



# Embryology

## Summary Endocrine System.

### "Pituitary Gland"

- Time line :- (week 4) begin
  - ↳ by week (6-10) → Rathke's pouch loses its connection with oral cavity.
- Embryological origin : 2 different embryonic
  - ↳ ① oral Ectoderm → Ant. Pituitary
  - ↳ ② Neural Ectoderm → Post Pituitary
- ① Oral Ectoderm :-
  - ① Thickening of the oral ectoderm from Hypo-Physeal Plate

(2) The palacode grows upward as Rathke's Pouch

(3) Rathke's Pouch constricts at its base & separates from the oral cavity.

(4) Its cells differentiate into:

① Pars distalis (Major part)

② Pars intermedia

③ Pars tuberalis

(3) Neural Ectoderm (ventral Diencephalon)

① A Downward extension of the ventral Diencephalon from infundibulum

② The infundibulum develop into:

① Pituitary stalk (infundibulum stalk)

② Pituitary nerves.

• High - Yield Exam point:

① Ant. Pituitary → Derived from Rathke's Pouch  
(rise up)

② Post. Pituitary → Derived from infundibulum  
(Comes Down)

# "Suprarenal Gland"

- Time line : (week 5)

The suprarenal (adrenal) gland develops from 2 different embryonic origins:

## ① Suprarenal Cortex : (Mesoderm)

① Around 5<sup>th</sup> week, mesothelial cells between the dorsal mesentery & developing gonad proliferate

② These cells form the (fetal cortex)

③ 2<sup>nd</sup> wave of mesodermal cells surrounds the fetal cortex to form the definitive (adult) cortex

④ After birth, the fetal cortex rapidly regresses while the adult cortex differentiates into 3 layers:

(1) zona glomerulosa

(2) zona fasciculata → biggest one

(3) zona reticularis → (Deeper one)  
from fetal cortex

## ② Development of Medulla (Neural crest)

① Neural crest cells migrate into the center of developing cortex

② They differentiate into chromaffin cell, which produce :-

① Epinephrine

② Norepinephrine

## "Thyroid Gland"

①

Follicular cells

↳ ① from Thyroid diverticulum itself (1<sup>st</sup> & 2<sup>nd</sup> pharyngeal pouch)

② These cells secrete HR

②

Parafollicular cells

↳ Ultimobranchial cells

↳ The origin 4<sup>th</sup> & 5<sup>th</sup> pharyngeal pouch (Endoderm)

↳ These cells secrete "Calcitonin"

↳ to decrease  $[Ca^{+2}]$  in blood

① The Thyroid gland begins as hollow tube called (Thyroid Diverticulum)

② During migration, the lumen closes due to rapid proliferation (Solidification)

③ The gland Expand into Right & left lobe connected by isthmus.

• Time line :

① week 7 → Thyroid reaches it's final position in the neck

② week 10 → Thyroglossal Duct normally disappears

③ week 12 → Thyroid become functional & secreted  $T_3/T_4$ .

Clinical Correlation :-

① Incomplete descent → lingual Thyroid

② Incomplete obliteration of Thyroglossal Duct

↳ Thyroglossal Duct cyst

↳ OR Pyramidal lobe

• High - Yield Exam Point :

origin → Endoderm

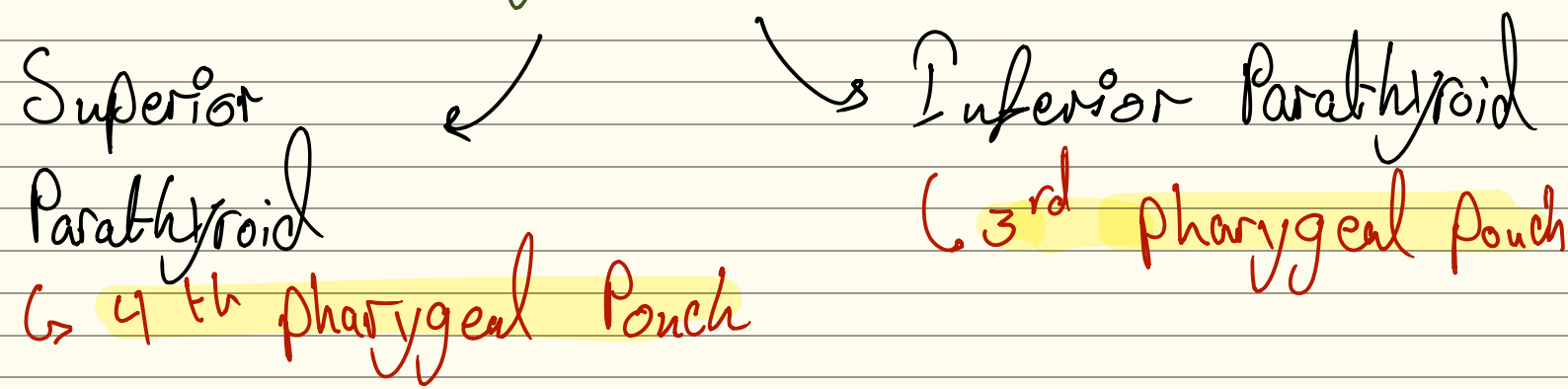
Starts → 4<sup>th</sup> week

Migrate → via the thyroglossal duct

Final Position → In front of the trachea by the 7<sup>th</sup> week



# "Parathyroid Gland"



- ① The 3<sup>rd</sup> pharyngeal pouch also forms the thymus.
  - ② As the thymus descends into the mediastinum it pulls the inferior parathyroid downward.
  - ③ The superior parathyroid gland descends only a short distance & attach to the posterior surface of the thyroid. (Constant in location)
  - ④ Eventually, all four parathyroid glands become attached to the Posterior surface of the thyroid gland, while remaining separate glands with their own capsules.
- High - Yield Exam points.

origin → Endoderm

\* Inferior gland migrate further bcz, they

desend with the thymus That's why they have variation in there location

Clinical correlation :

Abnormal migration can result in Ectopic Parathyroid gland, often in the neck or Mediastinum

### " Pineal Gland "

- Around the 7th week, the roof of the diencephalon evaginate to form the pineal diverticulum.

The diverticulum enlarges & differentiates into the pineal gland

The gland remains attached to the roof of 3rd ventricle.

### Cell Differentiation

Pinedocyte ↙  
↳ secrete Melatonin

↳ Neuroglial cells  
↳ Provide structural support



# Postnatal Changes

↳ After Birth pineal gland continues to mature.

↳ With increasing age, Corpora arenacea (Brain sand) calcified deposits of Ca & Mg salt - accumulate within the gland & ↑ Fat

- High - Yield Exam point

- origin → Neuroectoderm

- Develop from → Roof of the diencephalon

- Characteristic feature → Corpora arenacea increase with age

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## "Good Luck

## Everyone" Banan Al-Shqirat

④ لا تنسوا أخوتنا في غرة من هاج دعائكم وأخوتنا

في الجزائر في تونس اللهم برّداً وسلاماً عليهم .

⑤ ادعوا لجدي بالرحمة والشفاء والعاف .

