

## Anatomy (6)

### PARATHYROID GLAND

→ They have the main role in calcium homeostasis.

→ in the posterior border of the thyroid gland.

→ 4 parathyroid glands

2 are superior

2 are inferior

→ 3x6 mm total weight → 0.4g.

→ Embedded in the gland capsule.

→ They have their own capsule.

→ Blood supply → Inferior thyroid artery.

→ Venous drainage → superior, middle and inferior thyroid veins.

→ Lymphatic drainage → laterally to the deep cervical lymph nodes and few lymph vessels to the paratracheal nodes.

Pretracheal

Paratracheal

→ The superior parathyroid gland are the more constant in position (in the middle of the posterior border).

→ contained within a thin capsule from which septa extend into the gland.

→ *يعني لا يوجد فيهم*

→ in older people, many secretory cells are replaced with adipocytes.

## EMBRYOLOGY

→ superior parathyroid:-

↳ Derived from the Fourth pharyngeal Pouch.

↳ Location → Postabdominal aspect of the superior pole of the thyroid, 1cm superior to the junction of the recurrent laryngeal nerve (RLN) and the inferior thyroid artery.

→ inferior parathyroid:-

↳ Derived from the 3<sup>rd</sup> pharyngeal pouch.

↳ Location → near the inferior poles of the thyroid glands, within 1-2cm of the insertion of the inferior thyroid artery into the inferior pole of the thyroid.

↳ Location is much more variable than the superiors.

↳ It can be intra-thyroidal → within the thymus or other mediastinal structures and can even be found along the aorta arch (16%).

↳ it is possible to don't have it.

→ The thyroid g. From 1<sup>st</sup> and 2<sup>nd</sup> Pharyngeal pouches.

→ Ultimobranchial bodies g. - From the 4<sup>th</sup> or 5<sup>th</sup> pharyngeal pouches → it gives parafollicular c-cells.

→ Thymus g. - From the 3<sup>rd</sup> pharyngeal pouch (as the inferior parathyroid).



→ The inferior parathyroid may stick around or inside the thymus.

## STRUCTURE

2 Types of cells

↓  
chief cells

↓  
oxyphil cells

### 1. chief cells الأبيسية

↳ secretion of parathyroid hormone (PTH)

↳ smaller and more abundant than the oxyphil cells.

↳ Pale-staining cytoplasm.

↳ prominent golgi apparatus and a developed ER.

### 2. oxyphil cells

↳ appear after puberty.

↳ Larger. ↳ its number increase with age.

But not higher than chief cells.

↳ unknown function.

↳ they secrete PTH in patients with chronic renal diseases and people that use drugs of hyperparathyroidism.

## PTH MAJOR TARGETS

→ PTH is the MAIN controller of calcium level.

→ 3 mechanisms to restore the levels of calcium ⚡

1. ↓ calcium levels → PTH binds to receptors on osteoblasts → ↑ osteoclasts stimulating factors → Liberation of calcium → ↑ calcium levels → negative feedback inhibits releasing of PTH.

↳ in severe deficiency of calcium osteoporosis.

### 2. Kidney ⚡

PTH binds to receptors on the distal convoluted tubule → Promotes calcium reabsorption and excretion of phosphate.

### 3. Intestine ⚡ From the Kidney.

Activated Vitamin D → ↑ formation of the calcium-binding protein in the intestinal epithelial cells → ↑ the absorption of calcium.

→ Calcium is important for the contraction of the heart and the skeletal muscles

## SURGICAL CONSIDERATIONS

- Damage to the glands can occur during surgery, especially thyroidectomy (Due to carcinoma for example.)

- Preservation of as many parathyroid glands as possible.

- A single parathyroid gland should be sufficient

- Lifelong calcium and vitamin D supplementation

may be required when we remove the thyroid and all parathyroid glands.

- Removal of both pairs is very uncommon.

- losing of a huge amount of weight while eating normally → High T3 and T4 levels