**1.Spermatogenesis** is the process by which [haploid](https://en.m.wikipedia.org/wiki/Haploid) [spermatozoa](https://en.m.wikipedia.org/wiki/Spermatozoa) develop from [germ cells](https://en.m.wikipedia.org/wiki/Germ_cell) in the [seminiferous tubules](https://en.m.wikipedia.org/wiki/Seminiferous_tubules) of the [testis](https://en.m.wikipedia.org/wiki/Testis). This process starts with the [mitotic division](https://en.m.wikipedia.org/wiki/Mitosis) of the [stem cells](https://en.m.wikipedia.org/wiki/Stem_cell) located close to the basement membrane of the tubules. These cells are called [spermatogonial stem cells](https://en.m.wikipedia.org/wiki/Spermatogonial_Stem_Cells). The mitotic division of these produces two types of cells. Type A cells replenish the stem cells, and type B cells differentiate into primary [spermatocytes](https://en.m.wikipedia.org/wiki/Spermatocyte). The primary spermatocyte divides meiotically ([Meiosis](https://en.m.wikipedia.org/wiki/Meiosis) I) into two secondary spermatocytes; each secondary spermatocyte divides into two equal haploid [spermatids](https://en.m.wikipedia.org/wiki/Spermatids) by Meiosis II. The spermatids are transformed into spermatozoa (sperm) by the process of [spermiogenesis](https://en.m.wikipedia.org/wiki/Spermiogenesis). These develop into mature spermatozoa, also known as [sperm cells](https://en.m.wikipedia.org/wiki/Sperm). Thus, the primary spermatocyte gives rise to two cells, the secondary spermatocytes, and the two secondary spermatocytes by their subdivision produce four spermatozoa and four haploid cells.

Spermatozoa are the mature male [gametes](https://en.m.wikipedia.org/wiki/Gamete) in many sexually reproducing organisms. Thus, spermatogenesis is the male version of [gametogenesis](https://en.m.wikipedia.org/wiki/Gametogenesis), of which the female equivalent is [oogenesis](https://en.m.wikipedia.org/wiki/Oogenesis). In [mammals](https://en.m.wikipedia.org/wiki/Mammal) it occurs in the [seminiferous tubules](https://en.m.wikipedia.org/wiki/Seminiferous_tubules) of the male [testes](https://en.m.wikipedia.org/wiki/Testes) in a stepwise fashion. Spermatogenesis is highly dependent upon optimal conditions for the process to occur correctly, and is essential for [sexual reproduction](https://en.m.wikipedia.org/wiki/Sexual_reproduction). [DNA methylation](https://en.m.wikipedia.org/wiki/DNA_methylation) and [histone modification](https://en.m.wikipedia.org/wiki/Histone_modification) have been implicated in the regulation of this process. It starts at [puberty](https://en.m.wikipedia.org/wiki/Puberty) and usually continues uninterrupted until death, although a slight decrease can be discerned in the quantity of produced sperm with increase in age (see [Male infertility](https://en.m.wikipedia.org/wiki/Male_infertility)).

Spermatogenesis starts in the bottom part of seminiferous tubes and, progressively, cells go deeper into tubes and moving along it until mature spermatozoa reaches the lumen, where mature spermatozoa are deposited. The division happens asynchronically; if the tube is cut transversally one could observe different maturation states. A group of cells with different maturation states that are being generated at the same time is called a spermatogenic wave.

2. Semen

**Semen**, also known as **seminal fluid**, is an organic [fluid](https://en.m.wikipedia.org/wiki/Fluid) that contains [spermatozoa](https://en.m.wikipedia.org/wiki/Spermatozoon). It is secreted by the [gonads](https://en.m.wikipedia.org/wiki/Gonad) (sexual glands) and other sexual organs of [male](https://en.m.wikipedia.org/wiki/Male) or [hermaphroditic](https://en.m.wikipedia.org/wiki/Hermaphrodite) [animals](https://en.m.wikipedia.org/wiki/Animal) and can [fertilize](https://en.m.wikipedia.org/wiki/Fertilization) the [female](https://en.m.wikipedia.org/wiki/Female) [ovum](https://en.m.wikipedia.org/wiki/Ovum). In humans, seminal fluid contains several components besides spermatozoa: proteolytic and other enzymes as well as fructose are elements of seminal fluid which promote the survival of spermatozoa, and provide a medium through which they can move or "swim". Semen is produced and originates from the [seminal vesicle](https://en.m.wikipedia.org/wiki/Seminal_vesicle), which is located in the pelvis. The process that results in the discharge of semen is called [*ejaculation*](https://en.m.wikipedia.org/wiki/Ejaculation). Semen is also a form of genetic material. In animals, semen has been collected for cryoconservation. [Cryoconservation of animal genetic resources](https://en.m.wikipedia.org/wiki/Cryoconservation_of_animal_genetic_resources) is a practice that calls for the collection of genetic material in efforts for conservation of a particular breed.