JAYEOBA OLAMIDE OLUWAYEMISI

18/MHS01/193

MEDICINE AND SURGERY

Embryology

Assignment

1. Discuss ovulation

Ovulation is the release of secondary oocytes from the ovarian follicle. Coincident with final development of the vesicular follicle, there is an abrupt increase in LH that causes;

I. The primary oocyte to complete meiosis I.

II. The follicle to enter pre ovulatory mature vesicular stage.

Meiosis II is also initiated, but the secondary oocyte is arrested 3 hours before ovulation

In the meantime the surface of the ovary begins to bulge and at the Apex, an avascular spot, the stigma appears.

For the oocyte to be released, two events occur which are caused by Luteinizing hormone:

I. It increases collagenase activity, resulting in digestion of collagen fibers surrounding the follicle.

II. Prostaglandin levels also increase in response to the Luteinizing hormone surge and cause local muscular contractions in the ovarian wall.

This contractions causes ovulation in which the oocyte flows out of the ovary.

2. Differences between meiosis I and meiosis II

Meiosis I	Meiosis II
Prophase I: synapsis occurs Crossing over occurs Chiasma formation	**Prophase II:** No synapsis occur No crossing over occur No chiasma formation
Metaphase I: Alignment of 46 homologous chromosomes at the equation	**Metaphase II:** Alignment of 23 duplicated homologous chromosomes at the equator
Anaphase I: Separation of 46 homologous chromosomes from each other (centromere do not separate)	**Anaphase II:** Separation of 23 duplicated chromosomes into 23 single stranded chromatin
Telophase I: formation of two daughter cells	**Telophase II:** four daughter cells are formed

3. Stages in fertilization

I. Passage of sperm through corona radiata: For sperm to pass through the Corona radiata, they must have been capacitated (removal of glycoprotein and seminar plasma protein from the plasma membrane that overlies the acrosomal region of the spermatozoa). Only capacitated sperms passes through the Corona radiata.

II. Penetration of zona pellucida : The zona pellucida is a glycoprotein surrounding the egg that facilitates and maintains sperm binding and induces acrosome reaction.

The acrosome of the sperm binds with the zona glycoprotein on the zona pellucida. The release of the acrosome enzyme (acrosin) allows the sperm to penetrate the zona pellucida thereby coming in contact with the plasma membrane of the oocyte . When sperm comes in contact with the oocyte, lysosomal enzymes are released from the cortical granules lininh the plasma membrane. Only one sperm seems to be able to penetrate the oocyte.

III. Fusion of plasma membranes of the oocyte and sperm: The plasma membrane of the oosyte and sperm fuses together and breaks down at the area of fusion. The head and tail of the sperm enters the cytoplasm of the oocyte and the sperm plasma membrane remains behind.

IV . Completion of 2nd meiotic division and formation of female pronucleus: Penetration of the oocyte by the sperm activates the oocyte to complete second meiotic division and forming a matured oocyte. The nucleus of the matured oocyte is called the female pronucleus.

V. Formation of male pronucleus: Within the cytoplasm of the oocyte, the nucleus enlarges which forms the male pronucleus. The tail of the sperm degenerates. The oocyte contains two pronuclei each having haploid number called ootid

VI. Formation of zygote: The two pronuclei fuses together into a single diploid aggregation of chromosomes. The ootid becomes a zygote.

4. Differences between monozygotic and dizygotic twins

MONOZYGOTIC TWINS	**DIZYGOTIC TWINS**
A sperm fuses with the oocyte to form a zygote. The single zygote will divide into two during the blastocyst formation	Two different sperms fertilizes two different oocyte
They are genetically identical	Not genetically identical
Same sex	Different sexes
They share the same: Amniotic sac Chorionic sac Same placenta but two umblical cord	They have separate; Placenta Chorionic sac Amniotic sac Umbilical cord