

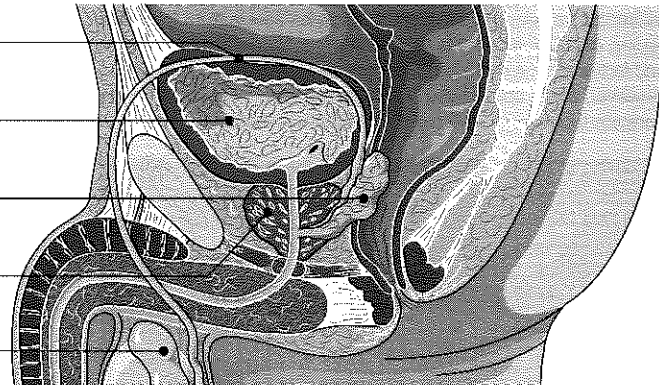


Male Reproductive System

The reproductive role of the male is to produce the sperm and deliver them to the female. When a sperm combines with an egg, it contributes half the genetic material of the offspring and, in

humans and other mammals, determines its sex. The reproductive structures of human males (described below and opposite) are in many ways typical of other mammals.

- (a)
- (b)
- (c)
- (d)
- Epididymis: Coiled tube where sperm complete maturation
- (e)
- (f)
- (g)



Vas deferens:
Carries sperm to the urethra

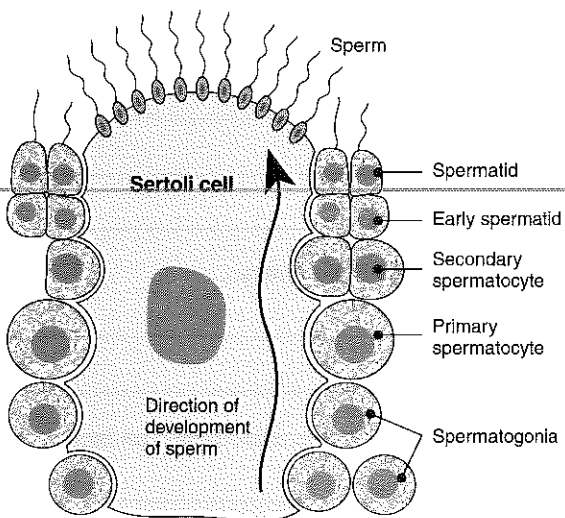
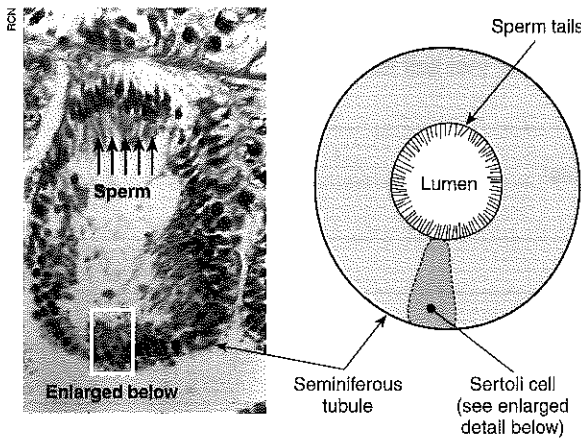
Epididymis: Coiled tube where sperm develop motility

Seminiferous tubules: Bundles of coiled tubes (total length 500m) leading to the epididymis

Cutaway of a Single Testis

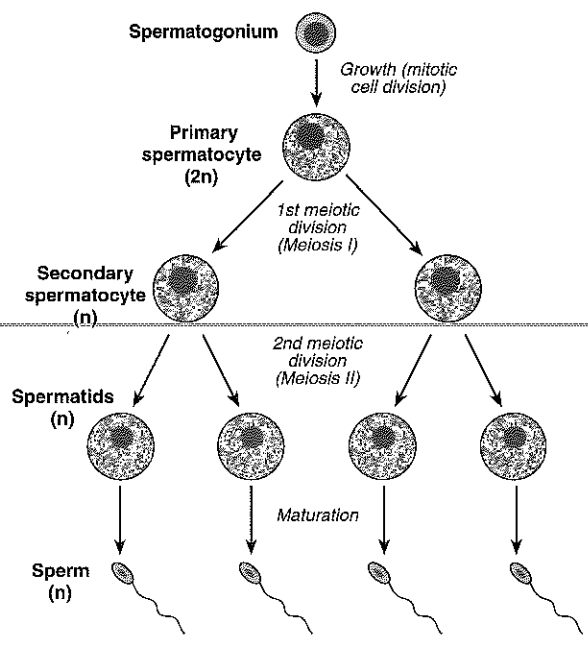
Cross Section through Seminiferous Tubule

The photograph (below, left) shows maturing sperm (arrowed) with tails projecting into the tubule. Their heads are embedded in the Sertoli cells in the tubule wall and they are ready to break free and move to the epididymis where they complete their maturation. The same cross-section is illustrated diagrammatically (below, right).



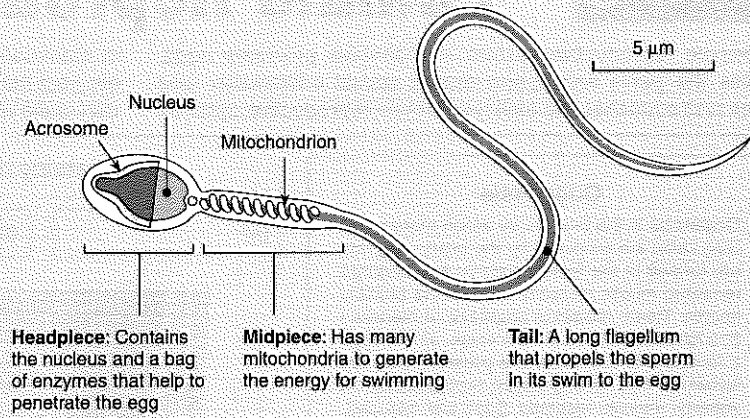
Spermatogenesis

Spermatogenesis is the process by which mature spermatozoa (sperm) are produced in the testis. In humans, about 120 million sperm are produced each day. Sperm production is regulated by the hormones FSH (from the anterior pituitary) and testosterone (from the testes). Spermatogonia, in the outermost layer of the seminiferous tubules, multiply throughout reproductive life. Some divide by meiosis into spermatocytes, which produce spermatids. The spermatids mature into sperm in the seminiferous tubules, and develop full motility in the epididymis.



The Structure of a Sperm Cell

Mature spermatozoa (sperm) are produced by a process called spermatogenesis in the testes (see description of the process on the previous page). Meiotic division of spermatocytes produces spermatids which then differentiate into mature sperm. Sperm are quite simple in structure – their purpose is to swim to the egg and donate their genetic material. They are composed of three regions: headpiece, midpiece, and tail. Sperm do not live long (only about 48 hours), but they swim quickly and there are so many of them (millions per ejaculation) that some are able to reach the egg to fertilise it.



1. The male human reproductive system and associated structures are shown on the previous page. Using the following word list identify the labelled parts (write your answers in the spaces provided on the diagram).

Word List: bladder, scrotal sac, sperm duct (vas deferens), seminal vesicle, testis, urethra, prostate gland

2. In a few words or a short sentence, state the function of each of the structures labelled (a) - (g) in the diagram on the previous page:

- (a) _____
- (b) _____
- (c) _____
- (d) _____
- (e) _____
- (f) _____
- (g) _____

3. The secretions of the prostate gland (which make up a large proportion of the seminal fluid produced in an ejaculation) are of alkaline pH, while the secretions of the vagina are normally slightly acidic. With this information, explain the role the prostate gland secretions have in maintaining the viability of sperm deposited in the vagina.

- 4. (a) Name the process that gives rise to the primary spermatocyte: _____
- (b) Name the process that produces the secondary spermatocytes and spermatids: _____
- (c) Name the two hormones that control sperm production: _____
- (d) In contrast to females, males may be fertile well into old age. Explain why this is the case: _____

5. Each ejaculation of a healthy, fertile male contains 100-400 million sperm. State why so many sperm are needed:

6. Recently, concern has been expressed about the level of synthetic oestrogen-like chemicals (oestrogen-mimics) in the environment. Suggest the reason for this concern with regards to male fertility:
