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COURSE: Embryology

DEPARTMENT: Medicine and surgery

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ASSIGNMENT:

1. Discuss ovulation
2. Differentiate between meiosis 1 and meiosis 2
3. Discuss the stages involved in fertilization
4. Differentiate between monozygotic and dizygotic twins.

ANSWER

1. Discuss ovulation

Ovulation is the release of an egg from one of a woman's ovaries. After the egg is released, it travels down the fallopian tube, where fertilization by a sperm 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 from month to month. Approximately 300-400 of the remaining eggs (about 300,000) will be ovulated during a woman's reproductive lifetime. When a mature egg leaves a woman's ovary and travels into the fallopian tube, a sperm cell can fertilize the egg. Sperm can live inside a woman's reproductive tract for about 3-5 days after sexual intercourse. During ovulation, the walls of the uterus also thicken to prepare for a fertilized egg. But if the egg is not fertilized, the uterine lining is shed about two weeks later, causing menstrual flow to begin.

2. Differentiate between meiosis 1 and meiosis 2

MEIOSIS 1	MEIOSIS 2
It begins with one diploid parent	It begins with two haploid parent cells
It is preceded by interphase.	Interphase does not take place
Homologous pairs of cells are present and separated into chromosomes in meiosis 2	Chromosomes are present here and separated into sister chromatids.
It is a reductive division	It is an equational division.
Crossing over of genetic materials occur	Crossing over of genetic material does not occur.
It is a complicated division process.	It is a simple division process.
Sister chromatids in prophase have convergent arms.	Sister chromatids in prophase have divergent arms.
Prophase splits into 5 sub-phases.	Prophase does not divide into any sub-phases

It ends with two daughter cells.	It ends with four daughter cells
Centromere does not split.	Centromere splits.

3. Discuss stages involved in fertilization.

Fertilization is the union of sperm and an oocyte in the ampulla of uterine tube. It takes approximately 24 hours and consists of six events.

- a. Passage of sperm through corona radiata: the sperm undergoes capacitation, which is the removal of glycoprotein and seminal plasma protein from plasma membrane, in order to pass through.
- b. Penetration of zona pellucida: here the acrosome of sperm binds with the active sites on zona pellucida (zona glycoprotein/ ZP3) which causes release of acrosin which breaks down zona pellucida allowing sperm to come in contact with plasma membrane of oocyte. After contact, lysosomal enzymes are released from cortical granules, lining plasma membrane of oocyte, which prevent sperm penetration and inactivates binding sites of zona pellucida.
- c. Fusion of plasma membrane of oocyte and sperm: plasma membrane of oocyte and sperm fuse and breakdown at area of fusion, causing head and tail of sperm to enter oocyte cytoplasm but leaving sperm's plasma membrane behind.
- d. Completion of 2nd meiotic division and formation of female pronucleus: when sperm penetrates into oocyte, it enables oocyte to complete second meiotic division and forms mature oocyte and 2nd polar body. The mature oocyte is called female pronucleus.
- e. Formation of male pronucleus: nucleus of sperm enlarges to form male pronucleus and tail degenerates.
- f. Formation of zygote: the pronuclei then fuse to form a single diploid zygote and chromosomes in zygote arrange on spindle in order to be broken down.

4. Differentiate between monozygotic and dizygotic twins:

MONOZYGOTIC TWINS	DIZYGOTIC TWINS
They result from fertilization of one egg by one sperm.	They result from fertilization of two eggs by two sperms.
The twin pairs are of the same sex.	The twin pairs can either be of the same sex or of opposite sexes.
They are genetically identical.	They are not genetically identical.
They are also called maternal twins.	They are also called fraternal twins.
They look very similar/alike.	They look the same way every sibling resemble each other.

They may or may not share amniotic sac, they share same placenta and chorionic sac.	They have two separate amniotic sacs, chorionic sac and placentas
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