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Topic: Function of male reproductive system

Function of male reproductive system

The organ of the male reproductive system are specialized for three primary functions: To produce, maintain, transport and nourish sperm (the male reproductive cells), and protective fluid (semen).To discharge sperm within the female reproductive tract.

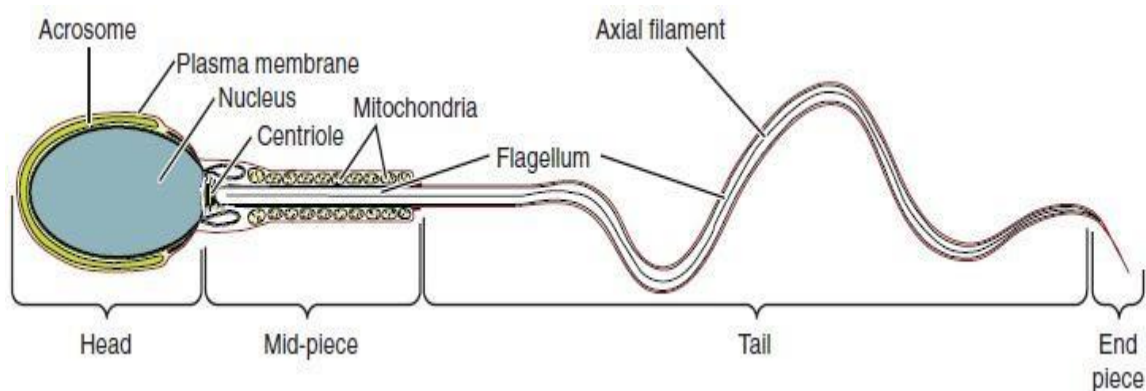


Fig.- Mature sperm cell

- The head is the part of the sperm that contains the nucleus and not much else. The nucleus, in turn, contains tightly coiled DNA that is the male parent's contribution to the genetic makeup of a zygote (if one forms). Each sperm is a haploid cell, containing half the chromosomal complement of a normal, diploid body cell.
- The front of the head is an area called the acrosome. The acrosome contains enzymes that help the sperm penetrate an egg (if it reaches one).

- The midpiece is the part of the sperm between the head and the flagellum tail. The midpiece is packed with mitochondria that produce the energy needed to move the flagellum.
- The flagellum (also called the tail) can rotate like a propeller, allowing the sperm to “swim” through the female reproductive tract to reach an egg if one is present.

Spermatogenesis

The process of producing sperm is known as spermatogenesis. Spermatogenesis normally starts when a boy reaches puberty, and it usually continues uninterrupted until death, although a decrease in sperm production generally occurs at older ages.

Spermatogenesis occurs in the seminiferous tubules in the testes. Spermatogenesis requires high concentrations of testosterone.

Testosterone is secreted by Leydig cells, which are adjacent to the seminiferous tubules in the testes.

Sperm production in the seminiferous tubules is very sensitive to temperature. This may be the most important reason the testes are located outside the body in the scrotum.

The temperature inside the scrotum is generally about 2 degrees Celsius (almost 4 degrees Fahrenheit) cooler than core body temperature. This lower temperature is optimal for spermatogenesis.

The scrotum regulates its internal temperature as needed by contractions of the smooth muscles lining the scrotum. When the temperature inside the scrotum becomes too low, the scrotal muscles contract.

The contraction of the muscles pulls the scrotum higher against the body, where the temperature is warmer. The opposite occurs when the temperature inside the scrotum becomes too high.

The process begins with a diploid stem cell called a spermatogonium (plural, spermatogonia), and involves several cell divisions. The entire process takes at least ten weeks to complete, including maturation in the epididymis.

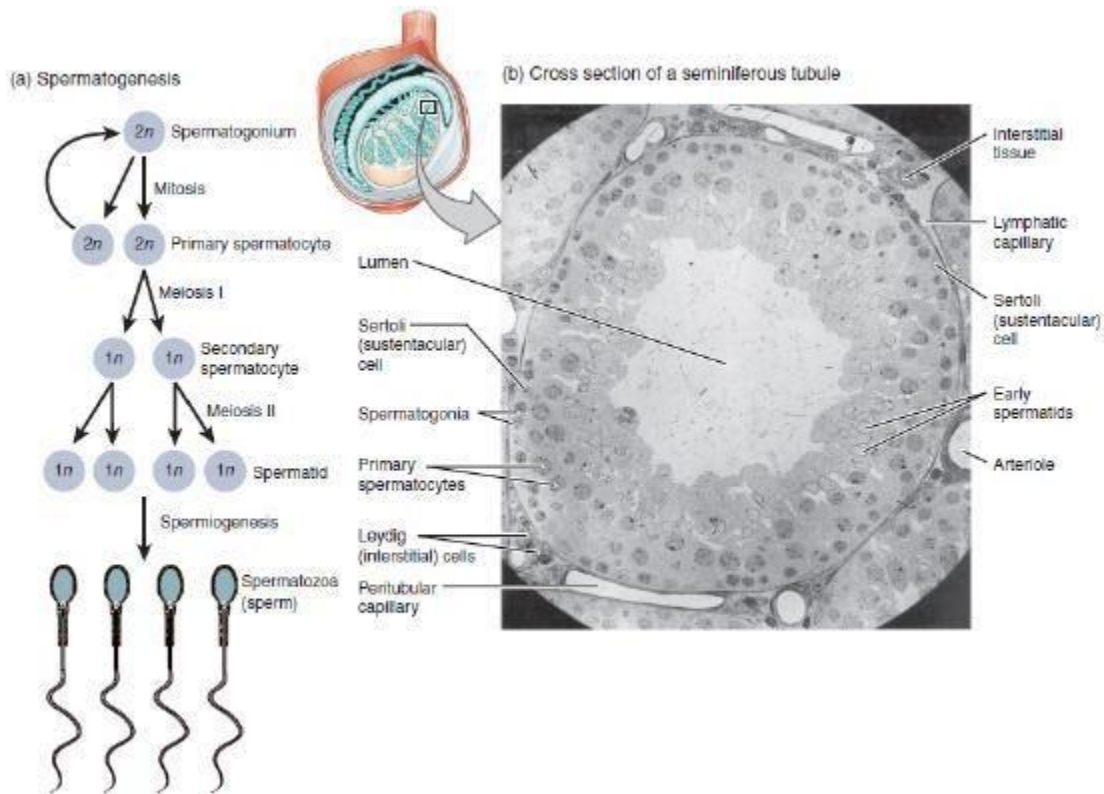


Figure: Spermatogenesis

1. A spermatogonium undergoes mitosis to produce two diploid cells called primary spermatocytes. One of the primary spermatocytes goes on to produce sperm. The other replenishes the reserve of spermatogonia.
2. The primary spermatocyte undergoes meiosis I to produce two haploid daughter cells called secondary spermatocytes.
3. The secondary spermatocytes rapidly undergo meiosis II to produce a total of four haploid daughter cells called spermatids.
4. The spermatids begin to form a tail, and their DNA becomes highly condensed. Unnecessary cytoplasm and organelles are removed from the

cells, and they form a head, midpiece, and flagellum. The resulting cells are sperm (spermatozoa).

Testosterone Production:

The final major function of the male reproductive system is the production of the male sex hormone testosterone. In mature males, this occurs mainly in the testes. Testosterone production is under the control of luteinizing hormone (LH) from the pituitary gland. LH stimulates Leydig cells in the testes to secrete testosterone.

Testosterone is important for male sexual development at puberty. It stimulates maturation of the male reproductive organs, as well as the development of secondary male sex characteristics (such as facial hair).

Testosterone is also needed in mature males for normal spermatogenesis to be maintained in the testes.

Follicle stimulating hormone (FSH) from the pituitary gland is also needed for spermatogenesis to occur, in part because it helps Sertoli cells in the testes concentrate testosterone to high enough levels to maintain sperm production.

Testosterone is also needed for the proper functioning of the prostate gland. In addition, testosterone plays a role in erection, allowing sperm to be deposited within the female reproductive tract.