

NAME: OKORODUDU ORITSEWEYINMI

MATRIC NO: 18/MHS01/270

COURSE: EMBRYOLOGY

DATE: 29-04-20

1. Ovulation is the release of a mature secondary oocyte from the ovarian follicle. Some days before ovulation, the secondary follicle grows to a diameter of about 25mm in order to become mature vesicular/ mature secondary follicle due to the influence of follicle stimulating hormone (FSH) and luteinizing hormone (LH). The abrupt increase in LH also leads to the completion of meiosis I by the primary oocyte and the follicle entering the preovulatory mature vesicular stage. Likewise, meiosis II also starts but the secondary oocyte is arrested at metaphase approximately 3 hours before ovulation. As that occurs, the surface of the ovary starts bulging due to LH surge and an avascular spot, stigma, appears. In order for the oocyte to be released, 2 things caused by LH surge must occur
 - I. There is an increase in collagenase activity which leads to the breakdown of collagen fibers around the follicle.
 - II. There is an increase in the level of prostaglandin which leads to muscular contraction of the ovarian wall

The muscular contractions push out the oocyte together with its surrounding follicular cells from the area of the cumulus oophorus. The cells of the cumulus oophorus then arrange themselves around the zona pellucida to form the corona radiata.

Ovulation usually occurs 12 to 24 hours after the LH peak.

Clinical correlates

During ovulation, some women feel different degree of abdominal pain called mittelschmerz and this is used as a symptom of ovulation. Other symptoms may include: tenderness of breast, increased sexual urge, change in cervical mucus from sticky, creamy or absent to watery or raw-egg-white-like, swollen vagina or vulva or slight drop in basal body temperature.

The failure to ovulate by some women is known as anovulation and it occurs due to low concentration of gonadotropins.

2. Differences between meiosis I and meiosis II

S/N	Meiosis I	Meiosis II
1.	It leads to the formation of 2 secondary gametocytes (daughter cells)	It leads to the formation of 4 gametes (daughter cells)
2.	Centromeres of chromosomes do not split	Centromeres split and sister chromatids separate
3.	There is interphase before meiosis I	There is no interphase between meiosis I and II
4.	At anaphase I, homologous chromosomes separate from each other	At anaphase II, sister chromatids separate from each other
5.	Crossing over occurs	Crossing over does not occur
6.	The sub phases include prophase I, metaphase I, anaphase I and telophase I	The sub phases include prophase II, metaphase II, anaphase II and telophase II
7.	Synapsis occurs	Synapsis does not occur

3. The stages involved in fertilization

Fertilization is the union of the sperm and the oocyte. It usually takes place in the ampulla of the uterine tube and the process takes approximately 24 hours. The stages include:

- I. Passage of sperm through the corona radiata: in order for the sperm to pass through the corona radiata, it must undergo capacitation (removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane)
- II. Penetration of zona pellucida: the acrosome binds with a zona glycoprotein, zona protein 3 on the zona pellucida, releasing acrosin which helps it penetrate through the zona pellucida to come in contact with the plasma membrane of the oocyte. As the sperm touches the plasma membrane of the oocyte, the cortical granules send a message back to the zona pellucida to close their active site in order to prevent polyspermy.
- III. Fusion of plasma membrane: the plasma membrane of the sperm and oocyte fuse and break down at the place where they fuse, the head and tail of the sperm enter the cytoplasm of the oocyte while its plasma membrane is left behind.
- IV. Completion of second meiotic division and formation of female pronucleus: As soon as the head and tail of the sperm penetrate the nucleus of the oocyte, meiosis I is completed, forming a mature oocyte and a second polar body. The nucleus of the mature oocyte then becomes the female pronucleus.
- V. Formation of male pronucleus: in the cytoplasm of the oocyte, the tail degenerates while the nucleus of the sperm enlarges to form the male pronucleus.
- VI. Formation of zygote: the male and female pronuclei fuse to form an ootid which then becomes the zygote.

4. Differences between monozygotic and dizygotic twins

S/N	Monozygotic twins	Dizygotic twins
1.	They are of the same sex	They can either be of the same sex or different sex
2.	They are genetically identical	They are not genetically identical
3.	They are formed from one zygote	They are formed from two zygotes
4.	Their resemblance is similar i.e. they look alike	Their resemblance is like any other two siblings i.e. they do not look alike
5.	They share the same chorionic sac, amniotic sac and placenta but 2 umbilical cords	Their chorionic sac, amniotic sac, placenta and umbilical cord are separate
6.	Incidence is more common	Incidence is less common