



Fertilization and cleavage

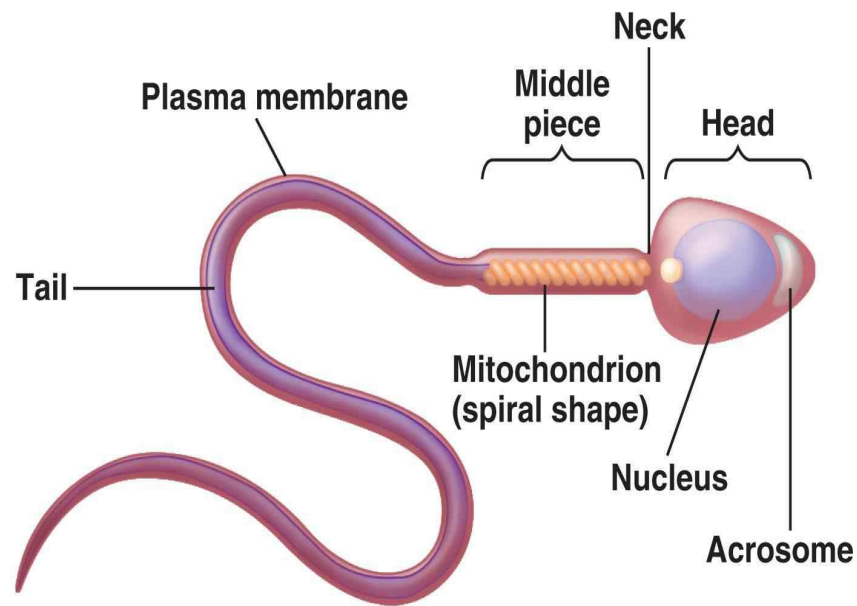
Anatomy Department
Beni-Suef University

Intended learning objectives (ILOs)

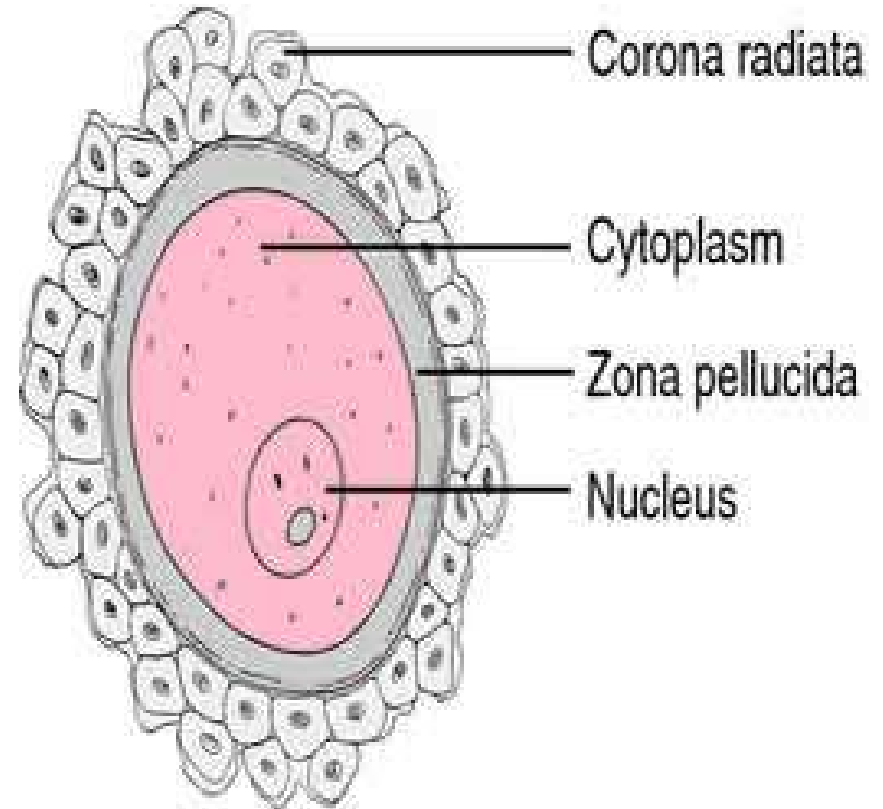
By the end of this lecture the student will be able to:

1. Identify the morphology of mature sperm and ovum.
2. Identify the term fertilization and discuss its results.
3. Describe the formation of the blastocyst.

Male and female gametes



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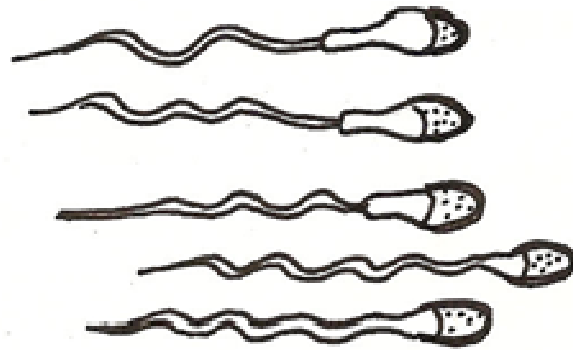
Fertilization

It is the union of the sperm and the ovum to form the zygote.

1.Site

2.Mechanism

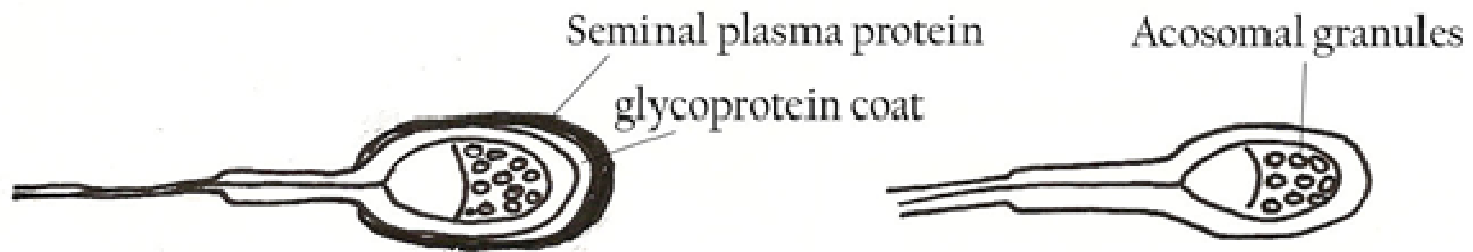
- Capacitation of the sperms.
- phase I (Penetration of the corona radiata).
- phase II (penetration of zona pellucida).
- phase III (penetration of cell membrane of the oocyte).



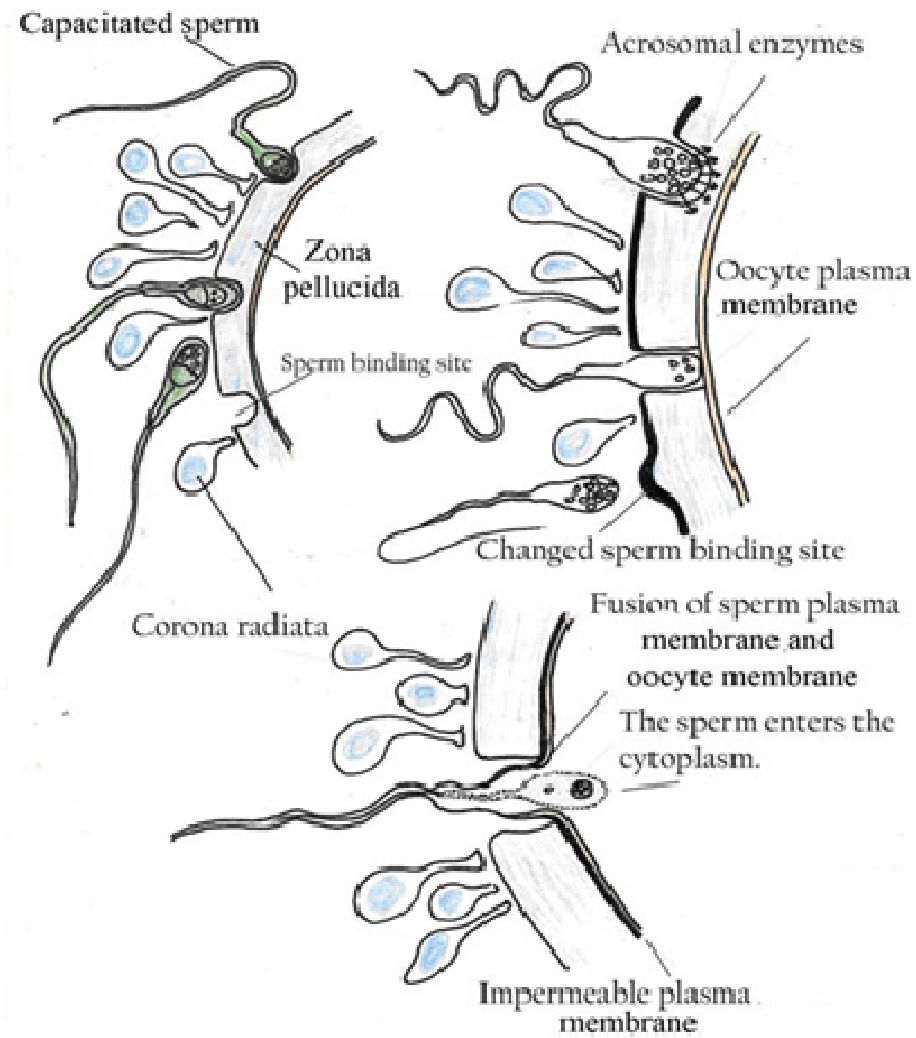
200 - 300 million/ejaculation



300 - 500 sperm reach the fertilization site



Capacitation



- **Events that occur after entrance of the sperm to the cytoplasm of the oocyte:**
 - a. Cortical and zonal reaction.
 - b. The secondary oocyte complete the 2nd meiotic division.
 - c. Male nucleus becomes larger.
 - d. Nuclear membrane of both male and female pronuclei fuse together to form the nucleus of zygote.

Results of fertilization:

- a. Formation of the zygote.
- b. Restoration of the diploid number of chromosomes (46).
- c. Determination of the sex of the new individual.
- d. Start cleavage.

Artificial fertilization:

1. In vitro fertilization (IVF)
2. Intracytoplasmic sperm injection (ICSI)
3. Gamete intrafallopian transfer (GIFT)

Cleavage (by mitosis) the zygote gives:

a. Two cell stage after 24 hr.

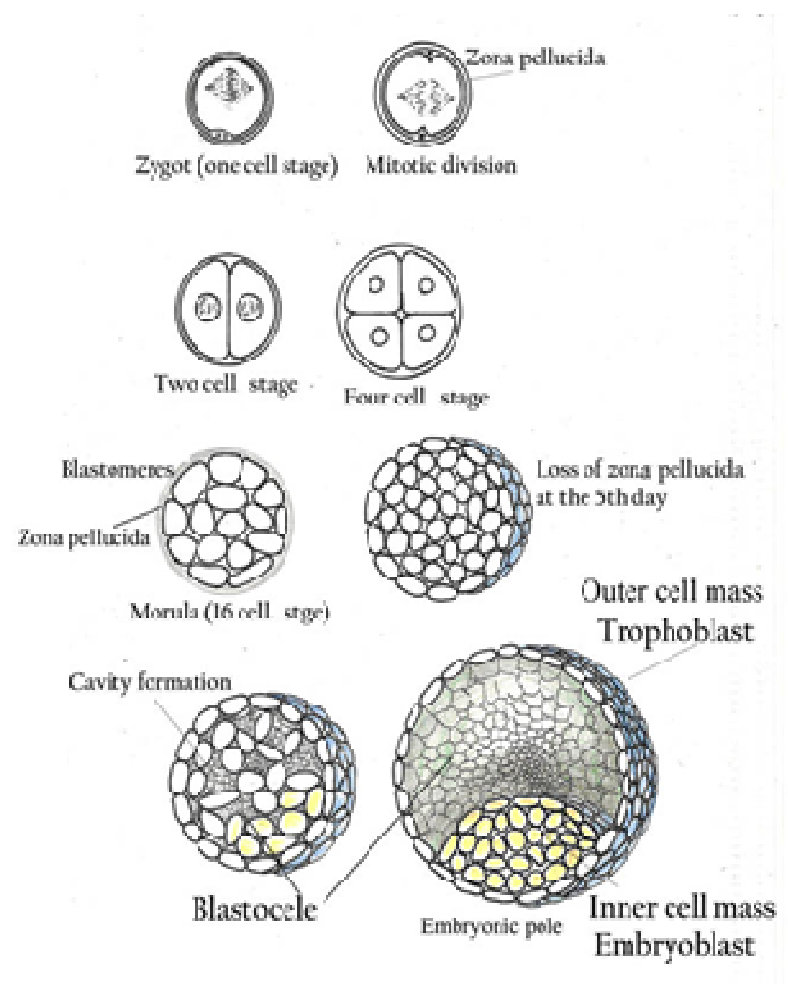
b. Four cell stage after 48 hr.

c. 16 cell stage (morula) after 3 days.

d. The morula reaches the uterine cavity.

Formation of the blastocyst

- a. The zona pellucida disappears at the end of the 5th day after fertilization.
- b. Fluid pass through the degenerating zona to form a cavity (blastococele)
- c. Blastocyst is composed of: outer cell mass (trophoblast), inner cell mass (embryoblast), blastococele, embryonic pole and abembryonic pole



Quiz

1. A membrane-bound structure, at tip of head of a sperm, helping in digesting outer surface of the ovum is called:

a.Sperm

b.Acrosome

c.Head of sperm

d.Base of ova

2. Fertilization occurs in

a. The cervix

b. The uterus

c. The fallopian tube

d. On the surface of ovary

3. Cleavage starts after fertilization in

a. Fallopian tube

b. Uterus

c. Cervix

d. vagina

4. Which of the following is correct about the zona pellucida

a. Surrounds the oocyte in the ovary.

b. Protect the oocyte in the uterine tube.

c. Is important for fertilization.

d. All of the above.

5. The blastocyst is composed of

a. Zona pellucida

b. Blastocoele

c. Trophoblast

d. embryoblast

Thank you