NAME: SAM-OGBONNA ONYINYECHI O.F

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DEPARTMENT: NURSING

**SPERM MOTILITY**

This describes the ability of [sperm](/wiki/Sperm%22%20%5Co%20%22Sperm) to move properly through the female reproductive tract ([internal fertilization](/wiki/Internal_fertilization%22%20%5Co%20%22Internal%20fertilization)) or through water ([external fertilization](/wiki/External_fertilization%22%20%5Co%20%22External%20fertilization)) to reach the [egg](/wiki/Ovum%22%20%5Co%20%22Ovum). Sperm motility can also be thought of as the [quality](/wiki/Semen_quality%22%20%5Co%20%22Semen%20quality), which is a factor in successful [conception](/wiki/Fertilisation%22%20%5Co%20%22Fertilisation); sperm that do not "swim" properly will not reach the egg in order to [fertilize](/wiki/Fertilisation%22%20%5Co%20%22Fertilisation) it. Sperm motility in mammals also facilitates the passage of the sperm through the [cumulus oophorus](/wiki/Cumulus_oophorus%22%20%5Co%20%22Cumulus%20oophorus) (a layer of cells) and the [zona pellucida](/wiki/Zona_pellucida%22%20%5Co%20%22Zona%20pellucida) (a layer of [extracellular matrix](/wiki/Extracellular_matrix%22%20%5Co%20%22Extracellular%20matrix)), which surround the mammalian [oocyte](/wiki/Oocyte%22%20%5Co%20%22Oocyte).

Sperms aggregate in 'trains' that are better able to fertilize eggs because they are more capable of navigating the viscous environment of the female reproductive tract. The trains move in a sinusoidal motion.

Sperm motility is also affected by certain factors released by eggs.

Sperm movement is activated by changes in intracellular ion concentration. The changes in ion concentration that provoke motility are different among species. In [marine invertebrates](/wiki/Marine_invertebrates%22%20%5Co%20%22Marine%20invertebrates) and [sea urchins](/wiki/Sea_urchin%22%20%5Co%20%22Sea%20urchin), the rise in pH to about 7.2–7.6 activates [ATPase](/wiki/ATPase%22%20%5Co%20%22ATPase) which leads to a decrease in intracellular potassium, and thus induces membrane [hyperpolarization](/wiki/Hyperpolarization_%28biology%29%22%20%5Co%20%22Hyperpolarization%20%28biology%29). As a result, sperm movement is activated. The change in cell volume which alters intracellular ion concentration can also contribute to the activation of sperm motility. In some [mammals](/wiki/Mammals%22%20%5Co%20%22Mammals), sperm motility is activated by increase in pH, calcium ion and [cAMP](/wiki/Cyclic_adenosine_monophosphate%22%20%5Co%20%22Cyclic%20adenosine%20monophosphate), yet it is suppressed by low pH in the [epididymis](/wiki/Epididymis%22%20%5Co%20%22Epididymis).

The tail of the sperm - the [flagellum](/wiki/Flagellum%22%20%5Co%20%22Flagellum) - confers motility upon the sperm, and has three principal components:

1. A central skeleton constructed of 11 [microtubules](/wiki/Microtubule%22%20%5Co%20%22Microtubule) collectively termed the [axoneme](/wiki/Axoneme%22%20%5Co%20%22Axoneme)and similar to the equivalent structure found in [cilia](/wiki/Cilium%22%20%5Co%20%22Cilium)
2. A thin cell membrane covering the axoneme
3. Mitochondria arranged spirally around in the axoneme

Back and forth movement of the tail results from a rhythmical longitudinal sliding motion between the anterior and posterior tubules that make up the axoneme. The energy for this process is supplied by [ATP](/wiki/Adenosine_triphosphate%22%20%5Co%20%22Adenosine%20triphosphate) produced by mitochondria. The velocity of a sperm in fluid medium is usually 1–4 mm/min. This allows the sperm to move towards an [ovum](/wiki/Ovum%22%20%5Co%20%22Ovum) in order to fertilize it.

In mammals, [spermatozoa](/wiki/Spermatozoa%22%20%5Co%20%22Spermatozoa) mature functionally through a process which is known as [capacitation](/wiki/Capacitation%22%20%5Co%20%22Capacitation). When spermatozoa reach the isthmic [oviduct](/wiki/Oviduct%22%20%5Co%20%22Oviduct), their motility has been reported to be reduced as they attach to epithelium. Near the time of ovulation, hyper activation occurs. During this process, the flagella move with high curvature and long wavelength. Hyper activation is initiated by extracellular calcium; however, the factors that regulate calcium level is unknown.

Without technological intervention, a non-motile or abnormally-motile sperm is not going to fertilize. Therefore, the fraction of a sperm population that is motile is widely used as a measure of semen quality . Insufficient sperm motility is a common cause of [subfertility](/wiki/Subfertility%22%20%5Co%20%22Subfertility) or [infertility](/wiki/Infertility%22%20%5Co%20%22Infertility). Several measures are available to improve sperm quality.

**FACTORS FACILITATING SPERM TRANSPORT IN THE FEMALE REPRODUCTIVE TRACT**

* Alkaline secretions from prostrate gland into the semen helps to create an alkaline environment in the acidic vagina to protect the sperm in the vagina.
* Prostaglandins present in the semen and the female reproductive tract facilitates myometrial contractions to help the movement of sperm towards the oviduct.
* Oestrogen and oxytocin secreted in the female help to assist myometrial contractions in other to facilitate the upward mobility of sperm towards the oviduct
* Oestrogen facilitates the production of a watery mucus in the cervix during the timing of ovulation to allow easy passage of sperm.
* In the female reproductive tract, sperm undergoes capacitation, this occurs after the sperm becomes more fluid ensuing the removal of cholesterol and glycoproteins from the membrane in other to expose the zona pellucida binding sites
* There is a change in the sperm membrane potential that permits Ca²(calcium) to enter the sperm to facilitate vessicle release for acrosomal reactions.

Also during capacitation of sperm there is phosphorylation of numerous protein needed in fertilization.