

1. Ovulation, this is basically the release of a secondary oocyte from the ovarian follicle. In a few days before ovulation, under the influence of FSH and LH, the secondary follicle grows rapidly to a diameter of about 25 mm to become mature vesicular/ mature secondary or Graafian follicle, Coincident with final development of the vesicular follicle, there is an abrupt increase in LH that causes; the primary oocyte to complete meiosis I and the follicle to enter the preovulatory mature vesicular stage. Meiosis II is also initiated, but the secondary oocyte is arrested in metaphase approximately 3 hours before ovulation. In the meantime, the surface of the ovary begins to bulge locally, and at the apex, an avascular spot, the stigma, appears.

2.

MEIOSIS I	MEIOSIS II
Homologous chromosomes separate	Sister chromatids separate
Produces 2 diploid daughter cells	Produces 4 haploid daughter cells
Genetic recombination (crossing over) occurs	Genetic recombination (crossing over) does not occur

Fertilization is basically union of the sperm and oocyte. It is a sequence of coordinated events which takes approximately 24 hours and include the following stages

- **The passage of a sperm through the corona radiata:**

Capacitation of sperm as only capacitated sperm can pass through the corona radiata.

- **The 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 on the zona pellucida. Release of acrosomal acrosin allows sperm to penetrate the zona pellucida, thereby coming in contact with the plasma membrane of the oocyte. The permeability of the zona pellucida changes, as soon as the head of a sperm comes in contact with the oocyte surface.

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.

- **The 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.

- **The 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.

- **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. Recall all sperm mitochondria degenerate, all mitochondria within the zygote are of maternal origin. Morphologically, the male and female pronuclei are indistinguishable. The oocyte now contains 2 pronuclei, each having haploid number of chromosomes.

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.

4.

MONOZYGOTIC TWINS	DIZYGOTIC TWINS
Usually seen as conjoined twins	Not usually seen as conjoined twins
Similar resemblance	Resemblance is just as any two siblings
Twins are of the same sex	Twins are either of the same sex or different sex
Usually genetically identical	Usually not genetically identical
Formed from a single zygote	Usually formed from two zygotes
Usually has a single placenta, monochorionic and di-amniotic	Usually has two placentas, two chorions and two amnions
Usually more common	Usually less common

Submitted By: **Odunola Abdulrahman Abdulrasheed, 18/MHS01/249**