

NAME: IKEMEFUNA DUMEBI

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QUESTIONS

Discuss the factors facilitating the movement of sperm in the female reproductive tract.

ANSWERS

Fertilization refers to fusion (union) of male and female gametes (sperm and ovum) to form a new offspring. If sexual intercourse occurs at ovulation time and semen is ejaculated in the vagina, the sperms travel through the vagina and uterus to reach the fallopian tube. Sperms reach the ovarian end of fallopian tube within 30 to 60 minutes.

Movement of the sperm through uterus is facilitated by the antiperistaltic contractions of uterine muscles. Uterine contractions are induced by oxytocin, which is secreted from posterior pituitary by neuroendocrine reflex during sexual intercourse. Uterine contractions are also facilitated by prostaglandin (PGE₂) present in male seminal fluid. Among 200 to 300 million of sperms entering female genital tract, only a few thousand sperms reach the spot near the ovum. Among these few thousand sperms, only one succeeds in fertilizing the ovum. During fertilization, the sperm enters the ovum by penetrating the multiple layers of granulosa cells known as corona radiata present around the ovum. It is facilitated by hyaluronidase and proteolytic enzymes present in acrosome of sperm. Proteolytic enzymes from acrosome of the successful sperm diffuse through the structures of zona pellucida and inactivate the other sperms entering the ovum.

Penetrating movement of sperm is enabled by a protein called CatSper present in the tail portion of the sperm. It is a tunnel-shaped protein and forms the ion channel for entry of calcium into sperm cell. Immediately after fertilization, ovum, which is in secondary oocyte stage, divides into a matured ovum and a second polar body. Second polar body is expelled. Nucleus of matured ovum becomes female pronucleus with 23 chromosomes, which include 22 autosomes and one sex chromosome called X chromosome. Simultaneously, head of sperm swells and becomes male pronucleus. Then 23 chromosomes of the sperm and 23 chromosomes of ovum arrange themselves to reform the 23 pairs of chromosomes in the fertilized ovum.