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MATRIC NO: 18/MHS01/281

DEPARTMENT: MEDICINE AND SURGERY

LEVEL: 200L

COURSE: ANATOMY (EMBRYOLOGY)

1. Discuss ovulation

This is release of secondary oocyte from the ovarian follicle. Before ovulation occurs, there is a surge in Follicle stimulating hormone (FSH) and luteinizing hormone (LH) which causes the follicle to grow rapidly to a diameter 25mm to Graafian follicle

The abrupt increase in LH causes the primary oocyte to complete meiosis 1 and causes the follicle to enter the pre-ovulatory mature vesicular stage

Meiosis 2 is also initiated but the secondary oocyte is arrested in metaphase approximately three hours before ovulation. The surface of the ovary begins to bulge and an avascular spot, a stigma appears at the apex.

LH also causes an increase in collagenase activity resulting in the digestion of collagen fibers surrounding the follicle and an increase in prostaglandin levels which cause local muscular contractions in the ovarian wall. These contractions extrude the oocyte which together with its surrounding follicular cells from the cumulus oophorus, which causes the oocyte to float out of the ovary. Some of the cumulus oophorus cells then rearrange themselves around the zona pellucida form the corona radiata

1. Differentiate with between meiosis I and II

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| MEIOSIS 1 | MEIOSIS 2 |
| Preceded by interphase | No interphase involves |
| Heterotypic division | Homotypic division |
| Synapsis occurs | Synapsis does not occur |
| Crossing over takes place | Crossing over does not take place |
| Chiasma is formed | No chiasma is formed |
| Formation of two secondary gametocytes | Formation of four gametes |
| Stages involves are prophase 1, metaphase 1, anaphase 1, and telophase 1 | Stages involves are prophase 2, metaphase 2, anaphase 2, and telophase 2 |

1. Discuss the stages involved in fertilization

Fertilization is the fusion of sperm and oocyte. Its usual site is the ampulla of the uterine tube. It takes approximately 24 hours. The process involves the following stages:

1. The passage of sperm through the corona radiata: Before this can occur, capacitation of the sperm which involves the removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane that overlies the acrosomal region.
2. Penetration of the zona pellucida: The acrosome of the sperm binds with a zona glycoprotein (zona protein 3) on the zona pellucida. The release of acrosin from the acrosome allows sperm to penetrate the zona pellucida. As soon as the head of the sperm comes in contact with the oocyte surface, the permeability of the zona pellucida changes due to the action of lysosomal enzymes released from the cortical granules lining the plasma membrane of the oocyte.
3. Fusion of plasma membranes of the oocyte and sperm: the plasma membranes of the sperm and egg fuse and degenerate at the point of fusion. The head and tail of the sperm enter the cytoplasm of the oocyte but the sperms plasma membrane remains behind
4. Completion of the second meiotic division and formation of the female pronucleus: the penetration of the egg by the sperm triggers the completion of the second meiotic division forming a mature oocyte and a second polar body. The nucleus of the mature oocyte is now called the female pronucleus
5. Formation of the male pronucleus: within the cytoplasm of the oocyte, the nucleus of the sperm enlarges to form the male pronucleus and the tail degenerates
6. The two pronuclei fuse into a single diploid aggregation of chromosomes and a zygote id formed
7. Differentiate between monozygotic twins and dizygotic twins

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| MONOZYGOTIC TWINS | DIZYGOTIC TWINS |
| Formed from one sperm and one oocyte (one zygote) | Formed from two oocytes and two sperms (two zygotes) |
| They are genetically identical | They are not genetically identical |
| Same sex | Not necessarily same sex |
| Common chorion and amniotic sac | Independent chorions and amniotic sac |
| Resemblance is similar | Resemblance is like that of regular siblings |
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