

Equator University of Science and Technology

Anatomy Department

Course: General Histology and Embryology FHS 1102

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Tutorial (3)

First Week of Development

7/9/2026

1. A sperm reaches the secondary oocyte but cannot penetrate the surrounding zona pellucida.

- a) Which structure must the sperm penetrate first to reach the oocyte?
- b) What reaction in the sperm allows it to penetrate the zona pellucida?
- c) Which enzyme-containing structure of the sperm is involved in this process?

2. A secondary oocyte is fertilized normally, but immediately after one sperm penetrates it, additional sperm are prevented from entering.

- a) What mechanism prevents polyspermy?
- b) Which structure undergoes changes to prevent additional sperm penetration?
- c) Why is prevention of polyspermy essential for normal development?

3. Fertilization occurs in the ampulla of the uterine tube.

- a) Why is the ampulla considered the usual site of fertilization?
- b) What happens to the sperm before it becomes capable of fertilizing the oocyte?
- c) What is the name of this functional maturation process?

4. A zygote undergoes a series of rapid mitotic divisions without an increase in its overall size.

- a) What are these divisions called?
- b) What are the individual cells produced by these divisions called?
- c) Why does the overall size of the embryo remain approximately unchanged during this process?

5. Approximately three days after fertilization, the developing conceptus consists of a compact mass of cells.

- a) What is this developmental stage called?
- b) Approximately how many cells are typically present at this stage?
- c) What major developmental stage follows the formation of this cell mass?

6. Around day 5 after fertilization, a fluid-filled embryonic structure develops with an inner cell mass and an outer cell layer.

- a) What is this structure called?
- b) What is the developmental fate of the inner cell mass?
- c) What is the main function of the outer cell layer?

7. A blastocyst reaches the uterine cavity but remains completely surrounded by the zona pellucida.

- a) What process must occur before implantation can begin?
- b) What is the name given to the loss of the zona pellucida?
- c) Why is this process important for implantation?

8. A blastocyst begins attaching to the endometrial lining approximately 6–7 days after fertilization.

- a) What developmental process is beginning?
- b) Which part of the blastocyst is primarily responsible for attaching to and invading the endometrium?
- c) Name the two layers that subsequently form in this tissue.

9. A woman has a positive pregnancy test shortly after implantation.

- a) Which embryonic tissue produces human chorionic gonadotropin (hCG)?
- b) What is the main function of hCG during early pregnancy?
- c) Which ovarian structure is maintained by hCG during early pregnancy?

10. A fertilized ovum normally travels from the uterine tube toward the uterus during the first week of development.

- a) Which processes help transport the developing conceptus through the uterine tube?
- b) Where does implantation normally occur?
- c) What abnormality may occur if implantation takes place in the uterine tube instead of the uterus?