Embryology Assignment
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Assignment
1) Discuss ovulation

2) Differentiate between meosis 1 and meosis 2

3) Discuss the stages involved in ferterlization

4) differentiate between monozygotic twins and dizygotic twins

Answers

1) Ovulation:
Ovulation is the release of a mature secondary oocyte from the ovary of a female. The egg is released from the ruptured ovarian follicles. It usually occurs in the middle of a woman's menstrual cycle.
During the ovarian cycle, Ovarian follicles develop under the influence of hormones; Follicle stimulating hormone and Luteinizing hormone. These follicles grow and differentiate,from the primordial follicle, growing follicle, primary follicle, theca follicle, secondary or vesicular follicle to the mature vesicular or mature secondary or Graafian follicle.
During the final stages of development of the vesicular follicle, there's an increase in the concentration of Luteinizing hormone which triggers the primary oocyte to complete meiosis I and also for the vesicular follicle to develop into the mature vesicular follicle.
Meiosis II is initiated and the secondary Oocyte is stopped at Metaphase II shortly before ovulation by cytostatic factors.
The surface of the ovary bulges and a stigma appears at its apex

Process for the Release of the Oocyte
Before the oocyte is released, there's an abrupt increase in the concentration of Luteinizing hormone. This causes two events to occur:
A) Collagenase activity increases that leads to the digestion of collagen fibers around the follicles
B) prostaglandin is stimulated and it's concentration levels increase. This causes a local muscular contraction in the ovarian wall.
These contractions pushes out the oocyte which is followed by its surrounding follicular cells (cumulus oophorus). Once the oocyte has been pushed out and completely surrounded by the

cumulus oophorus, the layer of the cumulus oophorus is then called the corona radiata. Ovulation is complete.

2) Difference between Meiosis I and Meiosis II

Meiosis I	Meiosis II	
Homologous chromosomes pair at prophase I	Homologous chromosomes do not pair	
Synapsis occurs	synapsis does not occur	
Chiasma formation occurs at prophase I	Chiasma formation does not occur at prophase 2	
Crossing over of genetic material occurs at Prophase I	Crossing over does not occur at prophase II	
Homologous chromosomes separate at anaphase I. Centromere doesn't separate	Sister chromatids separate at anaphase II. Centromere separates	
produces 2 diploid cells	Produces 4 haploid daughter cells	

3) stages of fertilization

Fertilization is the fusion of the male and female gamete to form a zygote. It occurs in the ampulla of the Fallopian tubes. It's events includes:

A) passage of the sperm through the corona radiata: for this to occur, the sperm would go through a process called capacitation which is the removal of the glycoproteins coat and seminal plasma protein.

B) penetration of the zone pellucida: the sperm bonds to some binding sites on the zone pellucida. The acrosome has some lysosomal enzymes (acrosin) which helps it pass through the zone pellucida. Cortical granules on the plasma membrane sends a signal to the zone pellucida to close its binding sites when a sperm crosses into the plasma membrane. This is done to avoid polyspermy.

C) Fusion of plasma membrane of Sperm and oocyte: the head and tail of the sperm enters the plasma membrane of oocyte. The sperm leaves behind its plasma membrane.

D) Completion of 2nd meiotic division and formation of the female pronucleus: once the head and tail of the Sperm enters the cytoplasm, 2nd meiotic division is completed. Female nucleus becomes the female pronucleus

E) formation of male pronucleus : the tail will degenerate and the male nucleus enlarges to become the male pronucleus

F) formation of zygote: the male and female pronucleus fuses to form an ootid which becomes a zygote

4) Differentiate between monozygotic twins and Dizygotic twins

Monozygotic twins	Dizygotic twins
They have identical DNA	do not have identical DNA
They are also called identical twins	they are also called fraternal twins
This occurs when one zygote divides or splits into two	this occurs when two separate eggs are fertilized during fertilization
they may have the same amniotic sac	they do not have the same amniotic sac
may share a placenta	they do not share a placenta
Always of the same gender	can be of the same or different genders
No hereditary trait makes it's rare of occurrence higher	can be caused by a gene that predisposes women to hyperovulate