Toppersnotes
Unleash the topper in you

NEET-PG

PART-C

VOLUME-V

GYNAECOLOGY

& OBSTETRICS

SIERRA INNOVATIONS
Private Limited

GYNAECOLOGY & OBSTETRICS

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Germ cell differentiation.

What determines sex in fetus : SRY gene on short arm, chromosome y.

Others :

If SRY gene is present.

↓

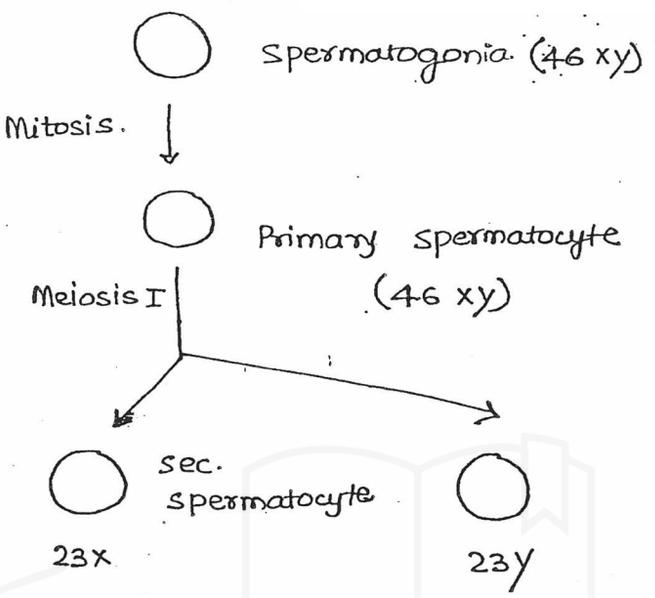
Gonads = Testis (7 wks).

(Gonads develop from Genital ridge)

- Sertoli cells
  - ↓
  - Mullerian inhibiting factor (A glycoprotein, secreted at 7 wks)
  - It has paracrine action. ie it acts locally.
  - ↓
  - Leads to ipsilateral regression of Mullerian ducts in males by 9 wks.
  - ↓
  - Remanants of Mullerian duct in males : Appendix of Testis, Prostatic utricle.
- Leydig cells
  - ↓
  - Testosterone (Its production begins at 9 wks (intra-uterine). Maxm producn @ 14-18 wks
  - 5α-reductase
    - Promotes the growth of wolffian duct in males
      - ↓
      - Int. Genitalia
      - S - Seminal vesicle
      - E - Ejaculatory duct
      - E - Epididymis
      - V - Vas deferens
    - Formn of DHT
      - ↓
      - Ext. genitalia in males.

* Appendix of Testis ≙ Hydatid of Morgagni.

Spermatogenesis.



Imp. points on spermatogenesis :

Begins at puberty.

Time taken : 72-75 days.

One spermatogonia forms - 16 primary spermatocyte.

One spermatocyte gives rise to 4 sperms/ spermatids.

One spermatogonia gives rise to 64 sperms/ spermatids.

Spermiogenesis :-

Spermatids change to sperms

No mitosis/ No meiosis

Time taken : 14 days.

Part of spermatid.		Part in sperm.
Nuclear material	—	Head of sperm.
Golgi body	—	Acrosomal cap.
Mitochondria	—	Middle piece.
Microtubules	—	Tail/axial filament.

* sperms lack ER (especially RER).-

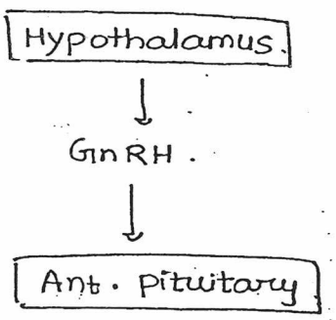
Perms

55 μm.

Life span - 72 hrs.

Sperms attain motility & maturity in - Cranial end of epididymis.

Hormonal support of spermatogenesis :



* 1st stimulus for leydig cells to produce testosterone : HCG.

Sperm pathway -

Spermatogenesis occur @ seminiferous tubules of Testis. (Sertoli cells)

↓

Motility & maturity @ Epididymis (cranial end).

↓

Vas deferens.

↓

They are released along with seminal vesicle fluid. (60% volm + Fructose).

+ Protastic fluid. + Bulbourethral gland secretion.

↓

The semen which is released should liquify in 20-30 minutes.

(Liquifacn d/t : prostatic fluid)

Ideally semen analysis is done on liquified semen.

But if no liquifcn occurs in 60 mins ∴ semen analysis on unliquified semen.

Note : If there is azoospermia with low semen volume & absent fructose → Block is below the level of seminal vesicle.

Men c congenital absence of vas def., suffer c seminal vesicle agenesis (CAVD)

∴ They have low semen volume, low PH & low fructose.

Spermatogenesis is, however, normal.

* Absence of spermatozoa } in semen.
  But presence of Fructose }

  Likely diagnosis may be : Mumps orchitis.

Capacitation :

- Ability of sperms to fertilize ova
- Begins in female reproductive tract (cervix).
- Major part occurs in Fallopian tube.
- Time taken : 7 hours
- After capacitation, sperms become hyper-motile.

Acrosomal ग्रक्रिया :

- occurs after the sperm binds to zona pellucida
- Zona pellucida has sperm receptors : ZP_1, ZP_2 & ZP_3, which mediate acrosomal ग्रक्रिया (Main : ZP_3).
- Acrosomal ग्रक्रिया occurs because enzymes like hylauronidase, acrosin, etc. are released.

In females

SRY gene Absent
- Whether ovary is Present / absent depends on Y chromosome.
- For dev. of ovary 2X chromosomes are needed.

↓

Gonads = ovary.

Sertoli cells absent

↓

∴ Mullerian I. F. absent

↓

∴ Mullerian duct grows into
- Fallopian tube
- Uterus
- Cervix
- Upper 3/5th Vagina.

Leydig cells absent

↓

Testosterone absent

Wolffian duct regresses

Ext. genitalia looks like female.

↑ Lower part of vagina develops from urogenital sinus (sino-vaginal bulb)

Most common cause of ambiguous female genitalia : Presence of testosterone in intra-uterine life [congenital adrenal hyperplasia]

Remnants of wolffian ducts in females :-

Part of Wolffian duct		Remnants in females.
1. Pronephros	— forms —	Hydatid of Morgagni / Kobelt tubercle.
2. Mesonephros.		
• Cranial end.	———	Epo-ophoron / organ of Rosenmuller
• Caudal end	———	Para-oophoron.
3. Wolfian duct proper	———	Gartner's duct

All remnants of wolffian duct is present in lateral part of broad ligament, except para-oophron, which is present in medial part of broad ligament.

* Wolffian duct ≅ Mesonephric duct
  Mullerian duct ≅ Para-mesonephric duct.

* organ of Rossenmuller :
  - consists Vertical tubules. (Not Horizontal tubules)
  - Lined by cuboid epithelia (Not by columnar epithelia).

Oogenesis.

46 XX — oogonia

↓ Mitosis.

46 XX — Primary oocyte.

↓

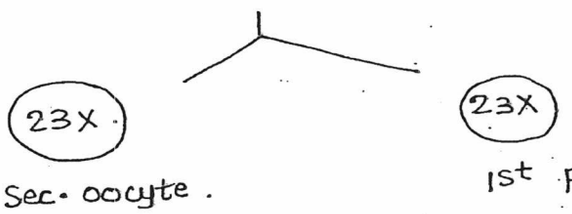
Meiosis I : arrested in Diplotene (Prophase)

* This arrested stage is known as Dictyate stage. (upto puberty)
  ↳ This stage is absent in spermatogenesis.

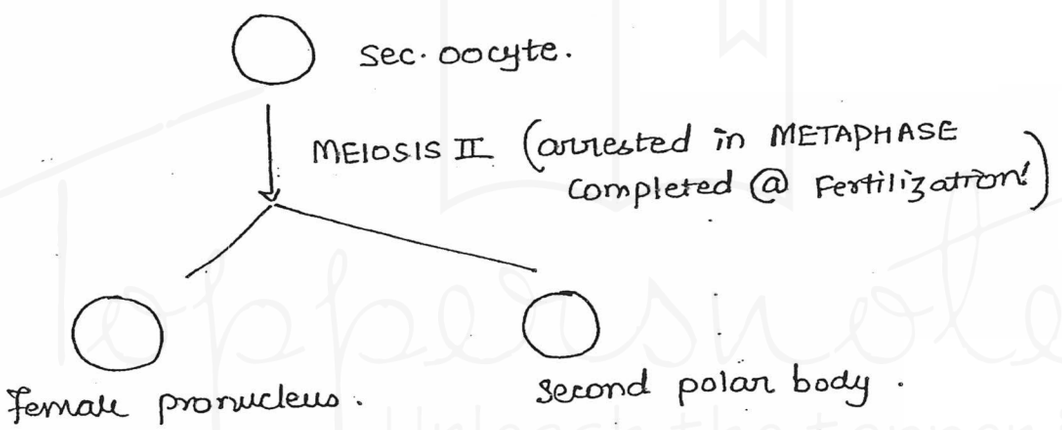
At puberty, Meiosis I is resumed.
Meiosis is hormone dependent. → LH
∴ Meiosis I is resumed 24-36 hours before ovulation.

At puberty :

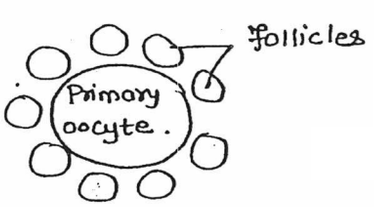
The arrest is over.



Release of sec. oocyte from primary is k/a ovulation.



- size of ova : 120 microns (largest cell of body).



PRIMORDIAL follicle. (size : 0.02 mm)

* size of follicle just before ovul^{n} = 18-20 mm

* Max^{m} no. of follicles @ 20 wks (5th month of intra-uterine life)
- 6-7 millions.

At birth : 1-2 millions

At Puberty : 4-5 lakhs.

400-500 follicles mature in entire lifetime.

Germ cells are derived from Epiplast/ectoderm.

↓

Reach yolk sac (by 3 wks)

↓

Genital ridge (6 wks)

↓

Oogonia are formed (9 wks)

↓

1st oocytes (12 wks)

↓

follicle formⁿ begins @ 14 wks'.
& completed by 24 wks.

- Fertilization:
  - site : ampulla (FT)
  - zygote undergoes cell division.

↓

2, 4, 8, 16 celled zygote.

↓

16 celled zygote (Morula).

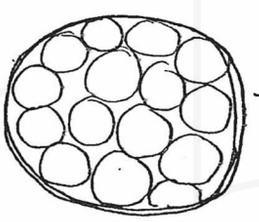
* zygote stays in Fallopian tube for 3 days.
Then it moves towards uterine cavity d/t:-
  (i) Peristalsis of tube
  (ii) Movement of cilia

Nutrition to the zygote in F.T. is provided by secretory cells of FT. in the form of pyruvate.

* zygote enters the uterine cavity : Day 4 after fertilizn

day 14th day 18th day.

Ovulation — zygote enters uterine cavity.



— Zona pellucida
(on 5th day zona pellucida is lost & this is K/a Zona Hatching).

Morula.

As the Morula enters uterine cavity, fluid enters into it. & Now it is K/a. BLASTOCYST.

In Blastocyst, cells are arranged in 2 manners.

↳ ~~* [illegible]~~ TROPHOBLAST : which lines the Blastocyst.

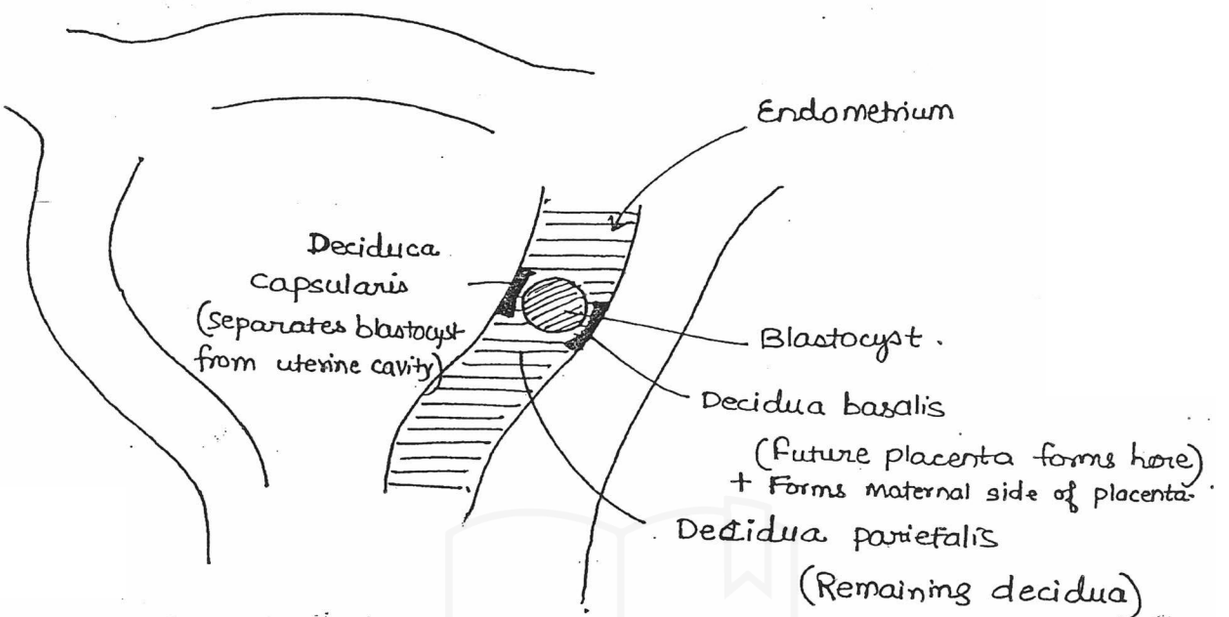
↳ Inner cell mass :

Implantation :

occurs in the form of Blastocyst

6-7 ~~[illegible]~~. days after fertilization : Beginning.

Completed by 10 days after fertilization

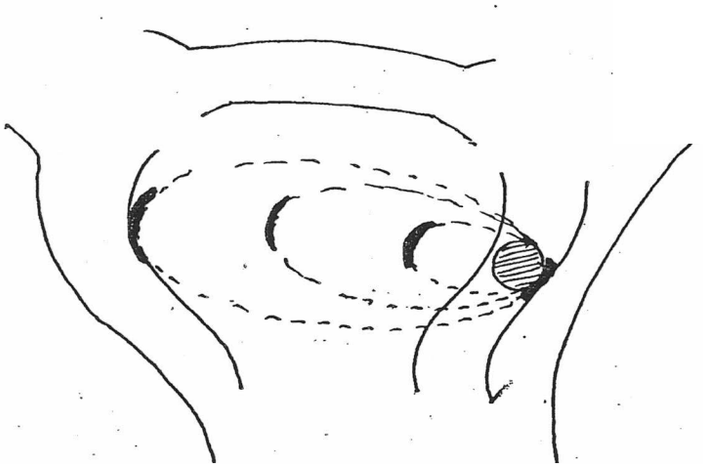


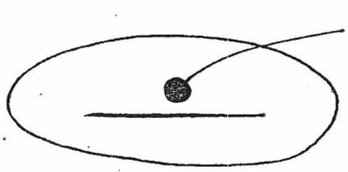
- Interstitial implantation.

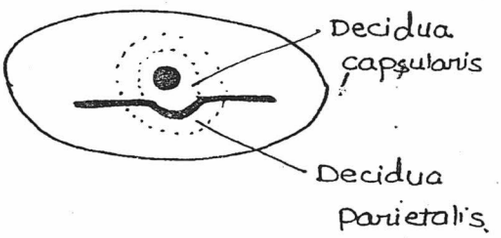
- Thickness of endometrium at time of implantation = 8mm.
  In some females, bleeding occurs at the time of implantn.
  — HARTMAN'S sign.

- After implantation, Endometrium is K/a Decidua.

- As the fetus grow, Decidua basalis & decidua parietalis fuse by 16 wks. (uterine cavity obliteration).
  ∴ Superfetation could be possible only before uterine cavity obliterates ie. by 16 wks.





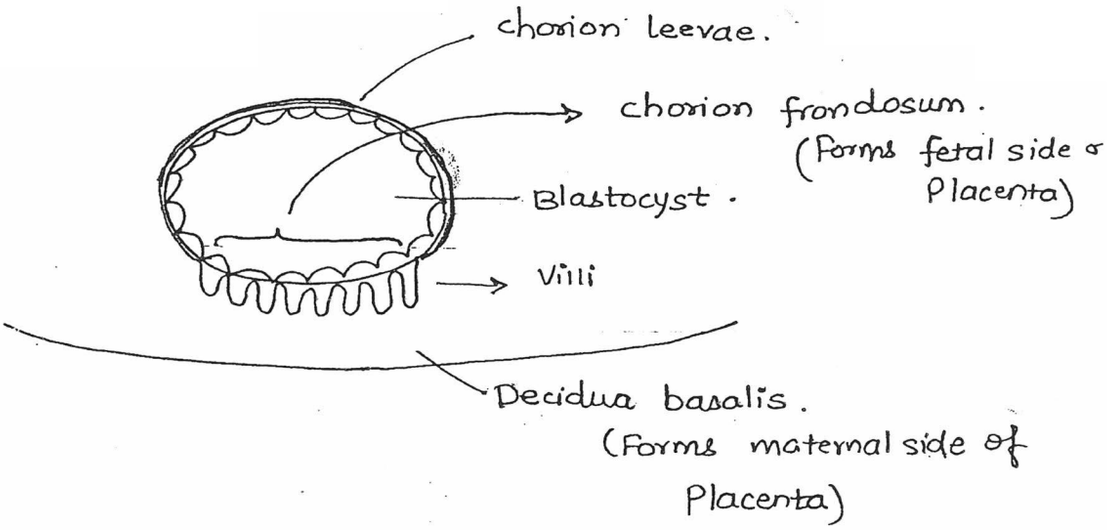


- Double ring sign-
(at

~~Double ring sign is absent in Ectopic Pregnancy~~ :

- Embryonic period : 3-8 wks after fertilization.
(5-10 wks after pregnancy).
↳ Most teratogenic period.
- Fetal period : From 9 wks after fertilization uptil delivery.
- first germ layer fromed in fetus : Endoderm.

Trophoblast < Cyto-trophoblast
Syncytio-trophoblast. | This differntiation occurs 8th day after fertilisn.



- Fetal membranes.

Amnion.

- Formed @ Day 10, 11. - after fertilisn.
- Derived from ectoderm
- Innermost fetal memb.
- Avascular; provides tensile strength to fetal memb.

Chorion.

formed 8 days after fertilisn

- Chorion leevae: fuses c amnion.
- Chorion frundosum

Yolk sac.

first site for hematopoiesis

Allantois.

- A diverticula that arises from hindgut & grows into connecting stalk.

† Prostaglandin predominantly present in fetal memb. — PGE_2
∴ When fetal memb. are ruptured during labour → Prostaglandins are released. & labour proceeds @ faster rate.

Site of hematopoiesis

1. Yolk sac.	3-6 wks.	Gower 1, 2 Portland.
2. Liver (mainly) & spleen.	≥ 6 wks.	HbF
3. Bone marrow	≥ 20 wks.	HbA.

Fetal RBCs have larger size.
but short life span. (90 days)

Fetal Hb. at term = 18 gm%. (75-80% is HbF).

Switch over of fetal Hb. to Adult Hb. begins at 36 wks & is completed by 6 months after birth. (HbF < 1% @ 6 months)
This shift is carried by Gluco-corticoids.

HbF	HbA.
– Less of 2,3 DPG. ∴ Higher affinity for O_2.	– ~~More 2,3 DPG.~~ ∴ Less affinity for O_2
– Less of carbonic anhydrase	– More.
– Resistant to acid & alkali	– Sensitive to acid & alkali ∴ gets hemolysed.

* Apt test / singer alkali denaturation test.

– It is a qualititative test done in vasa previa, to differntiate b/w maternal & fetal blood.