

**Name: Rodoye Temidayo
Oluwatosin**

Matric no: 18/MHS01/332

**Department: medicine and
surgery**

**College: medicine and health
sciences**

Course: embryology

Level: 200

Embryology assignment:

Discuss:

1. Discuss ovulation
2. Differences between meiosis 1 and meiosis 2
3. Discuss the stage involved in fertilization
4. Differentiate between monozygotic twins and dizygotic twins.

Answers:

OVULATION

Some events happen before ovulation that is considered important:

Soon after the development of follicular cells there is a development of a fluid filled space called an **antrum**. It is crescent shaped found in the follicular cells, an ovarian follicle possessing an antrum is called a **vesicular follicle or secondary follicle**.

The primary oocyte is then pushed to one side and it is mounted upon by follicular cells forming the **cumulus oophorus**. cumulus oophorus projects in the antrum.

The secondary follicle becomes mature having a diameter of 25mm or more to produce the **Graafian follicle**.

Ovulation

Few days before ovulation there is a formation of Graafian follicle a follicle having a diameter of 25mm or more. During ovulation there is an abrupt increase in the luteinizing hormone causing the primary oocyte to complete meiosis 1 and it takes the mature follicle to preovulatory mature vesicular stage.

The cell then enters meiosis 2 and the cell is arrested at metaphase 2 by cytostatic factor approximately 3 hours before ovulation. There is a bulge in the ovary at the apex an avascular spot a stigma appears.

N.B: ovulation is the release of secondary oocyte from the ovary.

There is an increase in the luteinizing hormone surge and this cause an:

- Increase in the collagenase activity: due to increase in the LH surge the collagenase activity increases causing there to be digestion of the collagen fibres surrounding cell.
- There is an increase in prostaglandin activity : prostaglandin helps in the with the contraction of uterine and ovarian wall due to the muscular contraction the

secondary oocyte and follicular cells are then pushed out of the ovary (ovulation occurs)

Then the follicular cells then surround the zona pellucida and become the corona radiata

- **Differences between meiosis 1 and 2**

Meiosis 1	Meiosis 2
1. Formation of two diploid daughter cells	Formation of four haploid daughter cells
2. At anaphase the chromosomes separate but the centromeres do not split.	At anaphase the chromosomes separate but the centromeres split.
3. At anaphase 46 homologous duplicated chromosomes separate.	At anaphase 23 homologous chromosomes separate
4. There is crossing over	There is no crossing over.
5. It undergoes synapsis	It doesn't undergo synapsis
6. There is chiasma formation	There is no chiasma formation

DISCUSS THE STAGES OF FERTILIZATION

- 1) Passage through corona radiata

- 2) Penetration of zona pellucida
- 3) Fusion of the male and female plasma membrane
- 4) Completion of second meiotic division and formation of female pronucleus
- 5) Formation of male pronucleus
- 6) Formation of zygote

Passage through corona radiata

For fertilization to occur capacitation must occur as it is only capacitated sperms that can pass through the corona radiata now capacitation occurs for approximately 7 hours. Capacitation is the removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane of the acrosome region.

Penetration of zona pellucida

For the sperm to pass through the zona pellucida it must undergo acrosomal reaction.

The acrosome binds to the zona pellucida with the aid of acrosine. on binding of the zona pellucida this causes cortical granules to release lysosomal enzymes to alert the zona pellucida to block its binding site as the sperm moves to the perivitelline space approaching the plasma membrane.

Fusion of plasma membrane

The plasma membrane of the sperm and oocyte fuse and then break down at the point of fusion (note that the sperm enters the cytoplasm of the oocyte leaving behind its plasma membrane).

Completion of second meiotic division and formation of female pronucleus

As the sperm moves into the cytoplasm it penetrates the oocyte forming mature oocyte and 2nd polar body leads to completion of second meiotic division and the nucleus of the mature oocyte is known as the female pronucleus.

Formation of the male pronucleus

The sperm's tail degenerates and the nucleus of the sperm becomes bigger and becomes known as the male pronucleus. This is why all mitochondria are of maternal origin. Now the oocyte containing 2 haploid pronuclei that looks alike is called an ootid. The 2 pronuclei fuses into a single diploid aggregation now the ootid becomes a zygote.

Differentiate between monozygotic twins and dizygotic twins.

Monozygotic twins	Dizygotic twins
They are formed from one oocyte and one sperm	They are formed from two sperms and two oocyte
There are identical	They are not identical they resemble just like normal siblings
They are formed from one zygote	They are formed from two zygotes
They are always of the same sex	They may be of the same sex or of different sex
They share the same placenta, amnion, chronic sac but have different umbilical Cord.	They share the different placenta, amnion, chronic sac and umbilical cord.