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1. Discuss Ovulation

Ovulation is the release of oocyte to form mature follicle. It is triggered by a surge in Luteinizing Hormone (LH) production which occurs between 12-36 hours before. Around mid-cycle (around 14th day of the menstrual cycle), the ovarian follicle undergoes a sudden growth sprut under the influence the Follicle Stimulating Hormone(FSH) and the Luteinizing Hormone(LH). A cystic swelling appears on the surface of the ovary. On the swelling, a small avascular spot called stigma appears. The rise in the amount LH in the blood causes the stigma to swell and form a vesicle.The stigma ruptures to expell the secondary oocytes and follicular fluids. Expulsion of the oocyte is due to intrafollicular pressure along with contraction of the smooth muscle in the theca externa. The smooth muscle is stimulated by postaglandins. The secondary oocyte becomes surrounded by the zona pellucida and layers of follicular cells which are radially arranged as corona radiata.

2. Differences between meiosis 1 and meiosis 2

PHASES	MEIOSIS 1	MEIOSIS 2
Prophase	Synapsis, chiasma formation and crossing over occurs	Synapsis,chiasma formation and crossing over does not occur
Metaphase	Alignment of 46 duplicated homologous chromosomes at metaphase plate	Alignment of 23 chromosomes at the metaphase plate
Anaphase	Separation of homologous chromosomes	Separation of sister chromatids
Telophase	Two diploid daughter cells are formed (46 chromosomes)	Four haploid daughter cells are formed (23 chromosomes)

3. Discuss the stages in fertilization

Fertilization is the fusion of a sperm and oocyte. It takes about 24 hours. The stages of fertilization are;

a. Penetration of Corona Radiata

About 200-300 mil spermatozoa are released into the vaginal tract but only 300-500 reach the site of fertilization, ampulla. The remaining aid in penetrating the barriers. Only the capacitated sperm cell passes through the corona cells. Movement of tails is important in this process

b. Penetration of Zona Pellucida

The zona pellucida is a glycoprotein coat around the oocyte. It facilitates the binding of sperm and induces the acrosome reaction. The sperm forms a pathway through the zona pellucida by action of the acrosome. The acrosome binds with the zona glycoprotein, ZP3 on the zona pellucida. Acrosin is then released to allow penetration and the sperm comes in contact with the plasma membrane of the oocyte. After penetration, the zona reaction occurs. The zona reaction involves a change in properties of the zona pellucida to make it impenetrable to other sperms and also deactivate the other binding sites on the zona pellucida. This reaction is influenced by action of lysosomal enzymes released in cortical granules near the plasma membrane of the oocyte. Only one sperm penetrates the oocyte membrane.

c. Fusion of Plasma membrane of oocyte and sperm

The plasma membrane of the oocyte and sperm fuse and break down at the site of fusion. The plasma membrane of the acrosomal head cap of the sperm breaks down while the head and tail enter cytoplasm of the oocyte.

d. Completion of second meiotic division and formation of female pronucleus

After penetration of oocyte, second meiotic division is completed. A mature oocyte and polar body is formed. The nucleus of the mature oocyte becomes the female pronucleus after condensation of maternal chromosomes.

e. Formation of male pronucleus

In the cytoplasm of the cell, the sperm moves closer to the female pronucleus. The nucleus swells to form the male pronucleus and the tail detaches and degenerates.

f. Fusion of pronuclei

The oocyte contains two haploid pronuclei and is referred to as ootid. The male and female pronuclei fuse to form a diploid aggregation of chromosomes and the ootid becomes a zygote.

4. Differentiate between monozygotic and dizygotic twins

S/N	Monozygotic Twins	Dizygotic Twins
i.	They are formed from a single zygote	They are formed from two different zygotes
ii.	The twins are genetically identical	The twins are not identical
iii.	They are the same sex	They are of different sexes
iv.	They share a common amniotic sac, chorionic sac and placenta	They have separate amniotic sacs, chorionic sacs and placentas

