

Chapter 6.1

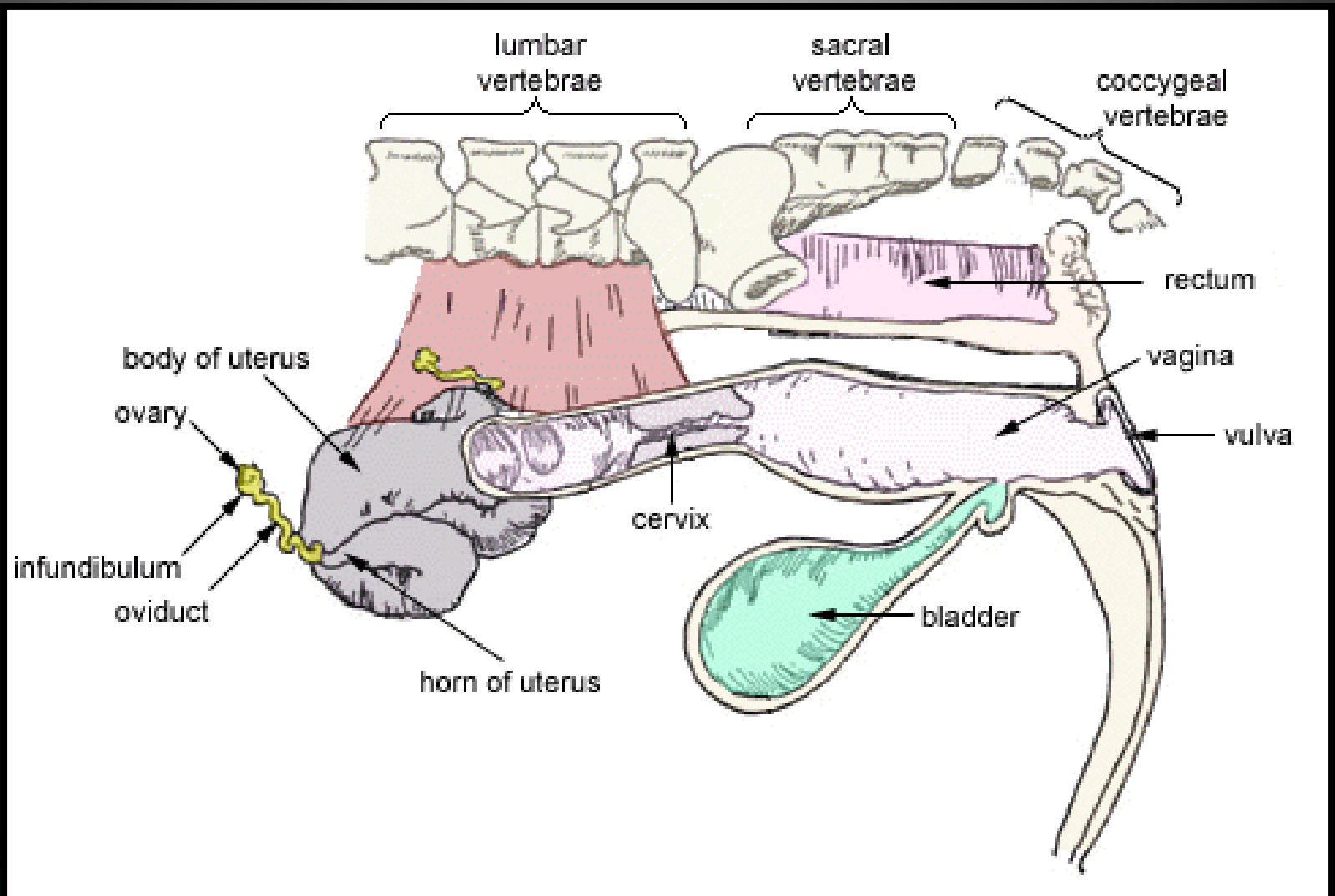
Reproductive Anatomy



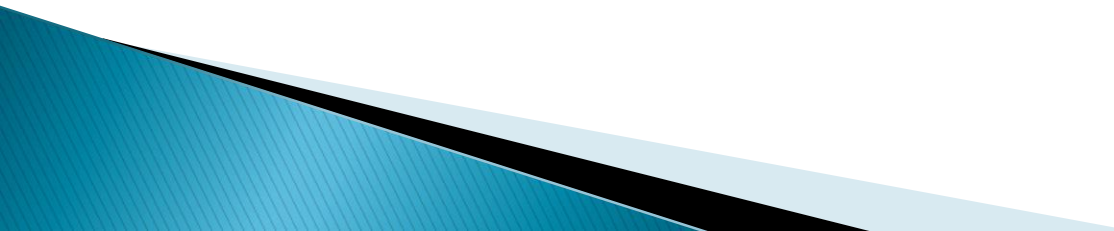
Female Anatomy



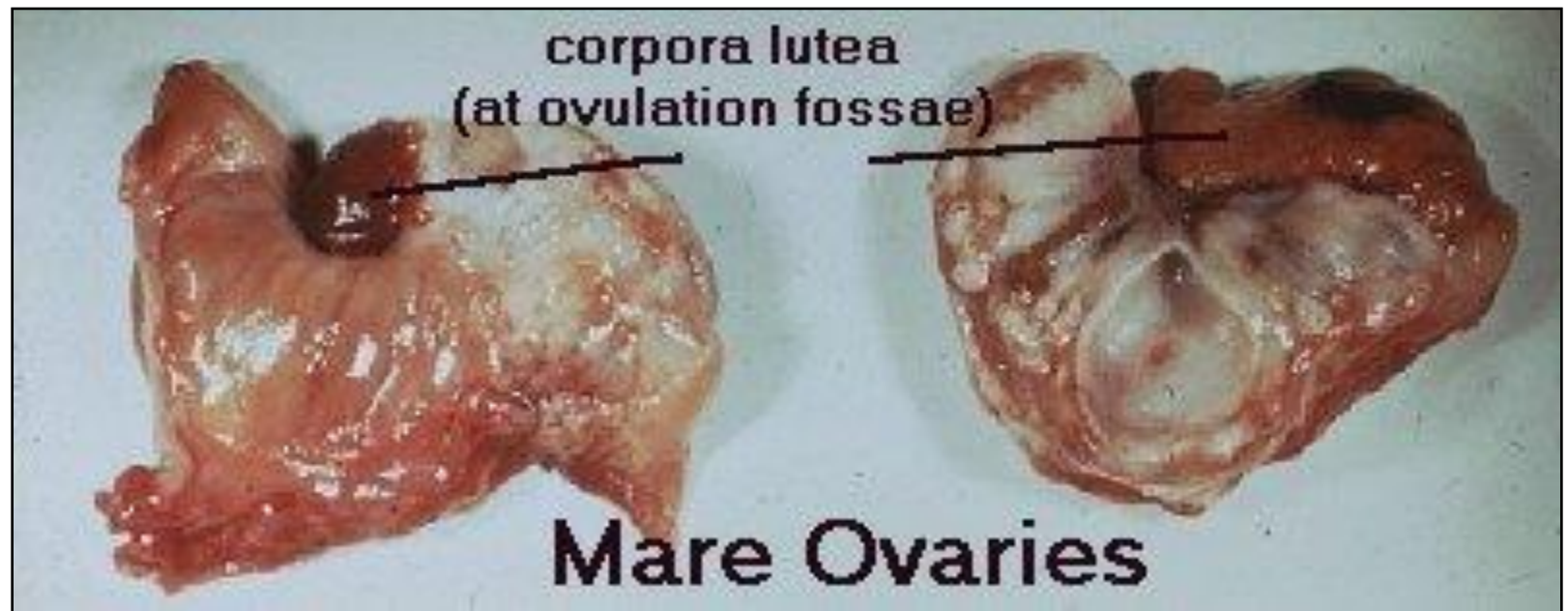
Female Tract



Female Reproductive System

- ▶ **Ovary** – the ovary is comparable to the male testicle and is the site of gamete production.
 - Ova are fully developed at puberty and are not continuously produced as in the male.
 - All species contain two functional ovaries except for the hen which has only a left functioning ovary.
 - Suspended from the Broad Ligament.
 - Great blood supply: Carries Oxygen and nutrients, plus carries hormones to and from the ovary.
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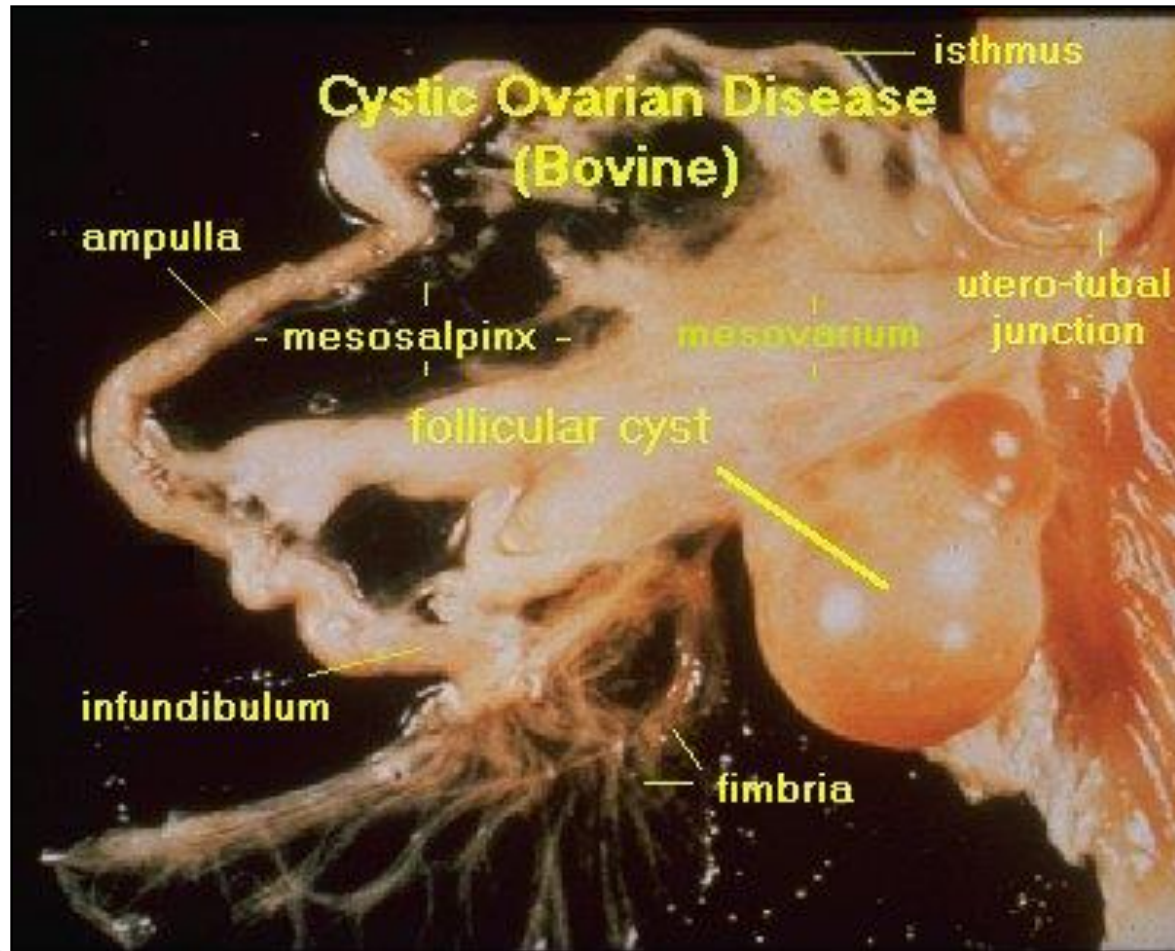
Female Reproductive System



Female Reproductive System

- ▶ Each ovary:
 - ▶ Inner medulla: Receives blood and nerve supply.
 - ▶ Outer cortex: Contains the ova.
 - Graafian (mature) follicles develop.
 - Estrogen is produced.
 - After Graafian Follicle ruptures and ova is released, corpus luteum develops.
 - Follicular Cyst: Result when ovulation does not occur (follicle does not rupture) and continues to grow or when a Graafian Follicle involutes (collapses on itself).
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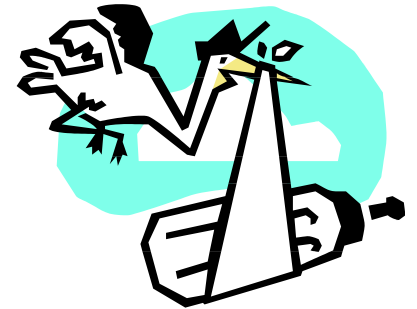
Female Reproductive System



Female Reproductive System

The ovaries have three major functions:

- ▶ Gamete production
- ▶ Secrete estrogen (hormone), results in:
 - absence of muscle development
 - development of mammary glands
 - development of reproductive systems and external genitalia
 - fat deposition on hips and stomach (source of energy)
 - triggering of heat
- ▶ Form the corpus luteum (CL):
 - Develops where an ovum has been shed.
 - Tissue regresses if conception does not occur.
 - Conception occurs: produces progesterone – maintains pregnancy.



Female Reproductive System

- ▶ **Infundibulum** – the funnel shaped portion of the fallopian tube near the ovary that catches the ovulated egg. Contains the Fimbria.
- ▶ **Oviducts (Fallopian Tubes in Humans)**– pair of small tubes leading from the ovaries to the horns of the uterus (5 – 6 inches).
 - Fertilization occurs in the oviduct at the Isthmus–Ampulla Junction.
 - Egg travels from ovary to uterine horn in 3 – 4 days.
 - Site of “Tubal Pregnancy” in humans. Life threatening and requires surgery and removal.

Female Reproductive System

- ▶ **Uterine Horns** - The anterior, divided end of the uterus in the cow, ewe, and mare.
- ▶ Cow and sow – bicornuate: mostly horn, small body
- ▶ Mare – bipartite: mostly body, small horns
- ▶ Human – simple: all body, no horns

- ▶ **Uterus** - Muscular sac connecting fallopian tubes and cervix. Suspended by the broad ligament.

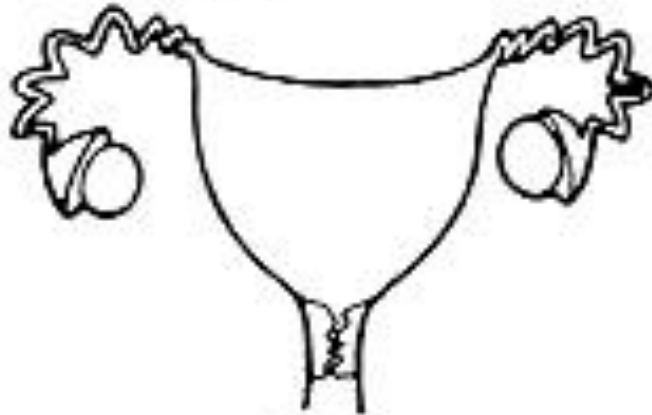
Female Reproductive System



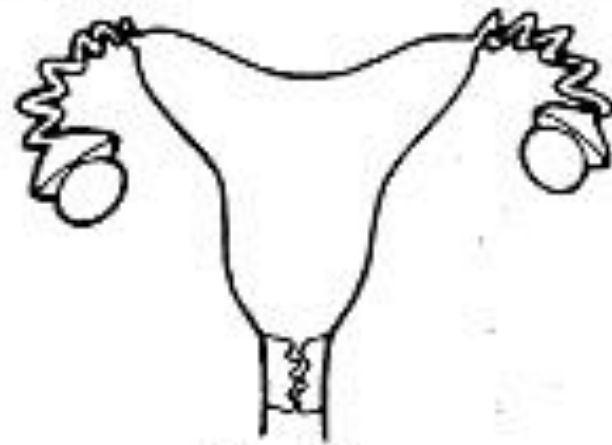
Duplex

Bicornuate (sow)

Bicornuate (cow)



Simple



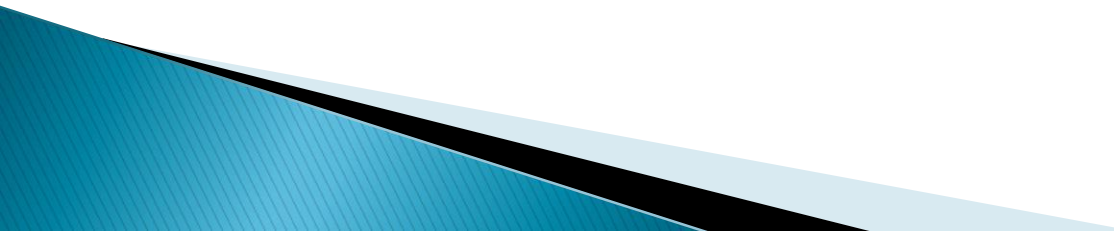
Bipartite

Female Reproductive System

Uterine Functions:

1. Sustains the sperm and aids in its transport.
2. Provides the site for implantation of the embryo and placentation (development of the placenta).
3. Supports embryo and fetus during gestation.
4. Expels fetus at parturition.

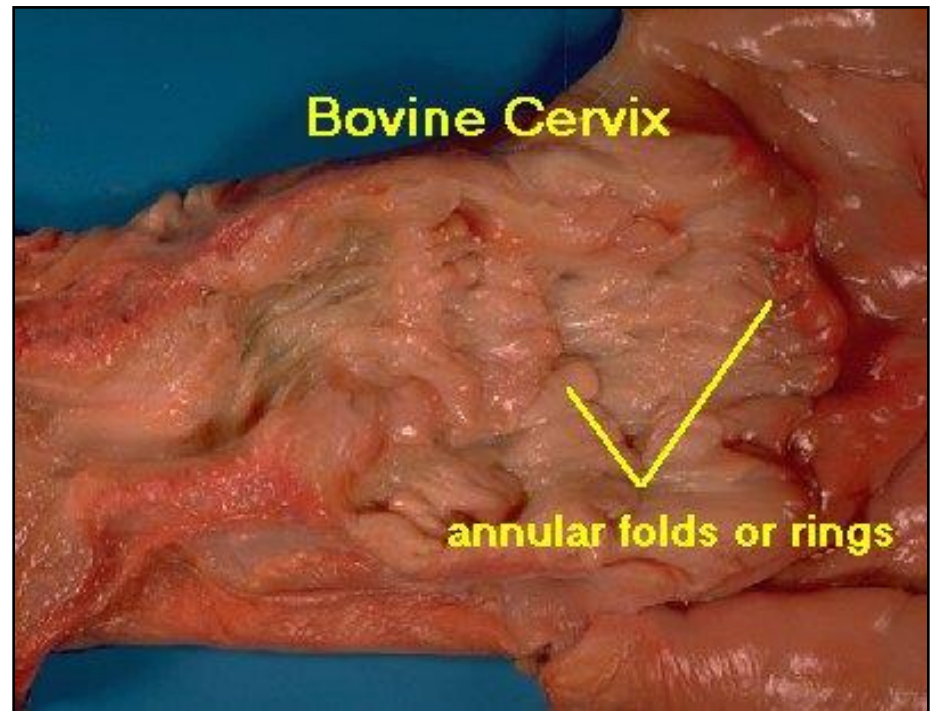
3 layers of uterus and uterine horns:

1. Outer covering.
 2. Myometrium: intermediate smooth layer, uterine contractions.
 3. Endometrium: innermost lining, glandular.
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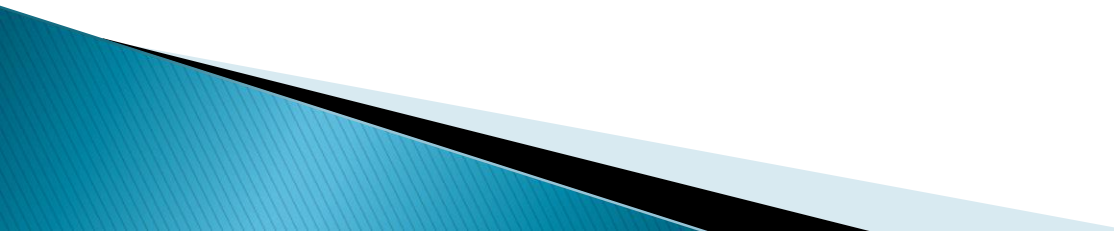
Female Reproductive System

► Cervix

- Area between the uterus and vagina, “Gateway to the Uterus.”
- Normally closed.
- Opens at estrus and parturition.
- 2 –3 inches long
- Os cervix – opening to the cervix, protrudes into the vagina cavity.



Female Reproductive System

- ▶ Cervix: Thick mucus plug produced while pregnant.
 - ▶ Sow: corkscrew shaped, accepts the boar's corkscrew-shaped penis.
 - ▶ Cow: 3 rings. Feel the AI rod 'pop' going through each ring.
 - ▶ Ewe: like a cow, rings, very difficult to manipulate an AI rod through.
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Female Reproductive System

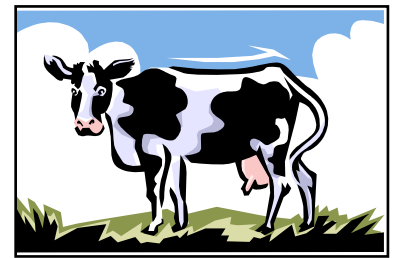
Vagina – the female organ of copulation

1. admits penis
2. receives semen (except in sow)
3. passageway for fetus at parturition

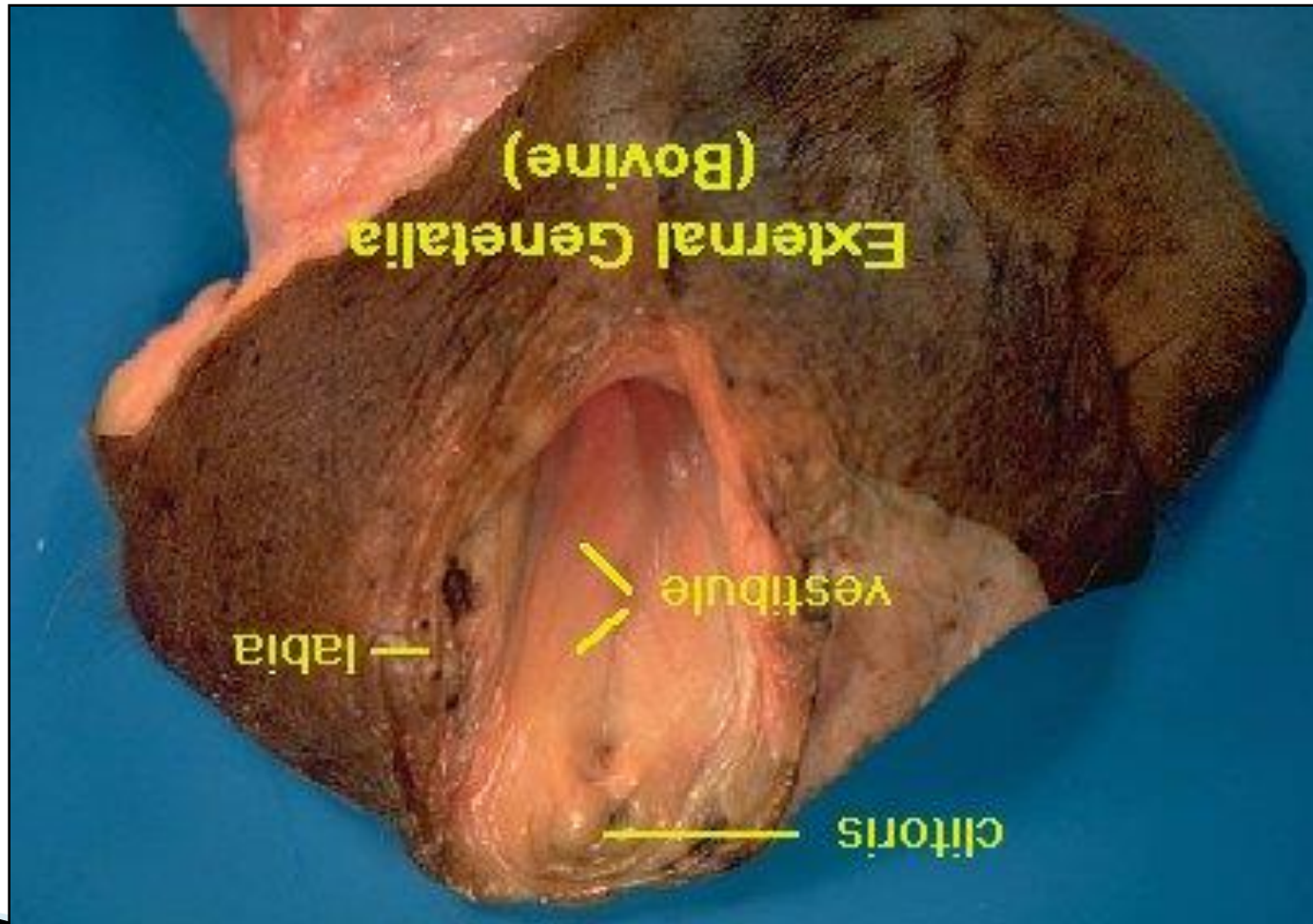
▶ **Bladder** – storage organ for urine

▶ **Vulva** – extended genitalia; opening for both urinary and genital tracts.

- Covers the clitoris, same embryonic origin as the Glans penis.
- Swelling of vulva occurs during estrus – helps with heat detection.



Female Reproductive System



Male Anatomy



Male Reproduction

- ▶ Male role is much LESS complex than that of the female.
- ▶ Two basic roles:
 1. Produce ample amounts of viable sperm.
 2. Be willing and able to deliver semen into the reproductive tract of the female in natural service or into a receptacle for use in artificial insemination.

Male reproductive system consists of:

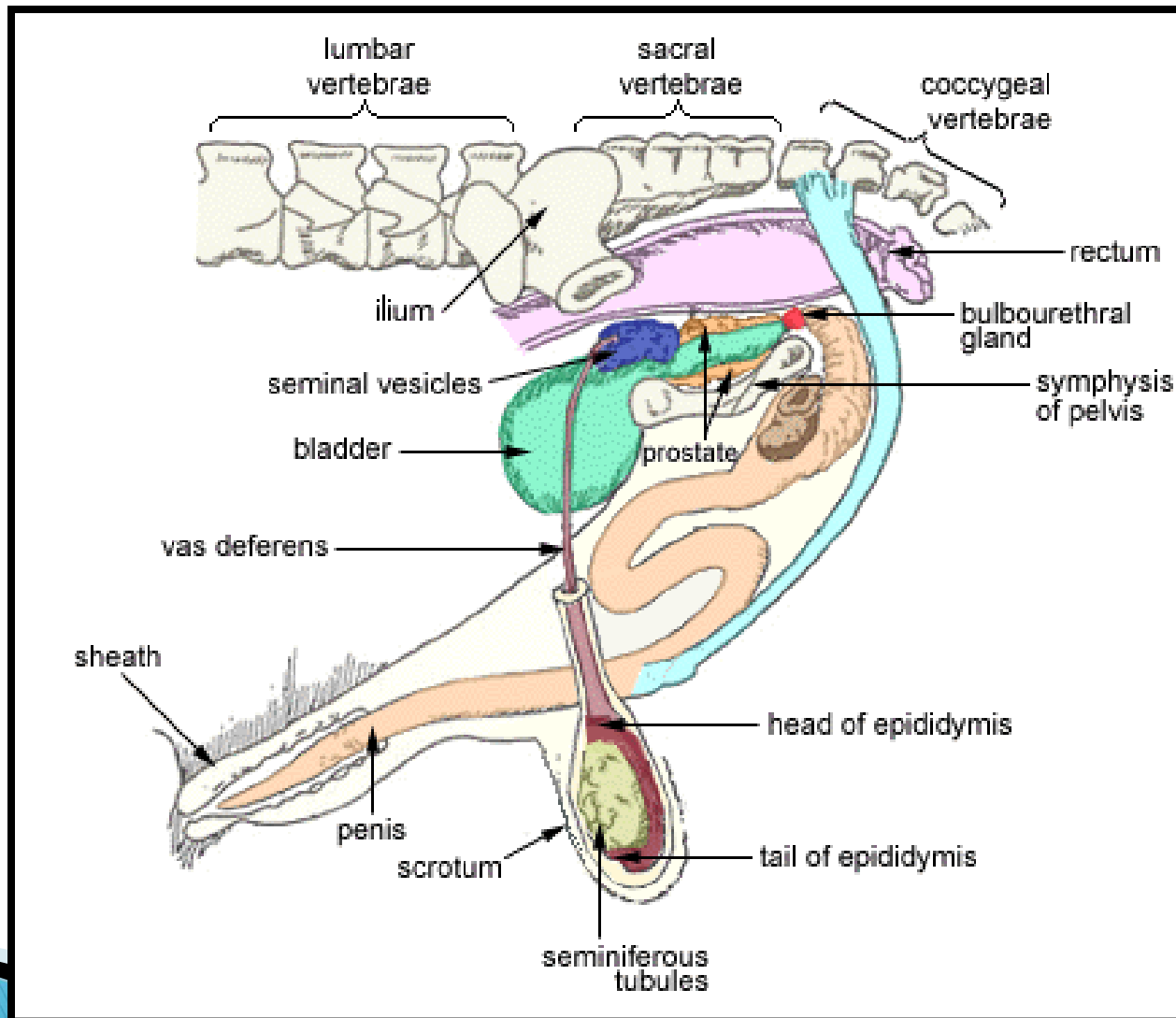
Testicles – produce sperm.

Duct system – delivers sperm and semen.

Accessory glands – produce fluid to lubricate and carry sperm.

Penis (male organ of copulation) – deposits semen in the female.

Male Reproductive Tract



Male Reproduction

- **Scrotum**

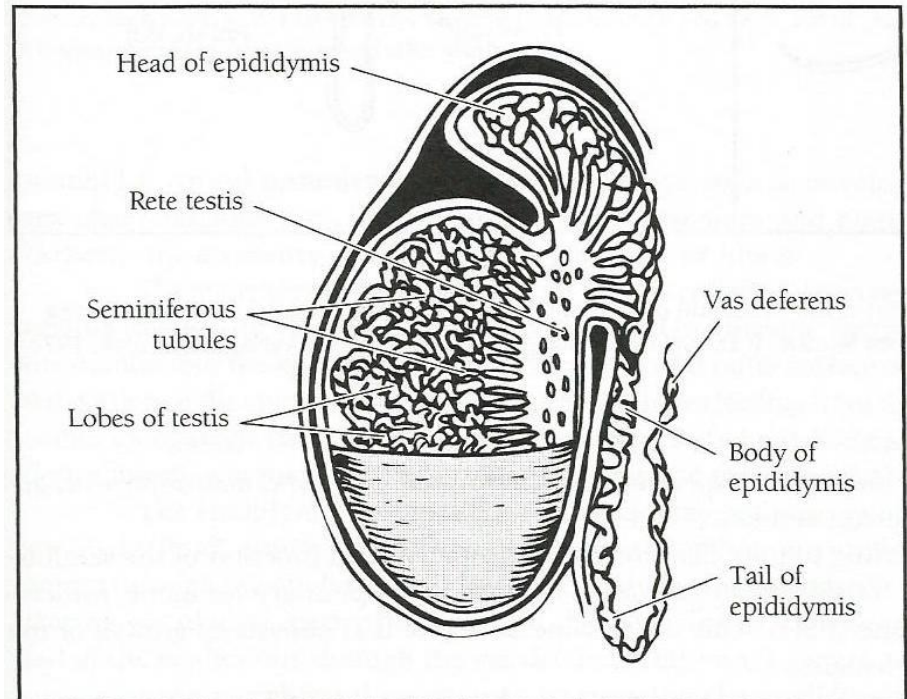
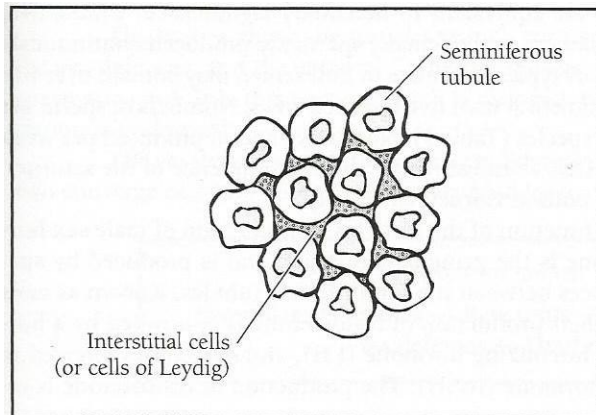
- external sac that holds testicles outside of the body to keep sperm at 4–8°F cooler than the body temperature.
- Production and survival of spermatozoa cannot occur at normal body temps (except poultry).
- Cold weather not nearly as harmful to sperm production and survival as HOT!

Testicular Temperature Regulation

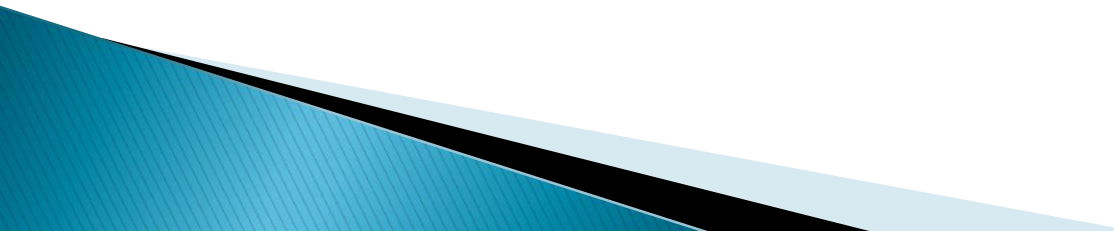
- ▶ Regulated by three systems that work together.
 - ▶ 1. External Cremaster muscle: Contracts during cold weather to hold the testicles closer to the abdominal wall (heat!) and relaxes during hot weather to allow the testicles to be farther from the body (cooler).
 - ▶ 2. Tunica dartos: Smooth muscle fibers within the skin of the scrotum. Contracts to reduce total skin area. Closer to the body during cold weather, relax during hot weather.
 - ▶ 3. Pampiniform plexus: Network of blood vessels above the testicles. Cooler venous blood cools the warmer arterial blood as it enters the testicles. Important in stallion and boar – testicles less pendulous.
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Male Reproductive Tract

- ▶ Testicles – the primary male organs of reproduction
 - to produce sperm (spermatogenesis).
 - to secrete testosterone (male sex hormone, androgen).



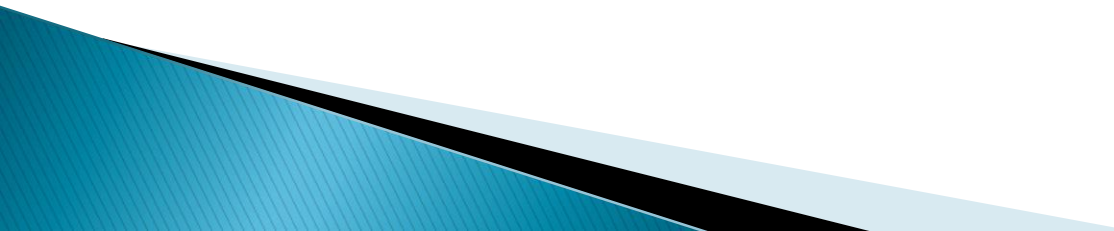
Testicles

- ▶ Internal structure is lobes of connective tissue.
 - ▶ Within the lobes are seminiferous tubules – 90% of total mass of testicle.
 - ▶ Seminiferous tubules produce spermatozoa cells from primary sex cells located within their walls.
 - ▶ Sertoli cells located within Seminiferous tubules, nourish and guide spermatids to the lumen (hollow center) of the Seminiferous tubule.
 - ▶ During migration toward the lumen, each spermatid is transformed into a spermatozoa with developed head, mid-piece, and tail.
 - ▶ Spermatogenesis is regulated by Follicle Stimulating Hormone (produced by pituitary gland).
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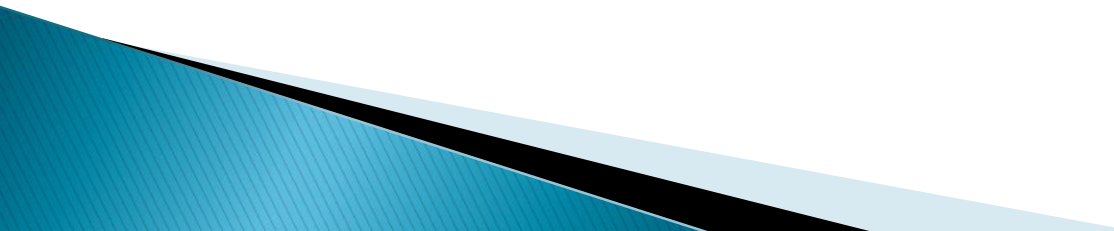
Male Reproductive Tract

- ▶ **Rete testis:** Area in the testicles where the Seminiferous tubules converge into a network of central connecting tubules.
- ▶ Connects to the Epididymis.
- ▶ **Epididymis** – Long coiled tube that is a path for sperm.
 - **Four Functions:**
 - Transportation – moves sperm from testes to penis
 - Maturation – Sperm mature from head to tail
 - Concentration – increase sperm numbers per fluid unit
 - Storage – hold sperm until time of ejaculation

Male Reproductive Tract

- ▶ **Vas Deferens** – slender tube from epididymis to urethra which moves sperm to the urethra at ejaculation.
 - ▶ **Urethra** – long tube from bladder to penis; passageway for urine and sperm out of the body.
 - ▶ **Spermatic cord**: Tissue above the testicles: blood vessels, nerves, vas deferens, external cremaster muscle – clamped or severed by non-surgical castration.
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Male Reproductive Tract

- **Penis** – male organ of copulation which conveys semen and urine out of the body
 - **Penis retractor muscle** – allows extension and retraction of the penis; sigmoid flexure extends in copulation
 - **Penis Types**
 - **Fibroelastic:** Bull, Boar, Ram – composed of fibrous connective tissue and is essentially erect all the time. Sigmoid Flexure.
 - **Vascular:** Stallion, Human – network of blood vessels, requires blood engorgement for erection. No Sigmoid Flexure.
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Penis Types



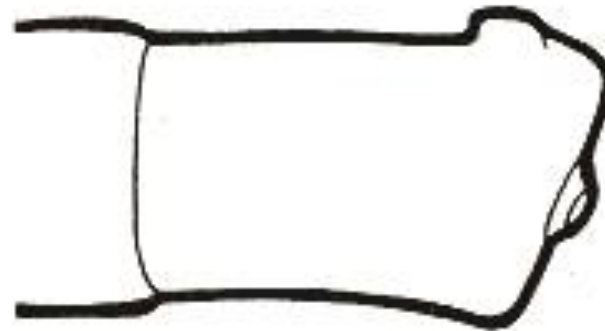
Bull



Boar



Ram

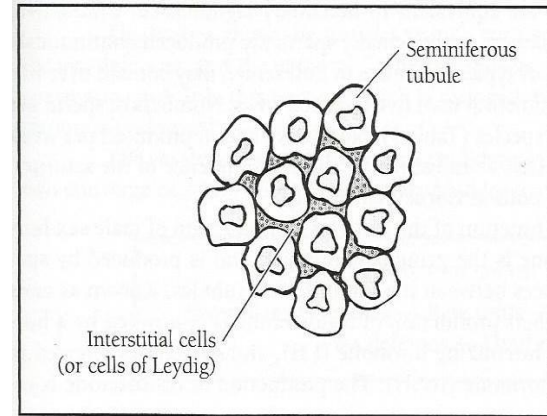


Stallion

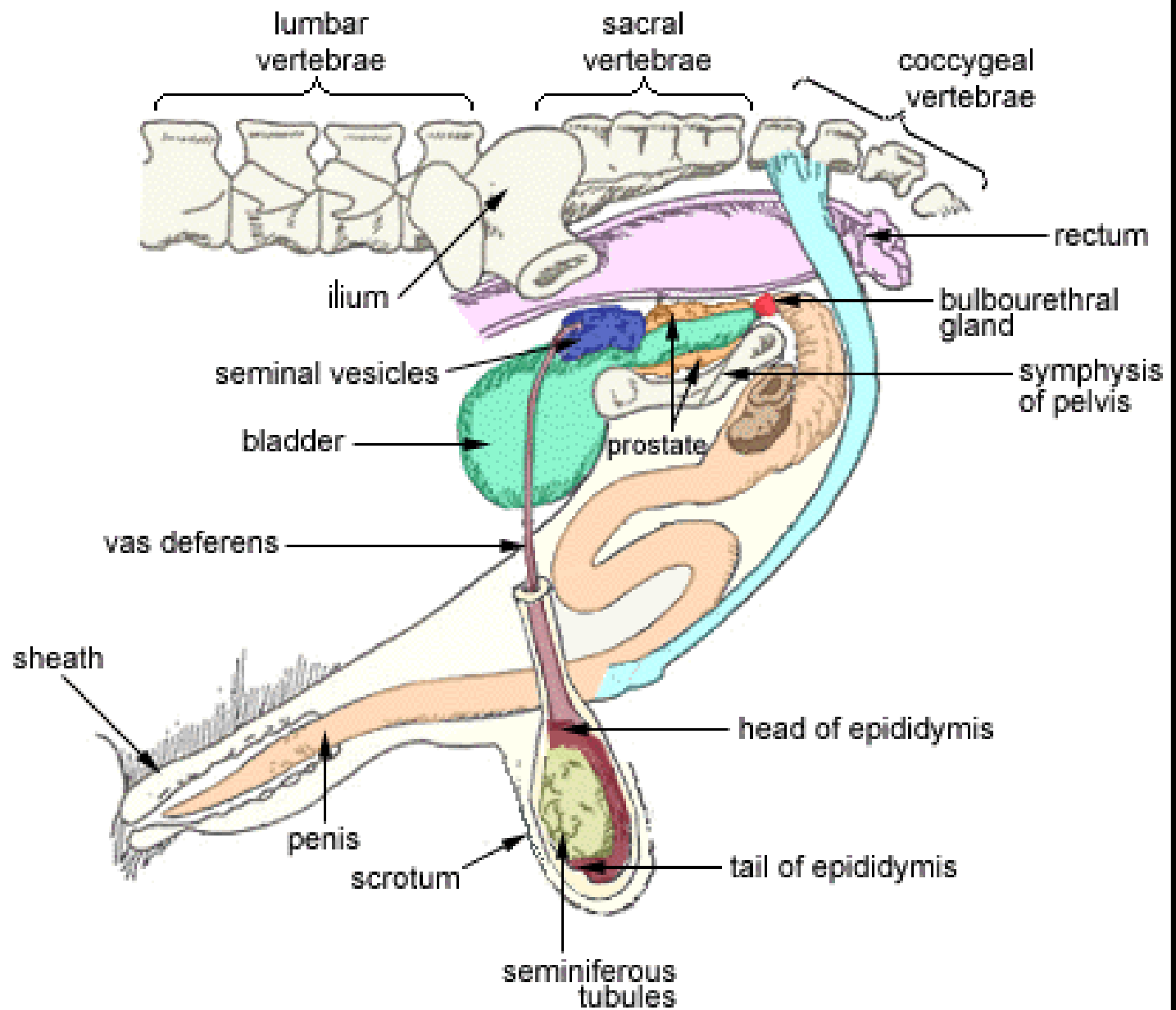
Male Reproductive Tract

- **Accessory Glands:**
 - **Seminal vesicles**– add fructose and citric acid to nourish the sperm.
 - **Prostate Gland** – located at the neck of the bladder
 - Cleans the urethra prior to and during ejaculation.
 - Provides minerals for sperm.
 - Provides the medium for sperm transport.
 - Provides the characteristic odor of semen.
 - **Cowper's gland**
 - Also called the Bulbourethral gland.
 - Paired organs.
 - Cleans the urethra prior to semen passage.
- Relatively non-motile sperm become activated upon contact with the fluids.

Male Sex Hormones



- ▶ Testosterone is principal androgen.
- ▶ Produced by Cells of Leydig (Interstitial Cells) – located in spaces between seminiferous tubules.
- ▶ Luteinizing Hormone controls production of testosterone. Produced by anterior pituitary.
- ▶ Testosterone for typical male development and behavior.
 - Accessory sex glands and sex drive (libido).
 - Secondary sex characteristics:
 - Heavier muscle development, masculine body conformation.



Male Reproductive Tract

