

ETINOSA-OGBAHON OSASENAGA

18/MHS07/019

PHARMACOLOGY

PHS 212

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

The factors facilitating the movement of sperm in the female reproductive tract include;

- The sperm must be capable of propelling themselves through the environment of the female vagina and cervix.**
- This environment, which is under cyclic hormonal control, must be favorable to admit the sperm without destroying them.**
- Finally, the sperm must possess the capability of converting to a form that can penetrate the cell membrane of the egg (capacitation).**

During mating, human males produce semen which is produced by the male reproductive system, the penis when he ejaculates. Each drop of semen contains thousands of sperms which are microscopic in nature. When the male ejaculates in the woman's genitals or the vagina, sperm enter through the cervix into the uterus. Approximately 300 million sperm are present in each human ejaculation, but less than 1% of it make their way into the cervix (mouth of the womb) as most of it is killed by the acidic fluids near the vagina, fail to make it due to flow back, prevented from entering by mucus or move towards the walls of the cervix into dead-end channels.

The rest (10000 sperm cells approximately) of the sperms approach towards the oviduct where ovaries release eggs towards the far end of the uterus, half of which move towards the oviduct. Out of this, due to the mucus lining in the uterine junction, only 1000 make it to the fallopian tube. At this point, 25% of the remaining sperm furthermore is either died out or gets stuck to the oviduct lining.

Finally, one sperm manages to enter the egg for the event of fertilization, the rest of which are propelled by the zona reaction causing it to become impermeable to any sperms further.

At coitus, human sperm are deposited into the anterior vagina, where, to avoid vaginal acid and immune responses, they quickly contact cervical mucus and enter the cervix. Cervical mucus filters out sperm with poor morphology and motility and as such only a minority of ejaculated sperm actually enter the cervix. In the uterus, muscular contractions may enhance passage of sperm through the uterine cavity. A few thousand sperm swim through the uterotubal junctions to reach the Fallopian tubes (uterine tubes, oviducts) where sperm are stored in a reservoir, or at least maintained in a fertile state, by interacting with endosalpingeal (oviductal) epithelium. As the time of ovulation approaches, sperm become capacitated and hyper-activated, which enables them to proceed towards the tubal ampulla. Sperm may be guided to the oocyte by a combination of thermotaxis and chemotaxis. Motility hyper activation assists sperm in penetrating mucus in the tubes and the cumulus oophorus and zona pellucida of the oocyte, so that they may finally fuse with the oocyte plasma membrane. Knowledge of the biology of sperm transport can inspire improvements in artificial insemination, IVF, the diagnosis of infertility and the development of contraceptives.

In some species, the cervical canal widens under the influence of estrogen. Fluoroscopy and scintigraphy have been used in domestic dogs and cats to examine cervical patency. Opening of the cervix in these species has been correlated with estrus. Radiopaque fluid and also human serum albumin radiolabelled with technetium 99 could be seen rapidly passing through the cervix and filling the uterine lumen after deposition in the cranial vagina at estrus. Sperm of humans and cattle enter the cervical canal rapidly where they encounter cervical mucus. Under the influence of estrogen the cervix secretes highly hydrated mucus, often exceeding 96% water in women. The extent of hydration is correlated with penetrability to sperm. Coitus on the day of maximal mucus hydration in women is more closely correlated with incidence of pregnancy than coitus timed with respect to ovulation detected using basal body temperature.