

NAME: OLATINWO FAREEDAH OYINKANSOLA

MATRIC NO: 18/MHS01/286

COURSE: EMBRYOLOGY

DEPARTMENT: MEDICINE AND SURGERY

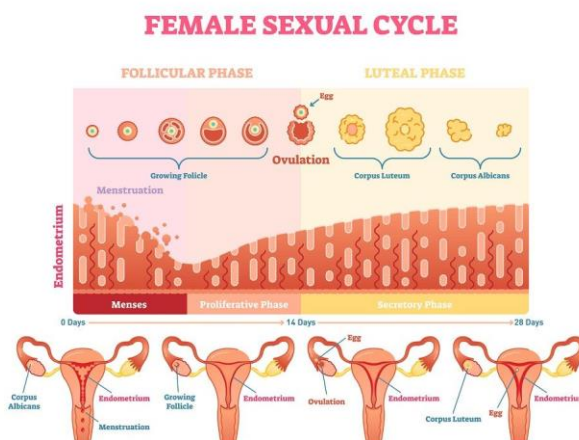
LEVEL:200L

1. DISCUSS OVULATION

Ovulation is the release of eggs from the ovaries (release of secondary oocyte from the ovarian follicle). Few days to ovulation under the influence of Follicle stimulating hormone and luteinizing hormone the secondary follicle grows rapidly to a diameter of about 25mm to become mature vesicular/mature secondary or Graafian follicle. During the final development of the vesicular follicle, there is a sudden increase in luteinizing hormone which causes the primary oocyte to complete meiosis 1 and the follicle to enter the preovulatory mature vesicular stage.

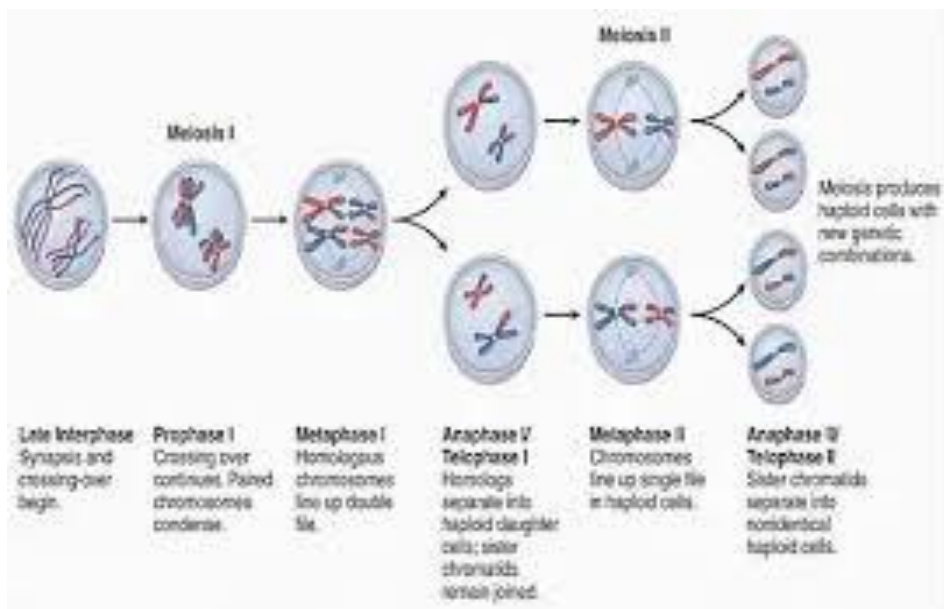
Meiosis 2 begins but the secondary oocyte is arrested in metaphase approximately 3 hours before ovulation. A few hours after the Follicle stimulating hormone/ Luteinizing hormone peak one observes increased vascularization and edematous changes in the dominant follicle's surroundings. With time it is displaced towards the ovarian surface where it finally bulges out. The hyaluronic acid, secreted by the granulosa cells, has the property that it binds water molecules: The more hyaluronic acid is made, the more water can be absorbed. In this way, a rapid increase of the amount of follicle fluid occurs and this leads to a dramatic increase of the tension in the follicle wall. This together with the effects of a lytic enzyme finally leads to the rupture of the follicle at a narrowly circumscribed place.

On the ovarian surface above the follicle that is about to burst, a white point forms shortly before the rupture (due to compression of the blood vessels), the so-called stigma.



2. DIFFERENTIATE BETWEEN MEIOSIS 1 AND MEIOSIS 2

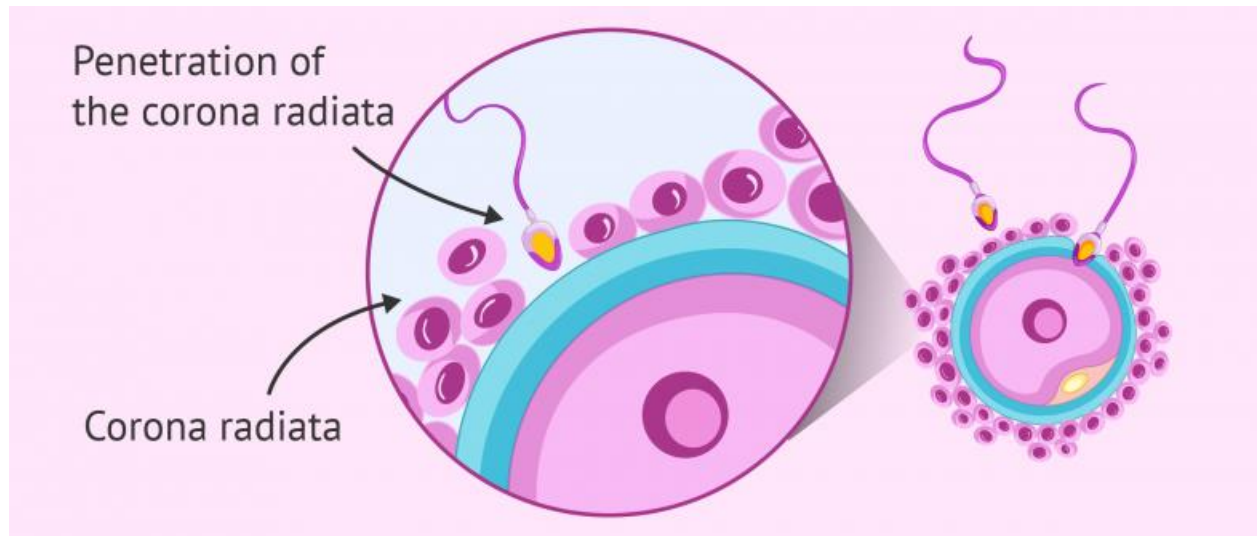
| MEIOSIS 1 | MEIOSIS 2 |
|--|--|
| 1. Meiosis 1 is the first cell division of meiosis. | Meiosis 2 is the second cell division of meiosis. |
| 2. Two diploid daughter cells are produced | Four haploid daughter cells are produced |
| 3. Crossing over occurs | Crossing over does not occur |
| 4. Synapsis is present | Synapsis is absent |
| 5. Centromere doesn't split | Centromere splits and sister chromatids separate. |
| 6. There is interphase before meiosis | There is no interphase between meiosis 1 and 2 |
| 7. Homologous chromosome separate from each other. | Sister chromatids separate from each other |
| 8. Homologous chromosomes separate | Sister chromatids separate |
| 9. The four phases are Prophase 1, Metaphase 1, Anaphase 1, Telophase 1. | The four phases are Prophase 2, Metaphase 2, Anaphase 3, Telophase 2 |
| 10. Heterotypic division | Homotypic division |



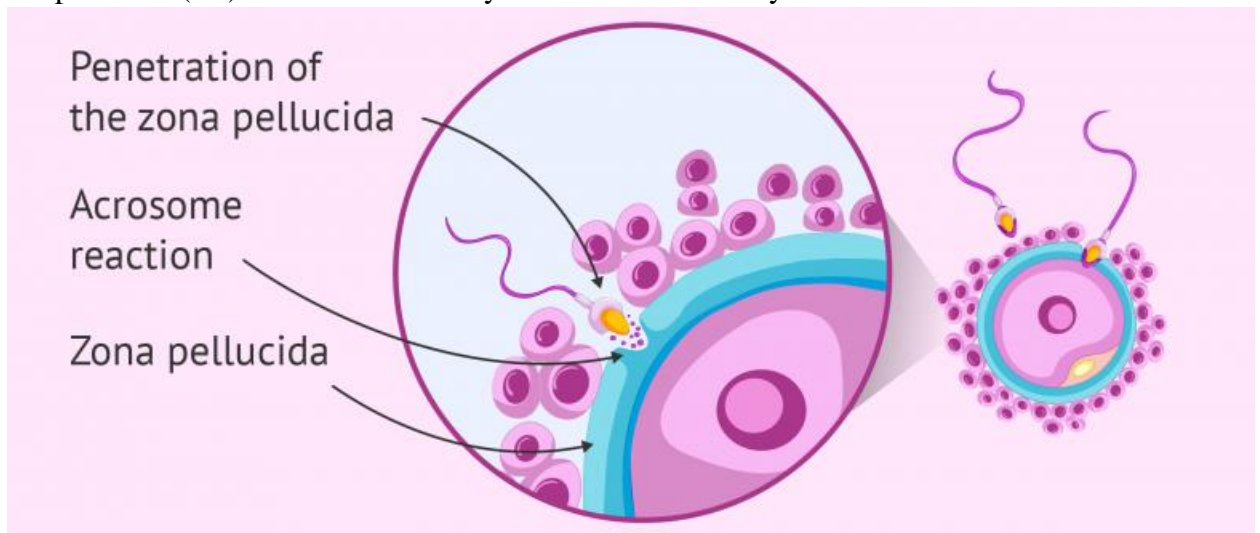
3. DISCUSS THE STAGES INVOLVED IN FERTILIZATION

Fertilization is the fusion male and female gamete i.e. sperm and oocyte to form zygote. It takes place in the ampulla of uterine tubes for about 24hours. Fertilization involves the following stages:

1. **Passage of sperm through the corona radiate:** only capacitated sperm can pass through the corona radiata, that is, the glycoprotein coat and seminal plasma protein of the plasma membrane that covers the acrosomal layer of the spermatozoa is removed.



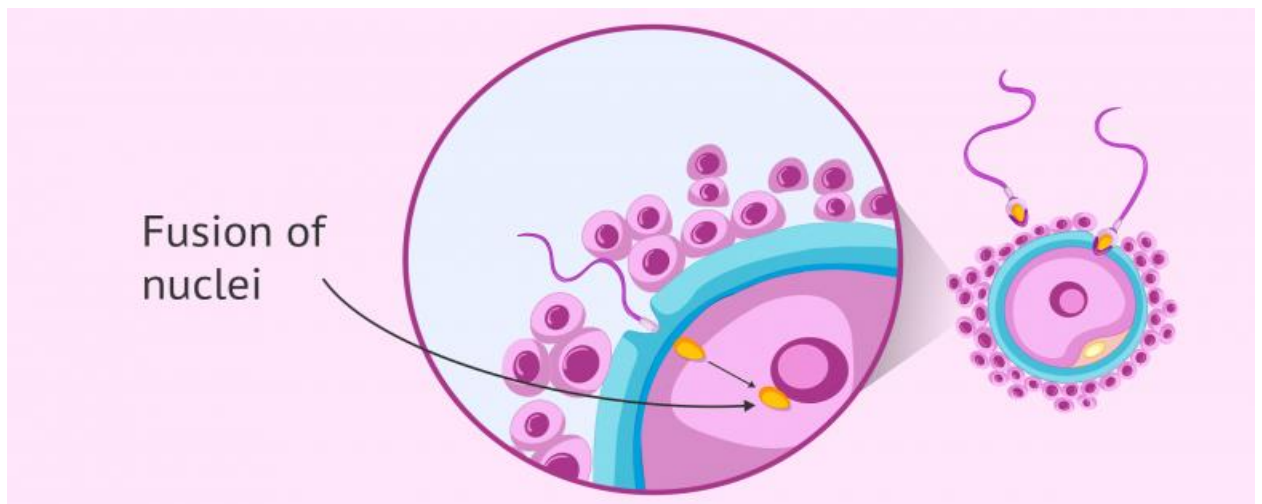
2. **Penetration of the zona pellucida:** More than a single sperm cell is required to degrade the ZP. Nonetheless, in the end just one of them will be the "winner", that is, the one who fertilizes the egg. In order to be able to cross this second barrier, the head of the sperm establishes contact with receptor ZP3 of the ZP. This triggers the acrosome reaction, which involves the release of a series of hydrolytic enzymes (contents of the acrosome). These enzymes dissolve the ZP to allow the passage of the sperm cell. When they cross this layer, spermatozoa encounter a second barrier: the zona pellucida (ZP). It is an external layer that surrounds oocytes.



3. **Fusion of plasma membrane of sperm and oocyte:** The region of the head without the acrosome and cell membrane with nucleus and the tail of sperm enter the cytoplasm of the oocyte leaving behind the plasma membrane of the sperm.
4. **Completion of second meiotic division and formation of female pronucleus:** Now that the passage of sperm has taken place, the oocyte activates itself to finish meiosis, the process whereby the number of chromosomes is reduced. With it, the second

polar body is released, and chromosomes distribute themselves forming a structure called female pronucleus.

5. **Formation of male pronucleus:** On the other hand, the sperm continues the fertilization process until its head, which contains the nucleus, reaches the female pronucleus. The sperm will lose its tail at some point, and the nucleus will swell to create the male pronucleus.
6. **Formation of zygote:** The female and male pronucleus fuse to form an ootid which develops into a zygote. The fusion of pronuclei means that the membranes of both end up disappearing so that the chromosomes can fuse together. This allows the cell to reestablish its normal number of chromosomes, that is, 46 chromosomes.



4. DIFFERENCE BETWEEN MONOZYGOTIC AND DIZYGOTIC TWINS

| MONOZYGOTIC TWINS | DIZYGOTIC TWINS |
|--|---|
| 1. They are developed by the splitting of a fertilized embryo into two | They are developed by two separate simultaneous fertilization events. |
| 2. Gender is the same | Gender is different |
| 3. Blood types are the same | Blood types are different |
| 4. Appearance is extremely similar but may be affected by environmental factors. | Appearance is similar as any other sibling |
| 5. Genetic codes are nearly identical | Genetic code are same as any other siblings |

