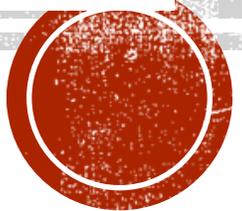


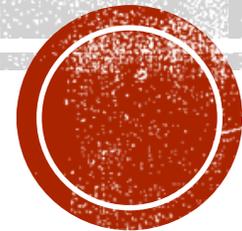
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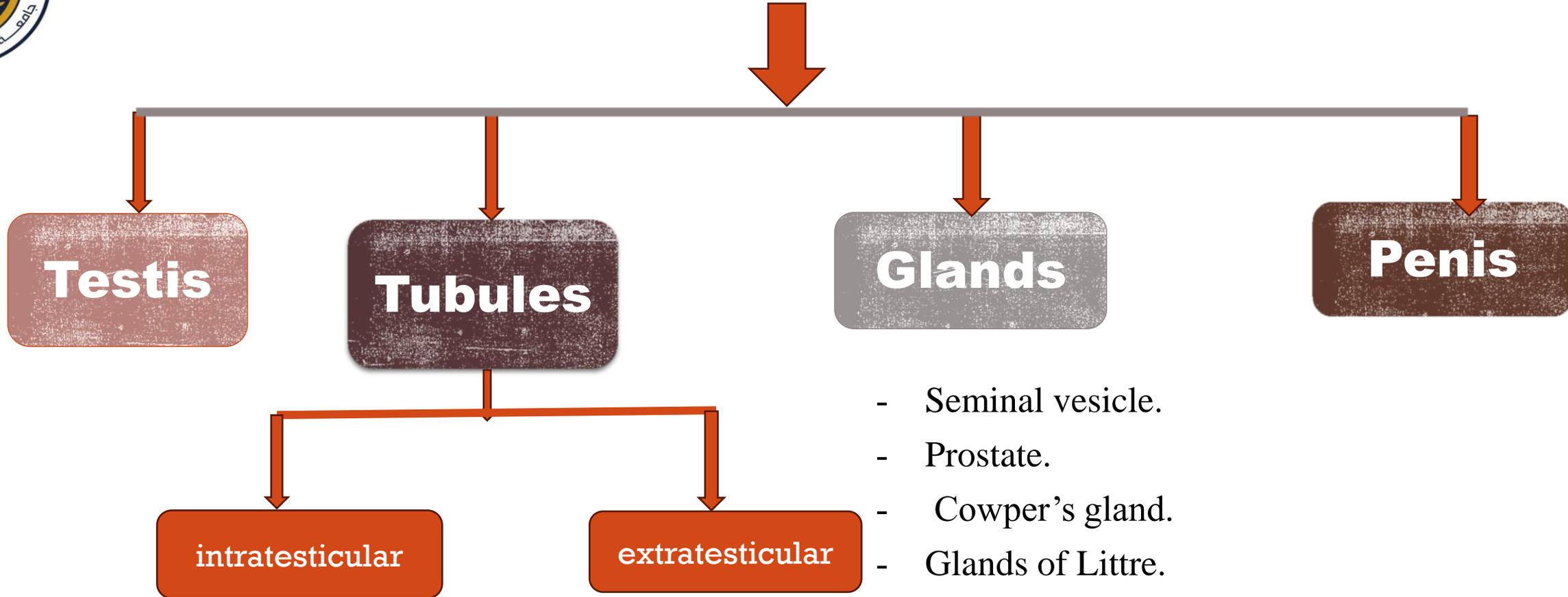
MALE GENITAL SYSTEM

Dr Eman saeed





Male genital system

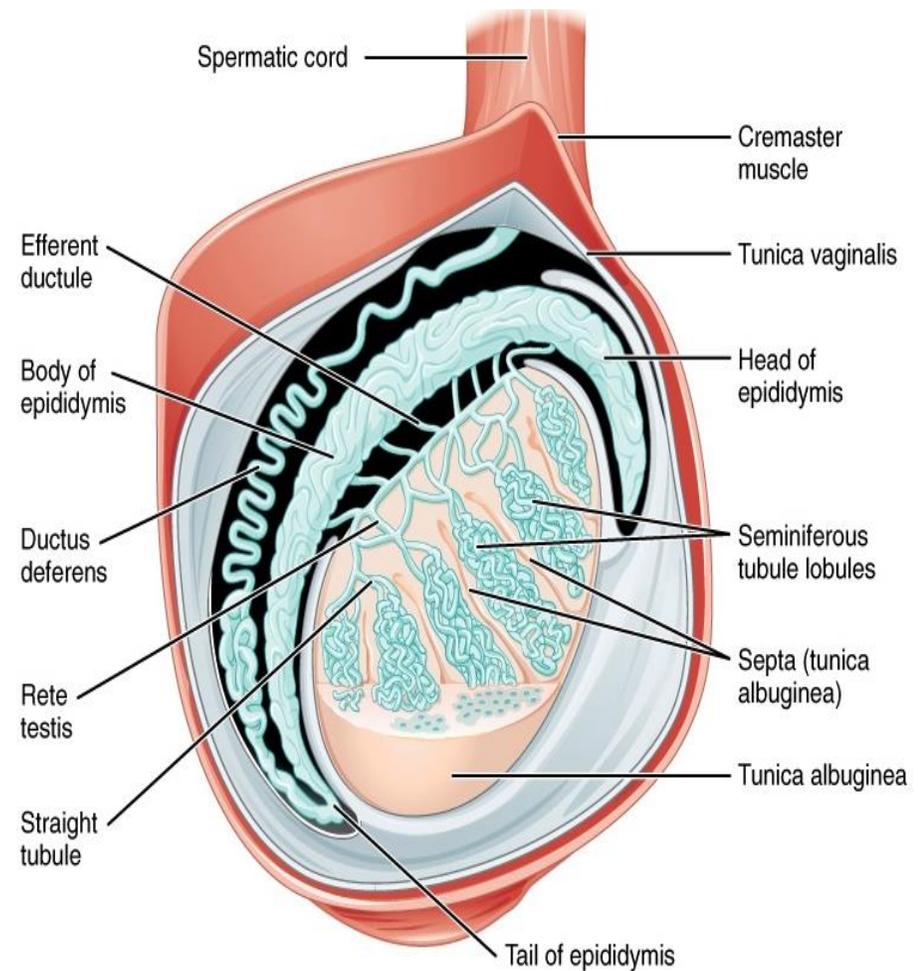


THE TESTIS

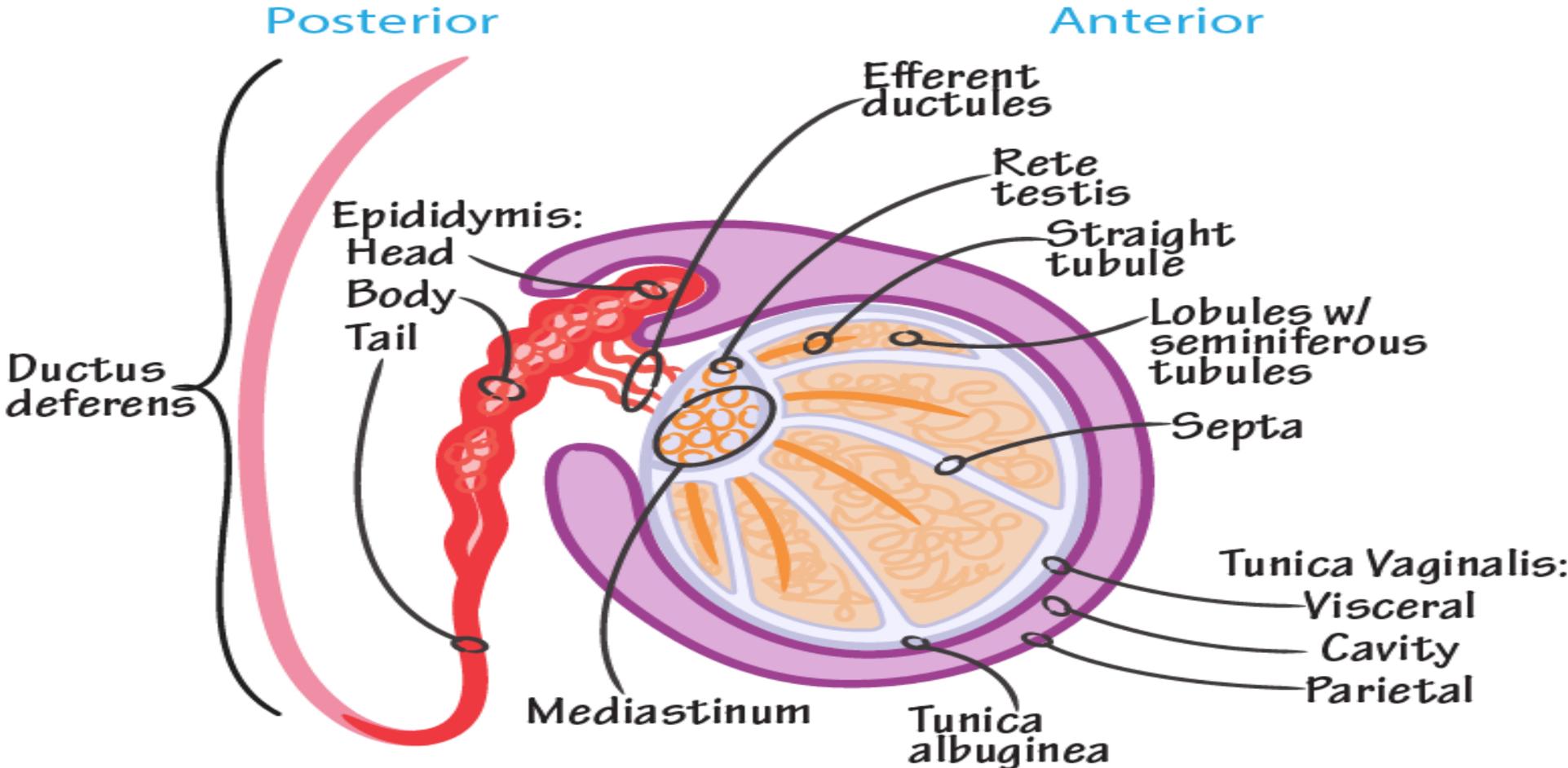
- ❖ It is the primary sex organ of the male genital system.
- ❖ It is a compound tubular gland with mixed exocrine (seminiferous tubules) and endocrine gland (Interstitial cells of Leydig).

1- Scrotum:
 It is formed (from outside) of:
 A pouch of thin skin with no hypodermis.
 A thin layer of smooth muscle fibers (Dartos muscle).
 A lining layer of flat cells which is the parietal layer of the *tunica vaginalis*.

2- Tunica vaginalis:
 It is a pouch of peritoneum which covers the testis.
 Its inner visceral layer forms the outer covering of the testis.
 Its outer parietal layer lines the scrotum.



TESTIS and EPIDIDYMIS Sagittal View





TESTIS

Stroma

❖ Tunica albuginea:

It is a thick layer of white collagenous fibers.

❖ Tunica vasculosa:

It is formed of loose C.T. rich in blood vessels.

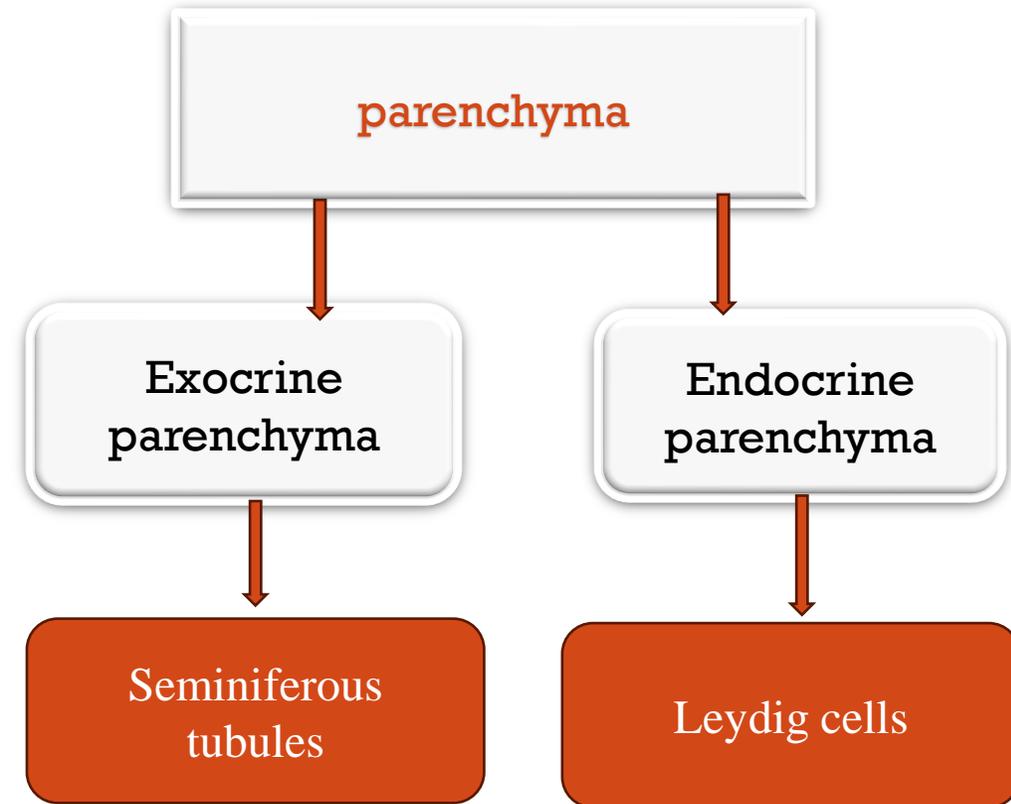
❖ Trabeculae:

These are incomplete septa which divide the testis into 250 compartments.

❖ Reticular tissue:

It is a network of reticular fibers.

It supports parenchyma and forms the background of lobules.



Seminiferous tubules

Characters:

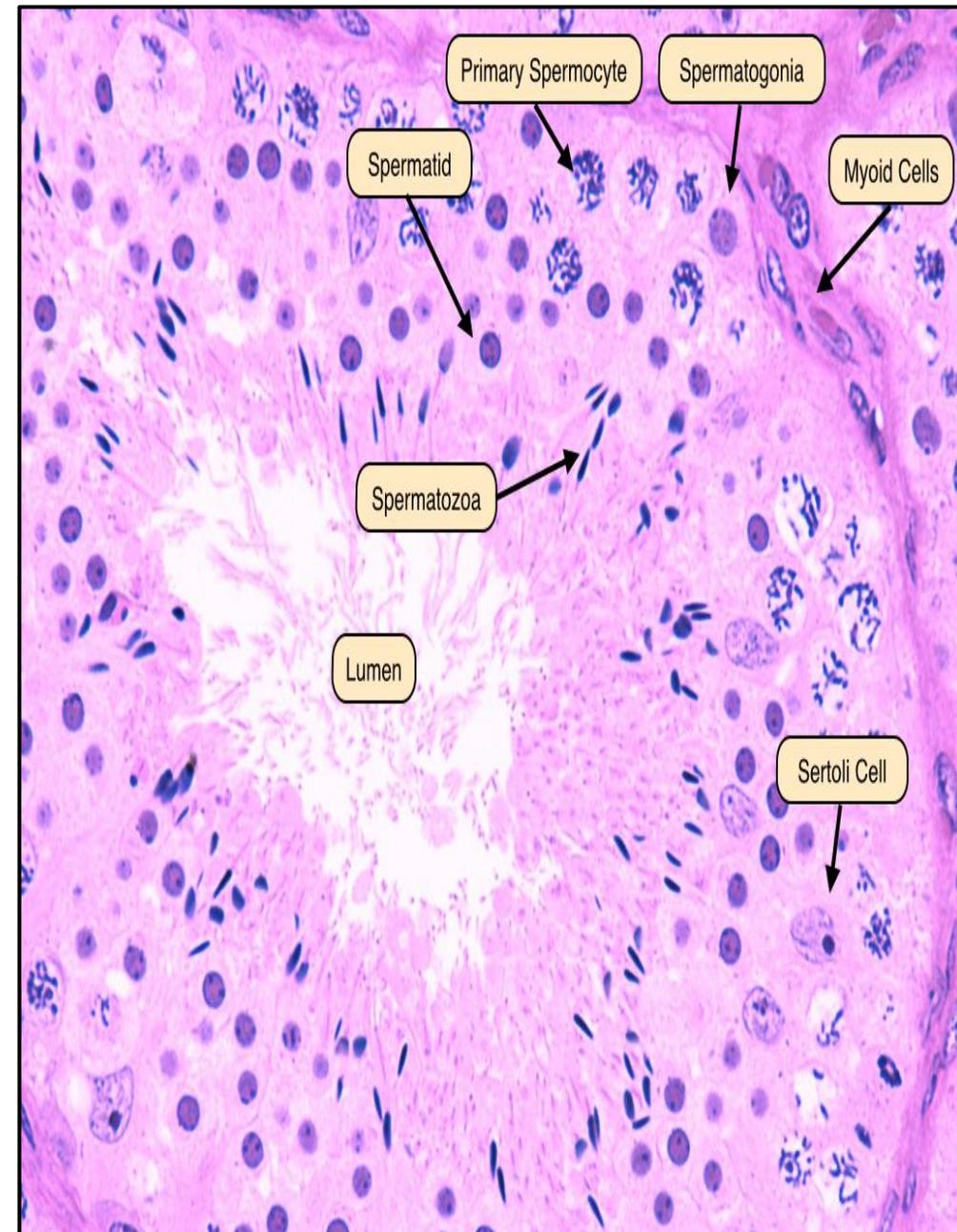
- ❑ It is the exocrine portion of the testis that produces spermatozoa.
- ❑ It is a highly tortuous compound tubular gland.
- ❑ It has a clear basement membrane which is surrounded by loose C.T containing blood vessels, smooth muscles fibers.

Lining cells:

- spermatogenic cells.
- Supporting Sertoli cells.

Spermatogenic cells

- These are the main cells which line the seminiferous tubule.
- They undergo the process of spermatogenesis which results in the production of mature spermatozoa.





Spermatogenesis

▪ spermatocytogenesis

spermatids production from the spermatogenic cells

spermiogenesis

morphological changes which occur in the spermatid to be changed into spermatozoa).





Spermatocytogenesis

Definition:

It is a process by which spermatids are produced from the spermatogenic cells

Duration:

64 days

Stages:

1-Proliferation:

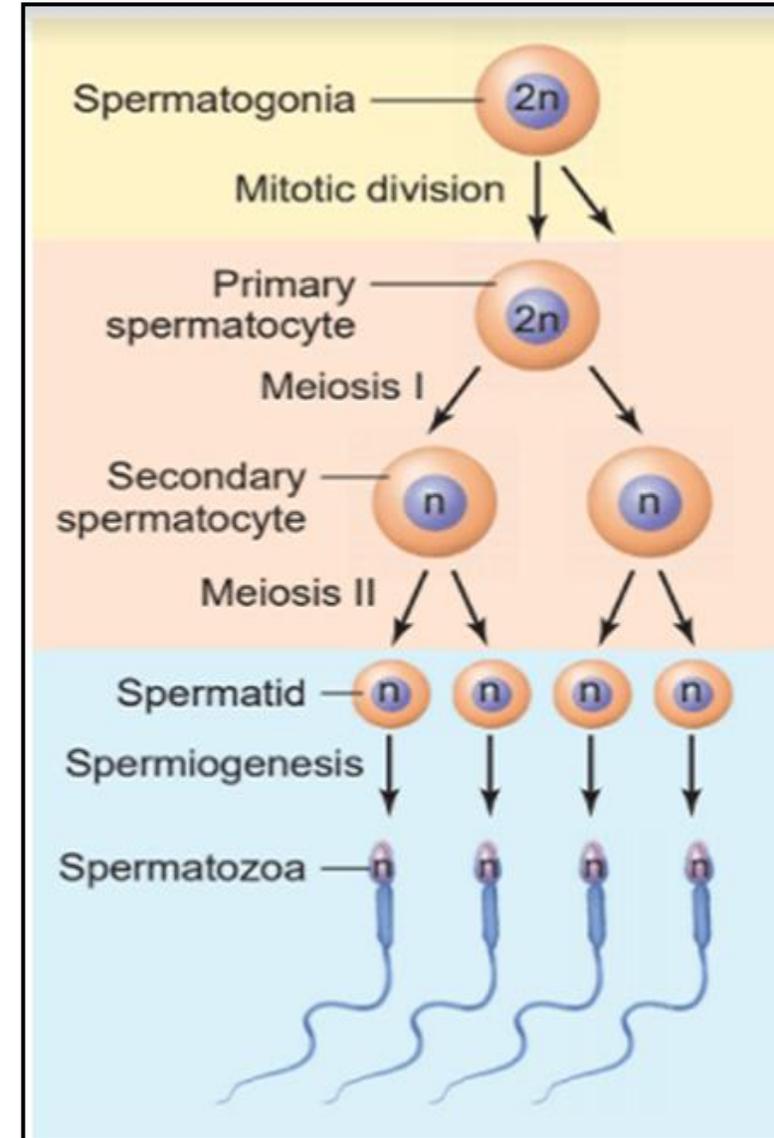
- Proliferation of spermatogonia by mitosis

2-Growth:

- spermatogonia grow to primary spermatocytes.

3-Maturation: (2 meiotic divisions)

- 1st meiotic division of primary spermatocytes to secondary spermatocytes.
- 2nd meiotic division of secondary spermatocytes to spermatids



STEPS

a) Spermatogonia:

Site: they form 1-2 layers on the basement membrane.

Shape: rounded

Nuclei: rounded

b) Primary spermatocytes:

Site: they form 2-3 layers inner to the spermatogonia.

Shape: rounded.

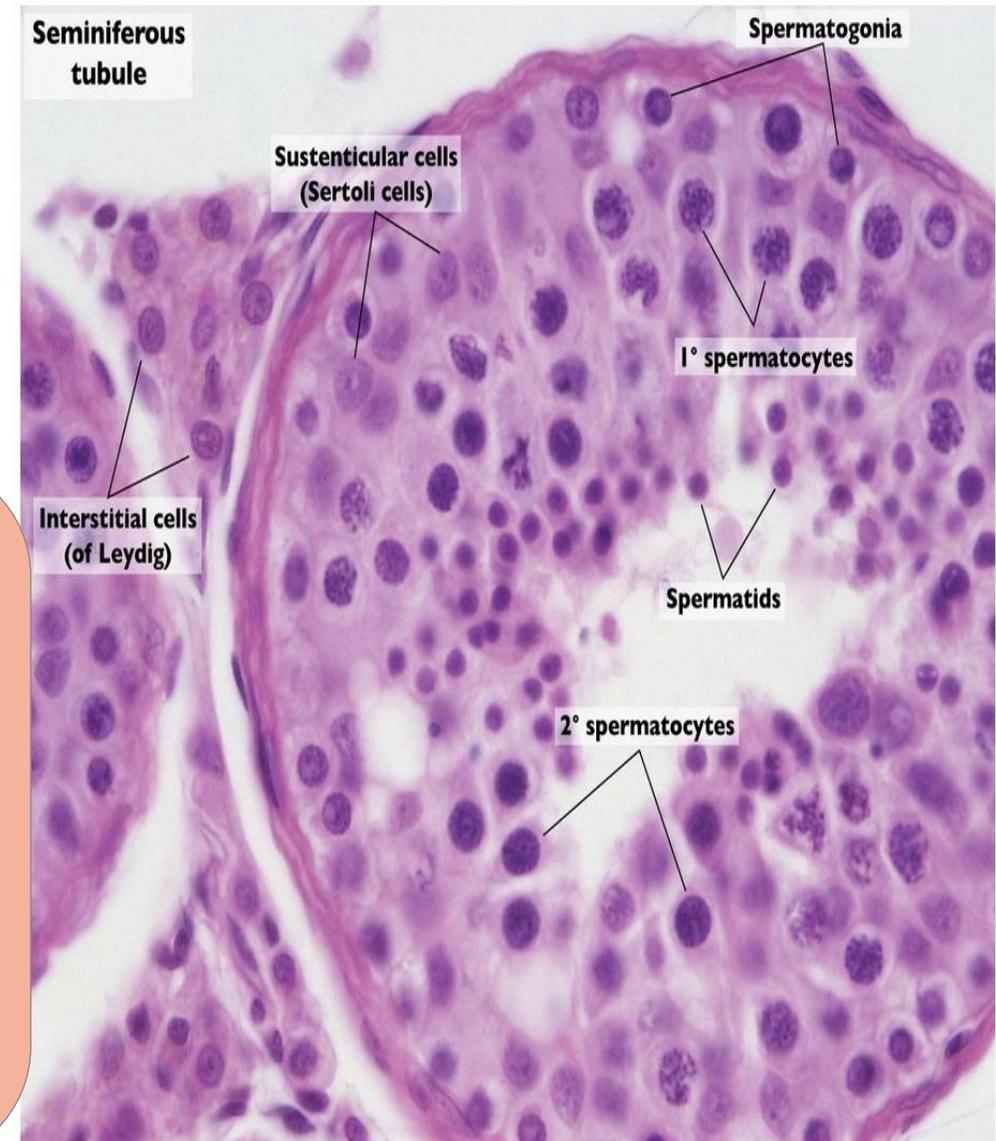
Size: the largest cells.

Nuclei:

- Large, central, rounded.
- Contain 46 d- chromosomes.

Changes:

They enter the first meiosis at puberty to form secondary spermatocytes with half number of chromosomes (23 chromosomes) and separation of X and Y chromosomes.



c) Secondary spermatocytes:

Site: they are difficult to be seen as they rapidly change into spermatids

Shape: rounded.

Size: smaller than primary spermatocytes

Nuclei:

Small, central, rounded.

Contain 23 d-chromosomes and some cells have X chromosomes and others have Y chromosomes.

Changes:

They rapidly form spermatids.

Spermatids:

Site:

At the inner parts of the tubules.

They are attached to the apex of Sertoli cells.

Shape: rounded then changed into elongated.

Size: very small (9 μm).

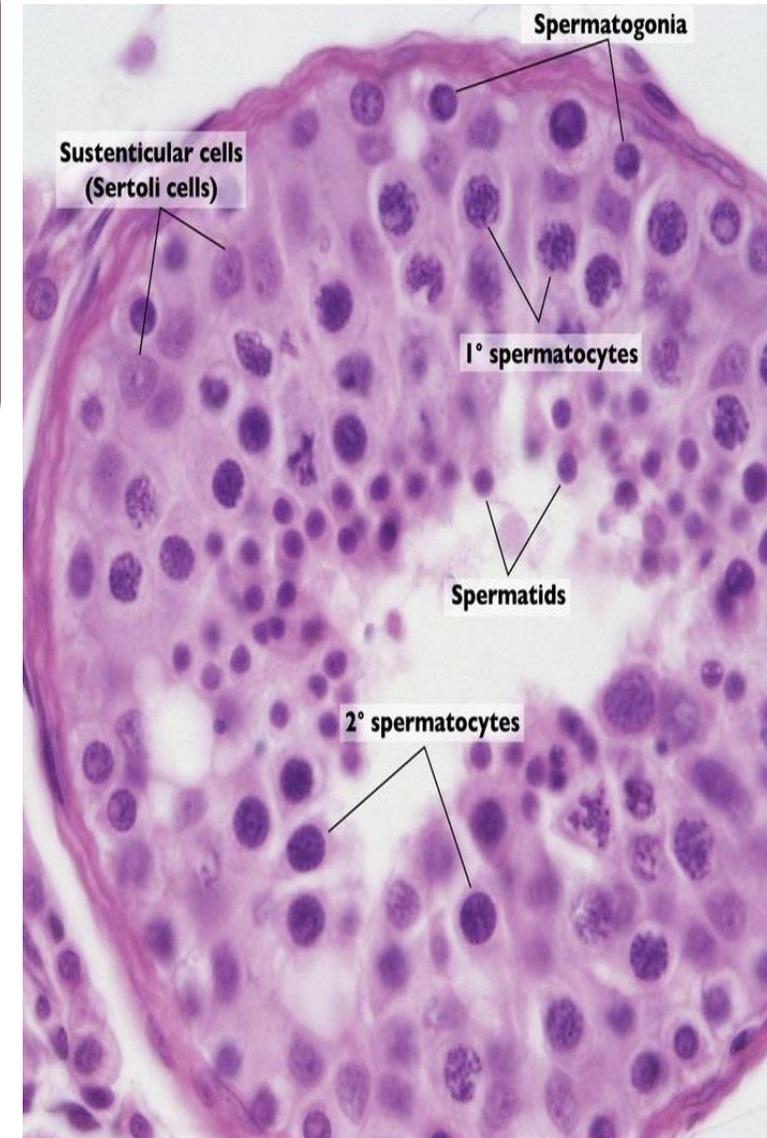
Nuclei:

Small, deeply stained.

Contain 23 S. chromosomes.

Changes:

undergo spermiogenesis and change into spermatozoa.



Spermiogenesis

■ Definition:

It is the morphological changes which occur in the spermatid to be a spermatozoa.

It occurs without cell division.

It includes different changes in nucleus, Golgi apparatus, mitochondria, centrioles and cytoplasm.

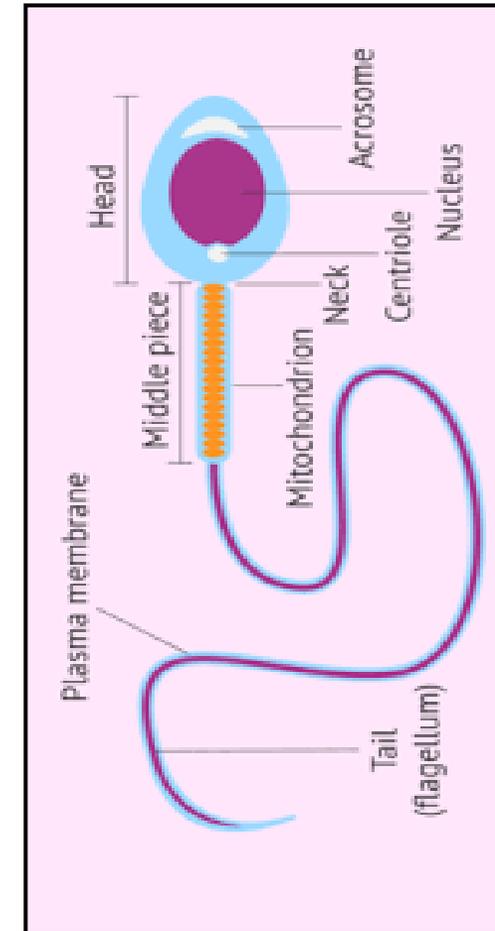
■ Changes:

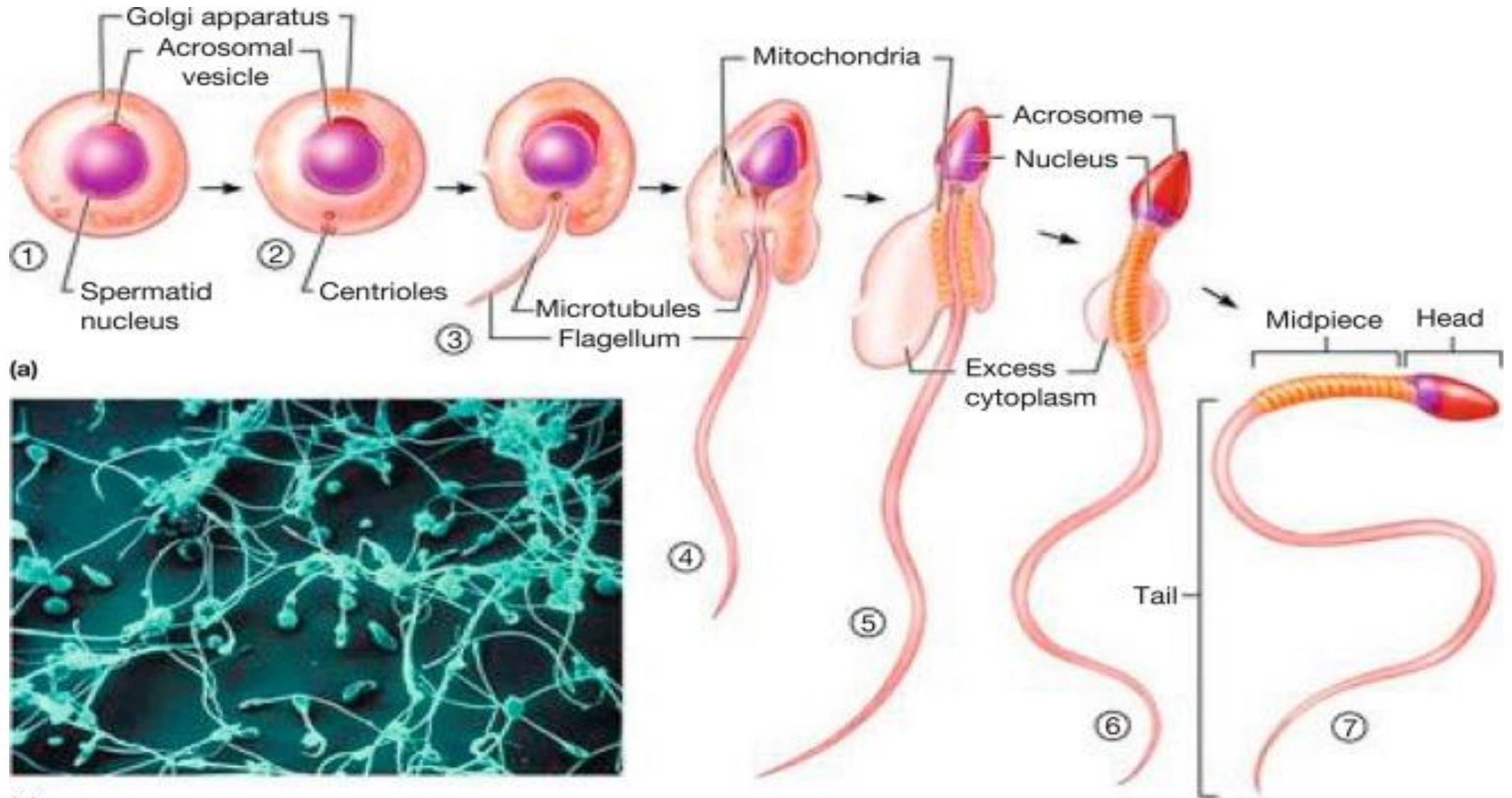
a) The nucleus:

- It is found at one pole of the cell.
- It becomes more condensed, elongated and flattened.

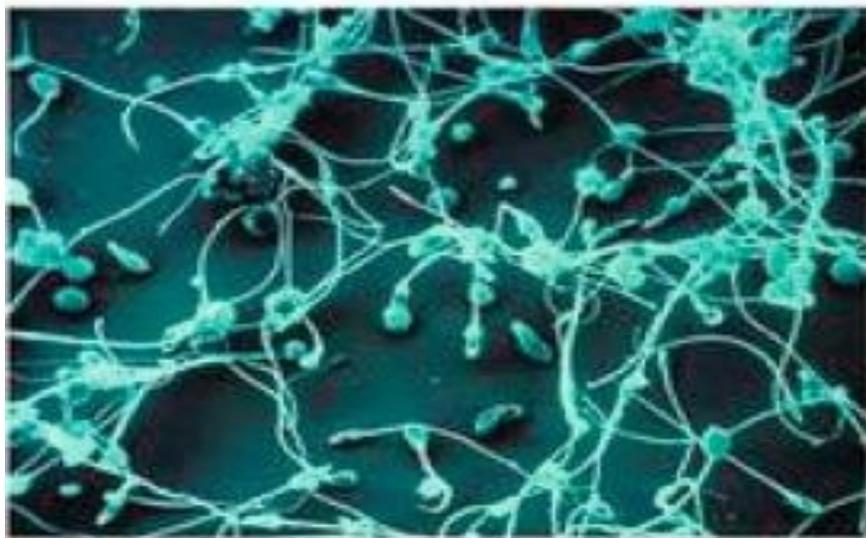
b) Golgi apparatus:

- It becomes closely associated with nucleus.
- It is changed into membranous vesicle called *acrosomal vesicle*.
- This vesicle encloses the anterior 2/3 of the nucleus to form the *head cap*.
- A dark granular mass appear in the vesicle which is called *acrosome*.
- The head cap and acrosome are called *acrosomic system*.
- This system contains hyaluronidase enzyme which help the spermatozoa to penetrate the ovum.





(a)



(b)





c) The centrioles

- The 2 centrioles migrate to the caudal pole of the nucleus.
- One of them becomes attached to the nucleus.
- The other is elongated to form the flagellum which is structurally similar to cilium.

D) mitochondria

- They are arranged as a sheath around the proximal part of the flagellum to form the middle piece of the spermatozoa.
- They provide energy for the motility of the spermatozoa.

E) cytoplasm

- It is reduced in amount (part of the cytoplasm is phagocytosed by Sertoli cells)





f) Mature spermatozoa:

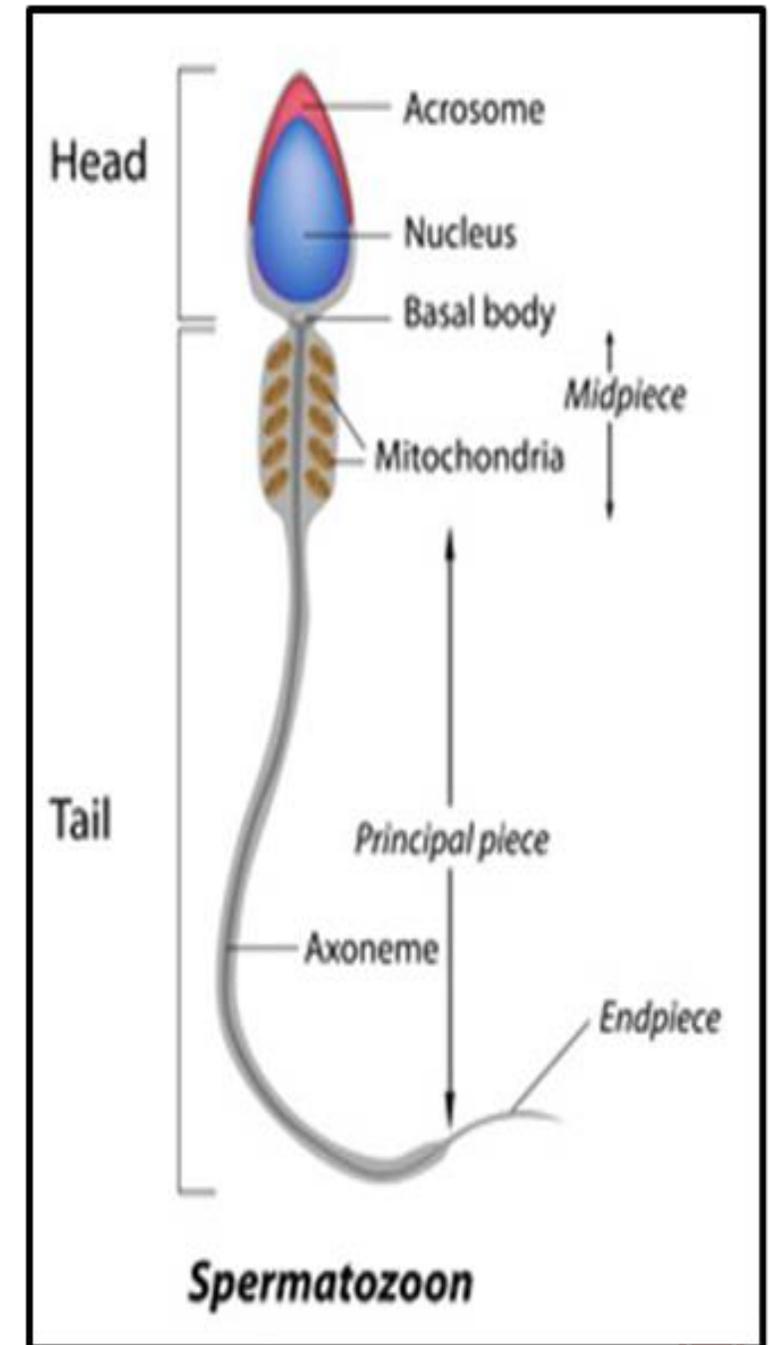
- The mature spermatozoon is formed of:
- **1- The head:**
- Length: 5 μm .
- Shape: pyriform.
- Contents:
 - 1. The condensed nucleus.
 - 2. Acrosomic system covering the anterior 2/3.





The neck: It is a constriction behind the head

- which contains the 2 centrioles.
- **3- Middle piece:**
 - Length: 5 μm .
 - Contents: It is formed of the flagellum surrounded by the mitochondrial sheath.
- **4- The tail:**
 - Length: 50 μm .
 - Contents: it is formed of principal and end piece.
 - It is highly motile.



Sertoli cells

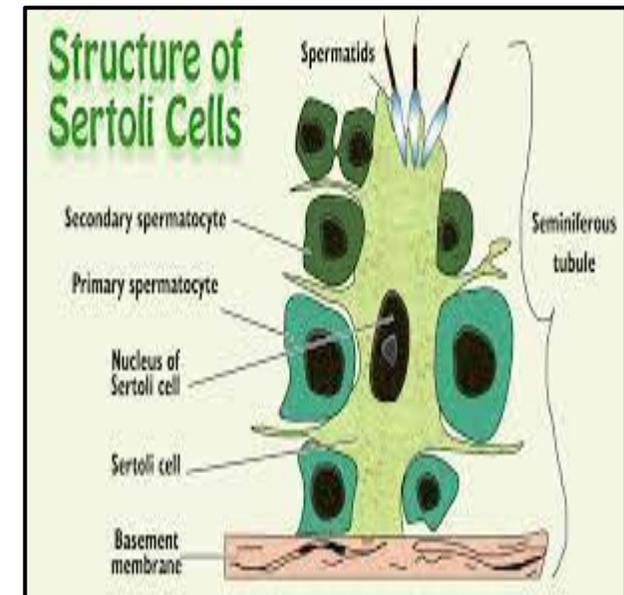
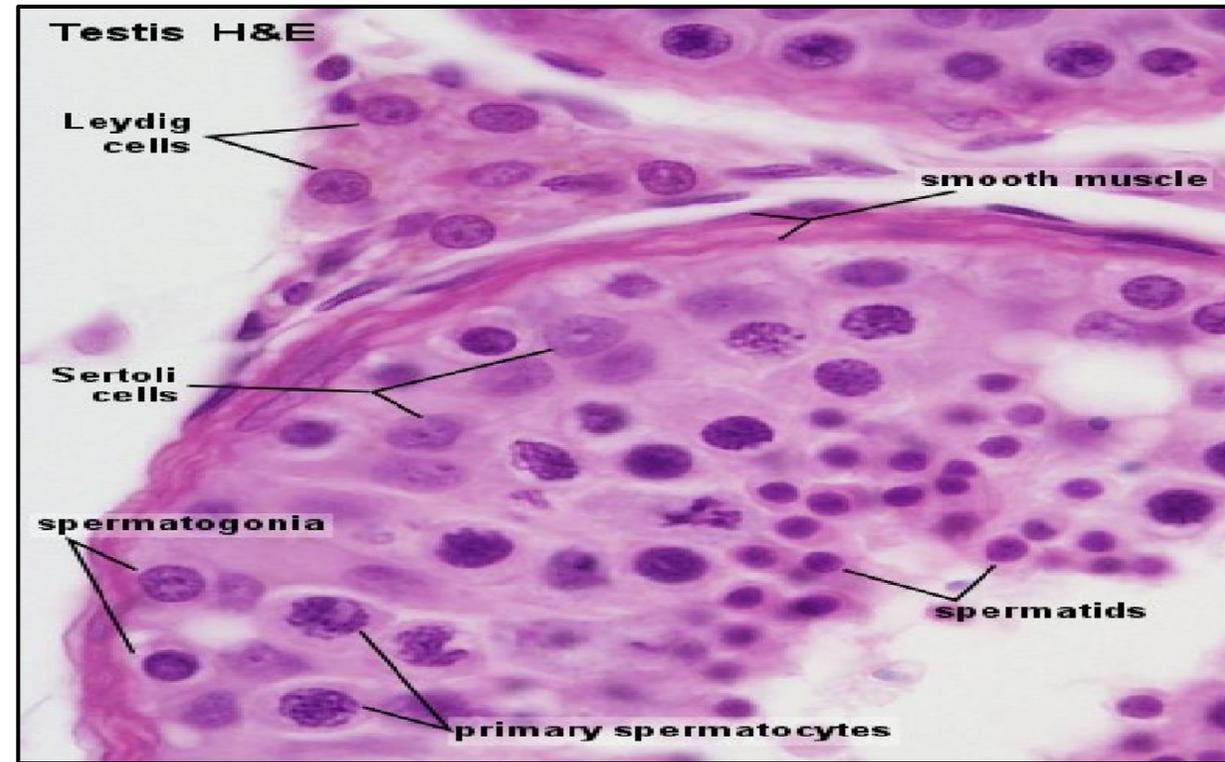
LM:

Shape: Tall irregular columnar cells

Site: insinuated between spermatogenic cells and extend from the basal lamina to the lumen.

nucleus: ovoid, near the base, pale stained with dispersed chromatin and 1-2 prominent nucleoli.

cytoplasm: pale stained and contains lipochrome pigment and lipid droplets.

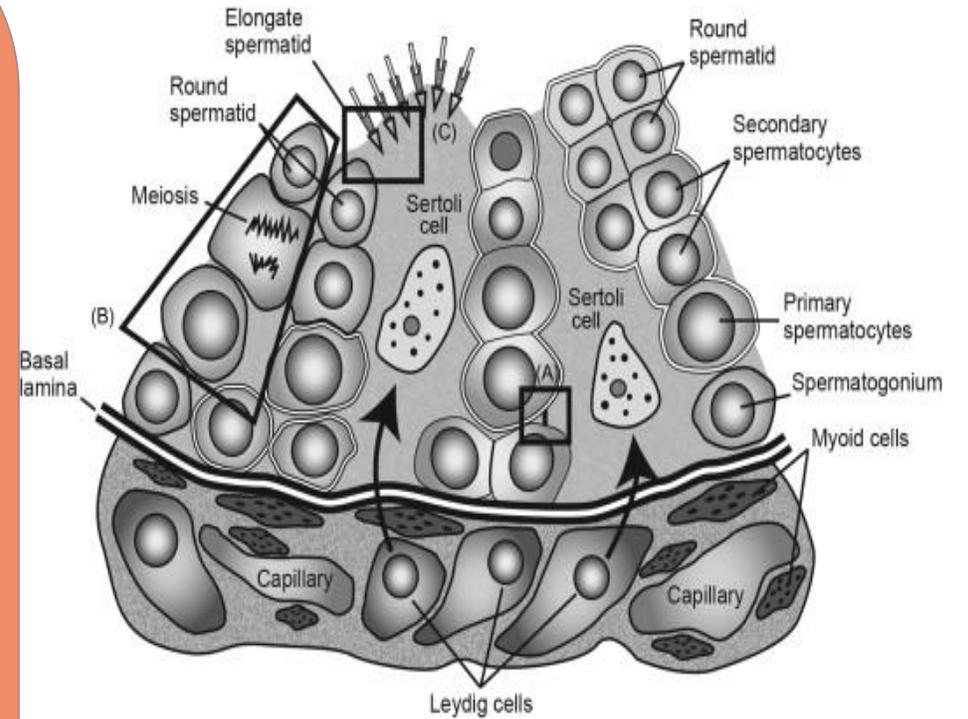


EM:

- 1- They are joined to each other by tight junction which act as blood testis is barrier.
- 2- The nuclear membrane shows a characteristic longitudinal groove.
- 3- The nucleolus is associated with chromatin on both sides
→ triplet structure.

The cytoplasm have:

- I) Numerous mitochondria, numerous SER, and Golgi apparatus.
- II) Lipid and glycogen granules.
- III) Cytoskeleton (actin and microtubule).
- IV) Digestive system (1ry, 2ry lysosomes and lipochrome pigment)





Function of Sertoli Cells:

- ❑ Phagocytose degenerated germ cells.
- ❑ Make a blood testis barrier which protect
 - the developing sperm from any injurious agent.
- ❑ Nourish spermatogenic cells.
- ❑ Prevent autoimmune disease.

The Blood -Testis Barrier

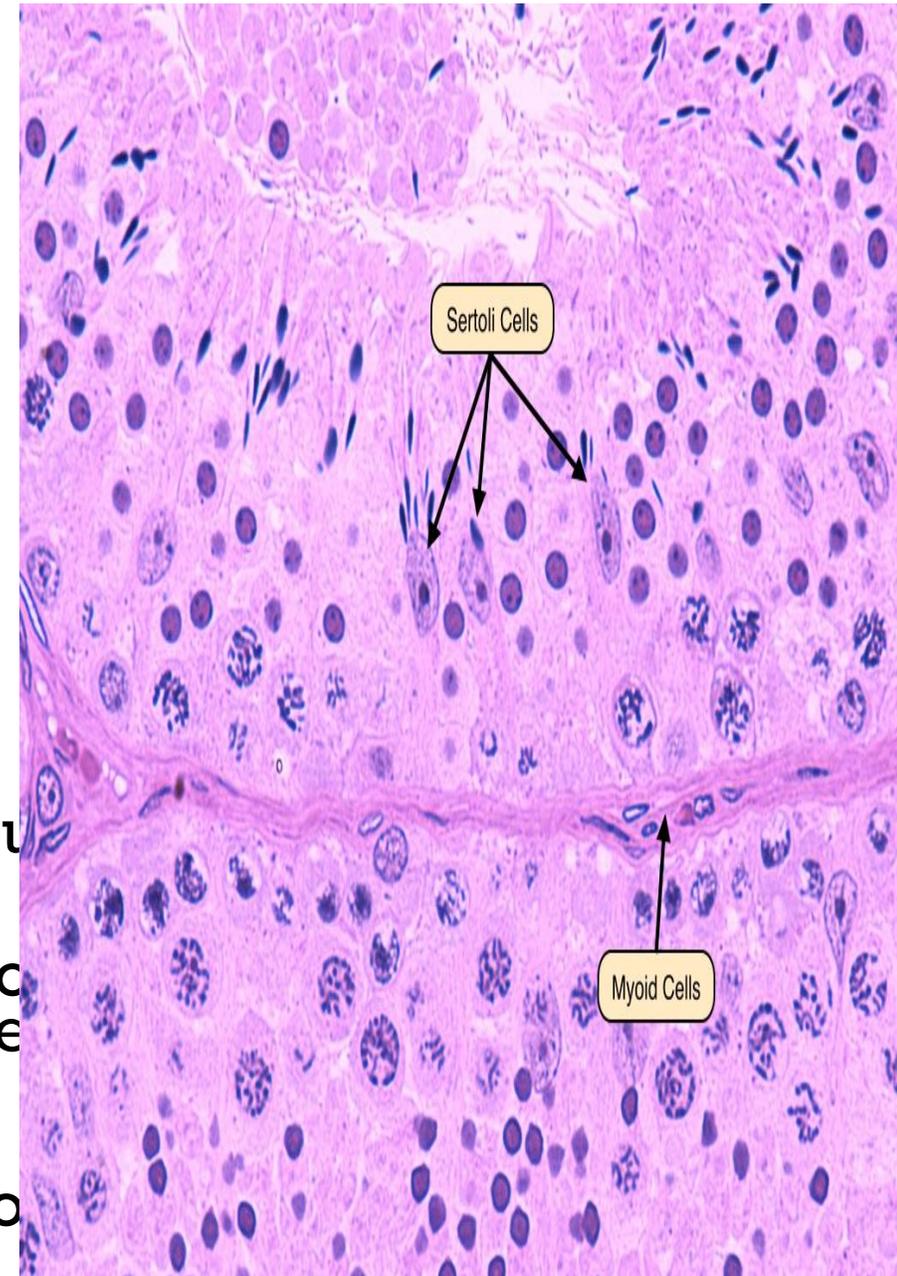
Definition:

It is a continuous membrane formed by the continuous junctions

the lateral borders of Sertoli cells near their bases to the selective passage of substances to the cells of the

Structure:

The junction divides the seminiferous tubule into two compartments:



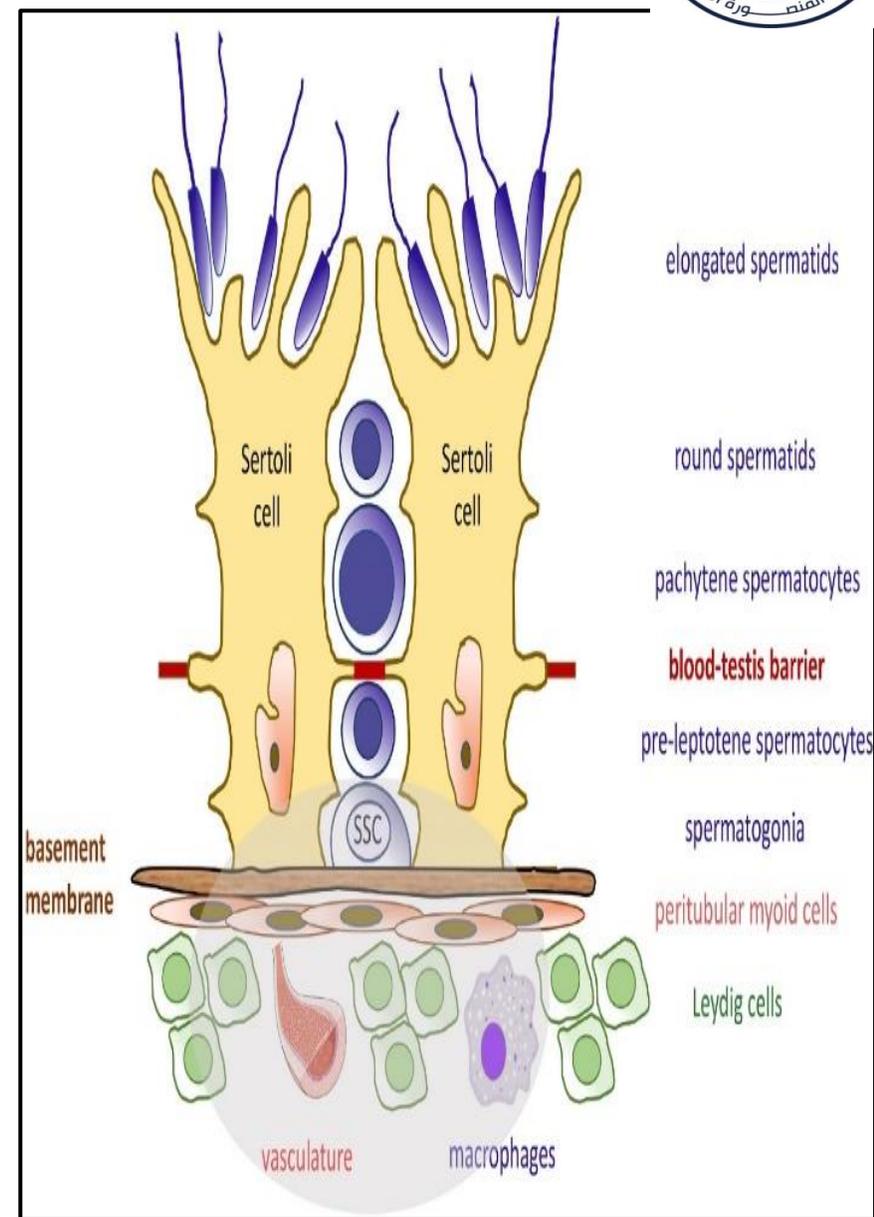
- **1-Inner Compartment:**

- Towards the lumen of the seminiferous tubule.
- It includes:
 - Primary, secondary spermatocytes, spermatid and sperm.
 - They are isolated from direct exchange with tissue fluid which is present outside the seminiferous tubule

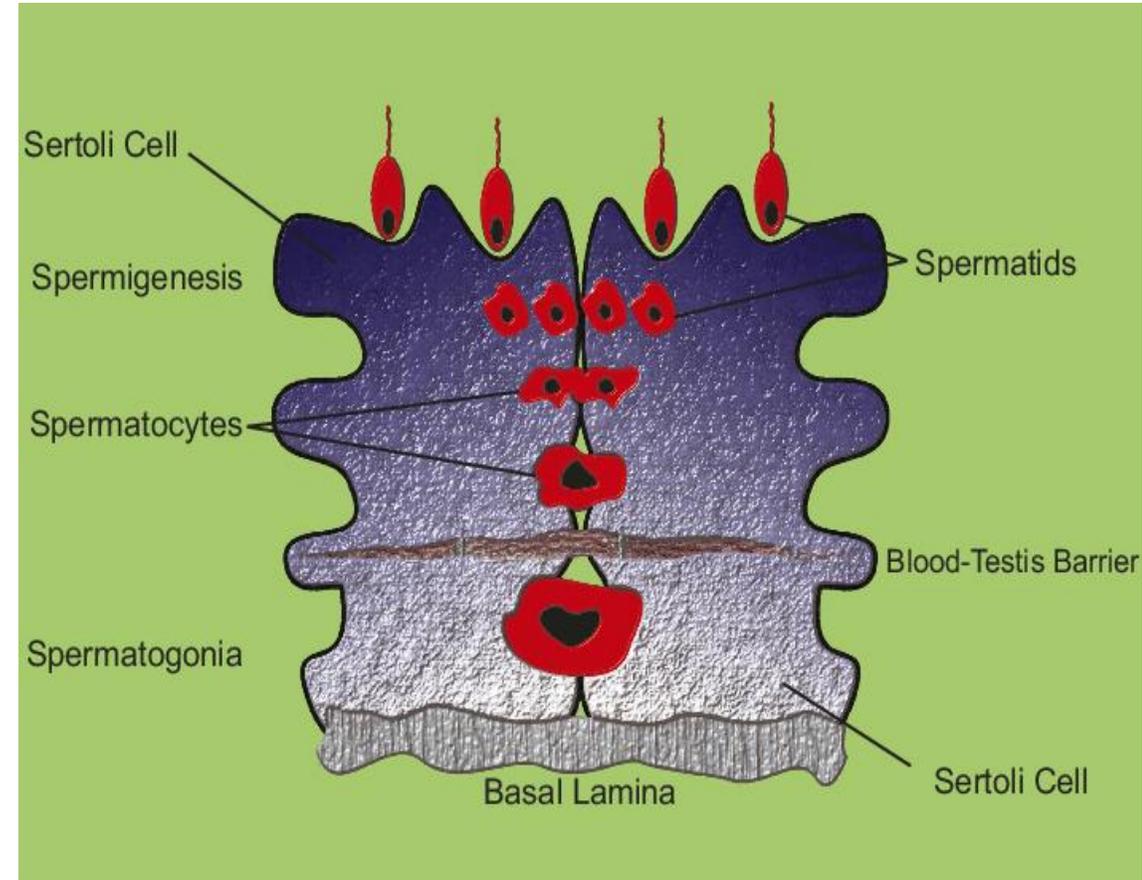
- **2-Outer Compartment:**

Towards the basement membrane.

- it includes spermatogonia.
- It permits free exchange of nutrients and waste products between interstitial vasculature and the more primitive spermatogenic cells.



- **Function:**
- 1- Select the passage of nutrients, hormones, proper fluid needed for differentiation and growth of spermatogenic cells.
- 2- Isolate and protect the spermatocyte from the damaging substances in the blood outside the tubules.
- 3- Decrease the entry of antisperm immunoglobulin which may damage the sperm.
- 4- Prevent the back passage of the antigen of the sperm to the blood, thus prevent the autoimmune reaction which cause death to sperm.
- 5- Maintain high concentration of K, Na, and androgen binding protein (ABP) in the inner compartment which help proper spermatogenesis.



Interstitial Cells of Leydig

Site:

Found singly or more commonly in clumps in the stroma between seminiferous tubules.

LM:

Nucleus: Pale rounded

Cytoplasm:

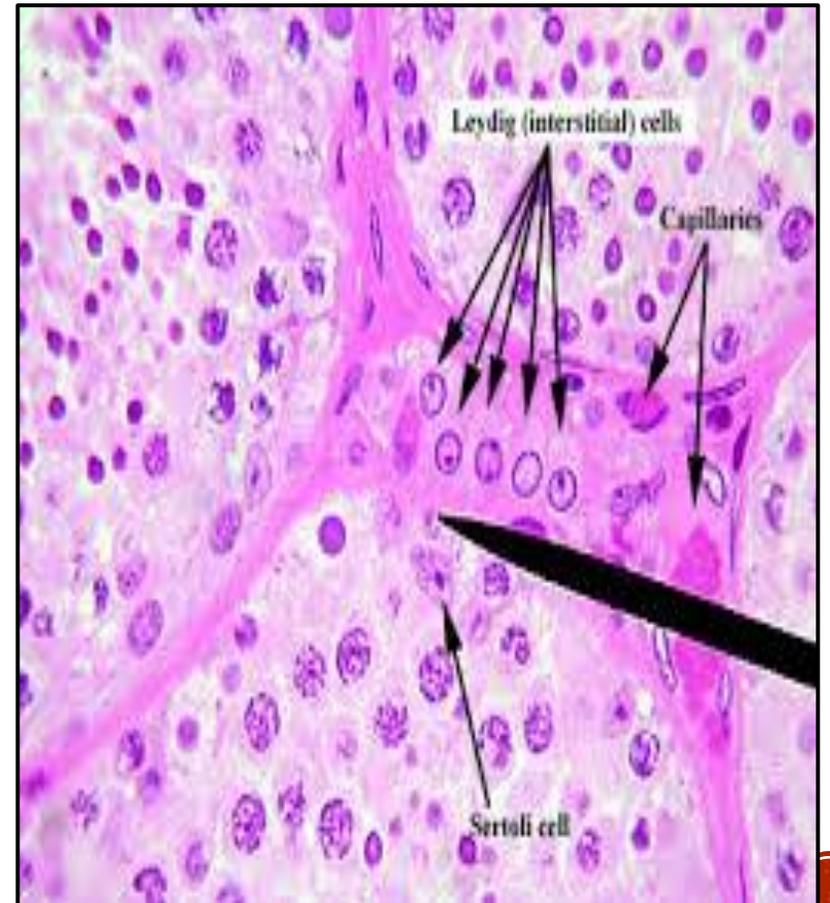
Pale stained, acidophilic due to dissolved lipid droplets.

EM:

- □ sER, mitochondria
- Lipochrome pigment.
- Peroxisomes-Lysosomes.

Function:

They secrete testosterone.



Thank
you!

