

→ The Graafian follicle now ruptures to release the secondary oocyte (ovum) from the ovary by the process called ovulation.

* Primary Follicle:-

- ① Location :- Fetal ovary
- ② Time period :- Fetal ovary to menarche
b/w menopause.
- ③ Contain :- Primary Oocyte.

* Secondary Follicle:-

- ① Location :- Ovary
- ② Time period :- In every menstrual cycle
during follicular phase.
- ③ Contain :- Primary Oocyte

* Tertiary follicle:-

- ① Location :- Ovary
- ② Time Period :- In Every menstrual cycle
during follicular phase.

- ③ contain :- Primary Oocyte → Secondary Oocyte

Meiosis II is
completed here.

* Graafian Follicle :-

① Location

:- Ovary

② Time Period

:- At the End of follicular phase.

③ Content

:- Secondary Oocyte
(Meiosis-II Metaphase-II)

* Primary Oocyte :-

→ It is in Primary, Secondary and Tertiary follicles.

→ Division status - Meiosis-I Prophase-I

Time Period :- From fetal ovary to Menarche - Menopause.

* Secondary Oocyte :-

→ It is in Tertiary and Graafian follicle.

Division status - Meiosis-II Metaphase-II

→ It ~~divides~~ only by the penetration of sperm in the fallopian tube.

→ It completes Meiosis-II just before fertilisation only by the penetration of sperm.

→ Chromosomal Number :- It is haploid (n).
because it is formed after Meiosis-I.

* Division

① Meiosis-I Prophase-2 :- 1

- Condition in Primary Oocyte.
- Found in fetal ovary to Menarche - Menopause.

* Meiosis-I completed & Metaphase-II Meiosis-II

- ^{last 4-5 days} follicular phase, Ovulatory phase and some part of ^{5 days} Luteal phase - Time line

* Meiosis-II completed :-

- By the penetration of Sperm.
- Performed by Secondary Oocyte.
- It results Ovary and Second polar body

* 1st Polar body :-

① Location

:- Tertiary follicle in the ovary during follicular phase.

② Formed after

:- Meiosis-I performed by Primary Oocyte in the tertiary follicle.

- First polar body formed along with Secondary oocyte and Secondary oocyte retains bulk of the nutrient rich cytoplasm of the Primary oocyte. Hence, first polar body is smaller in size.

Chromosomal status - Haploid

→ Does the first polar body born out of the first meiotic division further or degenerate?

At present we are not very certain about this.

* Second Polar body:-

→ It is formed after Meiosis-II.

→ But the completion of Meiosis-II depends on penetration of sperm.

→ So, No. of fertilisations in female is equal to no. of second polar body.

* Fertilisation And Implantation:-

- ① Coitus - Process of Copulation.
- ② Insemination - During copulation semen is released by the penis into the vagina is called Insemination.
- ③ Path of Spermatozoa:-

Seminiferous tubules



Rete testis



Vasa efferentia



Epididymis



Vas deferens



Ejaculatory duct



Urethra



Urethral meatus



Vaginal orifice



Cervical canal



Cervix



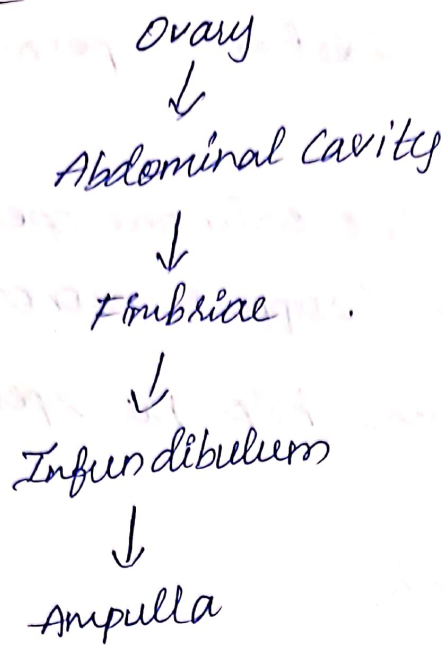
Uterus

Ampulla

Isthmus



① Path of Ovum:-



Assertion:- All copulations do not lead to fertilisation and pregnancy.

Reason:- Fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary region.

* Fertilisation:-

- The process of fusion of a sperm with an ovum is called fertilisation.
- During fertilisation first the sperm comes in contact with granulosa cells of corona radiata.
- They penetrate the corona radiata and reach zona pellucida.

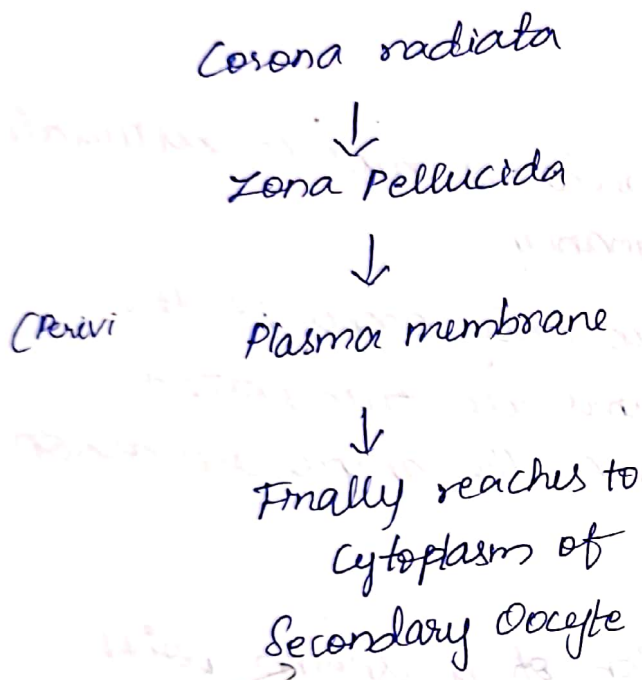
Zona pellucida is a glyco protein layer with sperm receptors.

During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum.

and induces changes in the membrane that block the entry of additional sperms (prevent polyspermy).

→ Thus, it ensures that only one sperm can fertilise an ovum (support monospermy).

→ Secretions of acrosome helps the sperm to cross

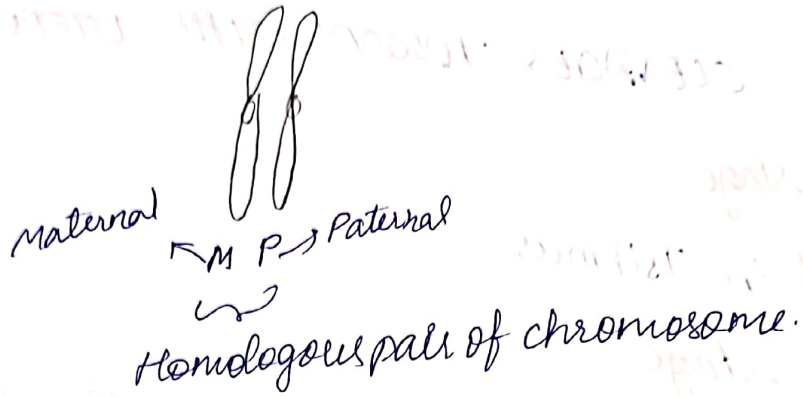


→ This induces the completion of the meiotic division of the secondary oocyte.

→ The second meiotic division is also unequal and results in the formation of a second polar body and a haploid ovum (Ootid)

→ Soon the haploid nucleus of the sperms and that of the ovum fuse together to form a diploid zygote.

How many chromosomes will be there in the zygote?
 a) 23 pairs (46 chromosomes).



→ Sex of human is determined during
 FERTILISATION.

Female: Male
 XX - XY

AAXX AAXY

homo
gamete | AX
 | AX

Hetero
gamete | AX
 | AY

♀ \ ♂	AX	AY
AX	AAXX	AAXY
AY	AAXX	AAXY

* Embryonic Development:-

→ Divisions of the zygote are mitotic divisions.

→ Divisions of the zygote starts when it is in oviduct only.

→ At this time zygote surrounded by zona pellucida, but corona radiata disappears.

* Zygote:-

→ mitotic division starts as the zygote moves through the isthmus of the oviduct called CLEAVAGES TOWARDS THE UTERUS.

* Two-cell stage:-

→ Located in Isthmus.

* Four-cell stage:-

→ Located in Isthmus

* Morula:-

→ Embryo with 8 to 16 blastomeres is called morula.

→ Entering from the Isthmus to uterus.

* Blastocyst:-

→ The morula continues to divide and transform into blastocyst.

→ As it moves further into the uterus.

→ The blastomeres in the blastocyst are arranged into an outer layer called trophoblast and an inner group of cells attached to trophoblast called the inner cell mass.

→ The trophoblast:-

* Attach to the endometrium during

Implantations.

* Inner cell mass :-

→ gets differentiated as the embryo.

Note :-

→ Still the blastocyst is surrounded by zona pellucida.

* Implantation :-

→ Just before implantation zona pellucida disappears.

→ The trophoblast layer gets attached to the endometrium.

→ After attachment, the uterine cells divide rapidly and covers the blastocyst.

→ As a result, the blastocyst becomes embedded in the endometrium of the uterus.

→ This is called Implantation and it leads to pregnancy.