***18/MHS01/120***

1. **Ovulation** is the release of an egg(ovum) from the ovaries of a female. After the egg is released, it travels down the fallopian tube, where fertilization by a sperm cell(MALE GERM 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. But the timing of the process varies for each woman, and it may even vary from month to month. At birth, a female fetus has 1 to 2 million immature eggs called oocytes inside her ovaries, which is all the eggs she will ever produce With every monthly menstrual cycle, a woman's body prepares for a potential pregnancy. The cycle is regulated by hormones, including the sex hormones estrogen and progesterone, as well as follicle-stimulating hormone and luteinizing hormone. Hormones play a key role in all stages of the menstrual cycle, allowing the ovum (egg) to mature and eventually be released.
2. **Differences Between Meiosis I and Meiosis II**

In meiosis I, homologous chromosomes separate, while in meiosis II, sister chromatids separate.

Meiosis II produces 4 haploid daughter cells, whereas meiosis I produces 2 diploid daughter cells.

Genetic recombination (crossing over) only occurs in meiosis I.

Meiosis I the chromosomal cross­over occurs during prophase 1, by exchanging the genetic material between non­sister chromatids while in Meiosis II there is no chromosomal cross­over during prophase 2.

Meiosis I the cohesin protein complexes at the arms of the homologous chromosomes are cleaved while in Meiosis II the cohesin at the centromeres are cleaved in order to separate the two sister chromatids.

1. **Stages of Fertilization**

* **Zygotic stage**: The zygote is formed when the male gamete (sperm) and female gamete (egg) fuse, this begins when the sperm cell successfully enters and fuses with an egg cell (ovum). The genetic material of the sperm and egg then combine to form a single cell called a zygote and the germinal stage of development commences into blastocyst stage.
* **Blastocyst stage**: The single-celled zygote begins to divide into a solid ball of cells. Then, it becomes a hollow ball of cells called a blastocyst, attaching to the lining of the mother's uterus. Cleavage itself is the first stage in blastulation, the process of forming the blastocyst. Cells differentiate into an outer layer of cells (collectively called the trophoblast) and an inner cell mass. They are still enclosed within the zona pellucida. The inner mass of cells differentiate to become embryoblasts and polarise at one end. They close together and form gap junctions, which facilitate cellular communication. This polarisation leaves a cavity, the blastocoel, creating a structure that is now termed the blastocyst. The trophoblasts secrete fluid into the blastocoel. The resulting increase in size of the blastocyst causes it to hatch through the zona pellucida, which then disintegrates.
* **Embryonic stage**: The major internal organs and external features begin to emerge, forming an embryo. In this stage, the heart, brain, and spinal cord become visible. Arms and legs start to develop.
* **Fetal stage**: Once the formed features of the embryo begin to grow and develop, the organism is considered a fetus. Differentiation and specialization of structures happens during this time.

1. **Differences Between Monozygotic And Dizygotic Twins**

* Monozygotic Twins are developed by the splitting of an already fertilized Embryo into two while Dizygotic twins are developed by two separate simultaneous fertilization events with two sperm cells and two egg cells.
* Monozygotic Twins have nearly identical to each other while Dizygotic genetic codes are the same as any other siblings own.
* Monozygotic twins have the same blood type while Dizygotic twins have different blood types.
* Appearance of Monozygotic Twins is extremely similar but may be affected by environmental factors while in Dizygotic twins the appearance is similar to any other sibling.