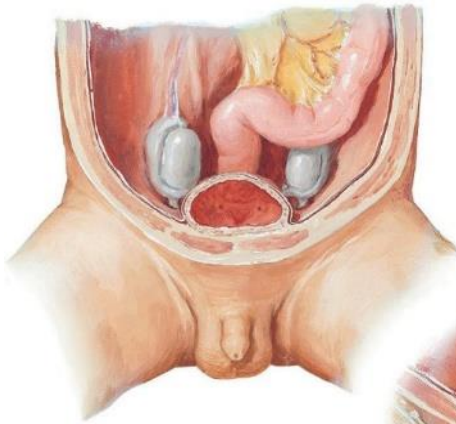
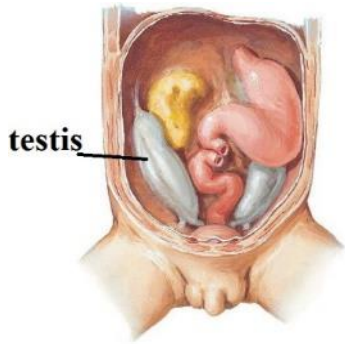


DEVELOPMENT OF THE GENITAL SYSTEM 1

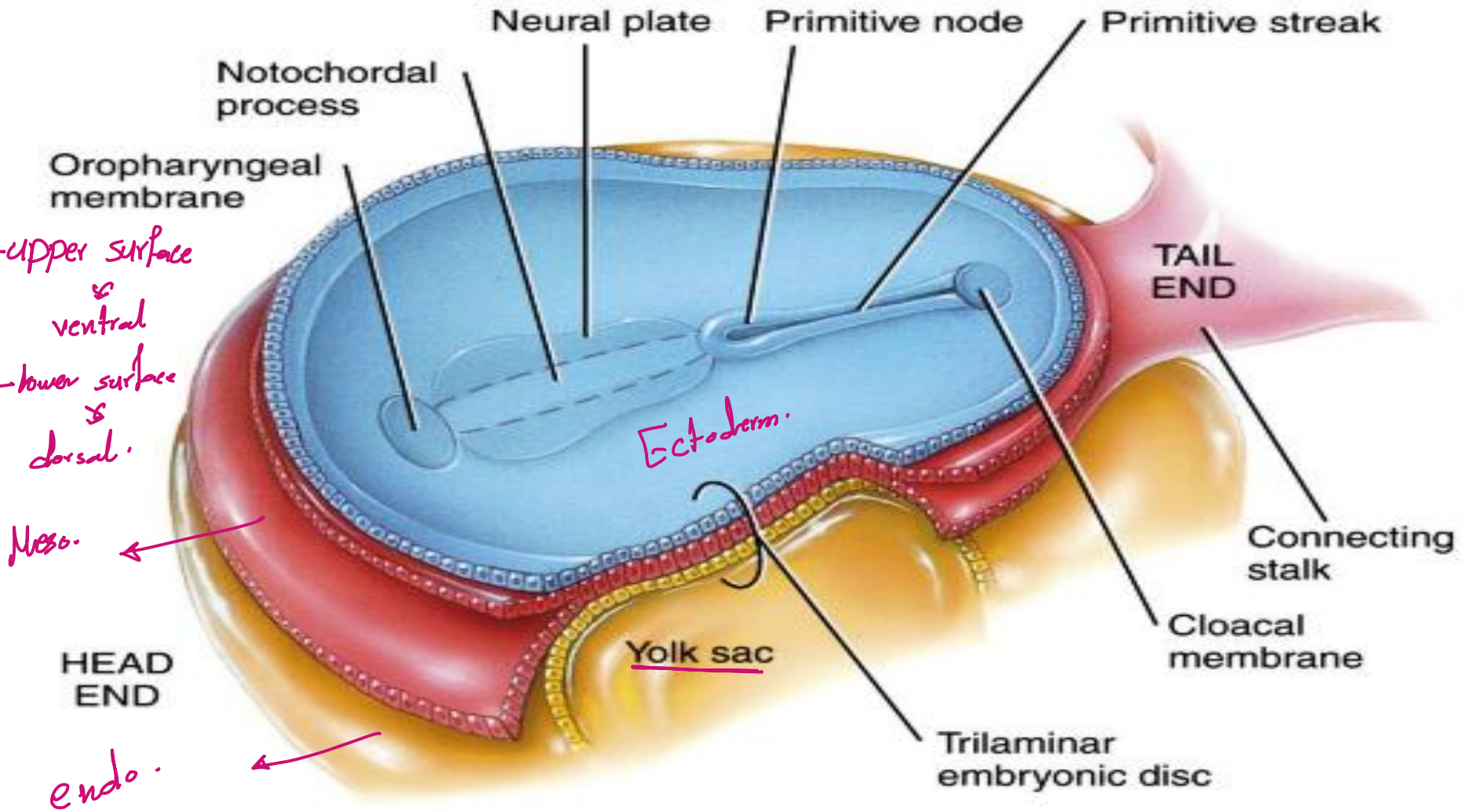


BY
DR ABULMAATY MOHAMED
ASSISTANT PROFESSOR
ANATOMY & EMBRYOLOGY
MUTAH UNIVERSITY

Sonder-Mos

- المحرر اسابيح -

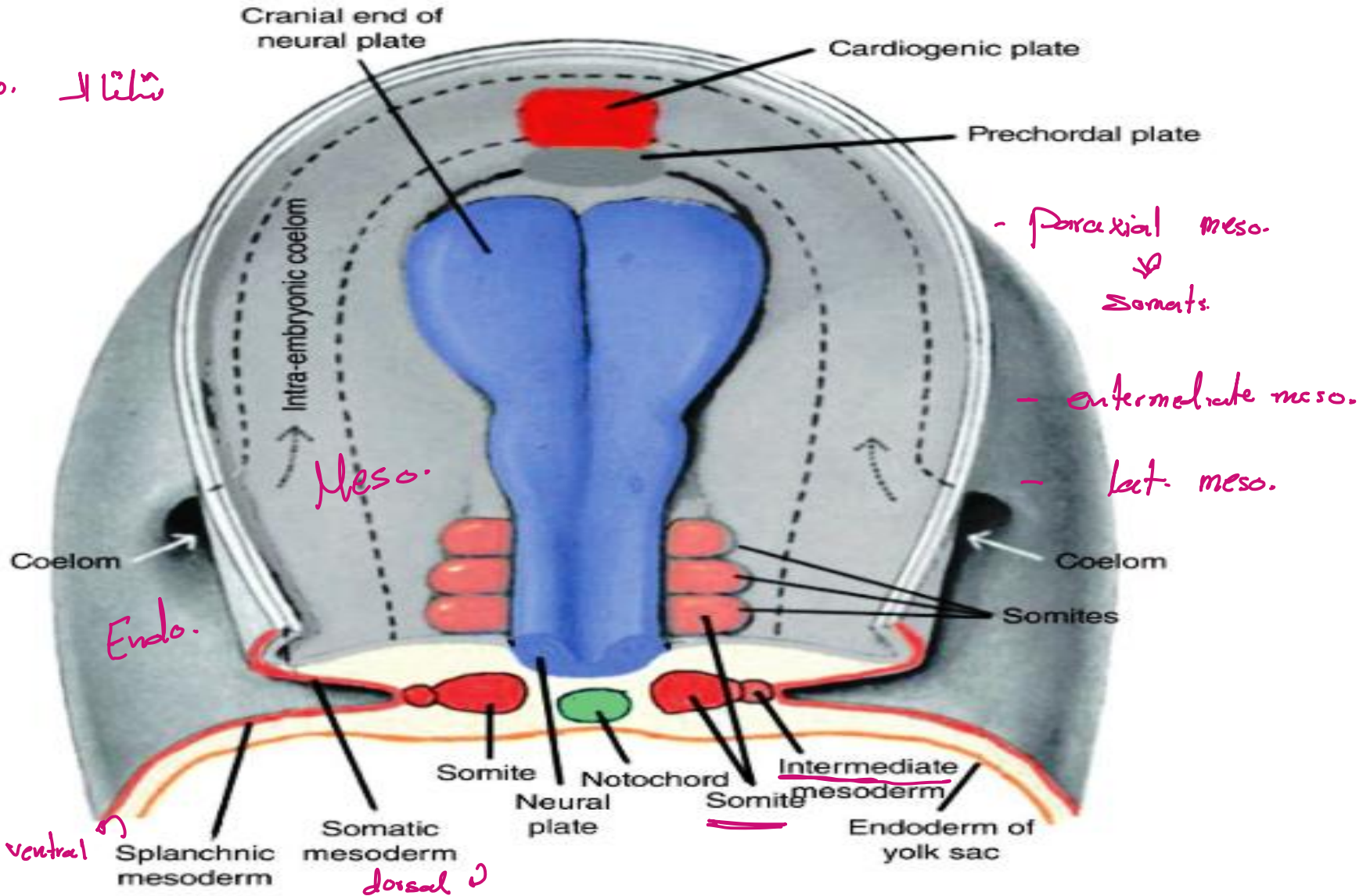
REV.



(a) Dorsal and partial sectional views of trilaminar embryonic disc, about 16 days after fertilization

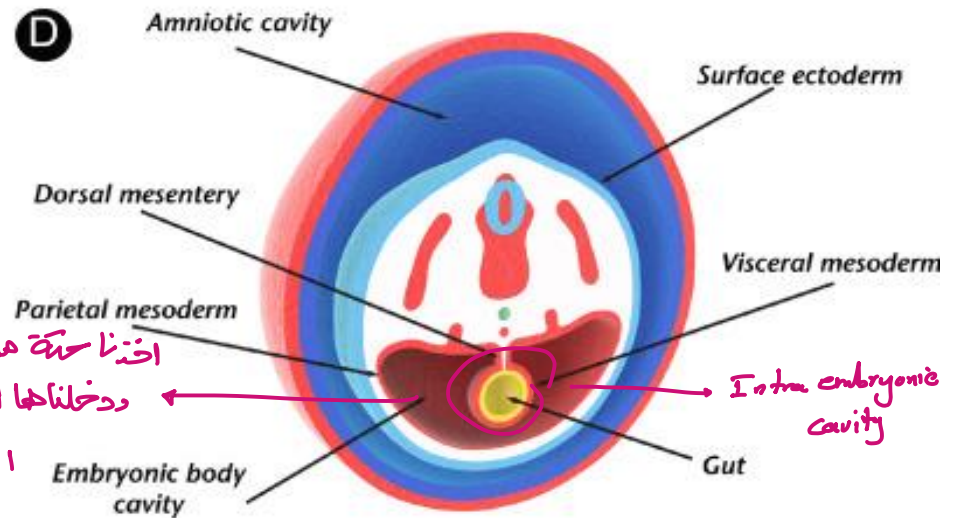
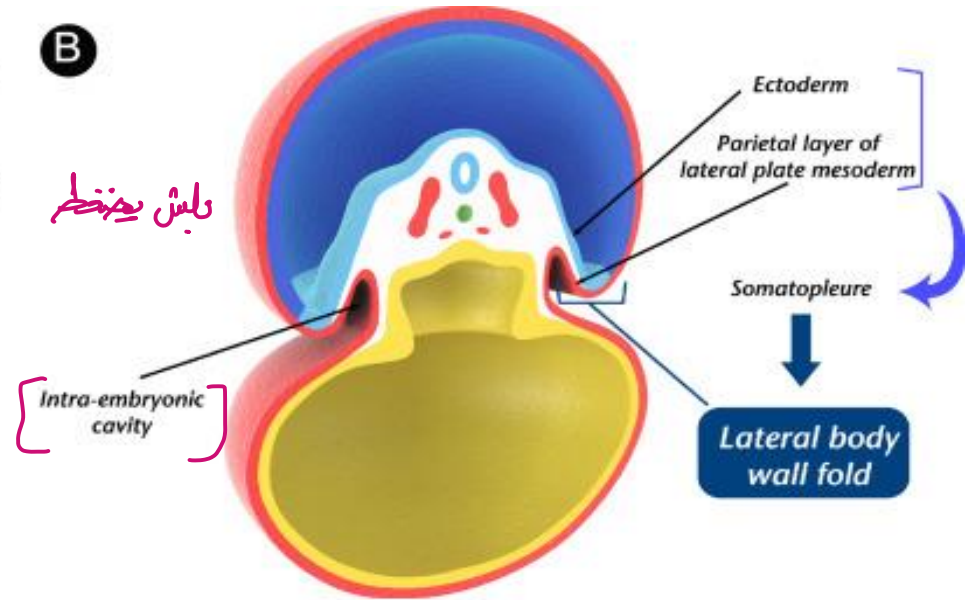
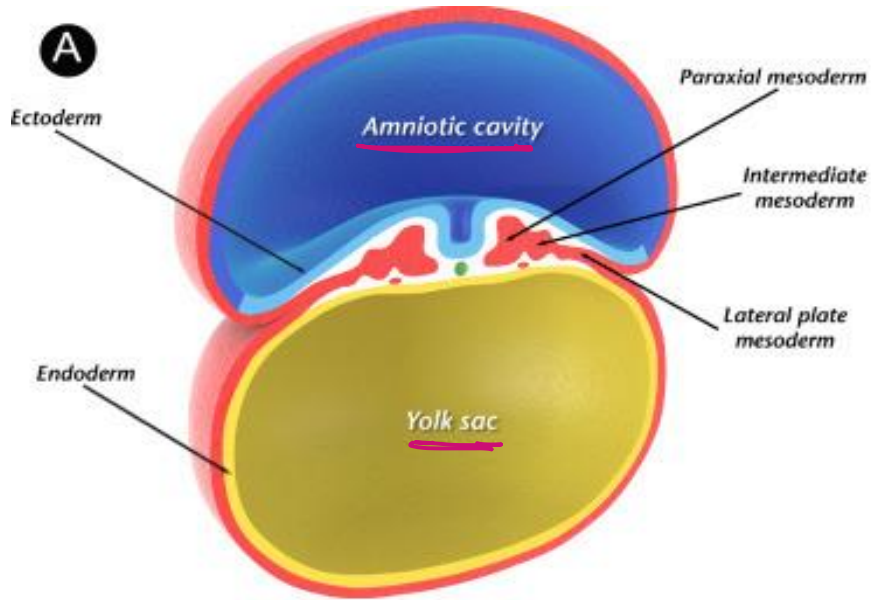
REV.

ecto. شلتا



REV.

Folding (4 folds)



شكل الصفح

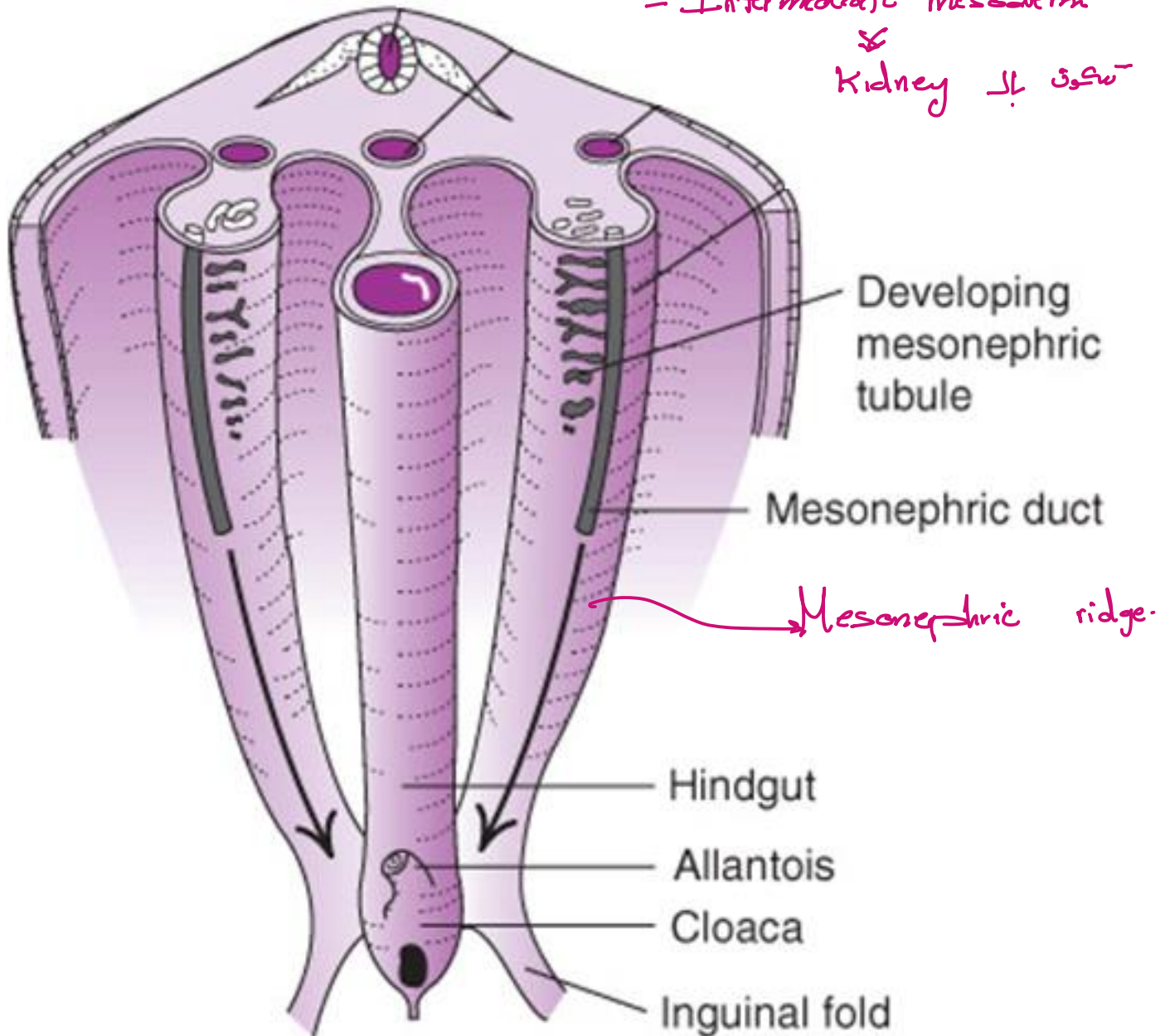
اختنا ساحة من الـ yolk sac
ودخلناها للحبيبة ثم تحولت
الى gut.

Intra-embryonic cavity

REV.

جوا تَجَوِّفُ الْبَطْنِ
لَاكِبِيَّ
وَيَقْرُجُ عَالِجِدَارَ
الْخَلْفِيِّ مَذْجَا

- Intermediate mesoderm
↳ Kidney



DEVELOPMENT OF GONADS

INDIFFERENT GONADES (similar in both sexes)

genital ridges ①

in the 4th week of development

genital ridges are formed

one on each side of midline

medial to mesonephric ridges

Both ridges form the urogenital ridge

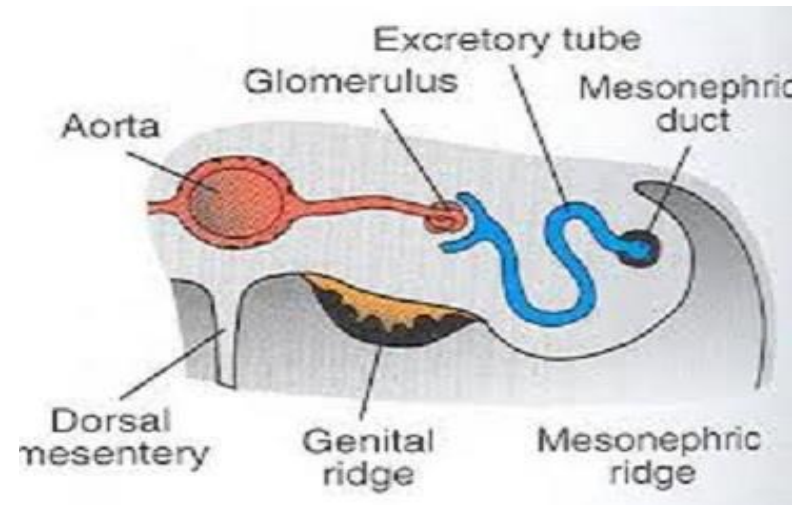
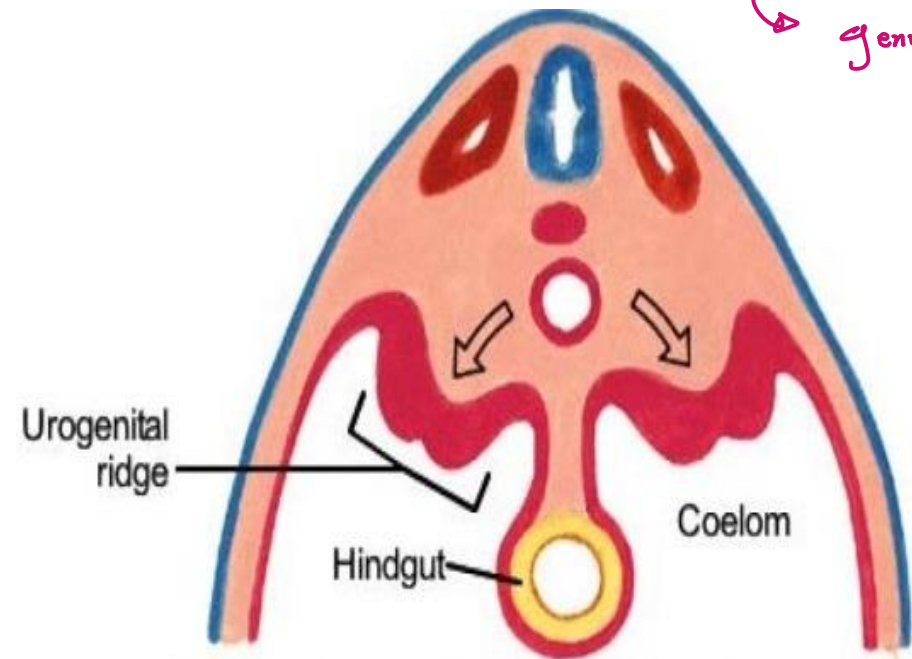
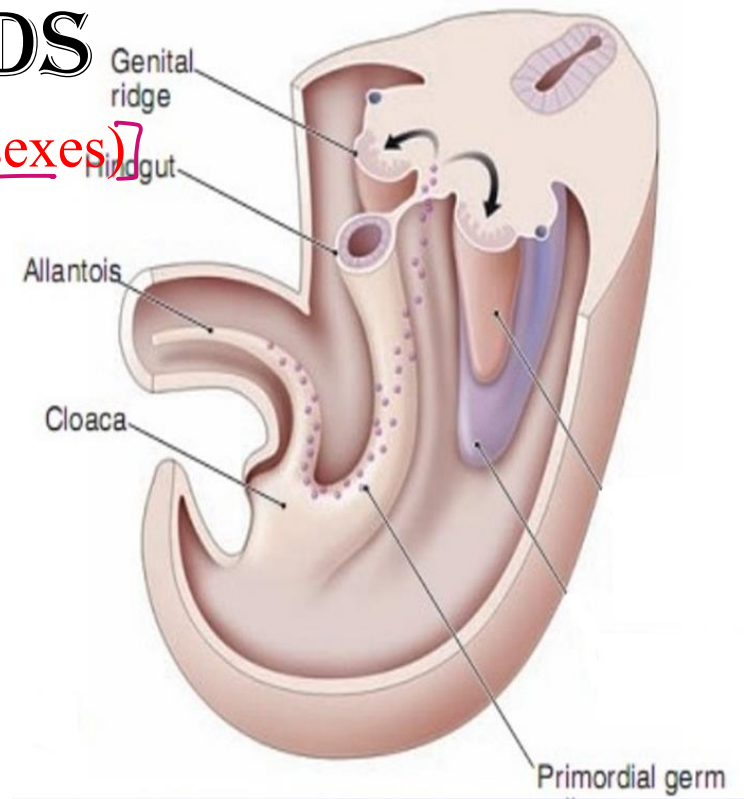
mesonephric مع genital

urinary genital

بدن ساجات عتاف سكون

proliferation thickening

انتفاخ

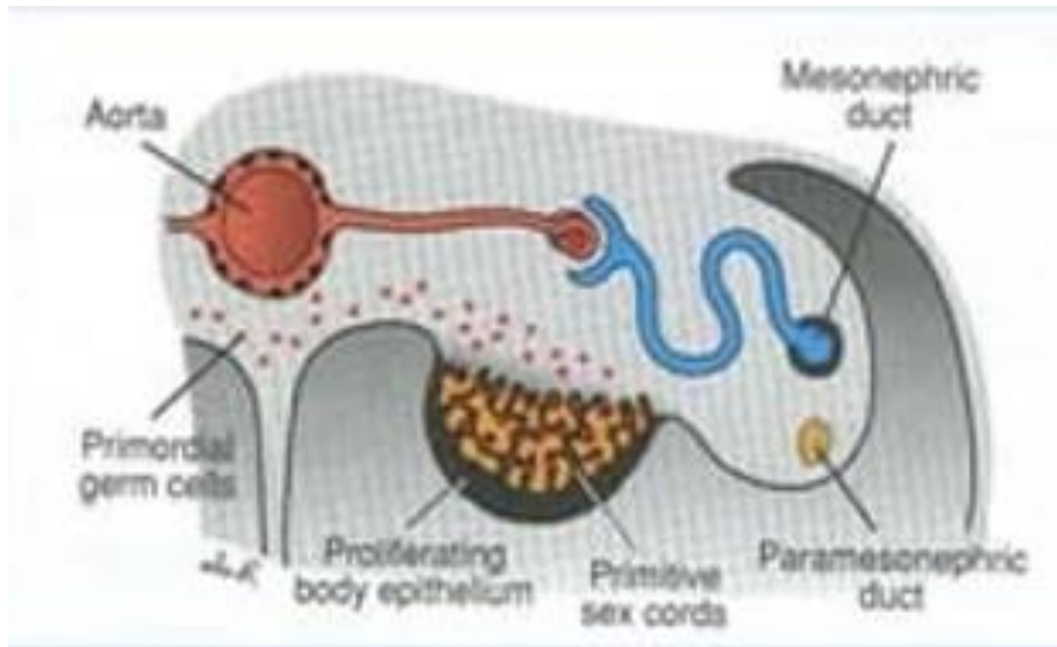
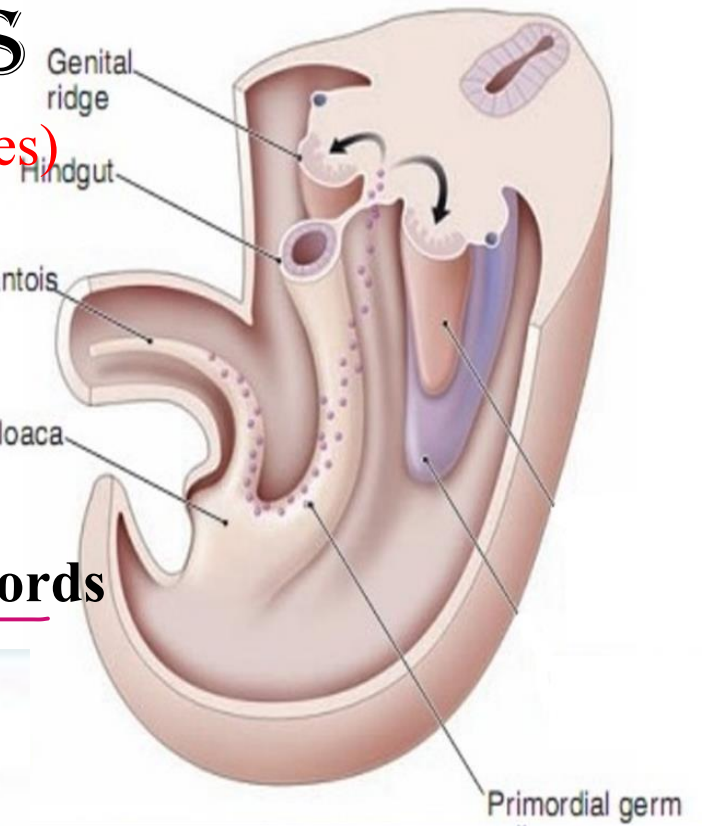


DEVELOPMENT OF GONADS

INDIFFERENT GONADES (similar in both sexes)

primitive sex cords

coelomic epithelium that cover the genital ridge proliferate and is called germinal epithelium that gives epithelial cells that penetrate the underlying intermediate mesoderm (mesenchyme) forming irregular primitive sex cords



DEVELOPMENT OF GONADS

INDIFFERENT GONADES (similar in both sexes)

primitive sex cells (endoderm) ③

1st appear in yolk sac in 4th week of development

- after folding they become incorporated in wall of hind gut

- migrate by amoeboid movement in mesentery of hind gut

- reach primitive gonads at 5th week of development

- Invade genital ridge at 6th week of development

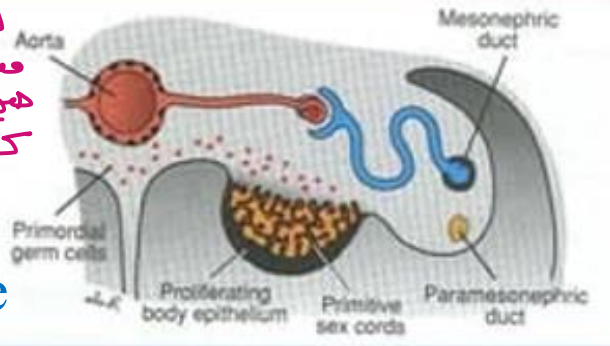
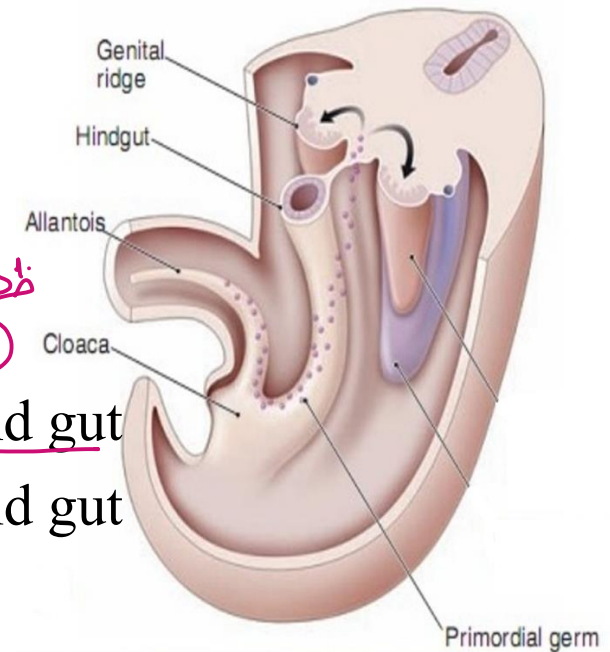
• genital ridges remain indifferent till 7th week

SEX DIFFERENTIATION

the key to sexual differentiation is Y chromosome that contains SRY (sex determining region on Y) gene

that form testis determining factor results in male development

~~N.B.~~: absence of this gene results in female development



spermatogenesis - - - -

DEVELOPMENT OF TESTIS

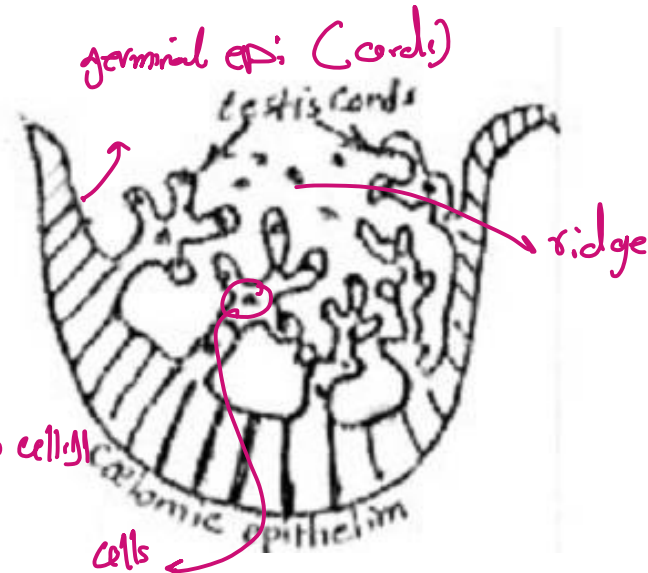
FORMATION (under effect of SRY gene) 5 خطوات

1-primitive sex cords branch & anastomose together forming testis cords (formed of Sertoli cells)

2-primitive sex cells are incorporated in the testis cords (now formed of Sertoli cells and primitive sex cells)
 ٢- خلايا جنسية بدائية تندمج في الحبال الخصوية (التي أصبحت الآن تتكون من خلايا سيرتولي وخلايا جنسية بدائية)

3-the parts of testis cords at the hilum of the gland break up into a network of tiny strands that give tubules of rete testis

3- الأجزاء من الحبال الخصوية عند الحليم الغدة تتفكك وتتحلل في شبكة من الخيوط الصغيرة التي تعطي تأبيات الخصية (خطوط رفيعة)



DEVELOPMENT OF TESTIS

FORMATION (under effect of SRY gene)

4-intermediate mesoderm gives: - حور ال - genital ridge

1-tunica albuginea around testis separating the testis cords from germinal epithelium.

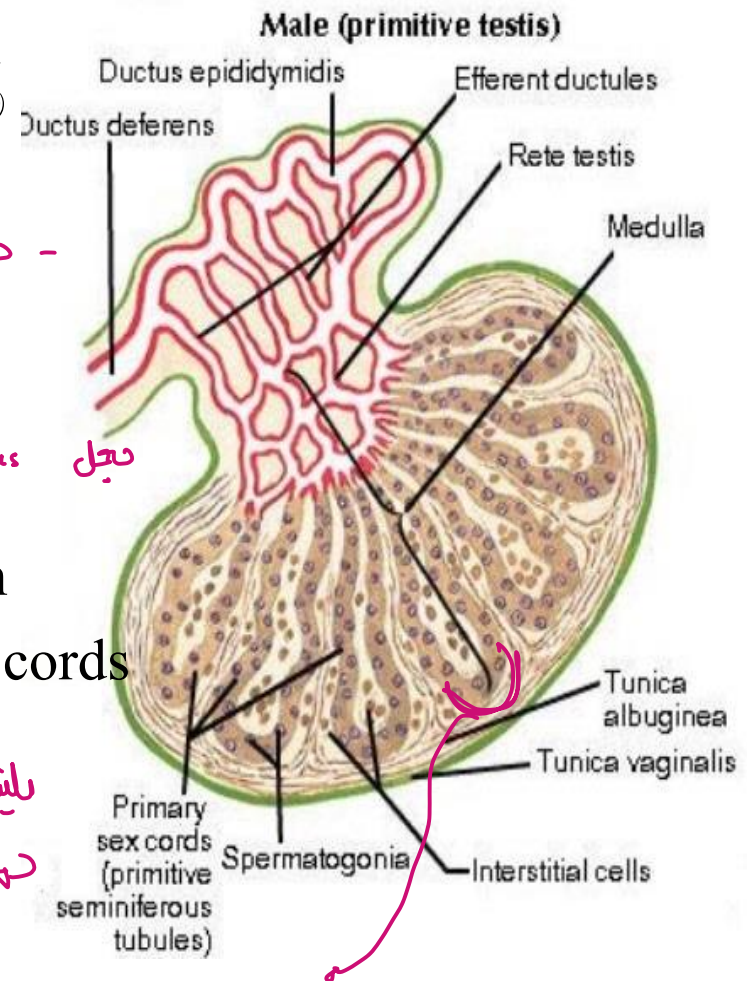
Now this surface germinal epithelium is replaced by an ordinary coelomic epithelium

2-interstitial cells of leydig that lie () the testis cords and start to secrete testosterone at 8th week of dev. which affects the sexual differentiation of the genital ducts and external genitalia

3-In the 4th month, the testis cords become horse shoe-shaped and their extremities are continuous with the rete testis.

The testis cords remain solid till puberty, then canalize forming seminiferous tubules that join rete testis, that in turn enter the efferent ductules.

primitive sex cells form spermatogonia



- لحد ال Puberty بنجل solid

← وقتها مصيد عنا شين + canalization

DEVELOPMENT OF TESTIS

N.B.

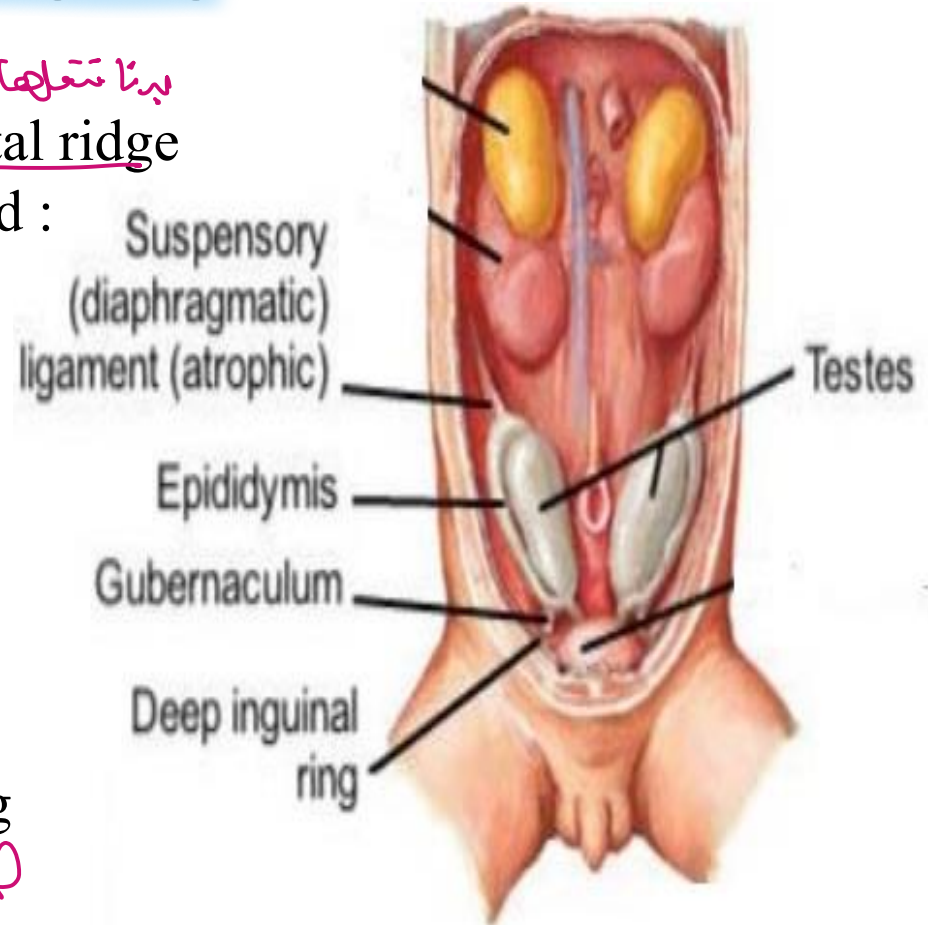
بينا متعلها لل Scrotum

testis is formed in middle part of genital ridge
& remaining parts of ridge are fibrosed :

cranial part of the ridge: الحنة في فوقه
form suspensory lig. of testis

caudal part of the ridge: الحنة في تحت
acquire some muscle fibers from
surrounding mesoderm forming
a fibromuscular structure called
gubernaculum that extend from
lower pole of testis to scrotal swelling
passing through inguinal canal

(لحد ال Scrotum المستقبلي)



DEVELOPMENT OF TESTIS

DESCENT OF TESTIS

cause: to reach scrotum where low temperature ^{میتوسیس} suitable for spermatogenesis

preparation - after dev. of testis suspensory lig. of testis degenerate

course & time:-

reach iliac fossa (false pelvis) at 3rd month

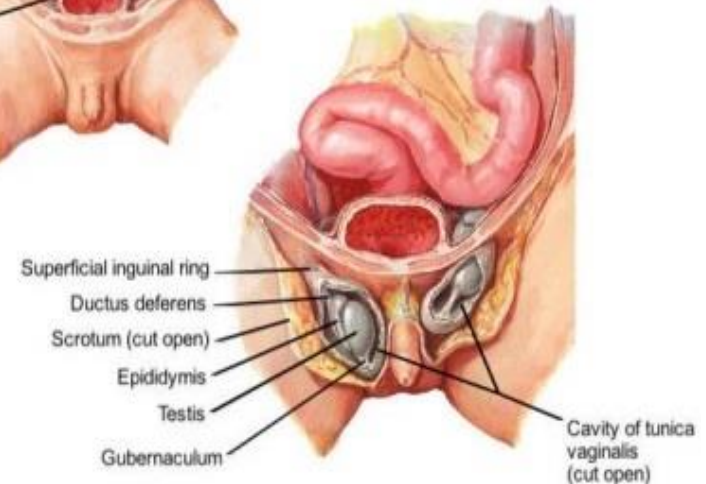
reach deep inguinal ring at 6th month

traverse inguinal canal at 7th month

reach superficial inguinal ring at 8th month

reach scrotum at 9th month

بال ۲ ← دھڑال genital ridge



DEVELOPMENT OF TESTIS

DESCENT OF TESTIS

assisting factors:

1-mechanical: gubernaculum keep pathway patent & pulls the testis by its muscles

2-hormonal: gonadotrophins & testosterone

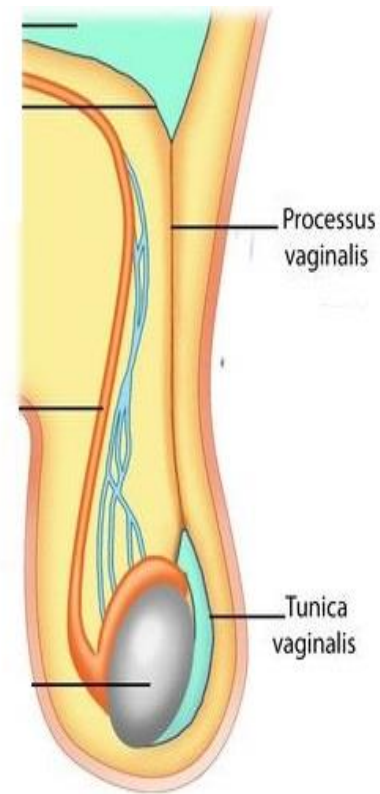
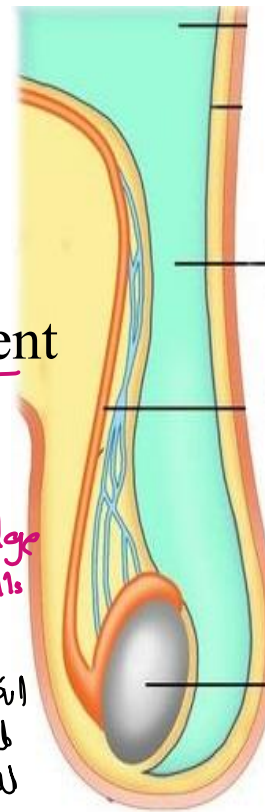
3-relative factor :- elongation of trunk growth - leads to relative descend

4-increased intra-abdominal pressure with development of organs

5-peritoneal: processus vaginalis facilitate gliding of testis

[fate of processus vaginalis:]
-proximal part: is obliterated and fibrosed, forming vestigial of processus vaginalis

-distal part: is invaginated by the testis forming tunica vaginalis around it



DEVELOPMENT OF TESTIS

CONGENITAL ANOMALIES

INFORMATION

#- Gonadal dysgenesis : He is man but not sterile (azospermia)

-it is improper formation of the testis

[due to failure of migration of the primordial germ cells to the genital ridge]

2-ovo testis (true hermaphrodite):
it is testis & ovary in one tissue & ext. genitalia of male & female (ambiguous).
most of these cases are raised as female

IN DESCEND

1- cryptorchidism (undescended testis):
-failure of descent of one or both testis that become retained in abdomen ,
[leads to sterility and is precancerous]

2- ectopic testis:
[descend to abnormal sites as root of penis , perineum or upper part of thigh
due to attachment of additional abnormal bundle of gubernaculum to these sites

DEVELOPMENT OF TESTIS

CONGENITAL ANOMALIES

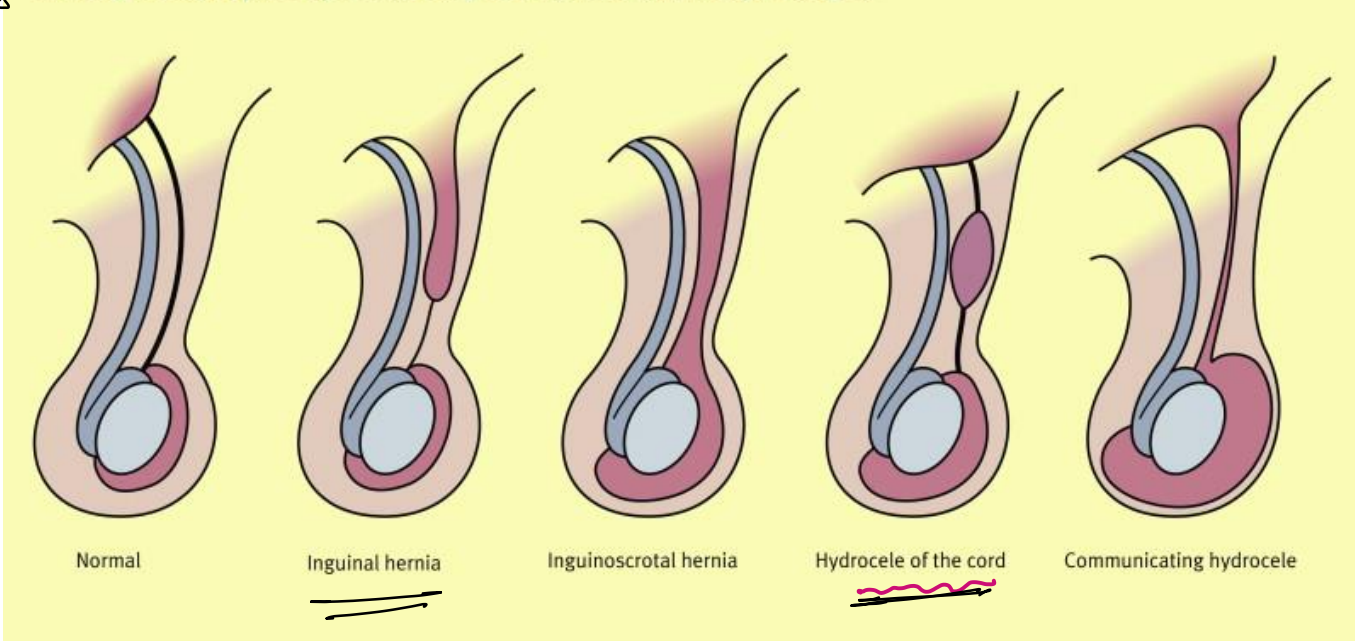
IN PROCESSUS VAGINALIS: *خللت نائجة*

- 1-congenital inguinal hernia: patent processus filled with intestine *منزل ريقها*
- 2-congenital hydrocele: patent processus filled with peritoneal fluid
- 3-cyst of testis or spermatic cord: patent segment with fluid secretion

على آخر البصر توصف
الدم الى testis
منقوصة اما بالليل
ماء عيافي
لا يصح الاطعام واضع
كل السوائل تنزل بالمجازية

Proximal Port
سنة من ال
خللت نائجة

Differing widths of patent processus vaginalis result in variable pathologies



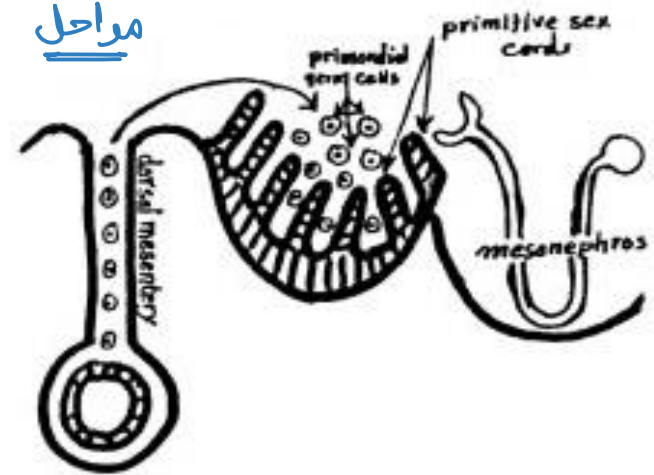
DEVELOPMENT OF OVARY



FORMATION (due to absence of Y chromosome and SRY gene in female (XX))

1- Primitive sex cords dissociate into clusters of cells in the medulla, then replaced by vascular stroma forming the ovarian medulla from intermediate mesoderm

مراحل



2- Germinal epithelium in 7th week give 2nd generation of sex cords called cortical cords, that, in

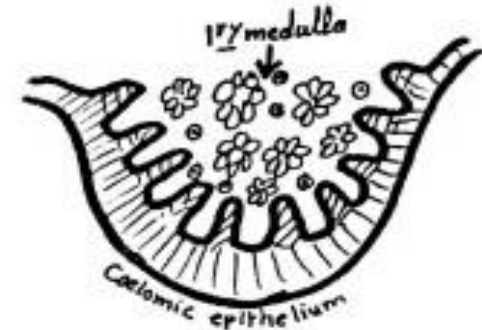
خلفة حبيبات الـ cortex

4th month split into clusters of cells, that surround primitive sex cells

عند الشهر الرابع تفصل وتتحول الى خلايا تحتوي على

3- Primitive sex cells give oogonia

N.B.: clusters of cells give follicular cells which with oogonia forming primary follicles



4- These follicles are not separated from the surface as there is no fibrous capsule (like tunica albuginea), and the germinal epithelium continue to give follicular cells (in male it degenerate)



DEVELOPMENT OF OVARY

FORMATION (due to absence of Y chromosome and SRY gene in female (XX))

N.B.: now the ovary is formed in middle part of genital ridge. The remaining parts of the genital ridge are fibrosed

-upper part forms suspensory lig. of ovary

-lower part forms gubernaculum ovarii that extends from ovary to labia majora.

its attachment to angle of uterus (near entrance of uterine tube) divide it in

upper part: ovarian lig. (true lig. of ovary)

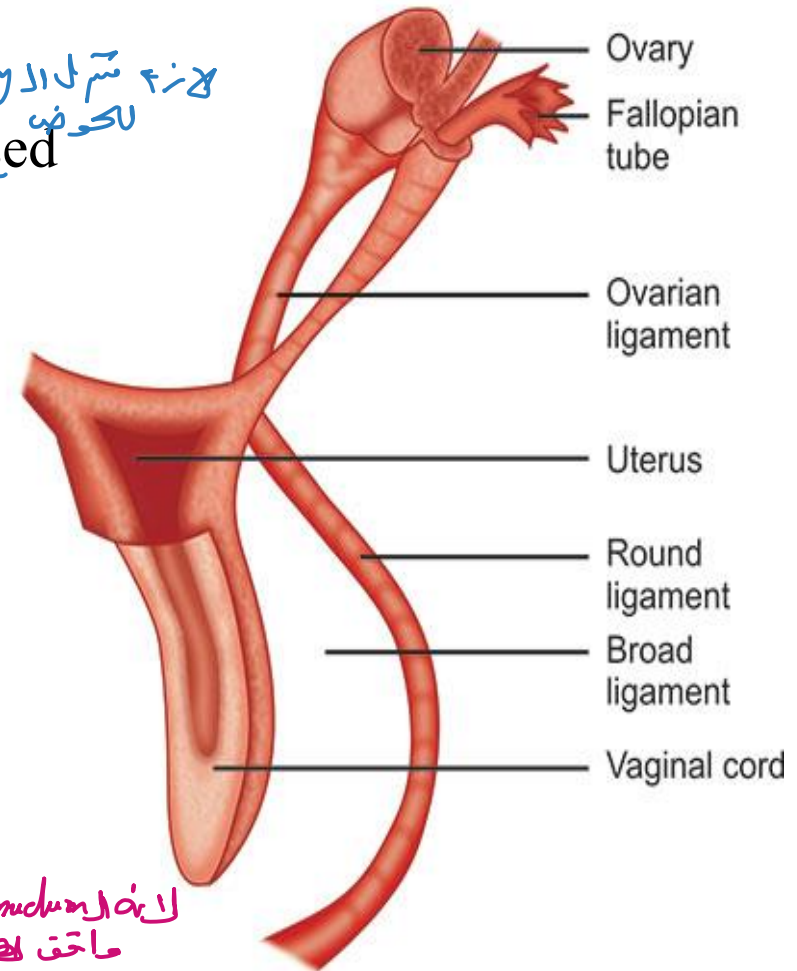
lower part round lig. of uterus

DESCENT

• internal descent : from post. abd wall to true pelvis

guided by gubernaculum ovarii that extend from ovary to labia majora

the attachment to angle of uterus restrict the descent of the ovary ,



DEVELOPMENT OF OVARY

CONGENITAL ANOMALIES:

1-gonadal dysgenesis

[failure of formation or migration of primitive sex cells to genital ridges]

- (fibrous) ovary with no oocytes & infantile female ext. genitalia (due to decreased estrogen) مافي فوليد مافي estrogen [لا تنجب وما عليها ملامح أنثى]
- due to chromosomal abnormalities e.g. (Swyer syndrome) (Turner's syndrome.)

2-ectopic ovary :

ovary behind labia majora , due to failure of attachment of gubernaculum to the uterus بيل ال pelvis

3-dermoid cyst & teratomas شعر، عظم، اسنان

swelling at labia major + painful when touching as testicular pain
due to ovary behind the labia majora.

THANK