

Matric number 18/mhs01/092

ATO BATELE GIDEON ADEDAPO

Question 1:

DISCUSS OVULATION:

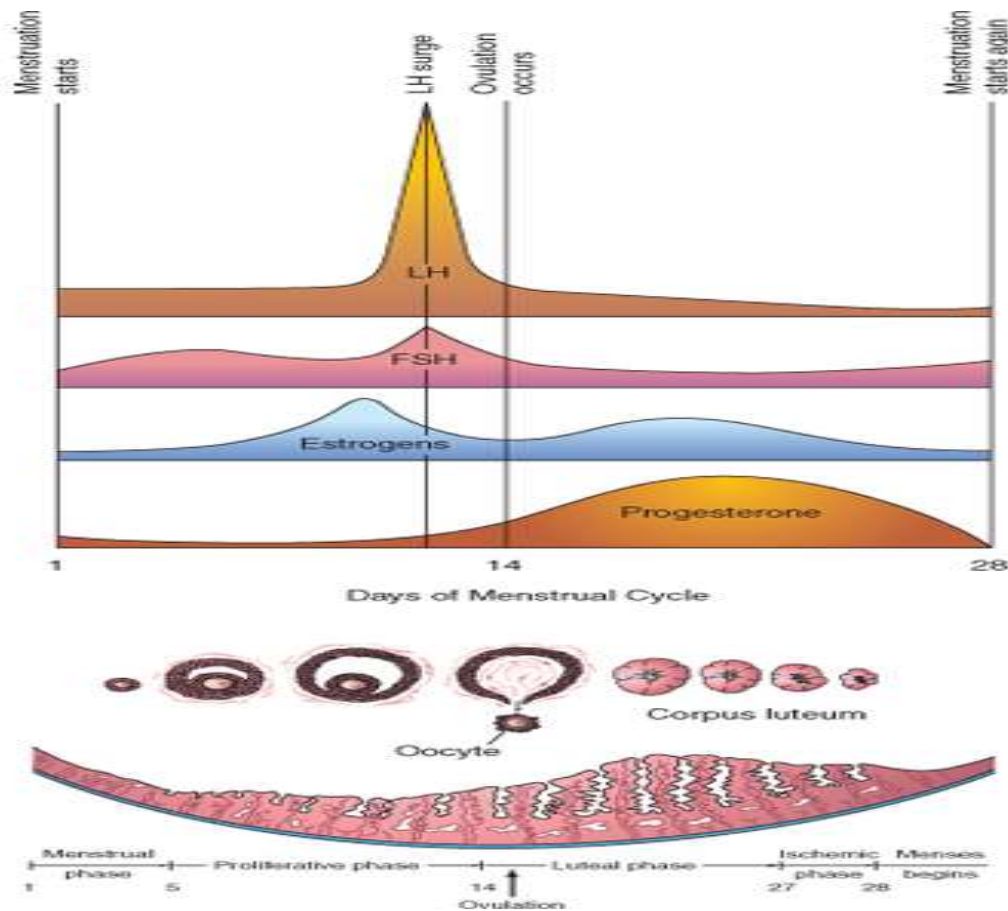
**Ovulation** is the release of an egg from one of a woman's ovaries. After the egg is released, it travels down the fallopian tube, where fertilization by a sperm cell may occur. **Ovulation** typically lasts one day and occurs in the middle of a woman's menstrual cycle, about two weeks before she expects to get her period.

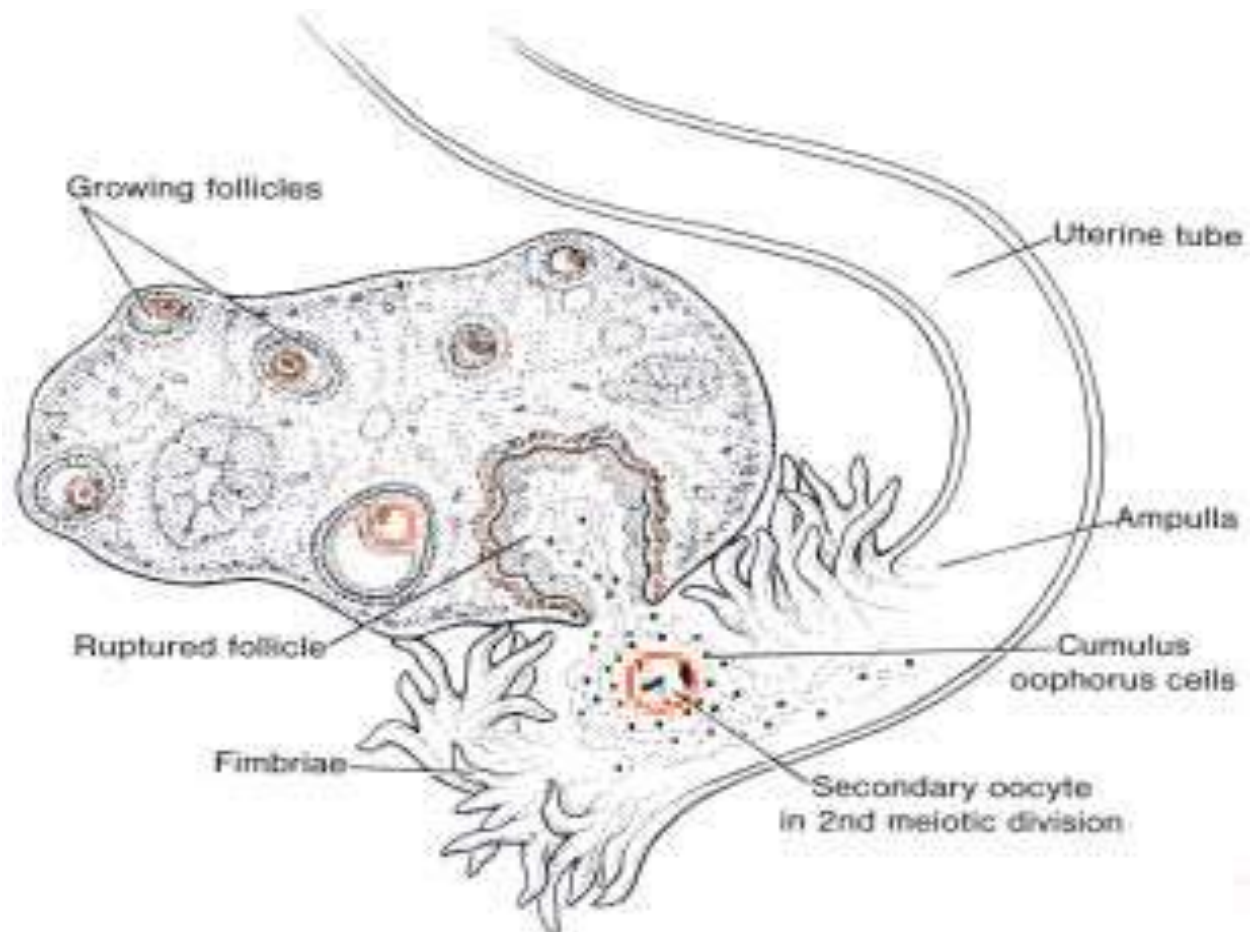
Around the middle of the ovarian cycle, the ovarian follicle under the influence of Follicle Stimulating Hormone and Luteinizing Hormone, undergoes a sudden growth spurt, producing a cystic swelling or bulge on the surface of the ovary. A small avascular spot, the stigma, soon appears on swelling. Before Ovulation the secondary oocyte and some cells of the cumulus oophorus detach from the interior of the distended follicle.

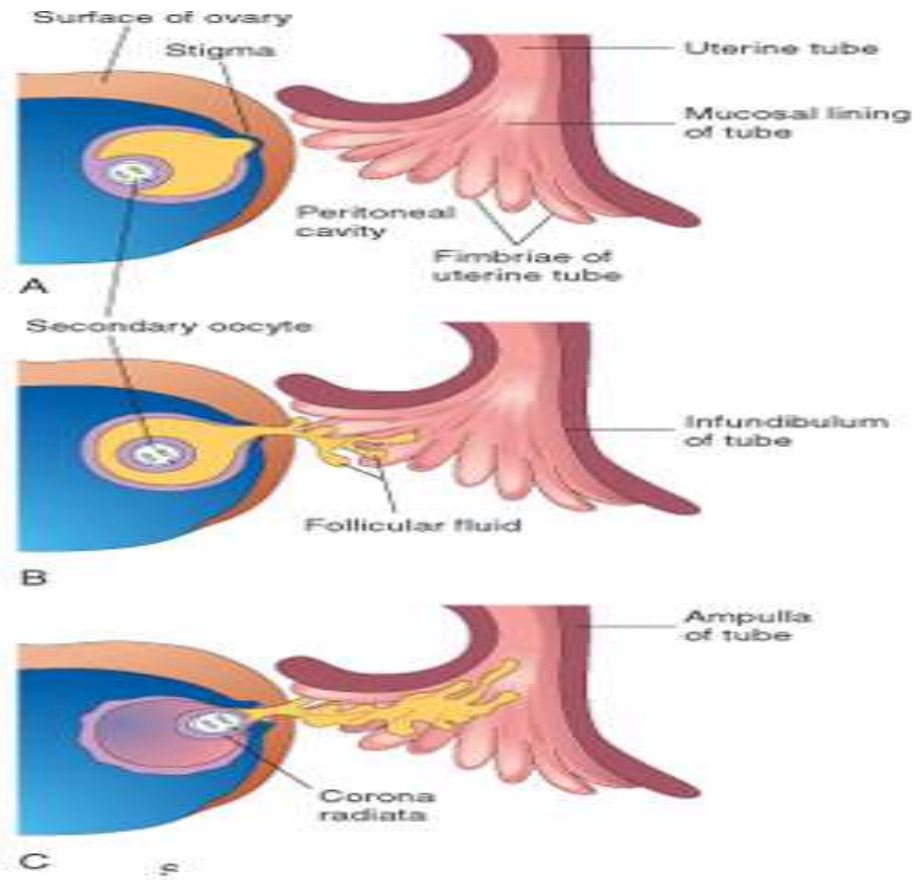
Ovulation is triggered by a surge of Luteinizing hormone production, ovulation usually follows the LH peak by 12 to 24 hours. The LH surge elicited by the high estrogen level in blood, appears to cause the stigma to balloon out, forming a vesicle. The stigma soon ruptures, expelling the secondary oocyte with the follicular fluid. Expulsion of the oocyte is the result of intrafollicular pressure, and possibly by contraction of smooth muscles in the theca externa (sheath) owing to stimulations by prostaglandins. The expelled secondary oocyte is surrounded by the zona pellucida and one or more layers of the follicular cells, which are radially arranged as the corona radiata forming the oocyte cumulus complex. The LH surge also seems to induce resumption of the first meiotic division of the primary oocyte, hence, mature ovarian follicle contain secondary oocyte. The zona pellucida is composed of three glycoproteins (ZPA, ZPB, ZPC) which usually form a network of filaments with multiple pores. Binding of the sperm to the zona pellucida is a complex and critical event during fertilization.

Clinical correlates

1. Some women fail to ovulate, this is called **anovulation**, because of a low concentration of gonadotropins
2. During ovulation, some women feel a variable amount of abdominal pain called **mittelschmer** also known as **middle pain** because it normally occurs near the middle of the menstrual cycle. In these cases, ovulation results in slight bleeding into the peritoneal cavity, which results in sudden constant pain in the lower abdomen, Mittelschmerz may be used as a symptom of ovulation, but there are better symptoms, such as the slight drop in basal body temperature







Question 2:

	Meiosis 1	Meiosis 2
1	homologous chromosomes separate	sister chromatids separate.
2	produces 2 diploid daughter cells.	produces 4 haploid daughter cells
3	Synapsis occurs	Synapsis does not occur
4	Crossing over occurs	No crossing over

Question 3:

Discuss The Stages in Fertilization

### 1. Passage of a sperm through the corona radiata:

For sperms to pass through the corona radiata, they must have been capacitated (removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane that overlies the acrosomal region of the spermatozoa). Only capacitated sperms can pass freely through the corona radiata

## **2. Penetration of the zona pellucida:**

The zona is a glycoprotein shell surrounding the egg that facilitates and maintains sperm binding and induces the acrosome reaction, The intact acrosome of the sperm binds with a zona glycoprotein (ZP3/ zona protein 3) on the zona pellucida, Release of acrosomal enzymes (acrosin) allows sperm to penetrate the zona pellucida, thereby coming in contact with the plasma membrane of the oocyte, As soon as the head of a sperm comes in contact with the oocyte surface, the permeability of the zona pellucida changes, When a sperm comes in contact with the oocyte surface, lysosomal enzymes are released from cortical granules lining the plasma membrane of the oocyte, In turn, these enzymes alter properties of the zona pellucida to prevent sperm penetration and inactivate binding sites for spermatozoa on the zona pellucida surface only one sperm seems to be able to penetrate the oocyte

## **3. Fusion of plasma membranes of the oocyte and sperm**

The plasma or cell membranes of the oocyte and sperm fuse and break down at the area of fusion, The head and tail of the sperm enter the cytoplasm of the oocyte, but the sperm's plasma membrane remains behind

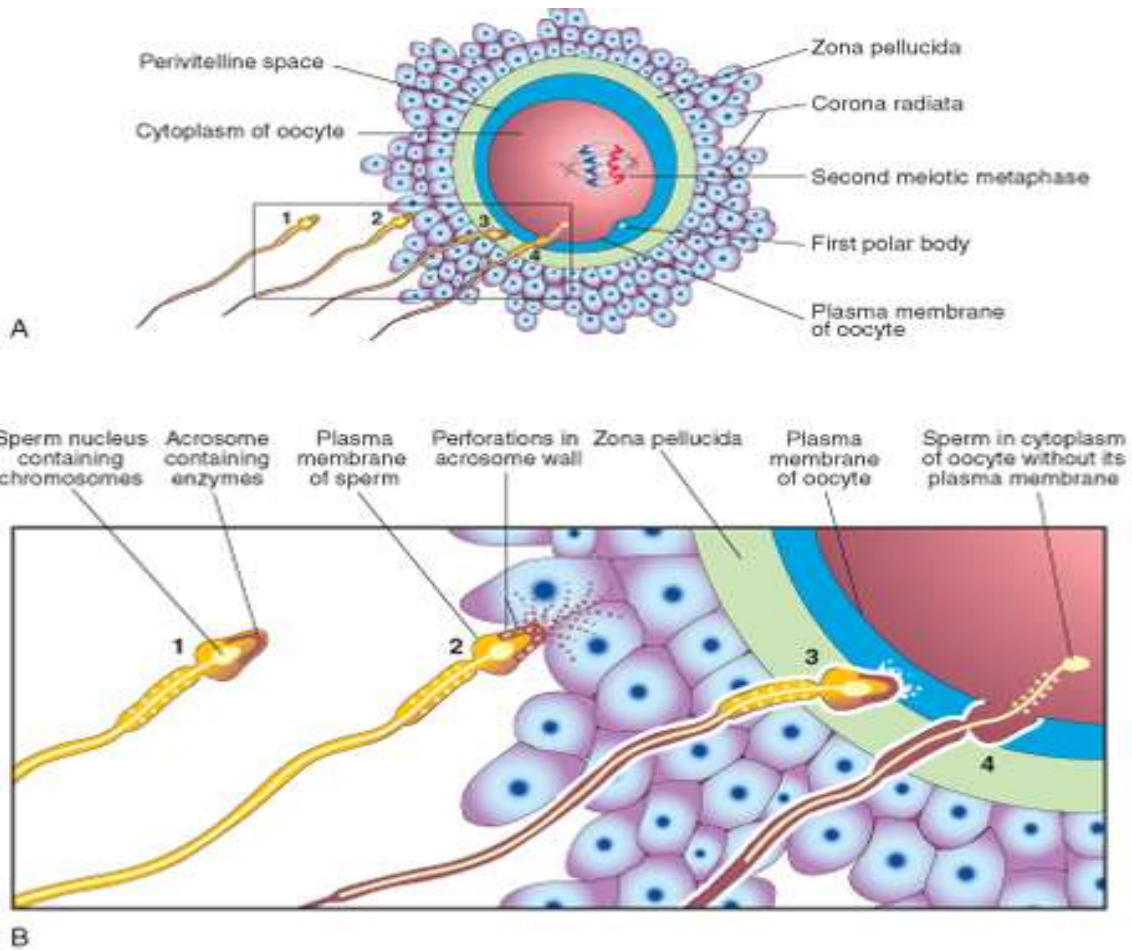
## **4. Completion of the second meiotic division of oocyte and formation of female pronucleus**

Penetration of the oocyte by a sperm activates the oocyte into completing the second meiotic division and forming a mature oocyte and a second polar body, The nucleus of the mature ovum/oocyte is now called the female pronucleus

## **5. Formation of the male pronucleus**

Within the cytoplasm of the oocyte, the nucleus of the sperm enlarges to form the male pronucleus and the tail of the sperm degenerates, Since all sperm mitochondria degenerate, all mitochondria within the zygote are of maternal origin (i.e., all mitochondrial DNA is of maternal origin), Morphologically, the male and female pronuclei are indistinguishable, The oocyte now contains 2 pronuclei, each having haploid number of chromosomes(23), The oocyte containing two haploid pronuclei is called an ootid, The 2 pronuclei fuse into a single diploid aggregation

of chromosomes, the ootid becomes a zygote, The chromosomes in the zygote become arranged on a cleavage spindle in preparation for cleavage of the zygote



Question 4

	Monozygotic Twins	Dizygotic twins
1	Formed from a single Zygote	Formed from two zygotes
2	Genetically Identical	Not Identical Genetically
3	They are of the same sex	They are of different sex
4	Resemblance is similar	Resemblance is like normal siblings
5	Incidence is common	Incidence is less common