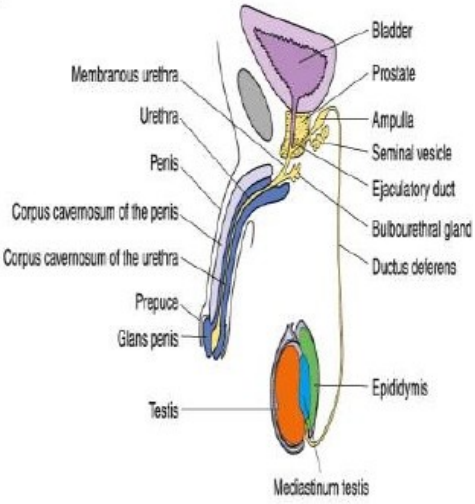
The male reproductive system

Composed of the testes, genital ducts, accessory glands, and penis.

The dual function of the testis is to produce spermatozoa and hormones.

The genital ducts and accessory glands produce secretions that, aided by smooth muscle contractions, conduct spermatozoa toward the exterior.

These secretions also provide nutrients for spermatozoa while they are confined to the male reproductive tract.



- **Spermatozoa and the secretions of the genital ducts and accessory glands make up the semen (from Latin, meaning seed.**
- **Although testosterone is the main hormone produced in the testes, both testosterone and one of its metabolites, dihydrotestosterone, are necessary for the physiology of men.**

LC9815

Structure and Functions of Male Reproductive Organs

Testes

- Location – two, oval shaped in thin walled sac scrotum. It covers and protects testes.

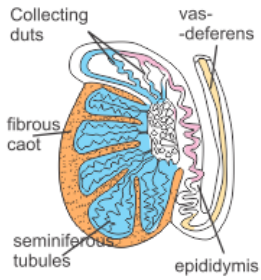
Structure

- **Seminiferous tubules** – tubular structure where sperms are produced. Spermatogenesis takes place.
- **Interstitial or Leydig cells** – between seminiferous tubules. Male sex hormone testosterone is produced
- **Epididymis** – temporary storage site for sperms
- **Sperm ducts** – two ducts, vas efferens and vas deferens transports the sperm.

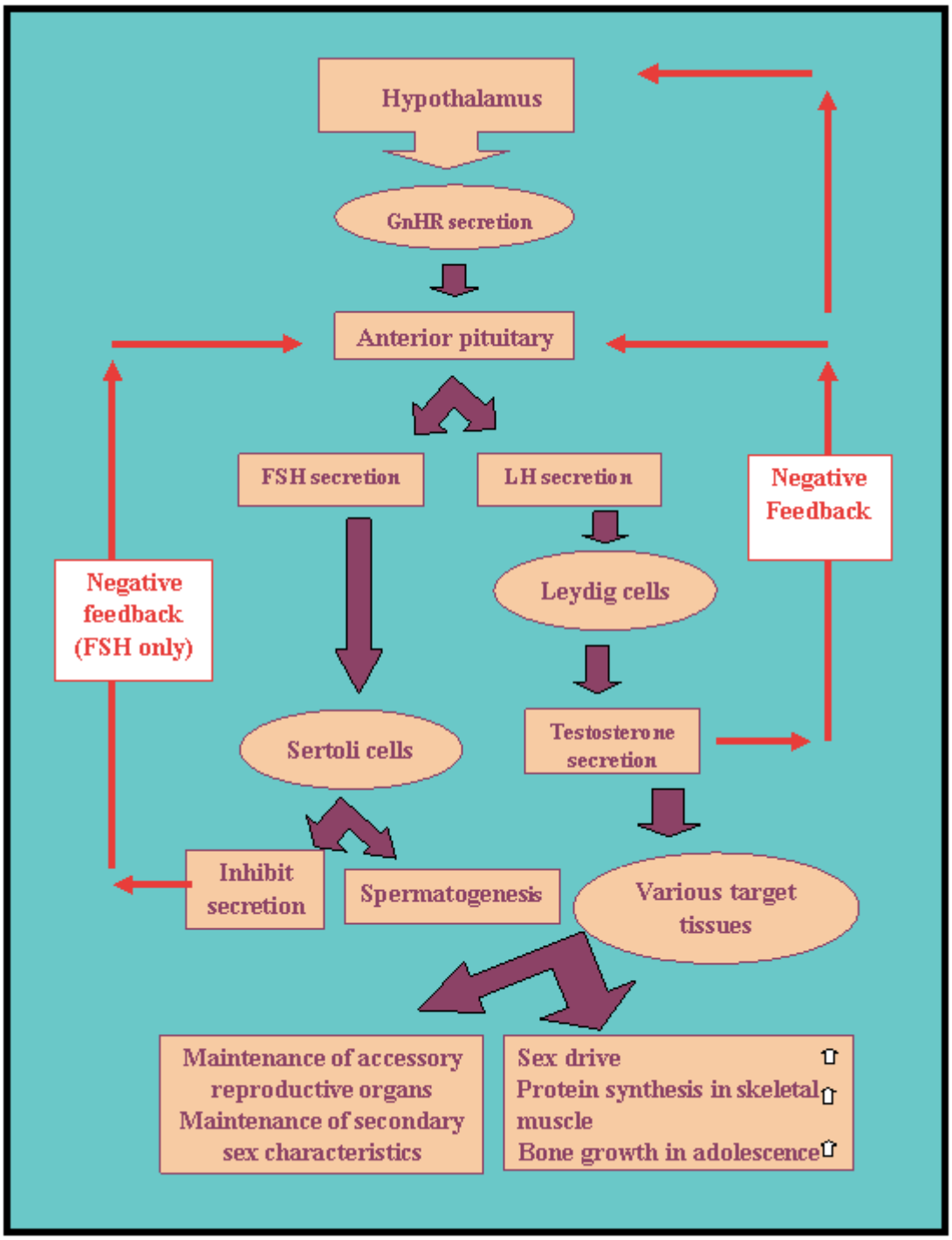
Accessory glands

1. Pair of **seminal vesicles** - medium for sperm transport.
2. Prostate gland bi-lobed structure surrounding urethra. Secretes alkaline secretion into semen and neutralizes acid in female's vagina.

- **Bulbo-urethral gland or Cowper's gland** – small ovoid glands opens into urethra and serves as lubricant.
- **Penis** – copulatory organ for discharging semen into vagina
- **Semen** – Mixture of sperms and secretions of accessory glands.



Seminiferous tubules → Network of tubules → Efferent ducts → epididymis → Sperm duct → Penis


Hypothalamus
GnHR secretion
Anterior pituitary
FSH secretion
LH secretion
Negative Feedback
Negative feedback (FSH only)
Leydig cells
Sertoli cells
Testosterone secretion
Inhibit secretion
Spermatogenesis
Various target tissues
Maintenance of accessory reproductive organs
Maintenance of secondary sex characteristics
Sex drive ⇧
Protein synthesis in skeletal muscle ⇧
Bone growth in adolescence ⇧

MALE REPRODUCTIVE ORGANS

External Genital Organs

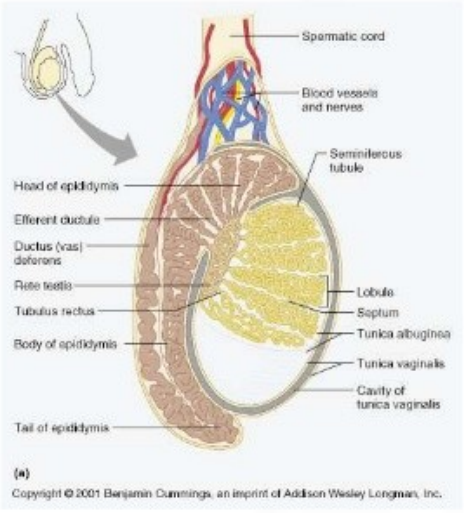
1. Penis
2. Scrotum

Internal Genital Organs

1. Testis
2. Epididymis
3. Vas Deferens
4. Accessory Glands
   a. Seminal Vesicles
   b. Prostate Gland
   c. Bulbourethral Glands

Testis *(plural* testes*)*

The testes are the two-oval shaped male organs that produce sperm and hormone testosterone.

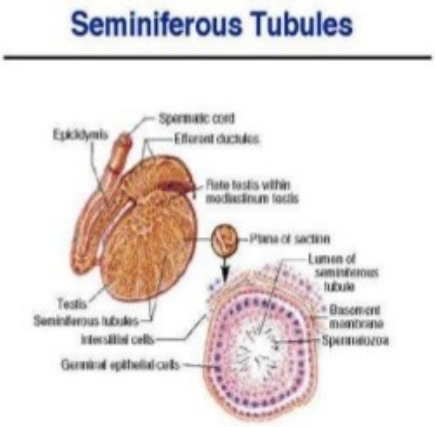


* ***Testosterone***- the primary male sex hormone

Cont…

Each testis is made of tightly coiled structures called ***seminiferous tubules.***

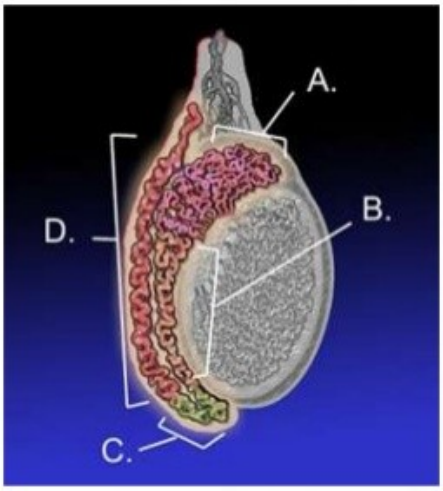
Among tubules are cells that produce testosterone.



Epididymis

The epididymis is a tightly coiled tubes against the testicles.

It acts as maturation and storage place for sperm.

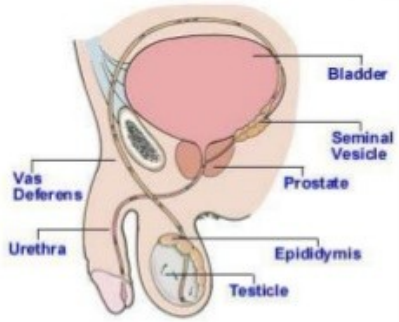


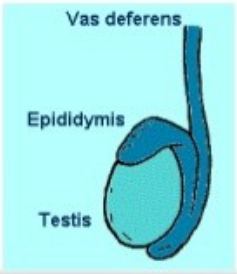
Adult human testicle with epididymis:
A. Head of epididymis,
B. Body of epididymis,
C. Tail of epididymis, and
D. Vas deferens

Vas Deferens (Ductus Deferens)

The vas deferens is a thin tube that starts from the epididymis to the urethra in the penis.

They transport sperm from the epididymis in anticipation of ejaculation.





Accessory glands

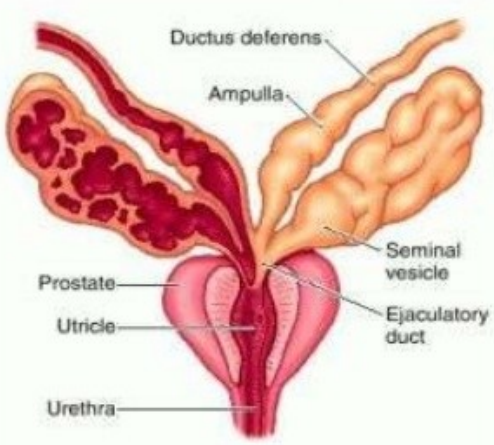
a. **Seminal Vesicles**
b. **Prostate Gland**
c. **Bulbourethral Glands**

These glands produce nourishing fluids for the sperms that enter the urethra.

Seminal Vesicles

The Seminal Vesicles are sac-like structures attached to the vas deferens at one side of the bladder.

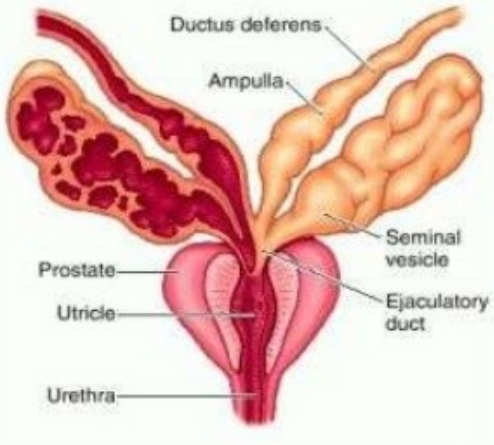
They produce a sticky yellowish fluid that contains fructose.



Prostate Gland

The Prostate Gland surrounds the ejaculatory ducts at the base of the urethra, just below the bladder.

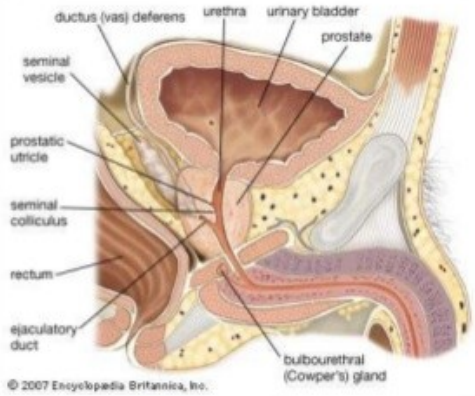
The Prostate Gland is responsible for making the production of semen, a liquid mixture of sperm cells, prostate fluid and seminal fluid.



Bulbourethral Glands (Cowper's gland)

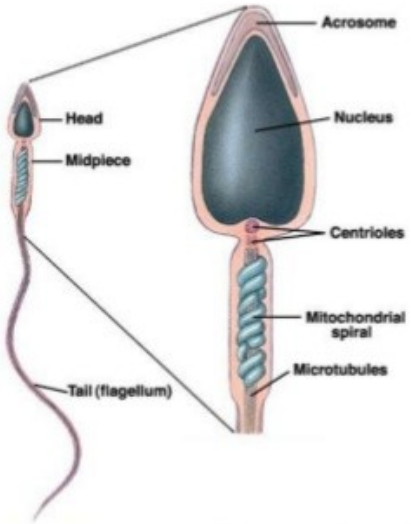
The Bulbourethral Glands are two small glands located on the sides of the urethra just below the prostate gland.

These glands produce a clear, slippery fluid that empties directly into the urethra.



SPERM

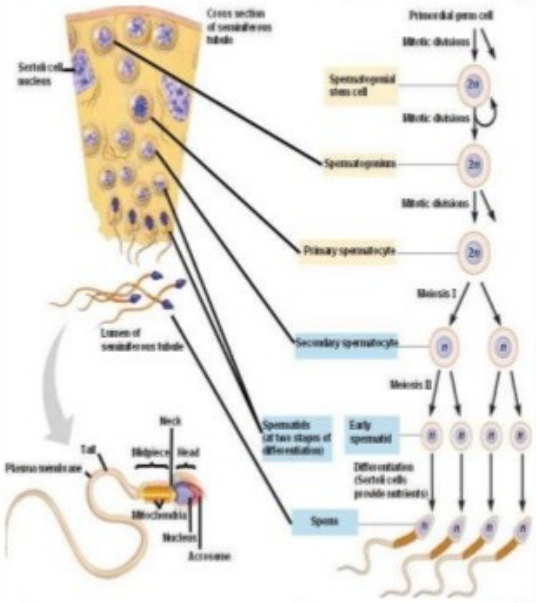
- *Function:*
  - To move and carry genetic information to the egg.
- *Structure:*
  - **Head**: The large head region of the sperm that contains DNA.
  - **Midpiece**: The narrow middle part of the cell that contains mitochondria.
  - **Tail**: The wavelike motion of the flagellum propels the sperm forward.



SPERMATOGENESIS

Spermatogenesis is the formation of sperm cells.

It takes place in the seminiferous tubules.



Process:

- Diploid cells that begin the process are located near the outer wall of the tubules.

  These cells multiply constantly by mitosis, and each day about 3 million of them differentiate into ***primary spermatocytes***, the cells that undergo meiosis.

Process:

- Diploid cells that begin the process are located near the outer wall of the tubules.

These cells multiply constantly by mitosis, and each day about 3 million of them differentiate into ***primary spermatocytes***, the cells that undergo meiosis.

Process:

- A sperm cell develops by differentiation of each of these haploid cells and gradually pushed toward the center of the seminiferous tubule.

From there, it passes into the epididymis, where it matures, becomes motile, and is stored until ejaculation.

Development

- It is the process of functional and **physiological maturation** of the individual. It is progressive increase in **skill** and **capacity** to function. It is related to maturation and **myelination** of the **nervous system**. It includes psychological, emotional and social changes. It is **qualitative** aspects.

Different between growth & development

Growth	development
• Quantitative	• Qualitative
• Ends with maturity	• Continuous from womb to grave
• Structural and physiological changes	• Changes in organism a whole
• Growth is one of the developmental process	• Overall changes in individual
• Does not depend upon maturation or learning	• Depends upon maturation and learning
• Observable and measurable changes	• Is not directly observable
• May or may not bring development	• Is possible without growth

DIFFERENCE BETWEEN GROWTH AND DEVELOPMENT

GROWTH	DEVELOPMENT
❖The term is used in purely physical sense. It generally refers to increase in size, length. ❖Changes in the quantitative aspects come into the domain of Growth.	❖Development implies overall change in shape, form or structure resulting in improved working or functioning. ❖Changes in the quality or character rather than the quantitative aspects comes in this domain.

Types of growth and development

- Types of growth includes:-
  - Physiological growth this involves the vital signs
  - Physical growth that is increase in weight ,height ,size etc.
- Types of development includes :-
  - Motor development
  - Cognitive development
  - Emotional development
  - Social development

Definition of growth and development

- Growth and development generally refers to the process by which a fertilized ovum eventually attains adult status
- Growth:-
  - is the increase in size of the body as a whole hence a quantitative change in a child body.
  - Its measured in terms of kilograms ,pounds, meters etc.

Conti.:

- Development:-
  - This refers to a progressive increase in skill and capacity to function
  - It usually a qualitative change in the child's development.

Principles of growth and development

- Every child grows and develop in their own unique ways
- Growth and development is a continuous process throughout the life span of an individual .
- There are usually increased periods of development in the early childhood and adolescents but decrease rate of G/D in the middle childhood
- Growth and development proceed in a regular related direction that is cephalocaudiol and proximodistal and from general to specific.
- Each stage of growth and development is affected by the preceding types of development
- Not all body parts grow at the same rate

Factors affecting growth and development

- factors are either
  - Environmental
  - Hereditary
- Environmental factors include
  - Pre-natal environment
  - Posta natal environment

Prenatal environment

- This are the factors related to the mother during pregnancy and also related to the fetus
  - Nutritional deficiencies
  - Diabetic mother
  - Exposure to radiation
  - Infection with German measles
  - Smoking
  - Use of drugs
  - Mal-position in uterus
  - Faulty placental implantation

Postnatal environment

- It can either be external environment or the internal environment
  - External environment:
    - socio-economic status of the family
    - child's nutrition
    - climate and season
    - child's ordinal position in the family
    - Number of siblings in the family
    - Family structure that is single parent the extended family

Conti.:

-Internal environment

-intelligence

-hormonal

-emotions

Types of growth and development

- Types of growth includes:-
  - Physiological growth this involves the vital signs
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- Types of development includes :-
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  - Emotional development
  - Social development

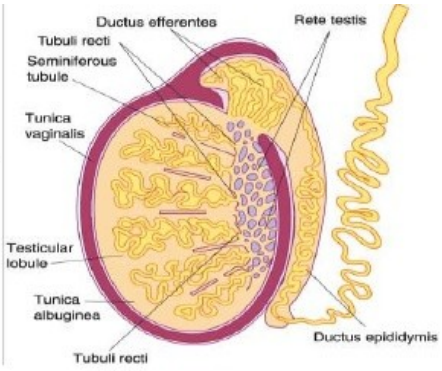
Physiological growth

- This vital signs include :
  - Temperature (T)
  - Respiration rate (RR)
  - Blood pressure(BP)
  - Heart rate (HR)

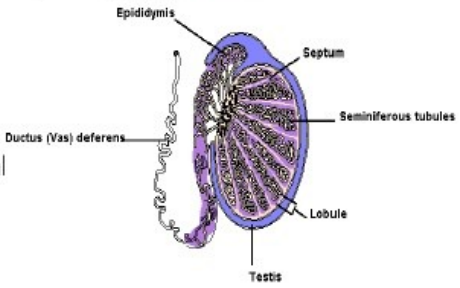
RESPIRATION	HEART RATE (APICAL)
Normal Variations	**Normal Variations**
30 to 60 respirations per min Average - 40 respirations per min	100 to 160 beats per min 100 while sleeping 160 while crying
TEMPERATURE	**BLOOD PRESSURE (AT BIRTH)**
Rectal 90.0° F to 99.5° F (35.6° C to 37.5° C)	**Average** 75/42
Axillary 97.6° F to 98.6° F (36.5° C to 37.0° C)	**Systolis** 60 to 80 mm Hg
	Diastolic 40 to 50 mm Hg

Testes

- Each testis is surrounded by a thick capsule of dense connective tissue (**tunica vaginalis)**
- **Tunica albuginea** is thickened on the posterior surface of the testis to form the **mediastinum testis,** from which fibrous septa penetrate the gland, dividing it into about 250 pyramidal compartments called the **testicular lobules**.



- These septa are incomplete, and there is frequent intercommunication between the lobules.
- Each lobule is occupied by one to four **seminiferous tubules** enmeshed in a web of loose connective tissue that is rich in blood and lymphatic vessels, nerves, and **interstitial cells,** also known as **Leydig cells.**
- Seminiferous tubules produce male reproductive cells, the spermatozoa.



During embryonic development the testes develop retroperitoneally in the dorsal wall of the abdominal cavity. They migrate during fetal development and become positioned within the scrotum, at the ends of the spermatic cords. Because of this migration, each testis carries with it a serous sac, the **tunica vaginalis,** derived from the peritoneum. The tunic consists of an outer parietal layer and an inner visceral layer, covering the tunica albuginea on the anterior and lateral sides of the testis.