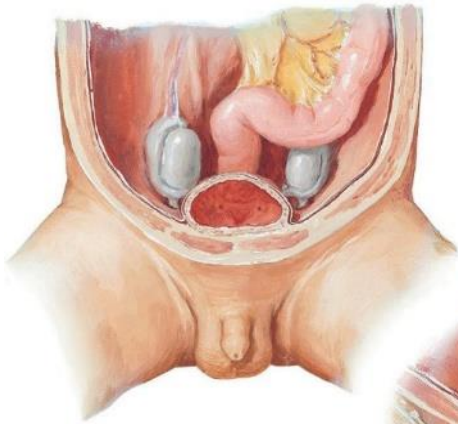
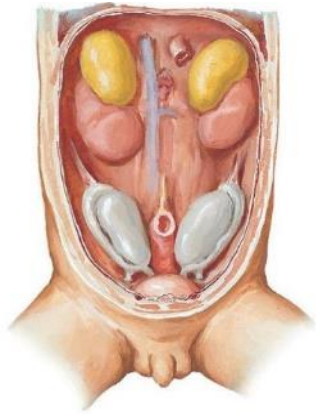
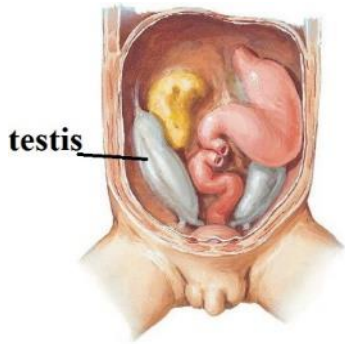
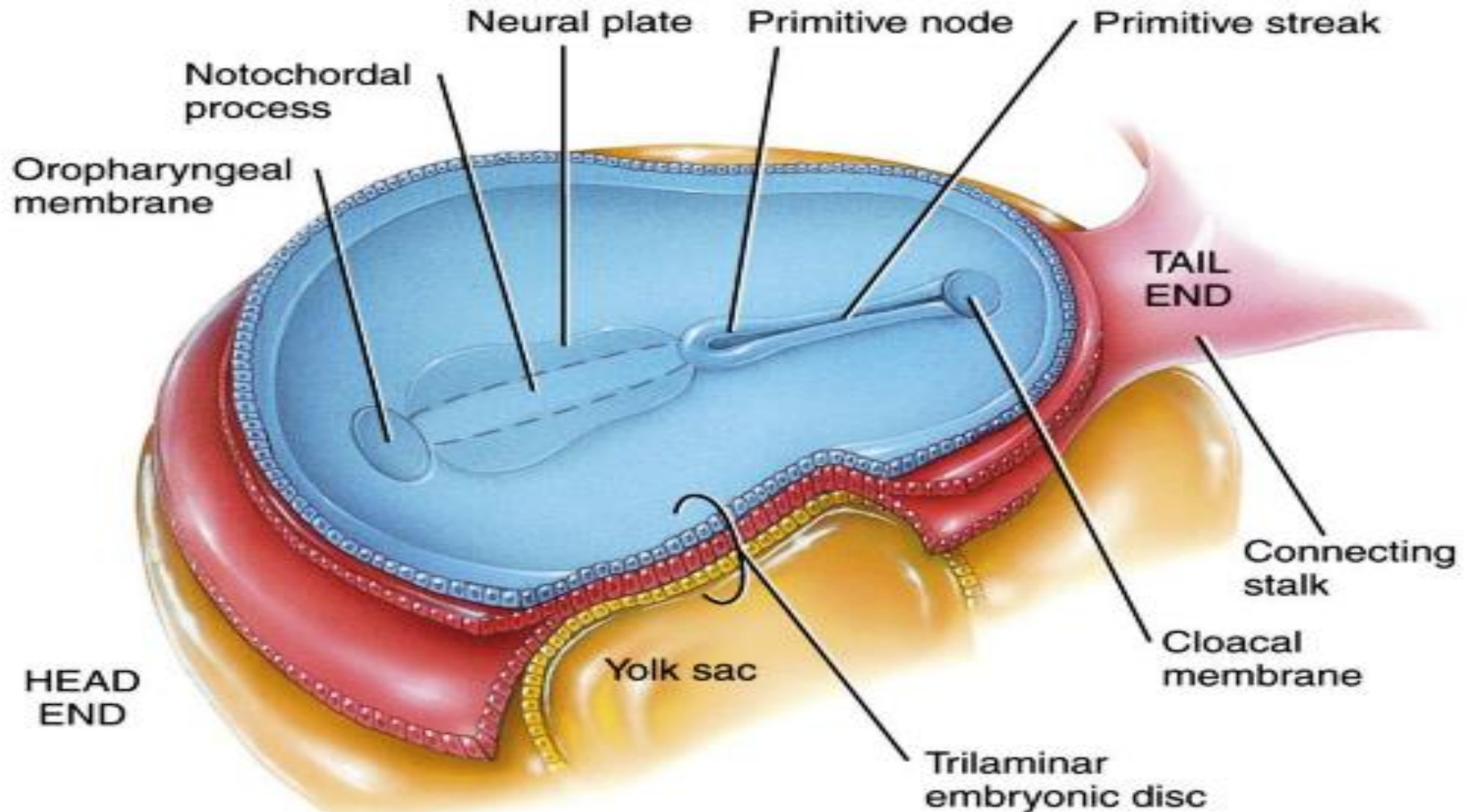


DEVELOPMENT OF THE GENITAL SYSTEM 1



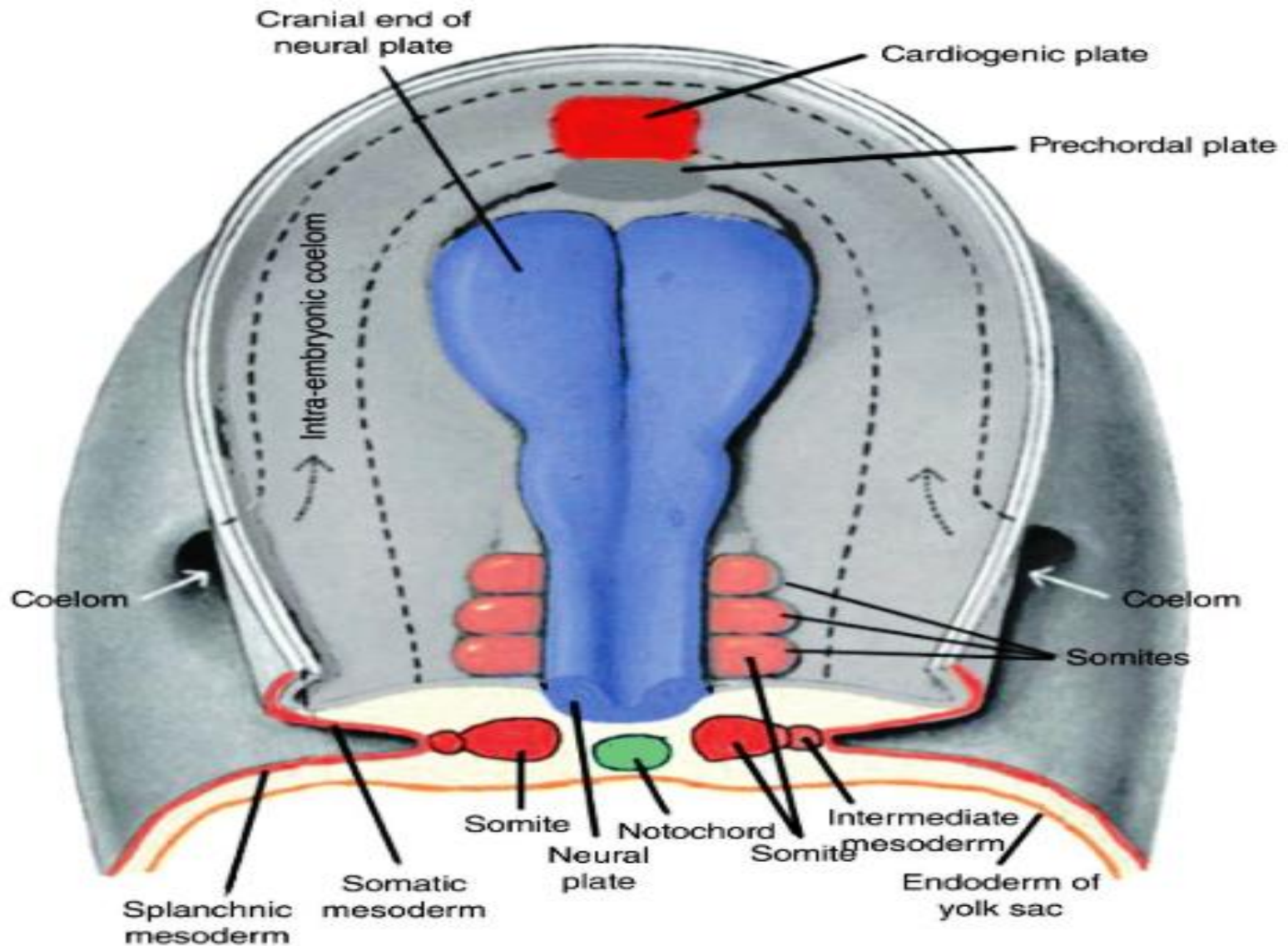
BY
DR ABULMAATY MOHAMED
ASSISTANT PROFESSOR
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MUTAH UNIVERSITY

REV.

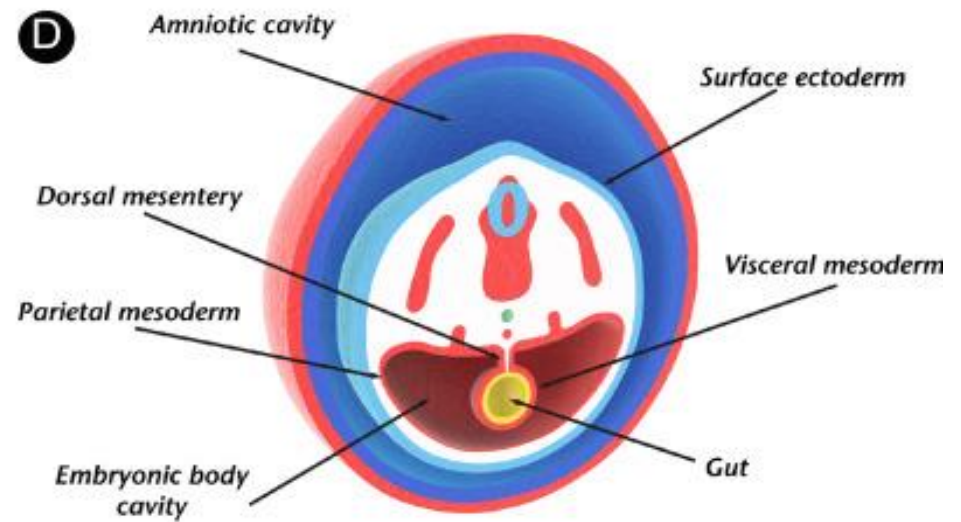
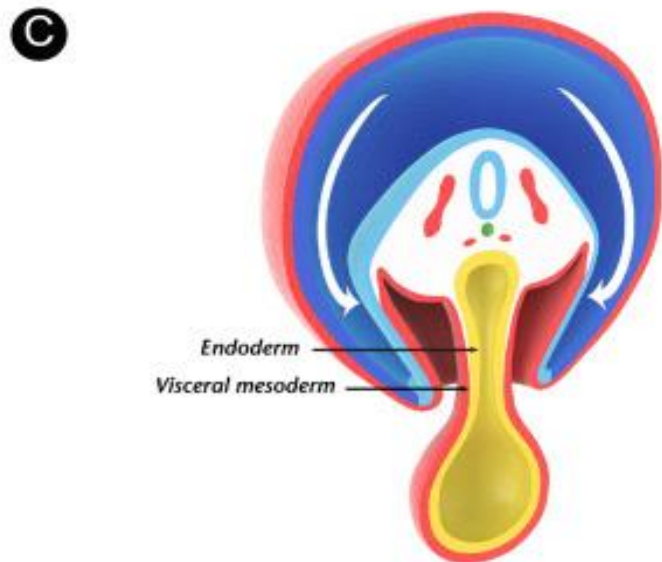
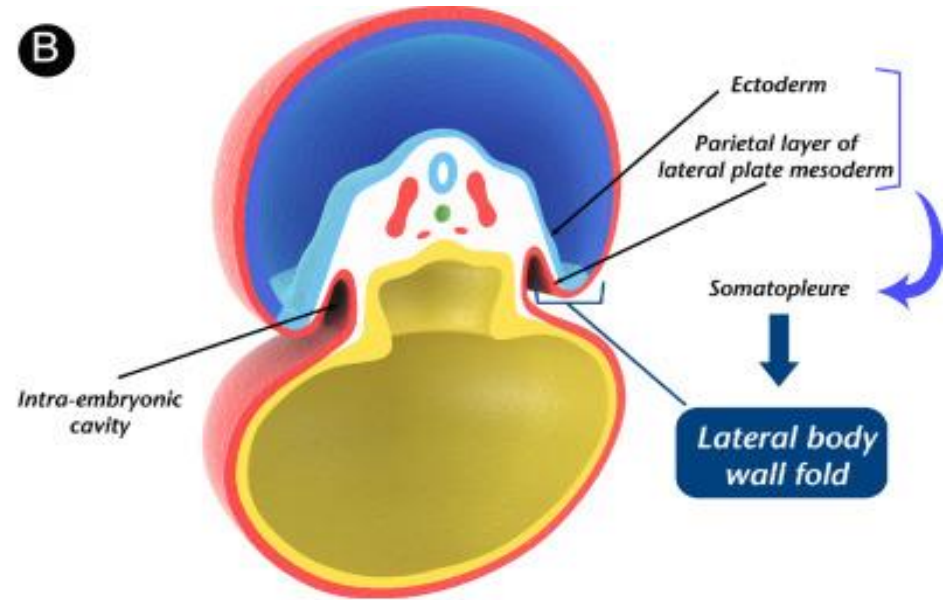
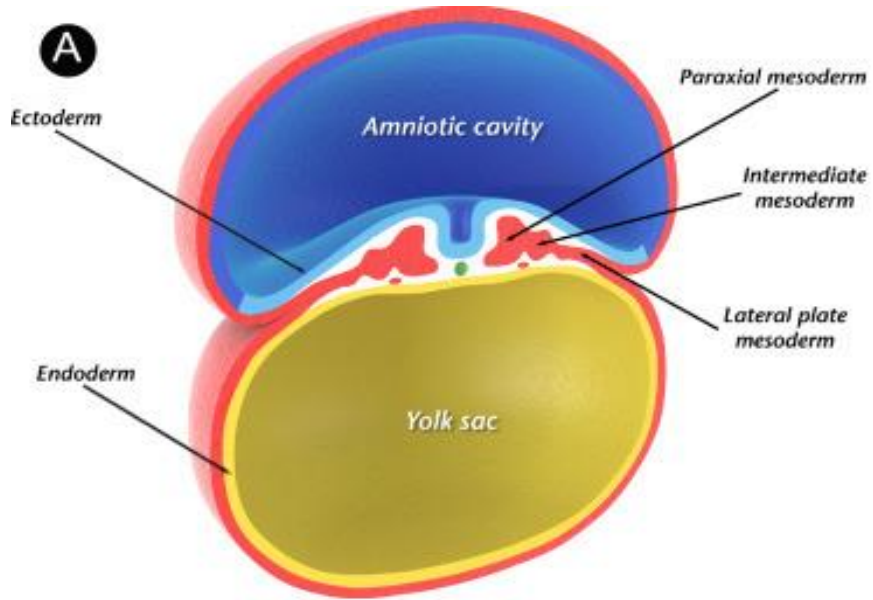


(a) Dorsal and partial sectional views of trilaminar embryonic disc, about 16 days after fertilization

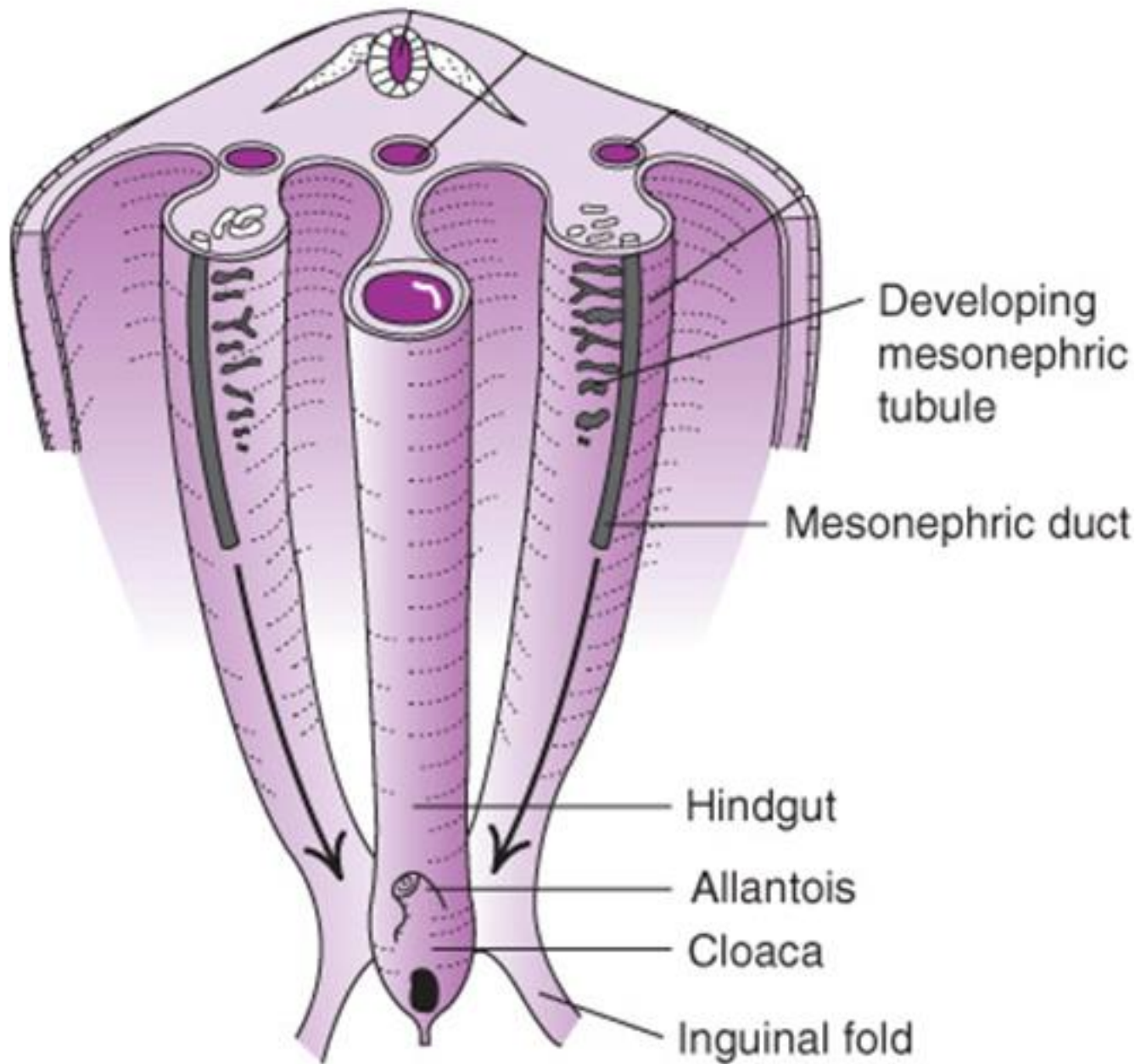
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DEVELOPMENT OF GONADS

INDIFFERENT GONADES (similar in both sexes)

genital ridges

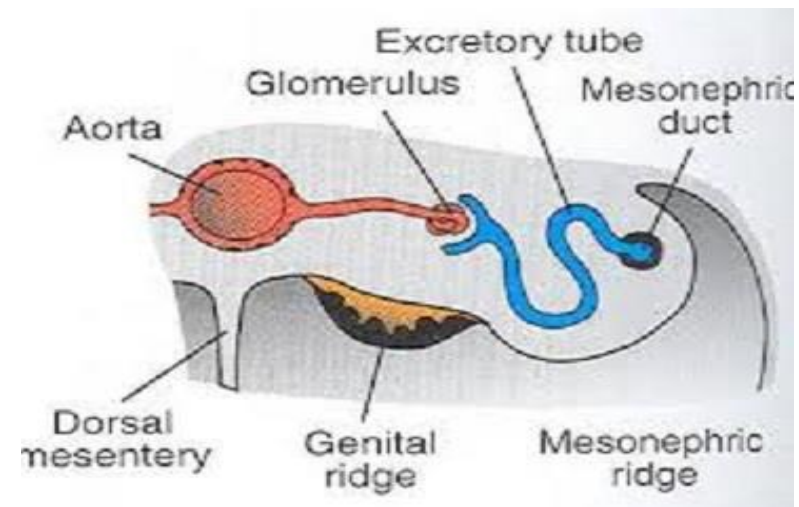
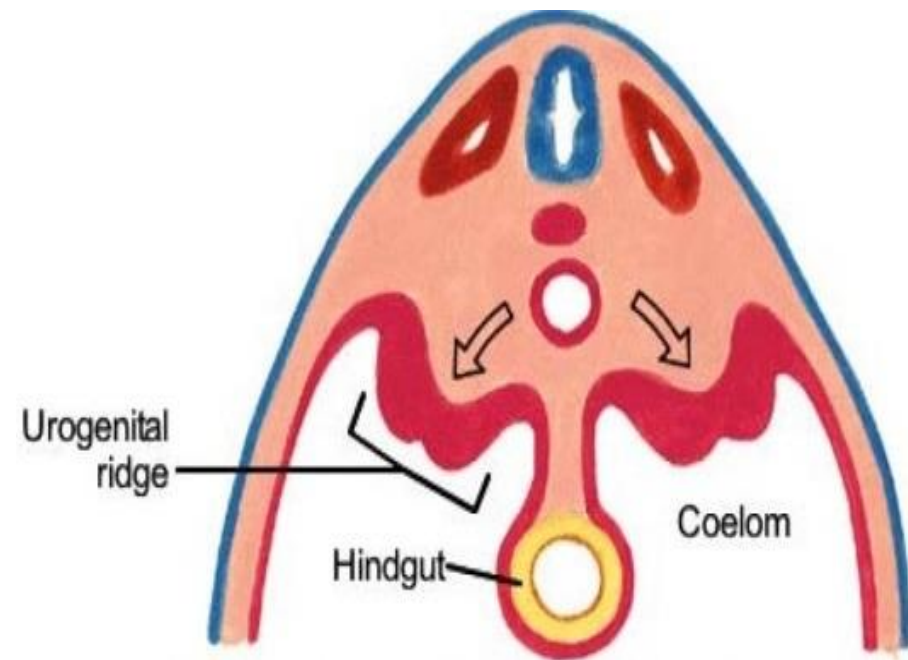
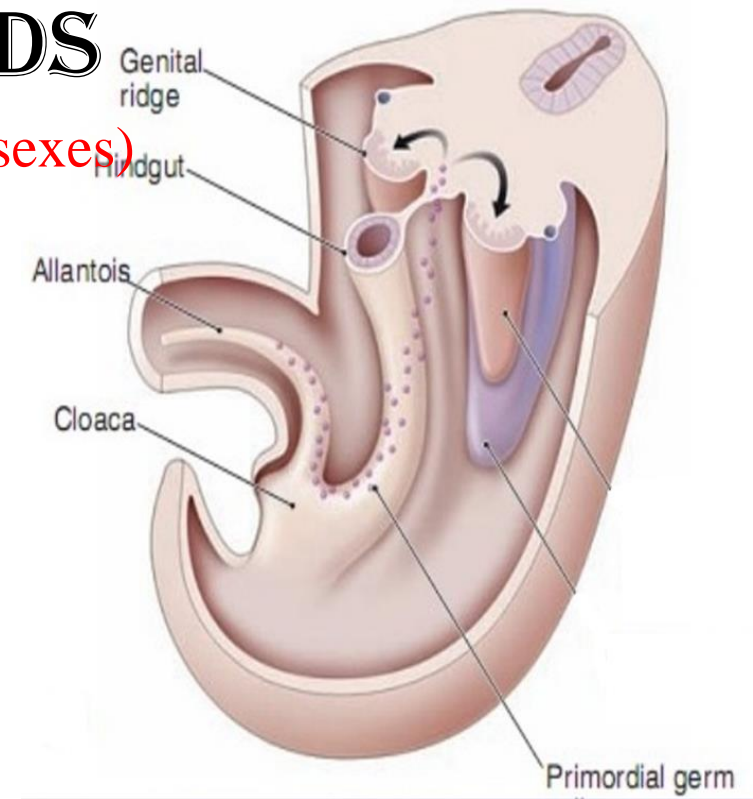
in the 4th week of development

genital ridges are formed

one on each side of midline

medial to mesonephric ridges

Both ridges form the urogenital ridge

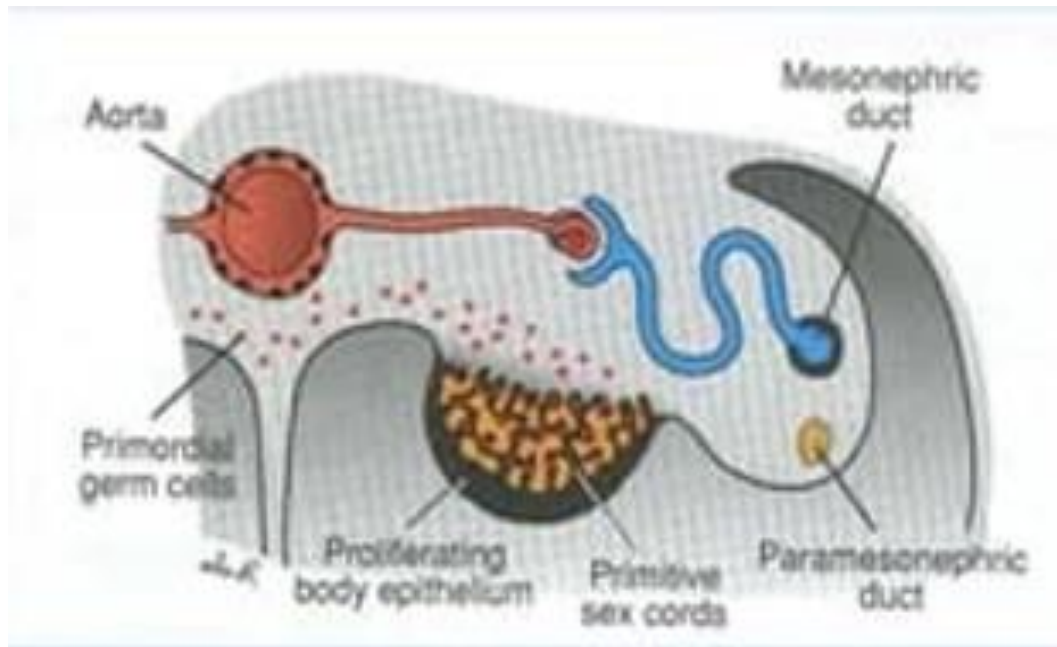
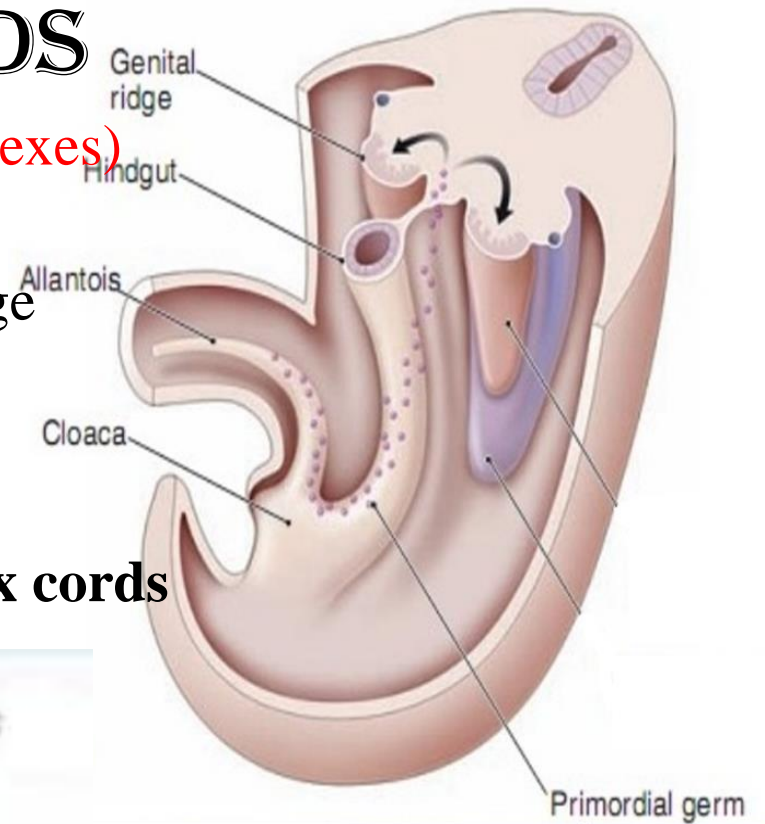


DEVELOPMENT OF GONADS

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

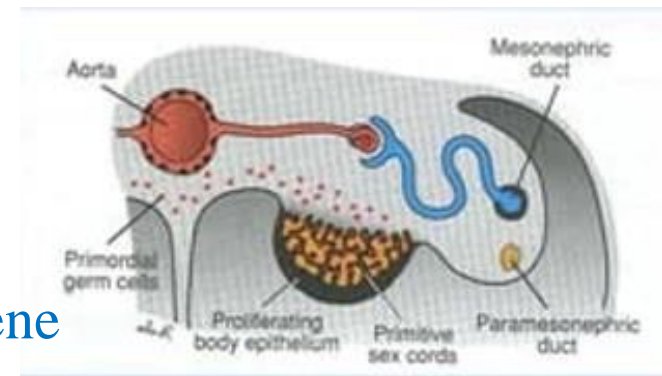
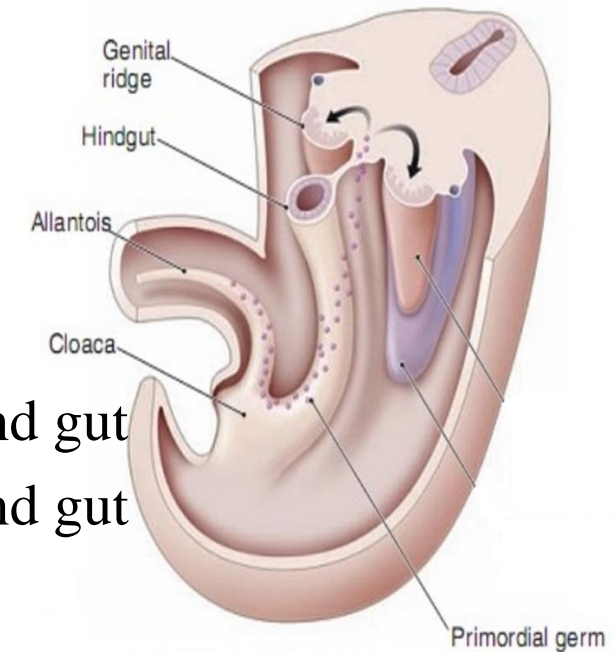
INDIFFERENT GONADES (similar in both sexes)

primitive sex cells (endoderm)

- 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

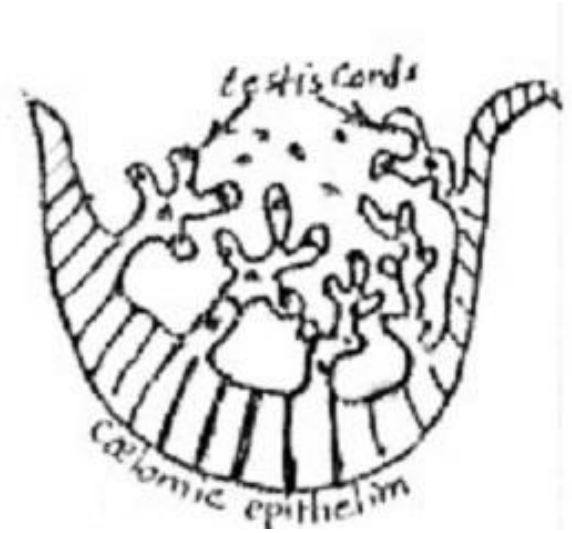
the key to sexual differentiation is Y chromosome
that contains SRY (sex determining region on Y) gene
that form testis determining factor results in male development
N.B: absence of this gene results in female development



DEVELOPMENT OF TESTIS

FORMATION (under effect of SRY gene)

- 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)
- 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



DEVELOPMENT OF TESTIS

FORMATION (under effect of SRY gene)

4-intermediate mesoderm gives:

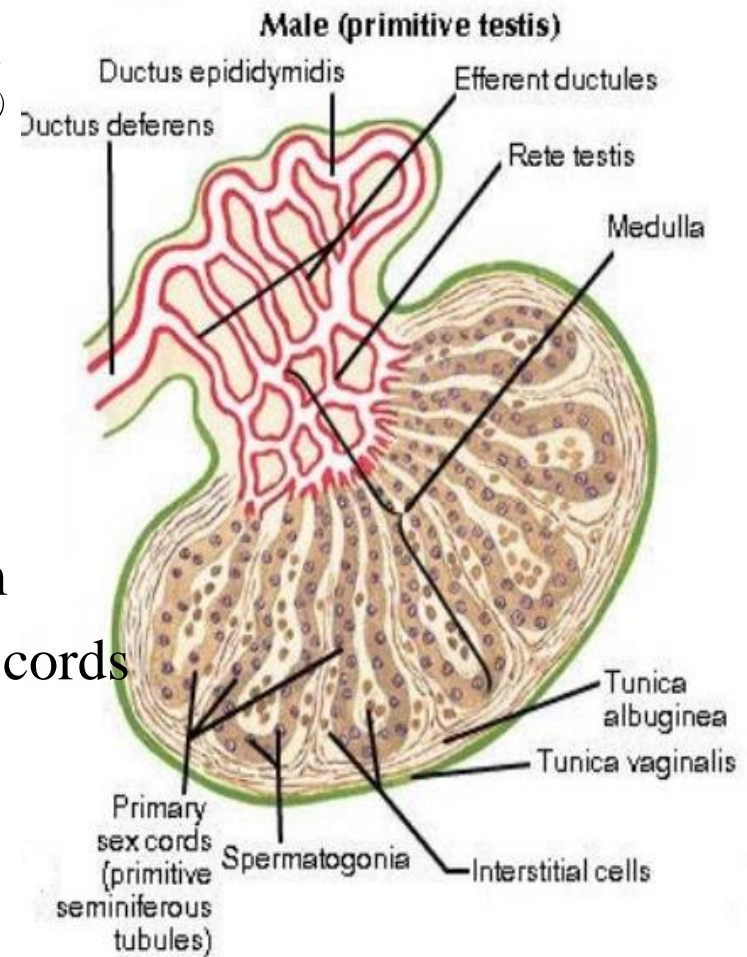
1-tunica albuginea around testis separating the testis cords from germinal epithelium.

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

5-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



DEVELOPMENT OF TESTIS

N.B.

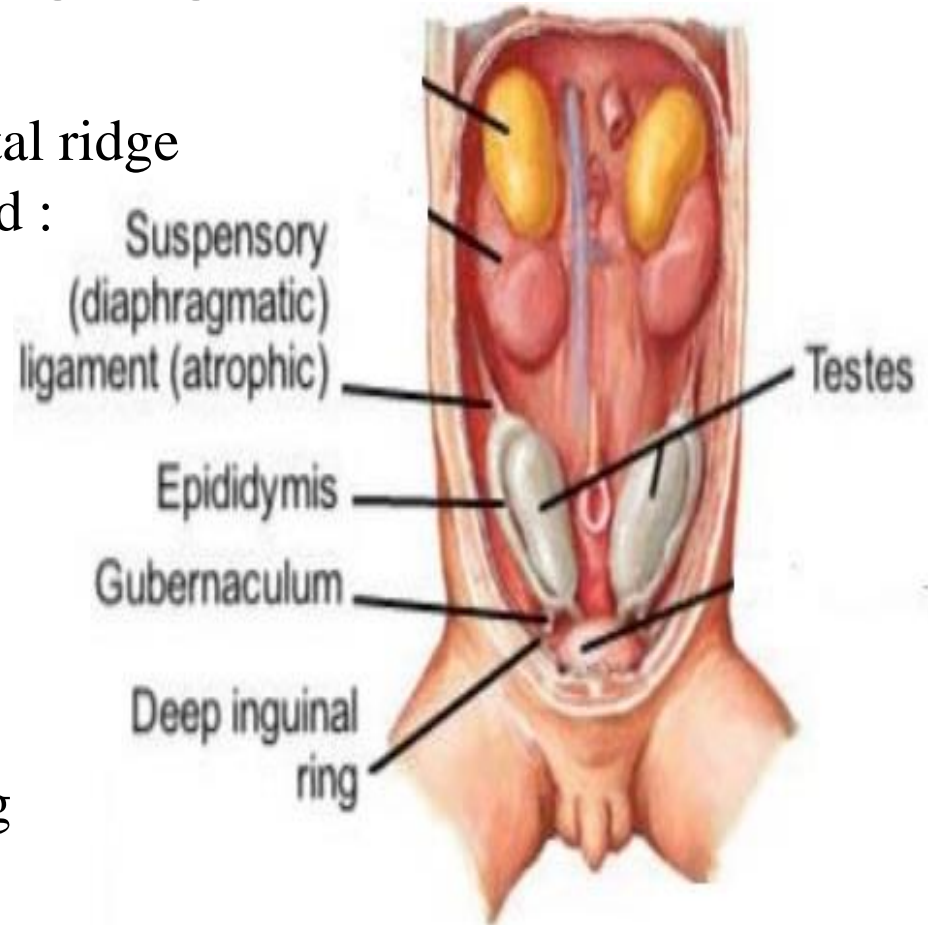
testis is formed in middle part of genital ridge
& remaining parts of ridge are fibrosed :

cranial part of the ridge:

form suspensory lig. of testis

caudal part of the ridge:

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



DEVELOPMENT OF TESTIS

DESCENT OF TESTIS

cause: to reach scrotum where low temperature, suitable for spermatogenesis

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

course & time:-

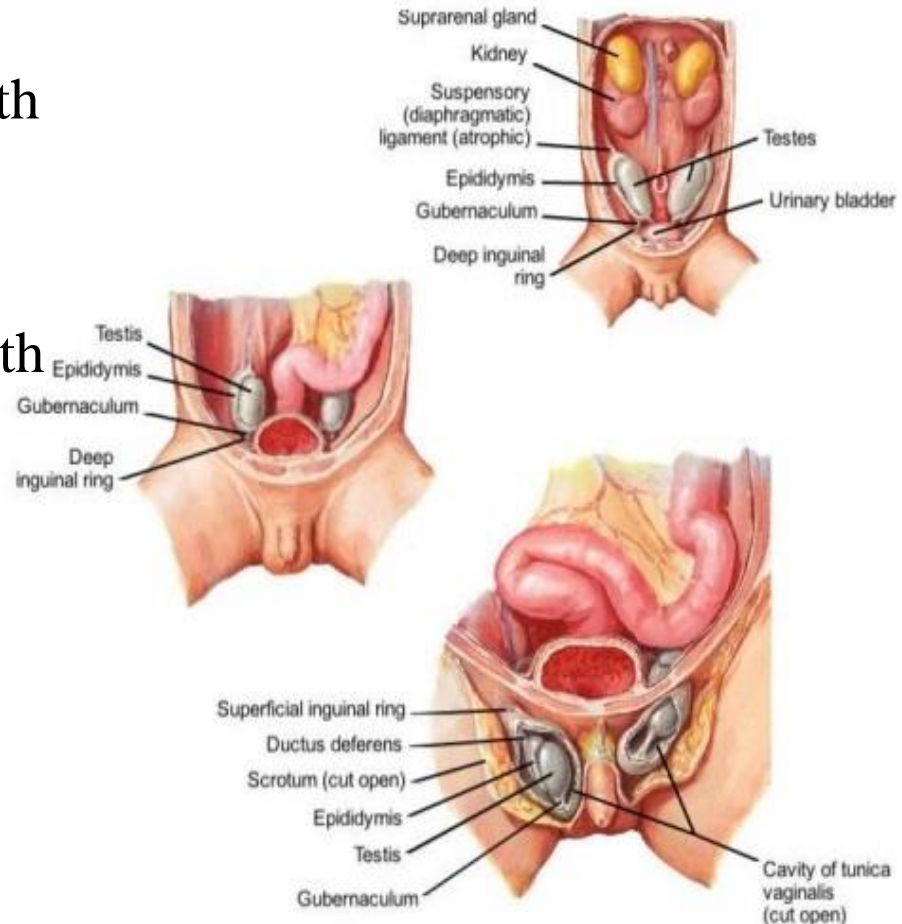
reach iliac fossa (false pelvis) at 3rd month

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



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
leads to relative descend

4-increased intra-abdominal pressure
with development of organs

5-peritoneal: processus vaginalis facilitate gliding of testis

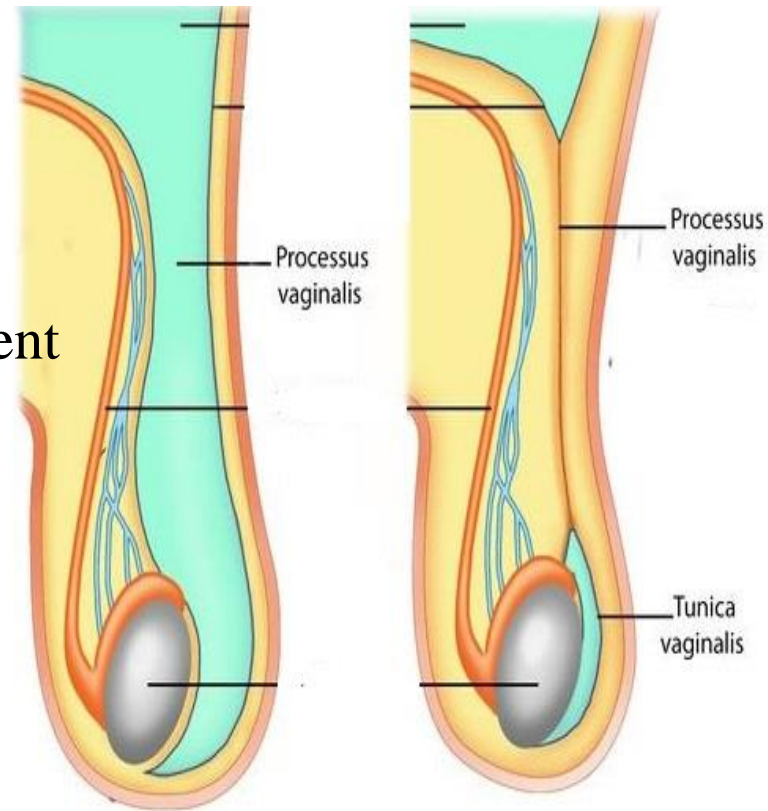
fate of processus vaginalis:

-proximal part:

is obliterated and fibrosed , forming vestigie of processus vaginalis

-distal part

is invaginated by the testis forming tunica vaginalis around it



DEVELOPMENT OF TESTIS

CONGENITAL ANOMALIES

INFORMATION

1- Gonadal dysgenesis :

- 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:

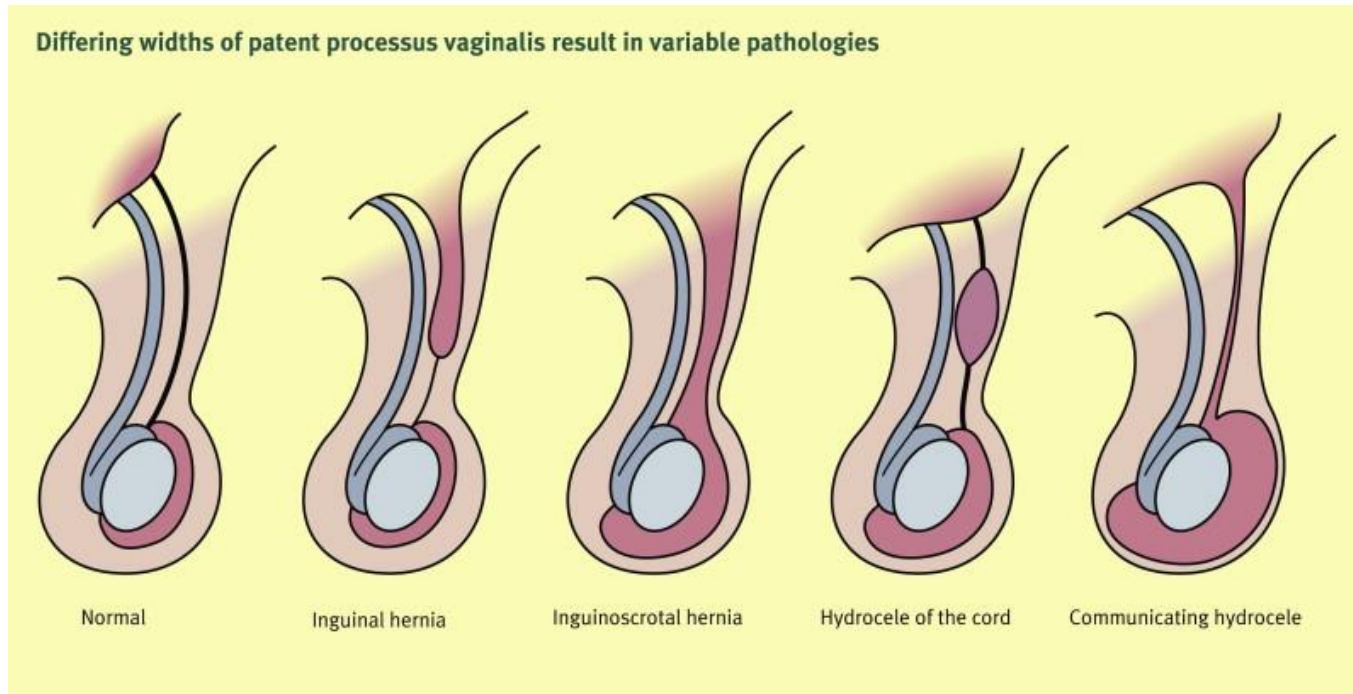
descend to abnormal sites as root of penis , perineum or upper part of thigh
due to attachment of additional abnormal bundle of gubernaculum to these sites

DEVELOPMENT OF TESTIS

CONGENITAL ANOMALIES

IN PROCESSUS VAGINALIS:

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



DEVELOPMENT OF OVARY

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

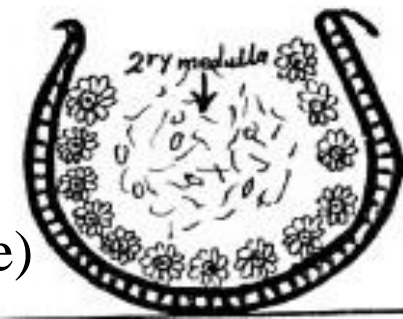
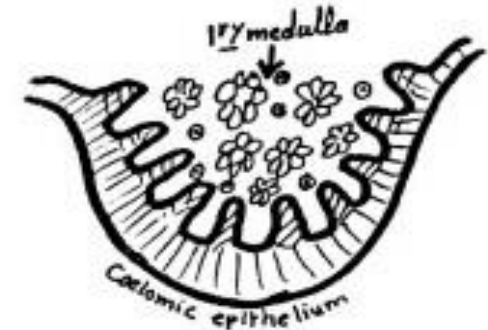
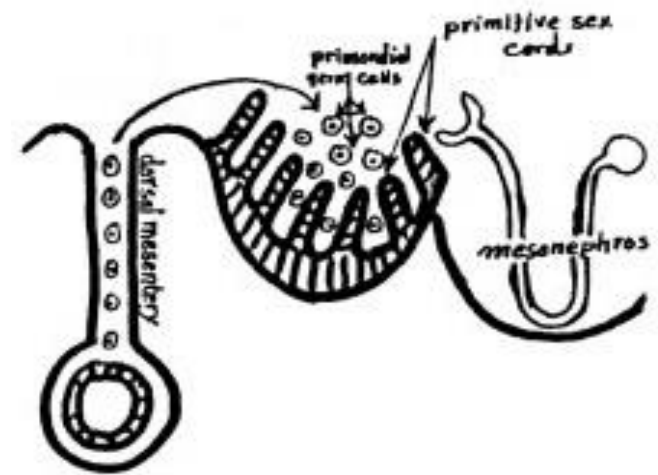
1-Primitive sex cords dissociate into clusters of cells in the medulla, then replaced by vascular stroma forming the ovarian medulla from intermediate mesoderm

2-Germinal epithelium in 7th week give 2nd generation of sex cords called cortical cords, that, in 4th month split into clusters of cells, that surround primitive sex cells

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.

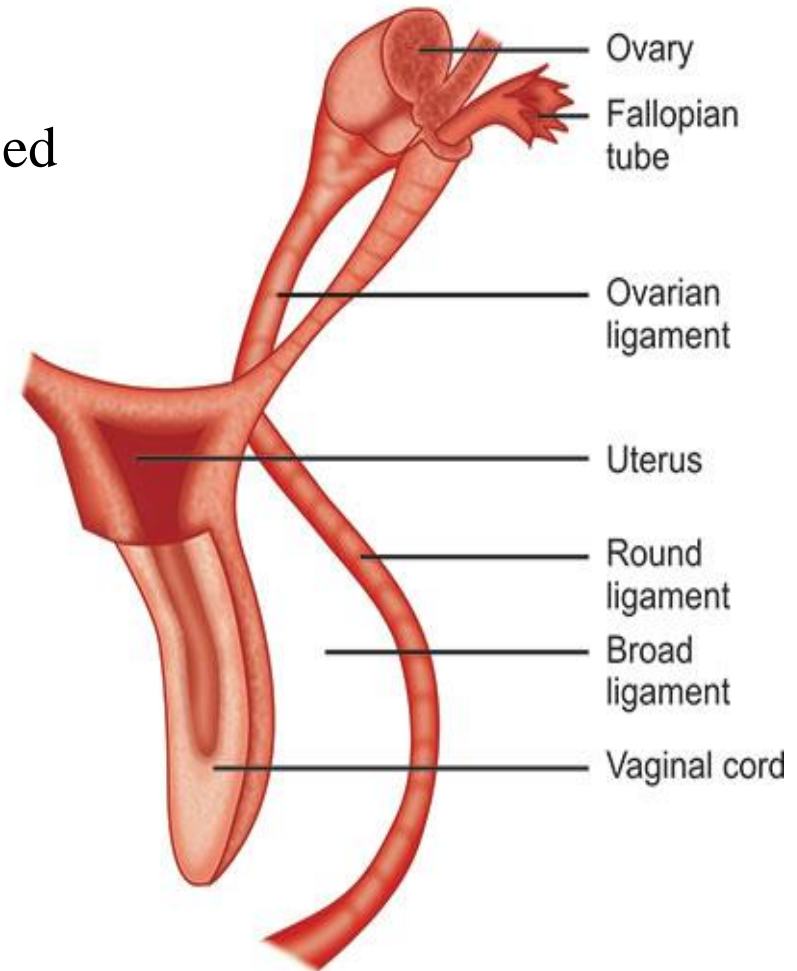
its attachment to angle of uterus (near entrance of uterine tube) divide it in

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)

-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

3-dermoid cyst & teratomas

THANK