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Sperm transport within the female reproductive tract is a cooperative effort between the functional properties of the sperm and seminal fluid on the one hand and cyclic adaptations of the female reproductive tract that facilitate the transport of sperm toward the ovulated egg. Much of the story of sperm transport in the female reproductive system involves the penetration by the sperm of various barriers along their way toward the egg. During coitus in the human, semen is deposited in the upper vagina close to the cervix. The normal environment of the vagina is inhospitable to the survival of sperm, principally because of its low pH (<5.0). The low pH of the vagina is a protective mechanism for the woman against many sexually transmitted pathogens, because no tissue barrier exists between the vagina (outside) and the peritoneal cavity (inside). The acidic pH of the vagina is bacteriocidal and is the reflection of an unusual functional adaptation of the vaginal epithelium. Alone among the stratified squamous epithelia in the body, the cells of the vaginal lining contain large amounts of glycogen. Anaerobic lactobacilli within the vagina break down the glycogen from shed vaginal epithelial cells, with the production of lactic acid as a byproduct. The lactic acid is responsible for the lowered vaginal pH.

Direct measurements have shown that within 8 seconds from the introduction of semen the pH of the upper vagina is raised from 4.3 to 7.2, creating an environment favorable for sperm motility. Another rapid event is the coagulation of human semen through the actions of semogelin by a minute after coitus. The coagulative function is incompletely understood, but it may play a role in keeping sperm near the cervical os. Thirty to 60 minutes after it coagulates, prostate-specific antigen (PSA), a proteolytic enzyme, degrades the coagulated semen. Within the semen and altered vaginal fluids, the sperm have begun to swim actively. A critical element in sperm motility is the availability of fructose, a nutrient provided by the seminal vesicles, within the semen. Because of their paucity of cytoplasm, spermatozoa require an external energy source. Unusually for most cells, spermatozoa have a specific requirement for fructose rather than glucose, the more commonly utilized carbohydrate energy source.

The next barrier facing sperm is the cervix. The cervical entrance (os) is not only very small, but it is blocked by cervical mucus. During most times in the menstrual cycle, cervical mucus is highly sticky (G mucus) and represents an almost impenetrable barrier to sperm penetration. Around the time of ovulation, however, the estrogenic environment of the female reproductive system brings about a change in cervical mucus, rendering it more watery and more amenable to penetration by sperm (E mucus).

Considerable uncertainty surrounds the question of passage of sperm through the cervix. The swimming speed of human sperm in fluid is approximately 5 mm/min, so in theory, sperm could swim through the cervical canal in a matter of minutes or hours. In reality, some sperm have been found in the upper reaches of the uterine tubes within minutes of coitus. These pioneers are likely to have been swept up the female reproductive tract during muscular contractions occurring at the time of or shortly after coitus. Research on rabbits has indicated that most of these sperm have been damaged and would not be able to fertilize an egg. The functional status of early-arriving human sperm is not known. On the other end of the spectrum, viable sperm have been taken from the cervix as long as 5 days after coitus. Between these two extremes, over the course of hours or even days, most of the spermatozoa make their way through the cervical mucus and up the cervical canal and into the uterus, where even less is known about the course of sperm transport in the human. Whether or not sperm are stored in the cervix is still not entirely certain. Sperm transport into and through the uterus is assumed to be assisted by contractions of its thick smooth muscle walls. There may or may not be subtle influences that favor the transport of sperm toward the opening of the uterine tube that contains the ovulated egg.

Of the huge numbers of sperm that enter the female reproductive tract, almost all fail to reach the uterine tubes. The unsuccessful sperm are removed by the infiltration of white blood cells into the cavities of the vagina, cervix, and uterus. These cells, along with certain immunoglobulins, inactivate and degrade foreign invaders, in this case, the excess sperm. Fortunately, the uterine tubes are not subject to this sort of cellular infiltration.

The flagellum of the sperm provides a whip-like movement in order to propel it forwards. The sperm cannot swim backwards due to the nature of the flagellar movement and propulsion. The sperm consists of a head that is 5 µm by 3 µm in size and a flagellum of around 50 µm in length.

There is little cytoplasm within the sperm and much of it is the DNA. The head contains the cell's DNA, tightly packaged into 23 chromosomes, while the neck of the sperm contains mitochondria to provide the sperm with energy. At the tip of the head is a package of enzymes that are needed to break down the protective layers that cover the egg's surface. Nearly 1000 sperm are made in the human male testes per second. Once released, the sperm can survive for approximately 48 hours.