

Answers

1. Discuss Ovulation

This is the release of secondary oocyte from the ovarian follicle (matured follicle). The secondary follicle becomes mature by growing to about 25mm and under the sway of Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). Happening at the same time with the final development of Graffian follicle is an abrupt increase in LH that causes;

- a) The primary oocyte to complete meiosis
- b) The follicle to enter the pre ovulatory mature vesicular stage.

Note: Ovulation usually follows the LH peak by 12–24 hours.

In the meantime, the surface of the ovary begins to bulge locally and at the apex, an avascular spot, the stigma appears.

Note: Meiosis II is initiated but secondary oocyte is arrested 3 hours before ovulation.

For the oocyte to be released, 2 events occur which are caused by the LH surge

- i) Increase in collagenase activity, resulting in digestion of collagen fibers (connective tissue) surrounding the follicle.
- ii) Prostaglandin levels also increase in response to the LH surge and cause local muscular contraction in the ovarian wall.

Note: The LH surge elicited by high estrogen level in blood, appears to cause the stigma to blow out, forming a vesicle.

Clinical Correlates

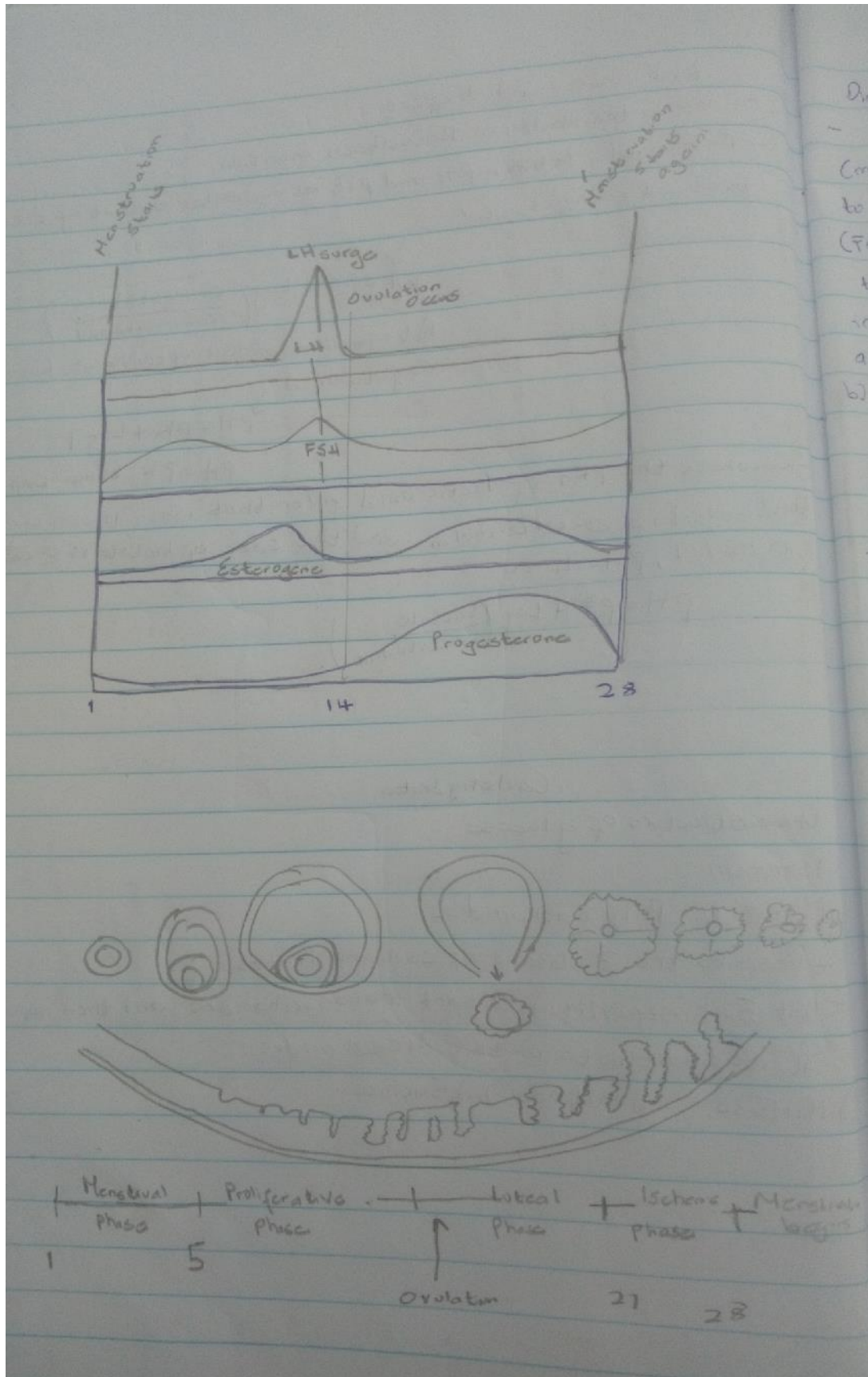
During Ovulation, some women feel a variable amount of abdominal pain called MITTELSCHMERZ, also known as middle pain. Because it normally occurs near the middle of the menstrual cycle.

Other signs include

- a) Increased Libido
- b) Tenderness of breast
- c) Swollen Vulva of Vagina

There are other better symptoms associated with ovulation, such as slight drop in basal body temperature. For most women, prior to ovulation, the basal body temperature is rather consistent. As it gets closer to ovulation, one may have a slight decline, but it will be followed by sharp increase after ovulation. The increase in temperature is a sign that ovulation has just occurred. Also the use of ovulation test kits(OPK) helps to detect the LH surge, which occurs 12–36 hours before ovulating. You can be sure to have sex at the right time for the purpose of conception.

Note: Some women fail to ovulate called ANOVULATION.



2. Differences between Meiosis I and Meiosis II

MEIOSIS I	MEIOSIS II
<ul style="list-style-type: none">a) Homologous Chromosomes separateb) Produces 2 diploid daughter cellsc) Synapsis presentd) Crossing Over presente) Chiasma formation presentf) At Anaphase, the centromere will not spiltg) It entails reduction	<ul style="list-style-type: none">Sister Chromatids separateProduces 4 haploid daughter cellsSynapsis absentCrossing Over absentChiasma formation absentAt Anaphase, the Centromere will spiltIt entails division

3. Discuss the Stages involved in Fertilization

a) Passage of sperm through corona radiata

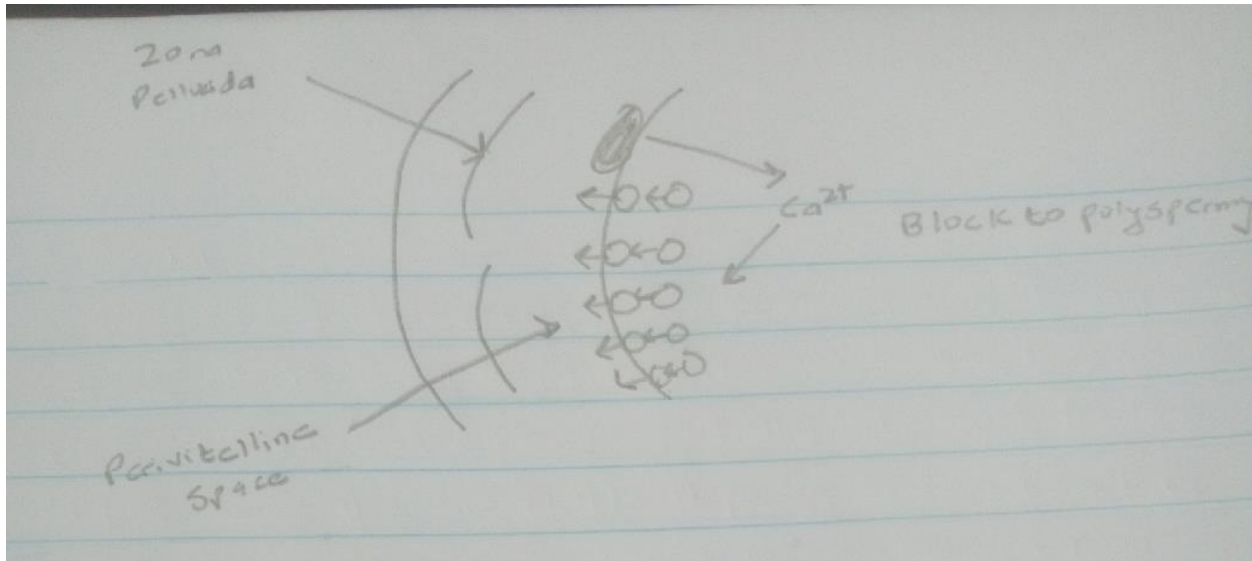
For sperms to pass through the corona radiata, they must have been capacitated i.e. removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane that overlies the acrosomal region of the spermatozoa because only capacitated sperms can pass through the corona radiata.

b) Penetration of Zona Pellucida

Zona- this is a glycoprotein shell that is surrounding the egg that facilitates and maintains sperm binding and induces acrosomal reaction.

This intact acrosome binds with receptor site on zona pellucida. This acrosome contains an enzyme called acrosine, allowing the sperm to penetrate the zona pellucida. This plasma membrane contains cortical granules. This sends a message to the zona pellucida to close its binding sites. They inactivate the

binding sites and hereby stop polyspermy.



c) Fusion of Plasma membrane of Sperm and Oocyte

Plasma membrane of sperm and oocyte fuse and break down at the area of fusion. Region of the head and tail will enter cytoplasm of oocyte leaving the plasma membrane behind.

d) Completion of 2nd Meiotic division and formation of Female Pronucleus

When the sperm penetrates the oocyte, it activates the completion of the second meiotic division thereby forming a matured oocyte and a second polar body. The nucleus in the matured oocyte now becomes the FEMALE PRONUCLEUS.

e) Formation of Male Pronucleus

Within the cytoplasm of the matured oocyte, the tail degenerates while the nucleus left enlarges becomes the male pronucleus. Morphologically, the male and female pronuclei are indistinguishable, but each still having a haploid number of chromosome as 23. Since all the sperm mitochondria degenerates, then the mitochondria of the zygote is of the maternal origin.

f) Formation of Zygote

The male and female pronucleus will fuse together to form an ootid which will end up becoming a zygote.

4. Differentiate between Monozygotic twins and Dizygotic twins

MONOZYGOTIC TWINS	DIZYGOTIC TWINS
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<ul style="list-style-type: none">a) They look alikeb) They have the same sexc) Are often called conjoined twinsd) They share amniotic sac, placenta and chronic cavity but have 2 umbilical cordse) They are genetically identicalf) Zygote divides into two	<ul style="list-style-type: none">a) They do not look alikeb) They can be of different sexesc) Not seen as conjoined twinsd) The amniotic sac. Placenta, chronic cavity and umbilical cord are separatee) They are genetically non-identicalf) Two different sperm fertilizes two different oocyte.
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