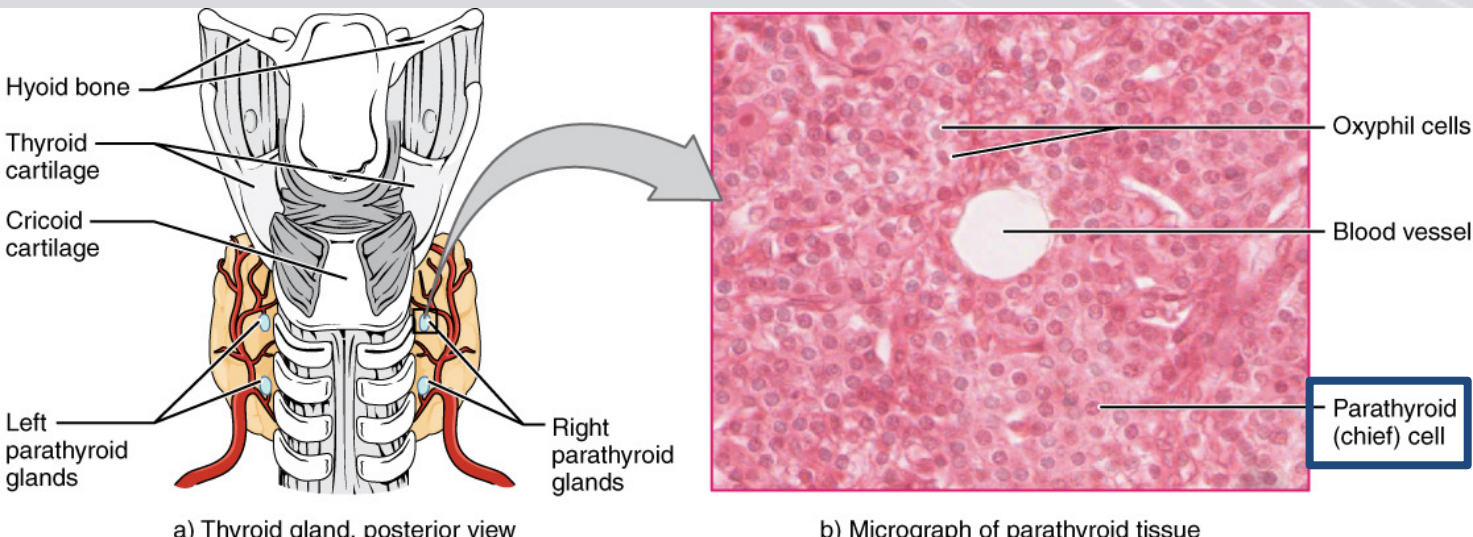
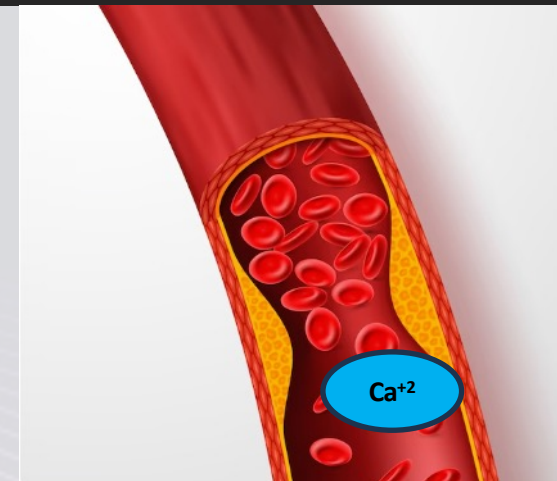


Ruffled border

Osteoclast
(functions in resorption, the breakdown of bone extracellular matrix)

Parathyroid Gland

- Chief cells
 - ❖ Produce and secrete parathyroid hormone (PTH)
 - ❖ In response:
 - ↓ blood Ca^{+2}
- Function:
 - ❖ Responsible for calcium homeostasis
 - ↑ Ca^{+2} levels
 - → stimulates osteoclasts activity
 - → inhibits osteoblastic activity



- Location: postero-lateral on the thyroid gland

Calcium Homeostasis

