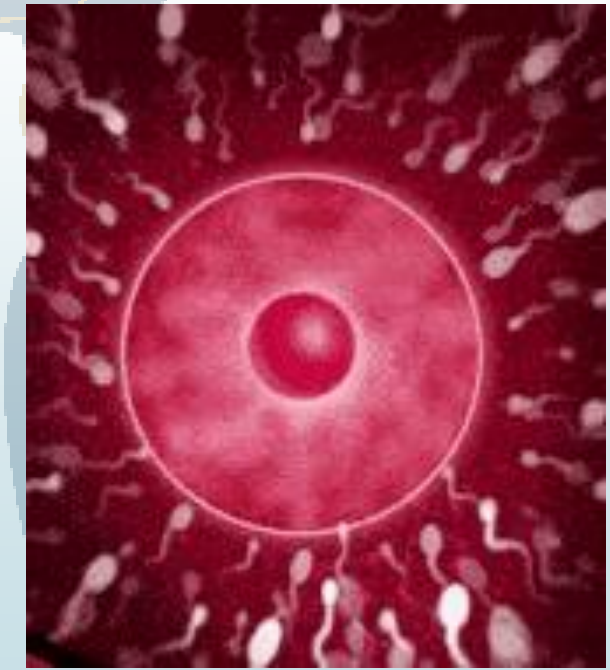
Chapter 1

Basic Mechanisms of Sexual Reproduction

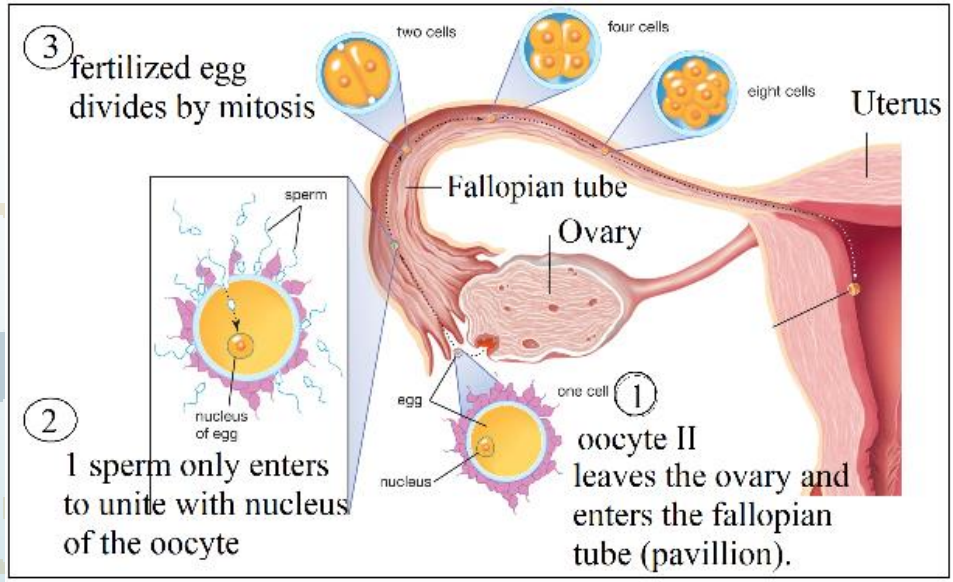
- Document 1: Male and Female Reproductive Systems
- Document 2: Diploid and Haploid Cells
- Document 3: Meiosis
- Document 4: Spermatogenesis
- Document 5: Oogenesis
- Document 6: Fertilization

Document 6:

Fertilization

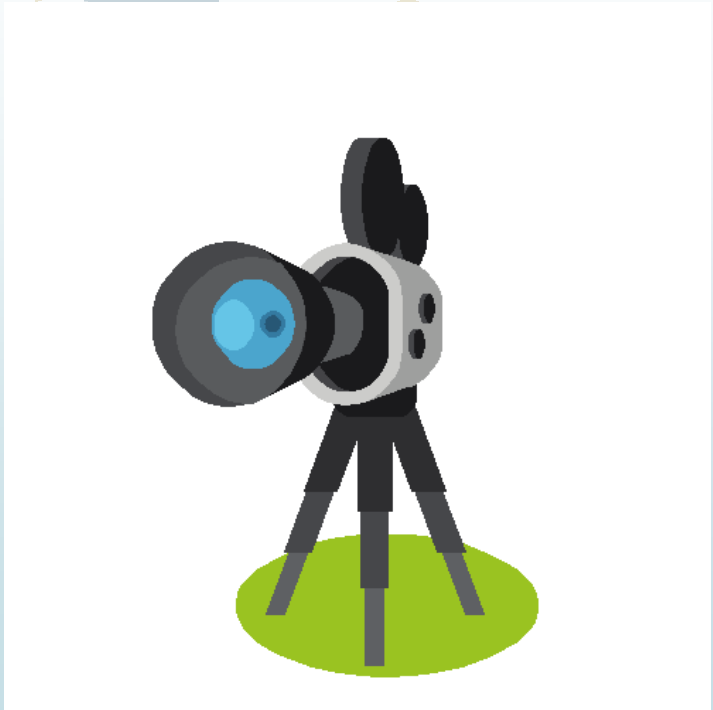


- **Definition:** It is the union of two haploid gametes (sperm and ootid) to give rise to a diploid cell called zygote, that is the first cell of a new individual.



- **Site of fertilization:**
  In the oviduct.
- **Importance:**
  It restores the diploid state of a new organism.

Video Time

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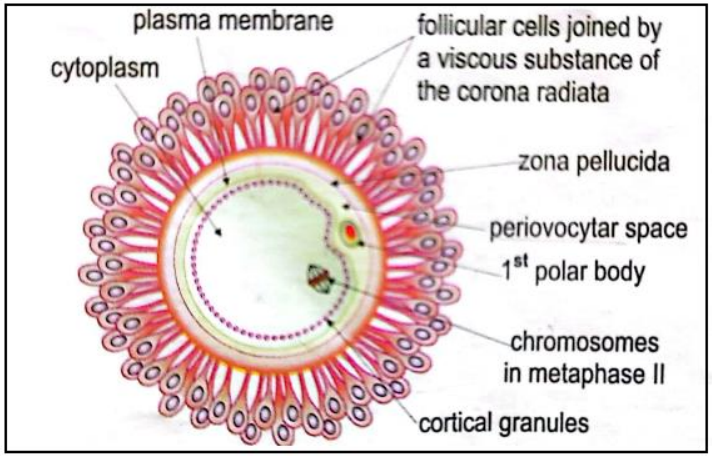
- Doc b, shows a schematic representation of an oocyte II blocked at metaphase II which is released to the oviduct at the day of ovulation.



Doc.b *Schematic representation of a secondary oocyte.*

- **Zona pellucida :** is the outer protective layer of the oocyte.
- **Corona radiata:** **two or three layers of follicular cells attached to the zona pellucida (it contains viscous substance).**

I. The Passage of Male Gametes in the Female Reproductive Tract

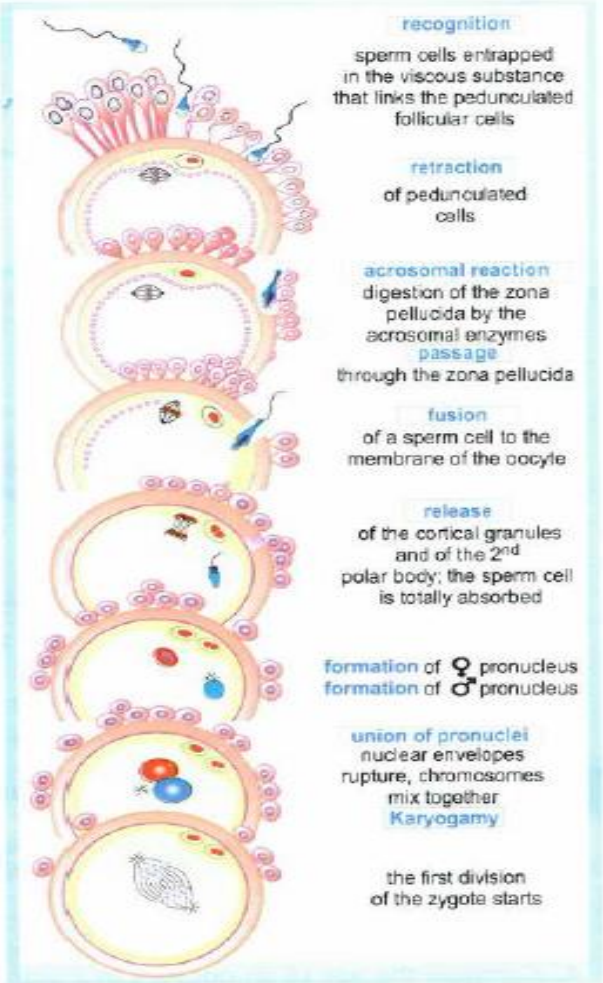
- Pathway of sperms in the female genital tract:

Vagina → Cervix →Uterus → Oviduct.

- During sexual intercourse ≈400 million sperms are deposited in the vagina, but less than 1 % can reach the uterus. Most of them degenerate and only a few hundred reach the oviduct. During this passage, in the female reproductive tract, sperms acquire their fertilizing capacity for 48 hours. This is known as sperm capacitation. The oocyte remains for only 24 hours after ovulation. If fertilization does not occur, the oocyte will degenerate.

- **Sperm capacitation :** is when the sperm cells acquire their fertilizing capacity during their passage in the female reproductive tract.
- The sperm head contains enzymes that are activated and released during fertilization to digest the wall of the oocyte II.

II. Steps of Fertilization



Doc.c *Sequence of events in the process of fertilization in humans.*

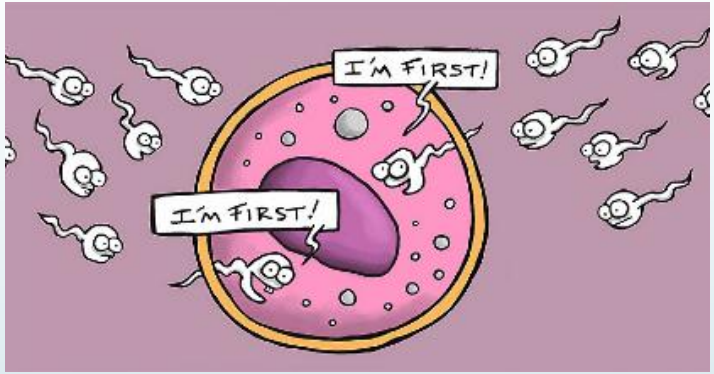
- **When a sperm reacts with the cytoplasmic membrane of the oocyte:**

  → Meiosis is reactivated (continues).

  → 2nd polar body is released.

  → cortical granules are released.

- Cortical granules are released during fertilization, to prevent polyspermy.
- **Polyspermy:** is the penetration of more than 1 sperm into the oocyte.



- **Fertilization and meiosis are characteristics of sexual reproduction.**