

NAME: EBOIGBE OSARIEMEN LILIAN

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DEPARTMENT: MEDICINE AND SURGERY

COLLEGE: MEDICINE AND HEALTH
SCIENCES

ASSIGNMENT:

1) Discuss Ovulation

Ovulation is part of the events that take place in the ovarian cycle. It has to do with the release of an oocyte from the ovarian follicle when the follicle is mature; there is an abrupt increase in luteinizing hormone during the final development of the mature follicle. This surge of luteinizing hormone causes the primary oocyte to complete meiosis I and the follicle enters the preovulatory stage. Meiosis I causes two daughter cells to be formed. One being the secondary oocyte and the other one being the first polar body. After which meiosis II takes place but the secondary oocyte is arrested in metaphase II approximately 3 hours before ovulation during which the surface of the ovary begins to bulge and at the apex, an avascular spot appears (stigma). Two events caused by the surge of luteinizing hormone,

case the oocyte to be released:

- The increase in collagenase activity which results in the digestion of the connective tissue surrounding the follicle
- Increase in prostaglandin level which causes contractions in the ovarian wall

These contractions, causes the release of the secondary oocyte as well as the cumulus oophorus. Some of the cumulus oophorus cells are then rearranged around the zona pellucid to form the corona radiata.

2) Differentiate between meiosis1 and meiosis2

	MEIOSIS 1	MEIOSIS2
Number of cells produced	Two	Four
Chromosome number	Becomes half	Does not divide into half
Chromosome separation	Homologous chromosomes separate from each other	Sister chromatids separate from each other
Splitting of centromeres	Does not take place	Takes place

Crossing over	Occurs	Does not occur
Duration	It is a complex division and takes more time	Takes less time

3) Discuss the stages involved in fertilization

The stages involved in fertilization include:

- Passage of sperm through the corona radiata
- Penetration of the zona pellucida
- Fusion of the plasma membrane of sperm and oocyte
- Completion of the 2nd meiotic division and formation of the female pronucleus.
- Formation of male pronucleus
- Formation of zygote

Passage of sperm through the corona radiata: The sperm must have been capitulated that is, removal of the glycoprotein coat and seminal plasma from the plasma membrane that overlies the acrosomal region before passing through the corona radiata.

Penetration of zona pellucida: The zona is a glycoprotein which

facilitates the binding of the sperm and induces acrosome reaction. The acrosome of the sperm binds with the zona pellucida. The release of acrosin by the sperm allows penetration of the zona pellucida by the sperm, making it come in contact with the plasma membrane of the oocyte. After which, the permeability of the zona pellucida changes to prevent sperm penetration, by the release of lysosomal enzymes from the cortical granules lining the plasma membrane of the oocyte.

Fusion of plasma membrane of sperm and oocyte: When they fuse, the plasma membrane breakdown at the area of fusion. The head and tail of the sperm leaves the plasma membrane behind as they enter the cytoplasm of the oocyte.

Completion of second meiotic division of oocyte and formation of female pronucleus: Entering of the sperm into the cytoplasm of the oocyte causes the oocyte to complete its second meiotic division forming a mature oocyte and a second polar body. The nucleus of the mature oocyte is called female pronucleus.

Formation of male pronucleus: The nucleus of the sperm in the oocyte enlarges to become the male pronucleus and the tail of the sperm degenerates.

Formation of zygote: The two pronuclei fuse into a diploid aggregation of chromosomes. The ootid becomes a zygote.

3) Differentiate between monozygotic twins and dizygotic twins

	Monozygotic twins	Dizygotic twin
cause	Random splitting of	Due to two separate

	the zygote into two embryos	eggs fertilized by two sperms
Genetic composition	They share the same DNA	They do not share the same DNA
Gender	Same gender	Can be different or same
Hereditary	Not hereditary	Hereditary
Characteristics	May have the same characteristics and development	Don't have the same characteristics and development