

# ABHULIMEN ANTHONY IMUDIYANNOSE

18/MHS01/006

## MEDICINE AND HEALTH SCIENCES

### MEDICINE AND SURGERY

ANA 205

### EMBRYOLOGY

#### 1. Discuss Ovulation.

Ovulation is the release of an oocyte from the Ovarian follicle. It is triggered by the Luteinizing hormone (LH) which causes: *the primary oocyte to complete meiosis I and the follicle to enter preovulatory mature vesicular stage.*

Note that **Meiosis II is also initiated but is arrested at metaphase II by cytostatic factor approximately 3hrs before ovulation.**

For an oocyte to be released, 2 events brought by LH must be carried out:

- i. Increased collagenase activity which brings about digestion of collagen fibers around the follicle.
- ii. Prostaglandin level increases causing contraction of the ovarian wall.

These contractions extrude the oocyte, which together with its surrounding follicular cells form the region of the cumulus oophorus.

This results in Ovulation in which the oocyte floats out of the Ovary.

Some of the cumulus oophorus cells then rearrange themselves around the zona pellucida to form the **corona radiata**

#### 2. Differentiate between Meiosis I and Meiosis II.

Meiosis I	Meiosis II
1. In Prophase I, pairing, crossing over and chiasma formation takes place.	In Prophase II, there is no pairing, no crossing over and no chiasma formation.
2. In Metaphase I, 46 homologous duplicated chromosomes lie at the equatorial plate.	In Metaphase II, 23 duplicated chromosomes lie at the equatorial plate.

3. In Anaphase I, 46 homologous duplicated chromosomes are separated from each other.	In Anaphase II, 23 duplicated chromosomes are separated from each other to form single stranded chromosomes.
4. In Telophase I, there is formation of 2 secondary gametocytes/2 daughter cells (23 duplicated chromosomes 2N).	In Telophase II, there is formation of 4 secondary gametocytes/4 daughter cells (23 single stranded chromosomes 1N)

### 3. Discuss the stages involved in fertilization.

Fertilization is the union of the male and female gametes to form the Zygote.

The stages involved in fertilization include:

**i. *Passage of the sperm through the Corona radiata:***

For this to occur, the sperms must undergo a process called **capacitation**. This process involves the removal of the glycoprotein and the seminal plasma proteins from the plasma membrane layer covering the acrosomal layer of the spermatozoa. Only capacitated sperms can pass through the corona radiata.

**ii. *Penetration of the Zona Pellucida:***

For this to occur, acrosomal reaction must take place. Acrosomal reaction takes place after the acrosomal region of the sperm binds with Zona pellucida. After binding, it releases some hormones such as Acrosin which facilitates the penetration of the Zona Pellucida.

**iii. *Fusion of plasma membrane of sperm and oocyte:***

The plasma membrane of the sperm and oocyte fuse together and break down at the site of fusion. After this is done, the head and tail of the sperm enters into the cytoplasm of oocyte.

**iv. *Completion of second meiotic division and the formation of the female Pronucleus:***

After the sperm penetrates the oocyte, the second meiotic division is complete. A mature oocyte and a second polar body are formed. The nucleus of the mature oocyte is what is known as the female pronucleus.

**v. *Formation of the male pronucleus:***

In the cytoplasm of the oocyte, the tail of the sperm degenerates while its head enlarges forming the male pronucleus.

**vi. *Formation of the zygote:***

Finally, the zygote is formed when the male and female pro nucleus fuses together.

4. Differentiate between monozygotic twins and dizygotic twins.

<b>Monozygotic twins</b>	<b>Dizygotic twins</b>
1. Twins develop from one embryo which splits into two embryos.	Twins are from different eggs that are fertilized by separate sperms.
2. Twins develop in the same womb	Twins develop in different wombs.
3. They are genetically identical	They are genetically unidentical.
4. They are always of the same sex	They can be of the same or different sexes.
5. They share 3 things in common: amniotic sac, chorionic sac and placenta (but they have two umbilical cords)	They share nothing in common.