

Stap 1: de coïtus / vagina

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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).

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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.ⁱ

Within about 10 seconds, the pH of the upper vagina is increased from 4.3 to as much as 7.2. The buffering effect lasts only a few minutes in humans, but it provides enough time for the spermatozoa to approach the cervix in an environment (pH 6.0–6.5) optimal for sperm motility.ⁱⁱ

Within minutes of vaginal deposition, human sperm begin to leave the seminal pool and swim into the cervical canal (Sobrero and MacLeod, 1962).ⁱⁱⁱ

Stap 2 Passage door de Cervix

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. ⁱ

The composition and viscosity of cervical mucus vary considerably throughout the menstrual cycle. Composed of cervical mucin (a glycoprotein with a high carbohydrate composition) and soluble components, cervical mucus is not readily penetrable. Between days 9 and 16 of the cycle, however, its water content increases, and this change facilitates the passage of sperm through the cervix around the time of ovulation; such mucus is sometimes called E mucus.

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There are two main modes of sperm transport through the cervix. One is a phase of initial rapid transport, by which some spermatozoa can reach the uterine tubes within 5–20 min of ejaculation. Such rapid transport relies more on muscular movements of the female reproductive tract than on the motility of the spermatozoa themselves. These early-arriving sperm, however, appear not to be as capable of fertilizing an egg as do those that have spent more time in the female reproductive tract. The second, slow phase of sperm transport involves the swimming of spermatozoa through the cervical mucus (traveling at a rate of 2–3 mm h⁻¹), their storage in cervical crypts, and their final passage through the cervical canal as much as 2–4 days later. ii

Are sperm stored in the cervix?

Little is known about how long sperm spend traversing the cervix or whether sperm are stored there. Vigorously motile sperm have been recovered from the human cervix up to 5 days after insemination (Gould et al., 1984), and the presence of sperm in midcycle cervical mucus forms the basis of the 'post coital test' (PCT) (Mortimer, 1994).iii

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- i The Reproductive System
Bruce M. Carlson MD, PhD, in *The Human Body*, 2019
 - ii Gamete Transport
In Reference Module in Biomedical Sciences, 2014
 - iii Sperm transport in the female reproductive tract
S.S.Suarez^{1,3} and A.A.Pacey² *Human Reproduction Update*, Vol.12, No.1 pp. 23–37, 2006
doi:10.1093/humupd/dmi047 Advance Access publication November 4, 2005