King Saud University
College of Medicine
Endocrine Block

2nd Embryology Lecture

Development of Adrenal glands

Embryology Team

Salwa Alshibani

Shatha Alharbi

Raseel al swidan

Haifa Alfozan

Development of the Adrenal Glands

- The adrenal gland consists of medulla and cortex, each part develops from a different origin.

Cortex

Celomic epithelium (mesothelium) derived from mesoderm

(During the 6th week)

These cells proliferate initially forming small buds that separate from the epithelium. and then form the fetal cortex (which will be later **replaced** by the adult permenant cortex)

A second wave of delaminating cells migrates and forms a thinner definitive (permenant) cortex surrounding the fetal cortex.

Ultrastructurally, cells of both fetal and definitive cortical layers exhibit cytologic characteristics of steroid-producing cells.

Late Fetal Period - differentiates to form cortical zones.

Birth - zona glomerulosa, zona fasiculata are present

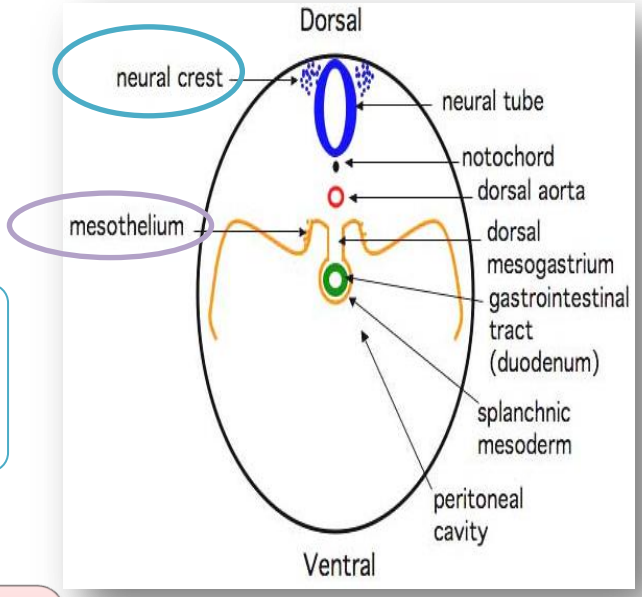
Year 3 - zona reticularis is present.

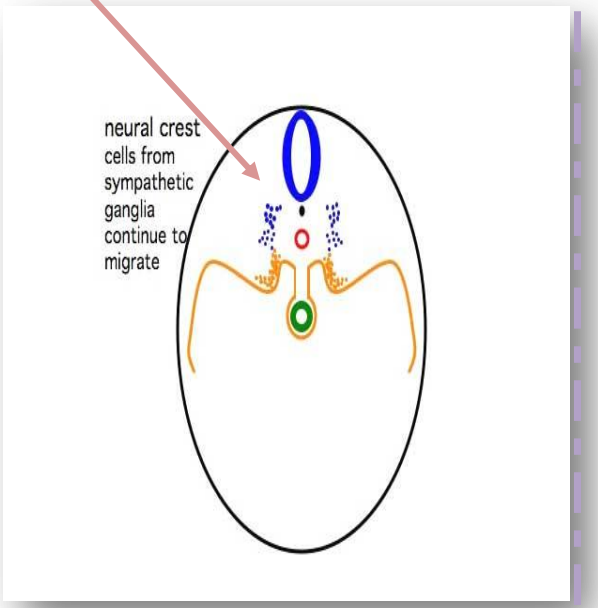
Medulla

Sympathochromaffin cells of the neural crest cells

These cells invade the cortex on its medial side, occupying the central position and differentiate into the secretory cells

Preganglionic sympathetic nerve fibers grow into the medulla and release *Epinephrine* and *Norepinephrine*





The adrenal gland	In the fetus	In the first 2-3 weeks after birth	1st year
Size	10-20 times larger than the adult glands and are large compared with the kidneys.	Smaller	Its fetal cortex involution (regression) is largely completed
Why?	**This is because of the extensive size of the fetal cortex. The medulla remains relatively small until after birth.**	due to the rapid regression of the fetal cortex	

If the adrenal glands fail to develop properly, this may lead to:

Congenital adrenal hyperplasia (CAH)

•An abnormal increase in the cortical cells results in excessive androgen production during the fetal period.

•In females, lead to musculization of external genitalia and enlargement of clitorus.

•In males, remain undetected in early infancy.

•Later in childhood, in both sexes, androgen excess may lead to rapid growth and accelerated skeletal maturation

Test Yourself

1. **Neural crest cells:**

a) Medulla Origin

b) Cortex Origin

c) Zona Glomerulosa

d) PNMT

The answer: (a)

2. **Celomic epithelium**

    a. Medulla Origin

    b. Cortex Origin

    c. Zona Glomerulosa

    d. PNMT

The answer (b)

3. **The cortex starts to form cortical zones at :**

    a. Birth

    b. 1st year of life

    c. Late fetal period

    d. Year 3

The answer (C)

4. **Which one of these layers is not present at birth:**

    a. zona glomerulosa
    b. zona fasiculata
    c. Medulla of adrenal gland
    d. zona reticularis

the answer (d)

http://quizlet.com/5180583/test/