1. Ovulation is simply the release of secondary oocyte from the ovarian follicle. It can also be referred to as the shedding of the ovum from the ovary. It occurs at the end of meiosis 2 which implies that meiosis 1 must be completed. It also occurs due to a sharp increase in the concentration of Luteinizing hormone compare to others, meiosis 1 is then completed.

The foolicle enters the preovulatory mature vesicular stage. At meiosis 2, the oocyte is arrested at metaphase approximately for 3 hours by CYTOSLATIC FACTOR. On the surface of the ovary, an avascular spot called STIGMA appears, ready to release the oocyte into the uterine tube. The follicular fluid is released first, then the secondary oocyte comes out but this occurs when Luteinizing hormone is high in concentration.

Luteinizing hormone sharply increases, an enzyme called COLLAGENEASE is produced which digests collagen fiber ie the connective tissue surrounding the follicle, thereby, making the structure weak. Prostaglandin level also increses in response to luteinizing hormone surge. It helps in muscular contraction of the ovarian wall in order for the ovum to be released.

As the oocyte begins to come out ie ovulation occurring, the cumulus oophorious floats out with the secondary oocyte called CORONA RADIATA.

1. Differences between meiosis 1 and meiosis 2 are as follows :

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| --- | --- | --- | --- |
|  |  | Meiosis 1 | Meiosis 2 |
| a. | Number of daughter cells formed | Two daughter cells | Four daughter cells |
| b. | At prophase | Synapsis, crossing over and chiasma formation occur | No synapsis, crossing over nor chiasma formation occur |
| c. | At anaphase | Centromere does not split | Centromere splits |
| d. | At metaphase | 46 duplicated homologous chromosomes align at the equator | 23 duplicated chromosomes align at the equator |
| e. | Ploidy level | Reduces from 4n to 2n | Reduces from 2n to n |

1. Fertilization refers to the union of the sperm and the oocyte at the ampulla of the uterine tube which gives rise to a zygote. It occurs approximately within 24 hours.

The stages involved during fertilization are;

1. Passage of sperm through the corona radiata: Here, the glycoprotein and seminal plasma materials are removed from the region of the head covering the acrosome. The sperm then passes through the corona radiata.
2. Penetration of the zona pellucida: The acrosome is fully involved here a it bond with the receptors n the zona pellucida. The acrosome has some lysosomal enzymes called ACROZYMES which help in creating a pathway for the sperm to pass through the zona pellucida.
3. Fusion of plasma membrane of the sperm and oocyte: As the sperm makes contact with the plasma membrane of the oocyte, the cortical granules on the surface of the membrane sends a message to the zona pellucida to close its binding site in order to prevent polyspermy.

The region of the head and tail of the sperm loose their plasma membrane and pass through the plasm membrane of the oocyte.

1. Completion of 2nd meiotic division and formation of female pronucleus: As soon as a sperm enters the cytoplasm of the oocyte, 2nd meiotic division is complete. Then we say that the female nucleus has become a pronucleus.
2. Formation of male pronucleus: The middle piece and tail of the sperm degenerate and the male nucleus then enlarges, thus becoming a pronucleus.
3. Formation of zygote: The female and male pronuclei fuse together to form a COTID which becomes a ZYGOTE.

4.Differences between monozygotic and dizygotic twins

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|  | Monozygotic twins | Dizygotic twins |
| a. | A sperm fuses with an oocyte | Two different sperms fuses with two different oocytes |
| b. | Zygote divides during formation of blastocyst | It does not occur here |
| c. | They are genetically identical | They are not genetically identical |
| d. | They look alike | They do not look alike |
| e. | They are of the same sex | They can be of same or different sex |
| f. | They share an amnion, chorion and placenta | They have two amnion, two chorion, and two placenta |
| g. | Less common | More common |