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EMBRYOLOGY ASSIGNMENT

**DISCUSS OVULATION**

Ovulation is the release of an oocyte from the ovarian follicle.

Few days before ovulation, the secondary follicle grows rapidly to a diameter of about 25mm to become mature vesicular/ mature secondary/graafian follicle. This process is under the influence of Follicle stimulating Hormone and Lutenizing Hormone.

Coincident with the final development of the graafian follicle, there is an increase in LH which causes;

* The primary oocyte to complete meiosis 1
* The follicle to enter preovulatory mature vesicular stage

Shortly after that, meiosis 2 is also initiated; coincident to that, the oocyte is arrested in metaphase shortly 3 hours before ovulation. The surface of the ovary begins to bulge locally, at the apex, stigma begins to appear.

Due to Lutenizing Hormone surge, 2 events are completed for the oocyte to be released.

* It increases the digestion of collagen surrounding the connective tissue.
* Prostaglandin levels increase causing local muscular contractions in the ovarian wall.

These contractions extrude the oocyte, along with its follicular cells from the region of the cumulus oophorus. This causes ovulation in which the oocyte floats out of the ovary. Some of the cumulus oophorus rearrange themselves around the zona pellucida to form the corona radiate.

Ovulation usually follows the Lutenizing hormone peak by 12 to 24 hours.

**CLINICAL CORRELATES**

During ovulation, some women experience an abnominal pain called Mittelschmer or middle pain due to its occurrence in the middle of the menstrual cycle. In this case, ovulation causes slight bleeding into the peritoneal cavity, which causes constant pain in the lower abdomen.

**Symptoms of ovulation**

* Mittelschmerz
* Slight drop in the basal body temperature.

Anovulation is a situation whereby women fail to ovulate. An agent used to stimulate gonadotropin release should be employed. These drugs often cause multiple ovulation; the risk of multiple pregnancies is 10 times higher in these women.

**DIFFERENTIATE BETWEEN MEIOSIS 1 AND MEIOSIS 2**

* Meiosis 1 is a heterotypic division WHILE Meiosis 2 is a homotypic division.
* Meiosis 1 reduces the chromosome number in the daughter cell while meiosis 2 equalizes the number of both parent and daughter cell.
* Homologous chromosomes are present at the beginning of meiosis 1 WHILE Individual, bivalent chromosomes are present at the beginning of meiosis 2
* The stages of meiosis 1 include: prophase 1, metaphase 1, anaphase 1, telophase 1 WHILE the stages of meiosis 2 include: prophase 2, metaphase 2, anaphase 2, telophase 2
* Meiosis 1 is preceeded by interphase WHILE no interphase takes place in meiosis 2
* Meiosis 1 is a complex division and takes more time WHILE meiosis 2 is comparativelyless simple and takes less time.

**DISCUSS THE STAGES INVOLVED IN FERTILIZATION**

Fertilization is the union of the sperm and the oocyte. Fertilization site is at the ampulla of the uterine tube and takes approximately 24 hours.

Stages of fertilization

* Passage of sperm through the corona radiata

Sperm must be capacitated in order to pass through the corona radiate

* Penetration of the zona peellucida

Lysosomal enzymes are released from the cortical granules of the oocyte. As this occurs, release of acrosin allows the sperm to penetrate. The lysosomal enzyme tends to increase sperm penetration and inactivate binding sites on the zona pellucida.

* Fusion of plasma membrane of sperm and oocyte

The plasma membrane of sperm and oocyte fuse and breakdown at the area of fusion. The head and tail of sperm enters the cytoplasm but leaves its plasma membrane behind.

* Completion of 2nd meiotic division and formation of female pronucleus

Penetration of oocyte causes completion of 2nd meiotic division, forming mature oocyte and 2nd polar body. The nucleus turns into the female pronucleus.

* Formation of male pronucleus

This occurs within the cytoplasm of the oocyte; the tail degenerates

* Fusion of the 2 pronuclei into a single diploid chromosome; the ootid becomes zygote

They form a cleavage spindle in preparation of cleavage of the zygote.

DIFFERENTIATE BETWEEN MONOZYGOTIC TWINS AND DIZYGOTIC TWINS

Monozygotic twins form from a single zygote WHILE Dizygotic twins form from 2 zygotes.

The incidence of monozygotic twins is more common WHILE The incidence of dizygotic twins is less common.

Monozygotic twins are of the same sex WHILE Dizygotic twins are of the same sex or different sex

Monozygotic twins resemblance is similar WHILE Dizygotic twins are just like any other 2 siblings.

Monozygotic twins are sometimes, seen as conjoined twins WHILE Dizygotic twins are not seen as conjoined.