

# **Appendix A**

## **The Male Reproductive System**



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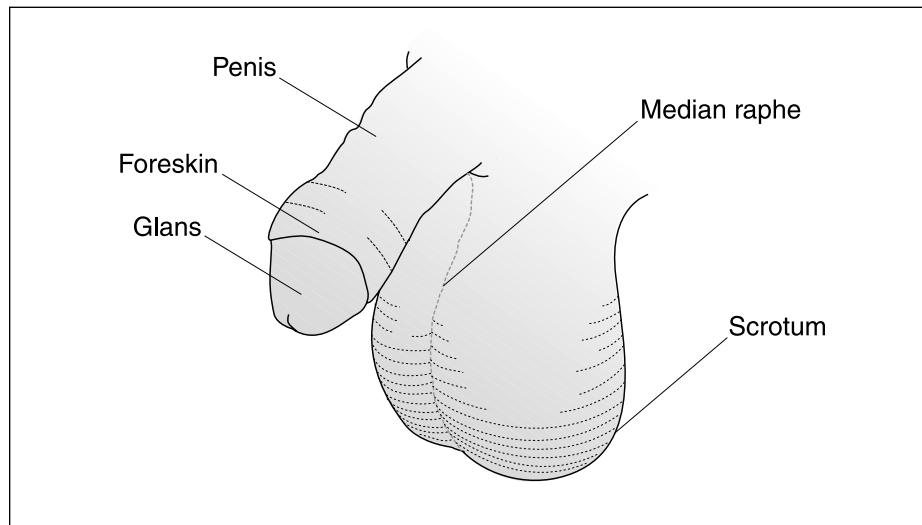
## Breasts

Breasts are sexual organs and, in males, are usually moderately sensitive to stimulation. The nipples may be highly sensitive to stimulation. Men's breasts are not as pendulous as women's except in the presence of **gynecomastia** (benign glandular enlargement of the breast, which is usually bilateral).

## External Male Genitals

As shown in Figure A-1, the external male genitals are the penis, the glans, the foreskin, and the scrotum.

**Figure A-1. External Male Genitals**



The **penis** is a tubular structure with the capacity to be flaccid or erect; it is very sensitive to stimulation. The head of the penis, the **glans**, includes the most highly innervated, or sensitive, part of the penis and is covered by the **foreskin** in men who are not circumcised. The penis provides passage for both urine and semen.

As is the case with other human characteristics, adult penis size and shape vary. The size of a penis when it is flaccid does not predict what size it will be when it is erect. Most men have an erect penis length in the range between 12 and 18 cm (5 to 7 inches), roughly the same as the length of most women's vaginas. Some variation also occurs in penis diameter. Average diameter (width) of an erect penis is 4 cm (1.6 inches).

Although concern about penis size is common, true **microphallus**, or abnormal smallness of the penis, is rare. To assess the normality of penis size, the **stretched penile length** of a flaccid penis is determined. Microphallus is defined as a stretched penile length of less than 4 cm (1.6 inches) for prepubertal boys or less than 10 cm (4 inches) for adult men.

The **scrotum** is a pouch hanging directly under the penis that contains the testes. The scrotum both protects the testes and contracts to raise or lower the testes toward and away from the body in order to maintain the optimal temperature for sperm production within the scrotum, 34°C (93°F). Sperm production is also called *spermatogenesis* (see “Overview: Spermatogenesis”). The **median raphe** is a seam or ridge indicating the junction of two lateral halves of the scrotum. It is continuous posteriorly (toward the back) with the raphe of the perineum, and continuous anteriorly (toward the front) with the raphe of the penis.

#### Overview: Male Circumcision

**Male circumcision** is the surgical removal of part or all of the foreskin, the skin that covers the glans of the penis. Although male circumcision is commonly practiced in many countries, its health benefits are uncertain; however, several studies show that circumcised boys are less likely to develop urinary tract infections than uncircumcised boys. But because these infections are relatively uncommon and easily treated, it is unclear whether male circumcision is a reasonable preventive measure. Current studies are looking at the relationship between male circumcision and the transmission of HIV and other sexually transmitted infections (STIs). In low-resource settings male circumcision is performed by service providers without proper medical training, risks associated with the procedure include tetanus infection, severe blood loss, disfigurement, and even death. When a provider performs a male circumcision, he or she should use anesthesia to minimize the client’s pain and trauma.

#### Overview: Spermatogenesis

Spermatogenesis—the process by which primary germ cells, called **spermatogonia** (singularly, a spermatogonium), become mature sperm, called **sperm** or **spermatozoa** (singularly, a spermatozoon)—involves the following steps:

1. The hypothalamus produces gonadotropin-releasing hormone (GnRH).
2. GnRH causes the anterior pituitary gland to secrete luteinizing hormone (LH) and follicle-stimulating hormone (FSH), which are gonadotropin hormones.
3. LH stimulates the Leydig cells to produce testosterone to help the sperm cells mature.
4. Within the seminiferous tubules in the testes, FSH acts on Sertoli cells to anchor and possibly nourish the developing sperm cells.
5. Other hormones (testosterone, inhibin, and activin) produced in the testes also enter the body’s general blood circulation. When these hormones reach the hypothalamus and pituitary gland, they act via a feedback mechanism to influence the amounts of GnRH, LH, and FSH that are produced.
6. After approximately 64 days, the spermatogonia become sperm.
7. When the sperm are fully formed, they travel through the epididymis, where they develop the capacity to fertilize female oocytes, or egg cells.

Source: Swanson & Forrest, 1984.

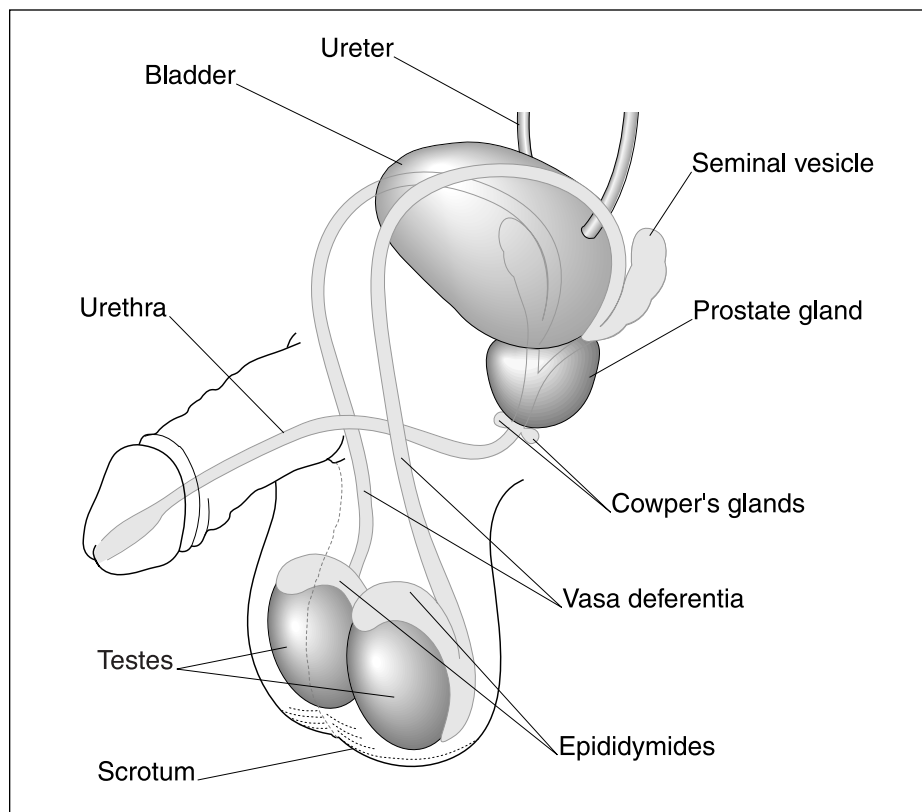
## Internal Male Genitals

As shown in Figure A-2, the internal male genitals are the testes, the epididymides, the vasa deferentia, the seminal vesicles, the prostate gland, and the Cowper's glands.

The **testes**, which are located in the scrotum, are the paired organs that produce sperm and male sex hormones. They are highly innervated and sensitive to touch and pressure. The testes produce testosterone, which is the hormone responsible for the development of male sexual characteristics (a man's deepened voice and prominent facial hair) and sex drive (libido). The **epididymides** are the two highly coiled tubes against the back of the testes where sperm mature and are stored until they are released during ejaculation. The **vasa deferentia** (singularly, a **vas deferens**) are the paired tubes that carry the mature sperm from the epididymis to the urethra.

The **seminal vesicles** are the pair of glandular sacs that secrete some of the fluid that makes up semen, the white, milky fluid in which sperm are transported. Seminal fluid provides both the medium for transport of and nourishment for the sperm. The **prostate gland** is a walnut-sized glandular structure that also secretes fluid that makes up semen. A muscle at the bottom of the prostate gland keeps sperm out of the urethra until ejaculation, the process of releasing semen, begins. This same muscle also keeps urine from coming out during ejaculation. The prostate gland is very sensitive to stimulation and can be a source of sexual pleasure. The (urinary) **bladder** is a hollow organ that serves as a

**Figure A-2. Internal Male Genitals**



reservoir for urine. The **ureters** are two long, narrow tubes that transport urine from the kidneys to the bladder.

The **Cowper's glands** are two pea-sized glands at the base of the penis under the prostate that secrete a clear fluid into the urethra during sexual arousal and before ejaculation. This fluid, which is sometimes known as **pre-ejaculate**, or "**pre-cum,**" acts as a lubricant for the sperm and coats the urethra while flowing out of the penis.