

AYODEJI OLUWABUNMI GLORIA.

18/MHS01/098.

MEDICINE AND HEALTH SCIENCES.

MEDICINE AND SURGERY.

EMBRYOLOGY.

1. **Ovulation**

Ovulation is the release of a mature secondary oocyte from the ovarian follicle.

Few days before ovulation, under the influence of follicle stimulating hormone (FSH) and luteinizing hormone (LH), the secondary follicle grows rapidly to a diameter of about 25mm and becomes mature vesicular or mature secondary or Graafian follicle.

There is an abrupt increase in luteinizing hormone which leads to completion of meiosis 1 and the follicle enters into preovulatory mature vesicular stage.

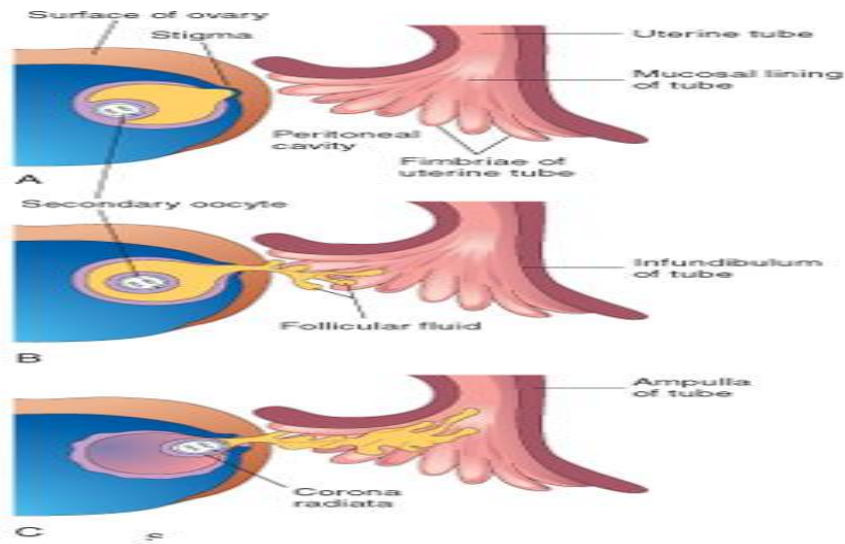
An avascular stigma appears at the surface of the ovary. When the secondary oocyte enters into meiosis 2, it becomes arrested at metaphase II stage three hours before ovulation by cytostatic factor. During the arrest, the surface of the ovary begins to bulge to form the stigma in order to prepare for the release.

There is an abrupt increase again in luteinizing hormone which causes increase in collagenase activity (an enzyme) which digests collagen fibers (connective tissue) around the secondary oocyte and increase in prostaglandin levels in response to luteinizing surge which causes local muscular contraction in the ovarian wall.

After this muscular contraction, the secondary oocyte as well as the follicular cells surrounding it (cumulus oophorus) are also extruded.

The cells of the cumulus oophorus now arrange themselves around the zona pellucida of the mature secondary oocyte to form another follicle called corona radiata.

Ovulation is completed after all these.



2. **Differences between Meiosis I and Meiosis II**

Meiosis 1	Meiosis 2
1. Homologous chromosomes separate.	Sister chromosomes separate.
2. Two daughter cells are produced.	Four daughter cells are produced.
3. Crossing over occurs here.	No crossing over occurs.
4. Begins with diploid parent cells.	Begins with haploid parent cells.
5. Chiasma formation occurs here.	No chiasma formation occurs here.
6. Centromere do not split here.	Centromeres split.

3. **FERTILIZATION.**

Fertilization is the union of sperm and oocytes. The process is approximately 24 hours. Its usual site is ampulla in the uterine tube. It is a sequence of coordinated events which include:

a) Passage of sperm through the corona radiata:

This involves capacitation- the removal of glycoprotein coat and seminal plasma protein from the plasma membrane over the region of the head of the sperm. This makes the sperm pass through the corona radiata.

b) Passage through the zona pellucida:

The acrosome of the sperm binds with the binding site on the region of the zona pellucida of the oocyte. The acrosome contains some lysing enzyme called Acrosin which helps the sperm to pass through the Zona pellucida. As soon as the sperms enter the plasma membrane, there are cortical granules in the plasma membrane. These cortical granules send signals to the zona pellucida to close their binding sites so as to prevent polyspermy.

c) Fusion of the plasma membrane of sperm and oocyte.

Plasma membrane of sperm and oocyte fuse together and break down at the area of fusion. The head and tail of the sperm enters the cytoplasm leaving behind its plasma membrane.

d) Completion of 2nd meiotic division and formation of female pronucleus.

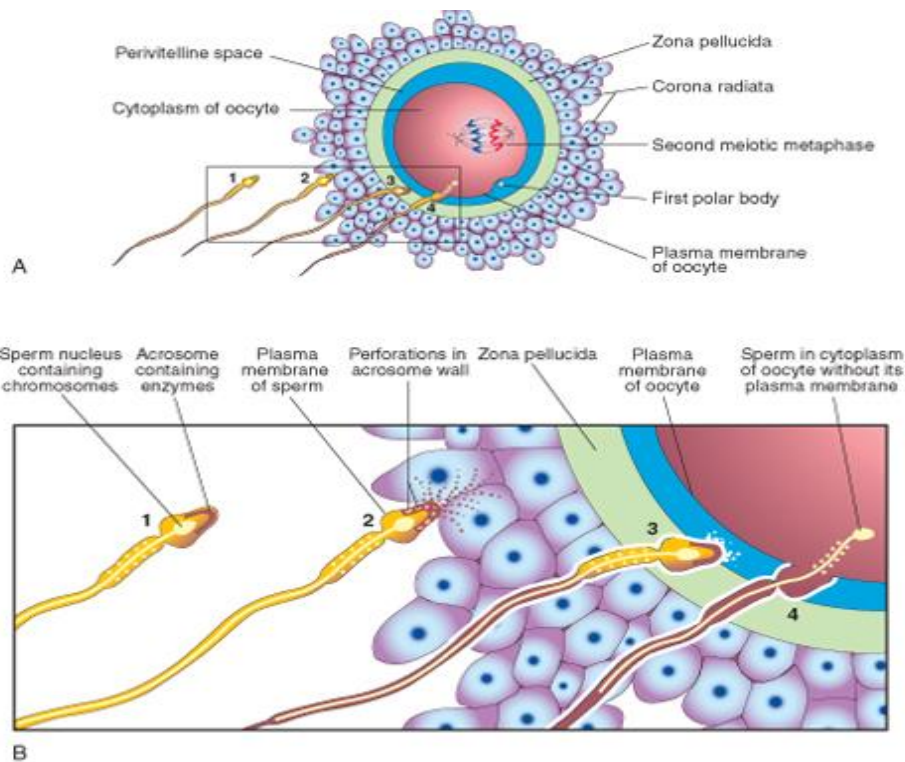
As soon as the head and tail of sperm enters the cytoplasm, 2nd meiotic division is completed. The nucleus of the oocyte becomes the female pronucleus.

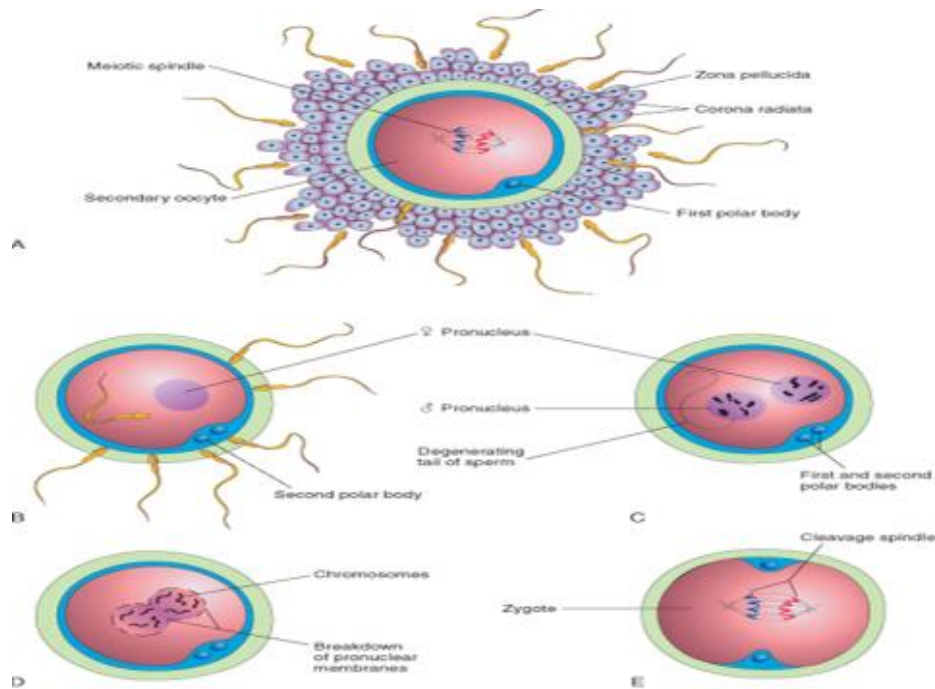
e) Formation of male pronucleus

The tail of the sperm degenerates while the nucleus becomes enlarged to form the male pronucleus. All mitochondria of the zygote is gotten from that of maternal origin since the mitochondria of the sperm degenerates with the tail.

f) Formation of Zygote

The male and female pronucleus fuse together and give rise to an Ootid which later becomes the zygote.





4. **Differences between monozygotic twins and dizygotic twins.**

MONOZYGOTIC TWINS	DIZYGOTIC TWINS
1. Formed from one zygote.	Formed from two zygotes.
2. It is less common.	It is more common.
3. They are genetically identical.	They are not genetically identical.
4. The resemblance is similar.	The resemblance is like that of any other siblings.
5. The twins are same sex.	They are not necessarily of the same sex.
6. They are mostly diamniotic, mono chorionic and single placenta.	They have two amnions, two chorions and placenta.
7. They are often called conjoined twins.	They are not seen as conjoined twins.