

NAME: ONYEAGBAKO CHINEMEREM CYNTHIA.

MATRICULATION NO:18/MHS01/310

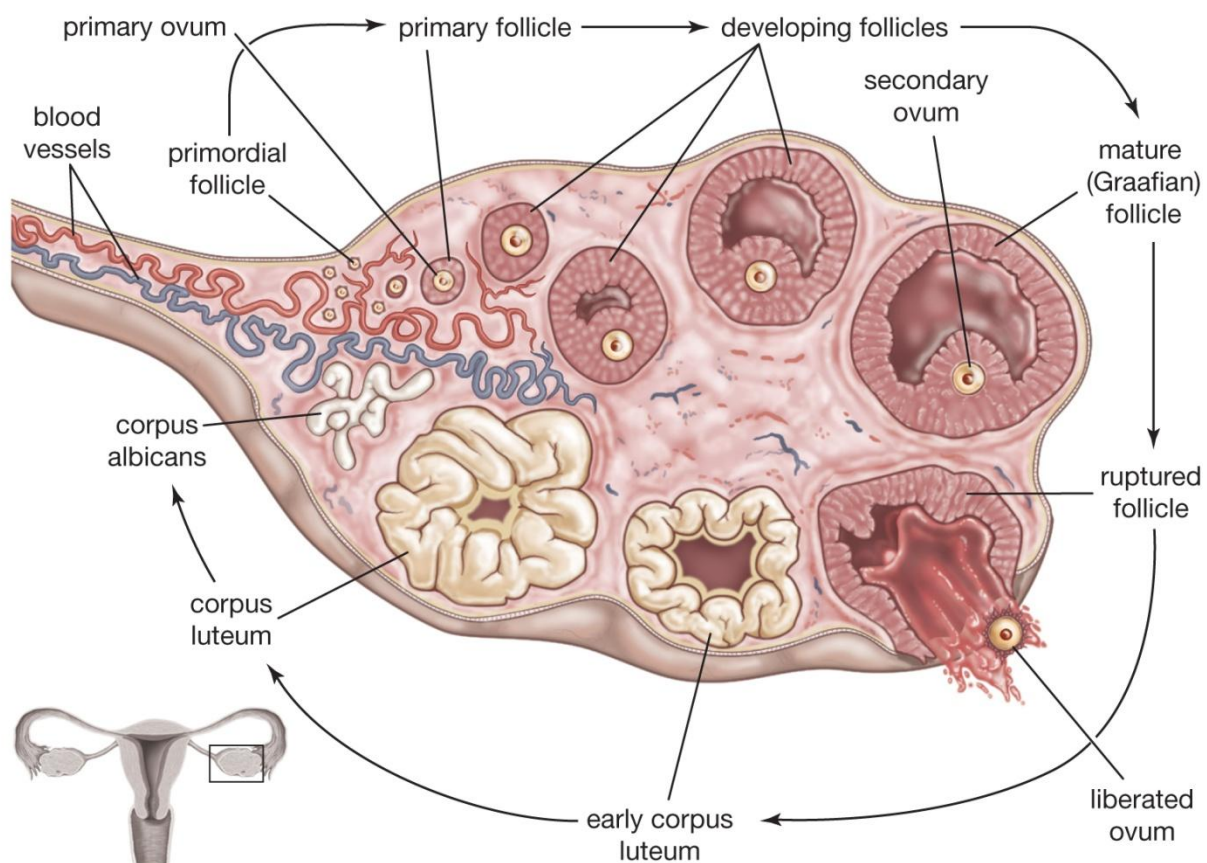
DEPARTMENT/COLLEGE: MEDICINE AND SURGERY /MHS

ASSIGNMENT TITLE: EMBRYOLOGY

COURSE TITLE: INTEGRATED CORE BASIC SCIENCES (ANATOMY)

COURSE CODE : ICBS

QUESTION 1: DISCUSS OVULATION



© 2012 Encyclopædia Britannica, Inc.

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

In a few days before ovulation, under the influence of the follicle stimulating hormone(FSH)and Luteinizing hormone(LH),the secondary follicle grows rapidly to a diameter of about 25 mm to become the mature vesicular / mature secondary or Graafian follicle.

Coincident with the final development of the vesicular follicle, there is an abrupt increase in the Luteinizing hormone which causes;

- ✓ The primary oocyte to complete meiosis 1
- ✓ the follicle to enter the preovulatory mature vesicular stage.

(meiosis 2 is also initiated but the secondary oocyte is arrested in the metaphase approximately 3 hours before ovulation. In the meantime, the surface of the ovary begins to bulge locally and at the apex, an avascular spot, THE STIGMA, appears.)

For the oocyte to be released, 2 events occur which are caused by Luteinizing Hormone surge. These events are;

- ✓ The increase in collagenase activity, resulting in the digestion of collagen fibers (connective tissue) surrounding the follicle.
- ✓ Prostaglandin levels also increase in response to the luteinizing hormone surge and cause local muscular contractions in the ovarian wall.

Those contractions expel the oocyte, which together with its surrounding follicular (granulosa) cells, form the region of the CUMULUS OOPHORUS. THIS CAUSES THE OVULATION IN WHICH THE MATURE OOCYTE FLOWS OUT OF THE OVARY.

Some of the cumulus oophorus cells then arrange themselves around the ZONA PELLUCIDA to form the CORONA RADIATA.

IMPORTANT POINTS TO NOTE

1. Ovulation is triggered by a surge of luteinizing hormone production.
2. Ovulation usually follows the Luteinizing hormone peak by 12 to 24 hours.
3. The luteinizing hormone surge, elicited by the high estrogen level in the blood, appears to cause the stigma to balloon out forming a Vesicle.
4. Basal body temperature is the lowest temperature of the body especially when the body is at rest.
5. Normal body temperature is 36.5 to 37.2 degree Celsius.
6. Anovulation is the inability to release an egg.

QUESTION 2: Differentiate between meiosis 1 and meiosis 2

Meiosis is the type of cell division, which happens only once in the lifetime of a eukaryote. This process is essential for the eukaryotic organisms as in this gametes, or sex cells are formed after the genetic material is mixed or rearranged. In the process of meiosis, the number of chromosomes in the parent cell are reduced to half, and four gamete cells are produced. Meiosis produces the eggs and sperm cells, which are used by the organism for sexual reproduction. The whole process of meiosis can be mainly divided into two smaller processes, Meiosis I and Meiosis II. In Meiosis I, the diploid parent cell forms haploid daughter cells, and the number of

chromosomes in this process are reduced to half, whereas in Meiosis II the two haploid parent cells produce four haploid daughter cells, and the number of chromosomes remains the same.

Comparison Chart

Basis	Meiosis I	Meiosis II
Number of chromosomes	In meiosis I, the number of chromosomes are reduced to half.	In meiosis II, the number of chromosomes remains the same
Production	Haploid daughter cells are formed from the diploid parent cell	Haploid daughter cells are formed from the haploid parent cell.
Complicated and Longer process	Yes	No
Crossing over of chromosomes	Yes	No

Key Differences

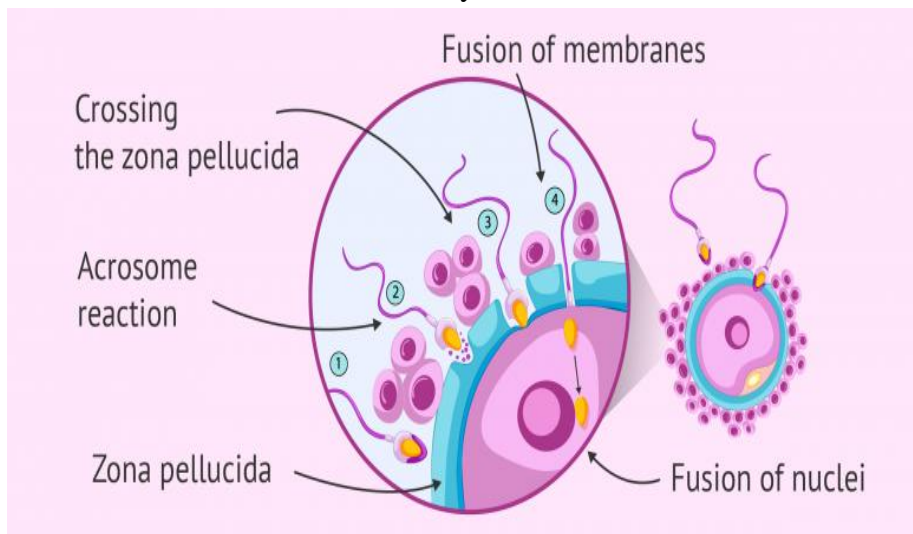
1. In meiosis I the number of chromosomes are reduced to half, and the haploid daughter cells are formed from the diploid parent cell, whereas in meiosis II number of chromosomes remain the same, and four haploid daughter cells are formed from the haploid parent cell.
2. As compared to the meiosis II, meiosis I is a more complicated and longer type of cell division.
3. Meiosis II closely resembles the process of mitosis.
4. The crossing over of chromosomes happens in the meiosis I, although it is absent in the meiosis II.

QUESTION 3:DISCUSS THE STAGES INVOLVED IN FERTILIZATION.

FERTILIZATION: This is the union of the sperm and the oocytes to give rise to a zygote. The usual site of fertilization is the AMPULLA of the uterine tube . The fertilization process takes approximately 2hours.It involves a sequence of coordinated events which include:

- **PASSAGE THROUGH THE CORONA RADIATA :** at this stage capacitation occurs in which the glycoprotein coat and seminal plasma proteins are removed from the plasma membrane of the acrosomal region of the sperm.
- **PENETRATION THROUGH THE ZONA PELLUCIDA:** at the region of the head, cell membrane is removed . The lysing enzyme , ACROSINE, is released to break the zona pellucida.**BLOCK TO POLYSPERMY** also occurs in the cortical granules which are present at the cell membrane , block the channel for passage of other sperms.

- **FUSION OF PLASMA MEMBRANE OF THE SPERM AND OOCYTE:** The region of the head and tail enter into the cytoplasm but the plasma membrane of the sperm is left behind.
- **COMPLETION OF SECONDARY MEIOTIC DIVISION AND FORMATION OF FEMALE PRONUCLEUS:** as soon as the sperm enters into the region of the oocyte, second meiotic division is complete. The nucleus becomes the female pronucleus.
- **FORMATION OF MALE PRONUCLEUS:** At this stage, the tail degenerates while the male nucleus left will enlarge to become the male pronucleus. Note that all the energy which the zygote possesses is from the maternal cell.
- **FORMATION OF ZYGOTE:** the female pronucleus and the male pronucleus will fuse to become an OOTID which eventually becomes **THE ZYGOTE**.



QUESTION 4: DIFFERENTIATE BETWEEN MONOZYGOTIC AND DIZYGOTIC TWINS.

INTRODUCTION

Monozygotic twins, or “identical twins,” are developed from the same egg which is fertilized by a single sperm cell. Dizygotic twins, or “fraternal twins,” are developed from two eggs that are fertilized by two different sperm cells. Monozygotic twins are developed in one placenta whereas dizygotic twins are developed in two separate placentas.

Monozygotic twins have genetic profiles that are almost identical to each other. They have the same blood type and may even share the same personalities. Most of the time, they are also of the same sex and share the same physical features. On the other hand, dizygotic twins have completely different genetic profiles and are just like regular siblings. They may be of the same or different gender, and they may look alike or different.

MAJOR DIFFERENCES

MONOZYGOTIC	DIZYGOTIC
They are genetically identical	They are genetically unidentical
They look alike	They do not look alike
They are of the same sex	They can be of different sex
They share the same amniotic sac, chorionic sac and placenta	They do not share the same amniotic sac, chorionic sac and placenta
They arise when a sperm fertilizes an oocyte to give rise to zygote which splits in two	They arise when two different sperm fertilize two different oocytes.

Monozygotic vs Dizygotic Twins
 More Information Online: WWW.DIFFERENCEBETWEEN.COM

	Monozygotic Twins	Dizygotic Twins
DEFINITION	Monozygotic twins are the two offspring that develop from one zygote.	Dizygotic twins are the two offspring that develop from two separate zygotes.
GENETIC COMPOSITION	Monozygotic twins originate from the same fertilized egg, and fertilized by the same sperm so, they share the same DNA.	Dizygotic twins originate from two fertilized egg and fertilized by two sperm; therefore, they do not share the same DNA.
PLACENTA, AMNIOTIC SAC AND CHORION	Zygotes only share the outer layer of the amniotic sac and have the two placentas but changes if divided within 4-8 days	Have a separate placenta, amniotic sac and chorion.
CAUSE	Due to the random splitting of the zygote into two embryos.	Due to two separate eggs fertilized by two sperms.
GENDER	Same gender	Can be different or the same gender.
APPEARANCE OF THE TWINS	Monozygotic twins almost have the same appearance.	Dizygotic twins may have the same appearance or different appearance.
CHARACTERISTICS	Monozygotic twins have the chance for same characters, developments, etc.	Dizygotic twins don't have the same characters, developments, etc
HEREDITARY	Not hereditary	Hereditary

REFERENCES

<https://difference.guru/difference-between-monozygotic-and-dizygotic-twins/>
www.britannica.com