

## General Functions

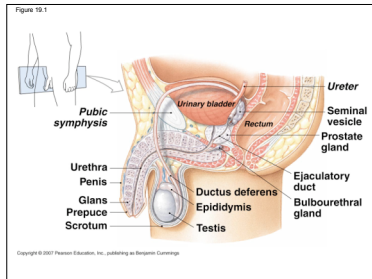
- The male and female reproductive tracts are similar in many ways
  - Both contain gamete producing organs (testes and ovaries)
  - Both produce large amounts of hormones
  - Both contain passageways for gametes to move through the reproductive system

## The Male Reproductive System

- The principal structures include:
  - Testes (testis is singular) produce spermatozoa (sperm)
  - Male reproductive tract:
    - Epididymis
    - Ductus deferens
    - Ejaculatory duct
    - Urethra

## The Male Reproductive System (cont.)

- Accessory Structures:
  - Seminal vesicles
  - Prostate gland
  - Bulbourethral gland
- External genitalia:
  - Scrotum
  - Penis

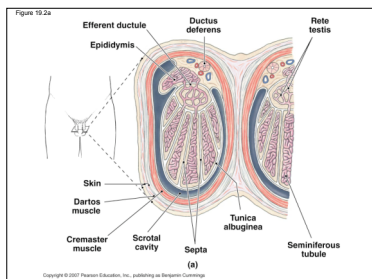


## The Testes and Scrotum

- The testes are the primary sex organ enclosed within the scrotum - produce sperm and sex hormones
- Scrotum is divided into 2 chambers or scrotal cavities - serous membrane lines the cavities reducing friction
- Dartos - smooth muscle that has sustained contractions and give the scrotum its characteristic wrinkled surface
- Cremaster muscle - skeletal muscle beneath the dermis contract to pull testes closer to the body

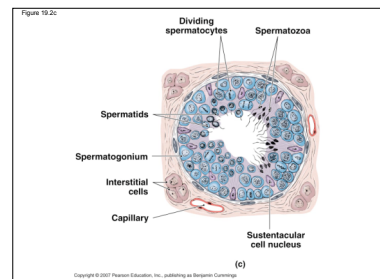
## The Testes and Scrotum (cont.)

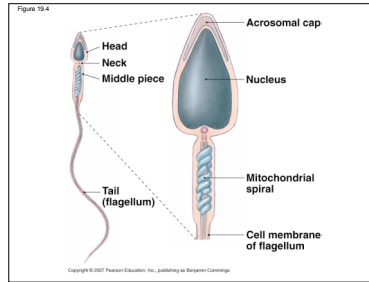
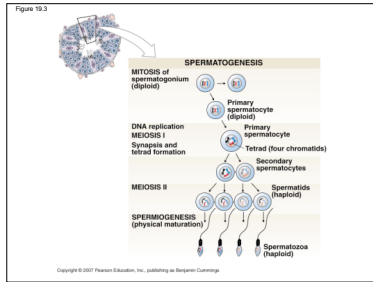
- Each testis
  - is wrapped in a dense fibrous capsule, the tunica albuginea
  - has roughly 250 lobules which contain tightly coiled seminiferous tubules where sperm are produced
  - contains interstitial cells that are located between the tubules and produce the sex hormones (androgens). Testosterone is the most important androgen.
- Cryptorchidism - one or both testes do not descend by the time of birth (p.614 Clinical Note)



## Spermatogenesis (begins at puberty)

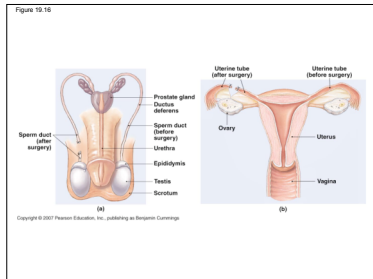
- Each seminiferous tubule contains sustentacular cells that nourish the developing sperm.
- Spermatogenesis - sperm production
  - Mitosis - stem cells called spermatogonia differentiate into spermatocytes
  - Meiosis - produces gametes that contain  $\frac{1}{2}$  the number of chromosomes; immature gametes are called spermatids
  - Spermiogenesis - spermatids mature into spermatozoon  $\rightarrow$  sperm cell





## The Male Reproductive Tract

- **Epididymis** - stores and nourishes immature sperm cells; promotes maturation (2 weeks)
  - Capacitation - sperm must undergo this process to become motile
- **Ductus deferens** - muscular tube; propel sperm and fluid through duct
- **Ejaculatory duct** - formed at the junction of the ductus deferens and the duct of the seminal vesicle; short passage that joins to urethra
- **Urethra** - extends from the urinary bladder to the tip of the penis; passes urine and semen



## Accessory Structures

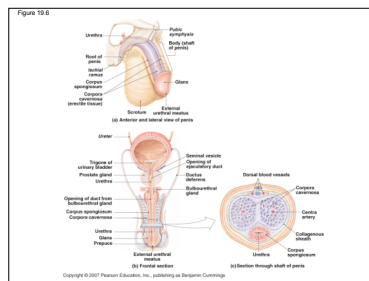
- **Seminal vesicles (60%)** - active secretory gland; secretes alkaline fluid that contains fructose, prostaglandins (promotes muscular contractions along male and female reproductive tracts), and fibrinogen
- **Prostate gland (20-30%)** - small muscular organ that surrounds the urethra as it leaves the bladder; slightly acidic secretion which contains several compounds including seminalplasmin (antibiotic).
- **Bulbourethral glands (Cowpers')** - secretes thick, sticky alkaline mucus that helps neutralize urinary acids and has lubricating properties.

## Accessory Structures (cont)

- **Semen** - consists of sperm cells and secretions of the accessory organs
- **Ejaculate** - expelled semen
  - Contains spermatozoa, seminal fluid, enzymes

## External Genitalia

- **Penis** - tubular organ composed of erectile tissue
  - Introduces sperm into the vagina and conducts urine to the exterior
  - Three regions:
    - Root - attaches penis to body
    - Body - shaft contains erectile tissue
    - Glans - expanded distal portion
      - Prepuce - foreskin; secrete waxy material called smegma

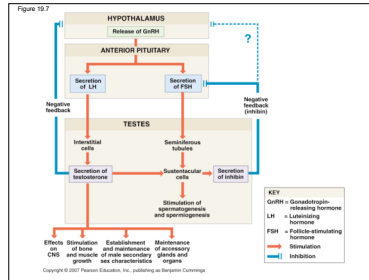


## Erection

- **Erectile tissue** consists of vascular channels separated by elastic tissue and smooth muscle
  - **Corpora cavernosa** - anterior surface
  - **Corpus spongiosum** - surrounds the urethra
- **At rest** there is little blood flow; parasympathetic innervation of the penile arteries → vasodilation → increased blood flow → erection of the penis.

## Hormones and Male Reproductive Function

- Hypothalamus releases gonadotropin-releasing hormone (GnRH) → stimulates the anterior pituitary to secrete follicle-stimulating hormone (FSH) and luteinizing hormone (LH)
- FSH (along w/ testosterone) - stimulates spermatogenesis; targets the sustentacular cells
  - Regulated by neg. feedback
  - Inhibin secreted from sustentacular cells - inhibits FSH production
- LH - stimulates interstitial cells to secrete testosterone



## Testosterone

- Most important androgen
- Functions
  - Stimulates spermatogenesis; sperm maturation
  - Affecting CNS function, influence of sexual drive (libido)
  - Stimulates metabolism; including bone and muscle growth
  - Determining and maintaining male secondary sexual characteristics
  - Maintaining the accessory structures of the male rep. sys.
  - Regulating LH and FSH secretions

## Testosterone (cont.)

- Production begins around 7<sup>th</sup> week of development (in the womb) and peaks around 6 months - stimulates the differentiation of the male duct system and accessory organs and affects CNS development
- Production accelerates at puberty
- Regulated by negative feedback