Male Reproductive System

Constitution of male reproductive system

Genital gland ----testis

Genital ducts

epididymis / ductus deferens / urinary duct

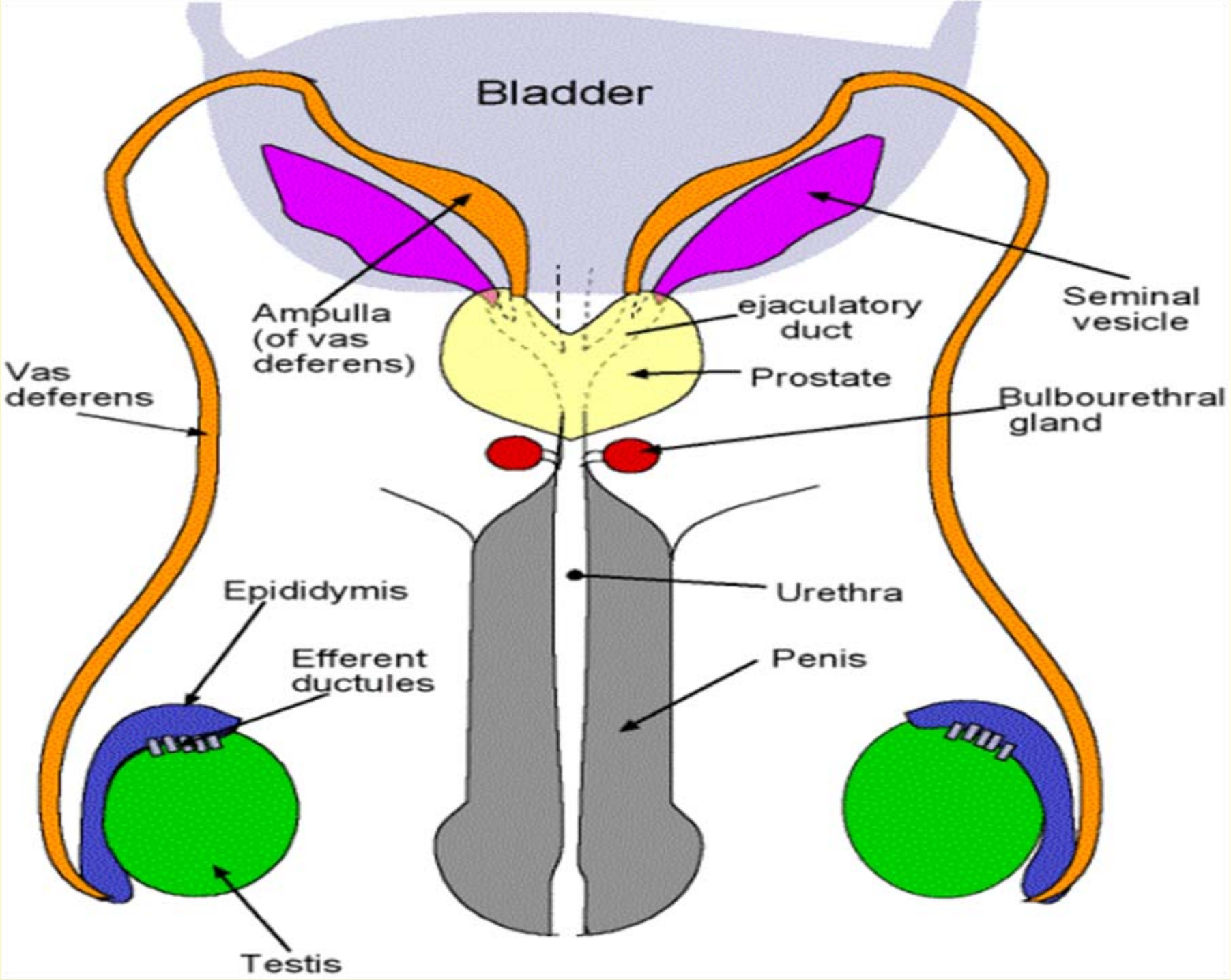
Accessory sex glands

prostate gland

Seminal vesicle

Bulbo-urethral glands

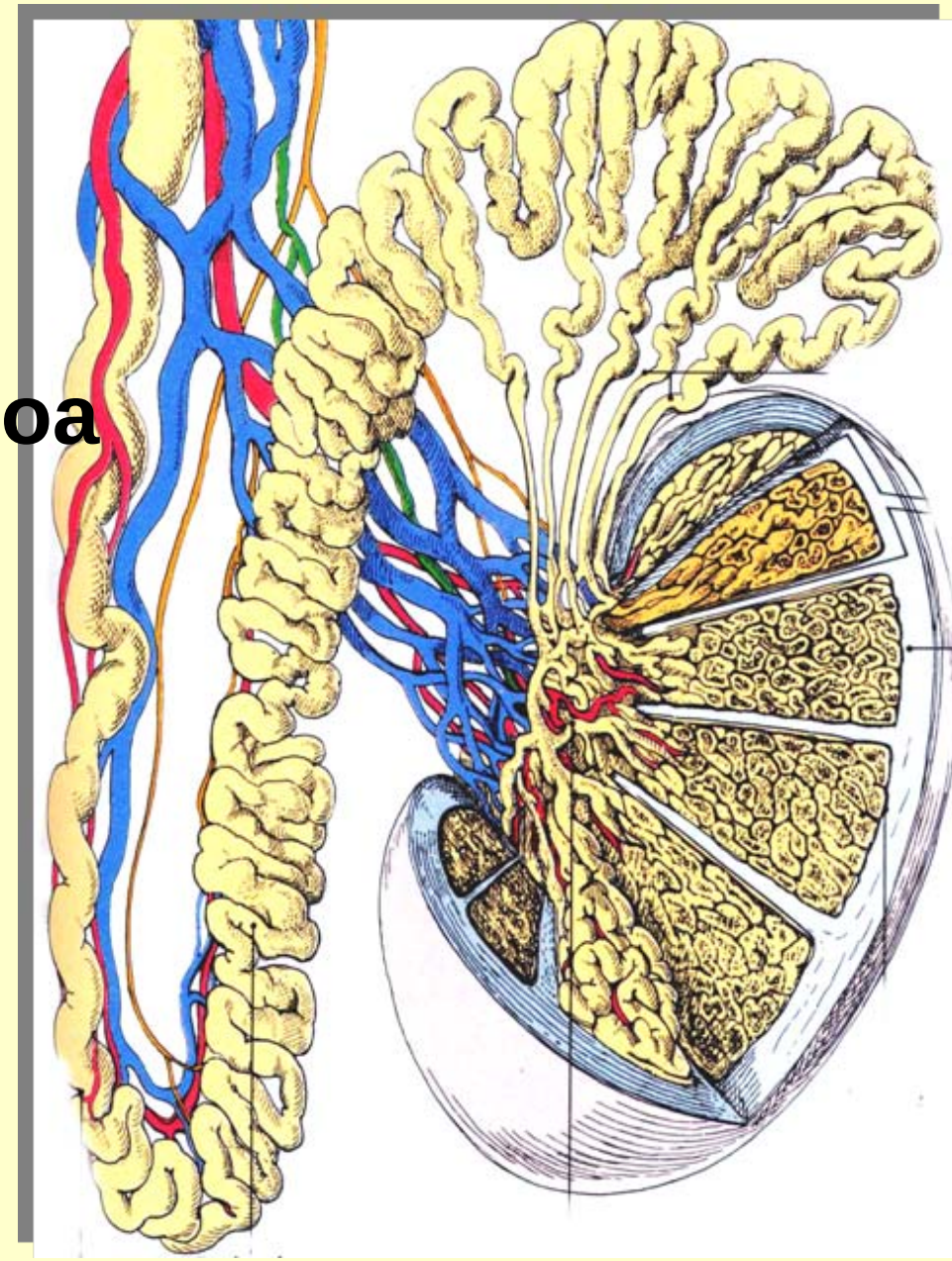
Penis


Bladder
Ampulla (of vas deferens)
ejaculatory duct
Seminal vesicle
Vas deferens
Prostate
Bulbourethral gland
Epididymis
Urethra
Efferent ductules
Penis
Testis

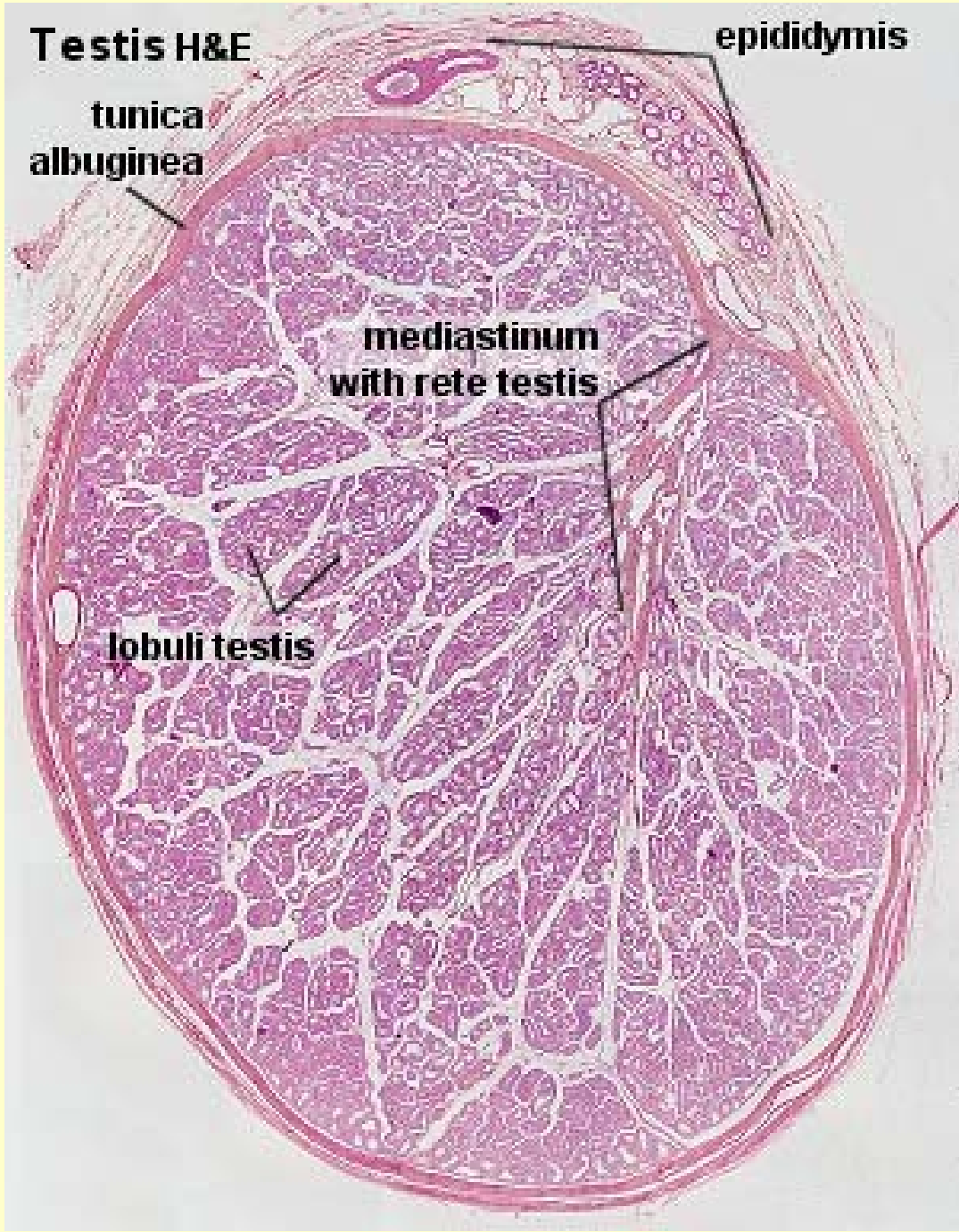
Testis

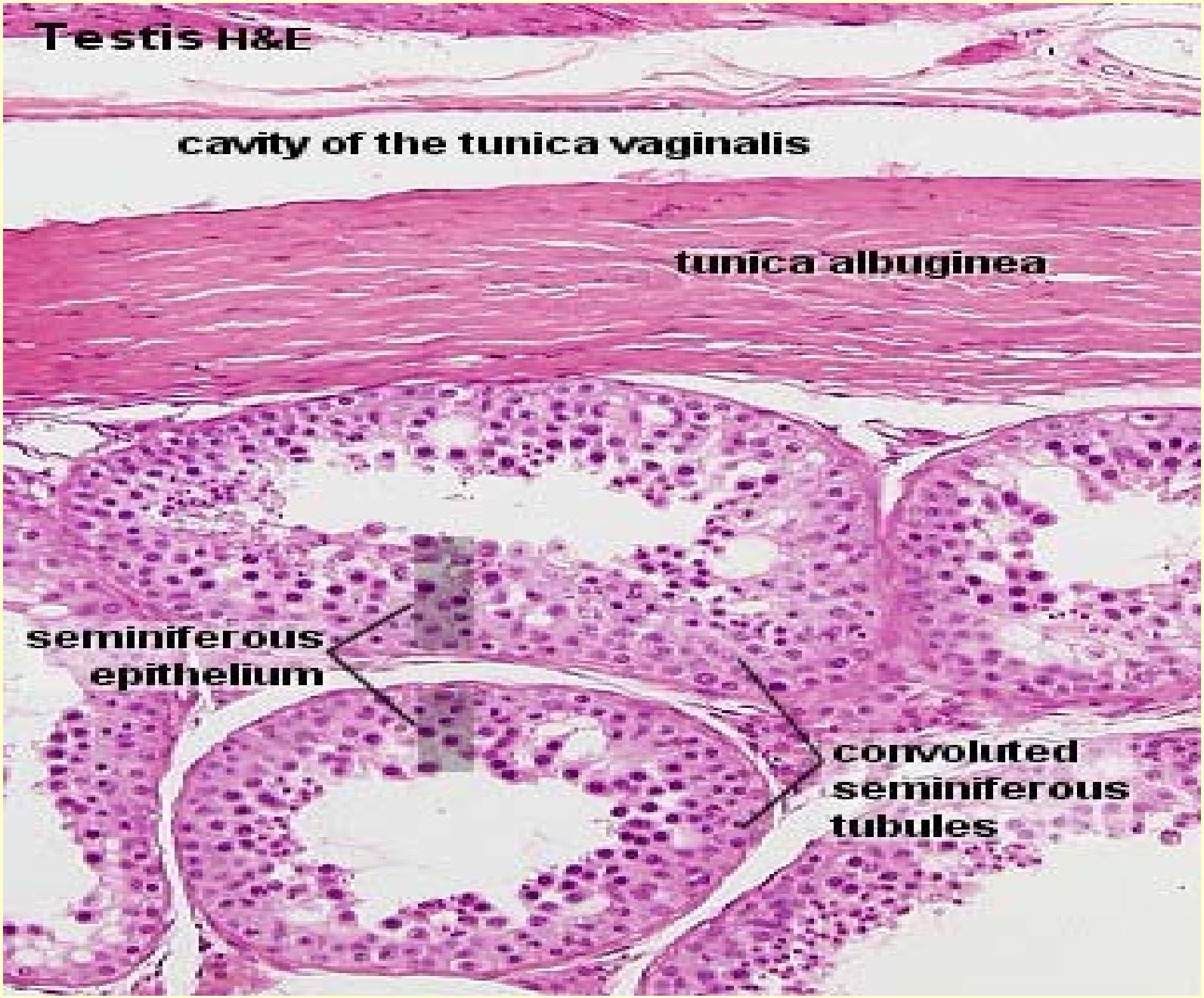
* producing spermatozoa

* Producing hormones



*tunica albuginea
* mediastinum testis
* testicular lobule
* seminiferous tubules
* tubulus rectus
* rete testis




Testis H&E
cavity of the tunica vaginalis
tunica albuginea
seminiferous epithelium
convoluted seminiferous tubules

- Seminiferous tubules:
    * the site of germatozoon production
    * total of 800-1600 tubules about 600 M
    * 66% of the testicular volume
- Interstitial area:
    *testicular interstitial cells which produce testosterone
    *connective tissue ; capillary

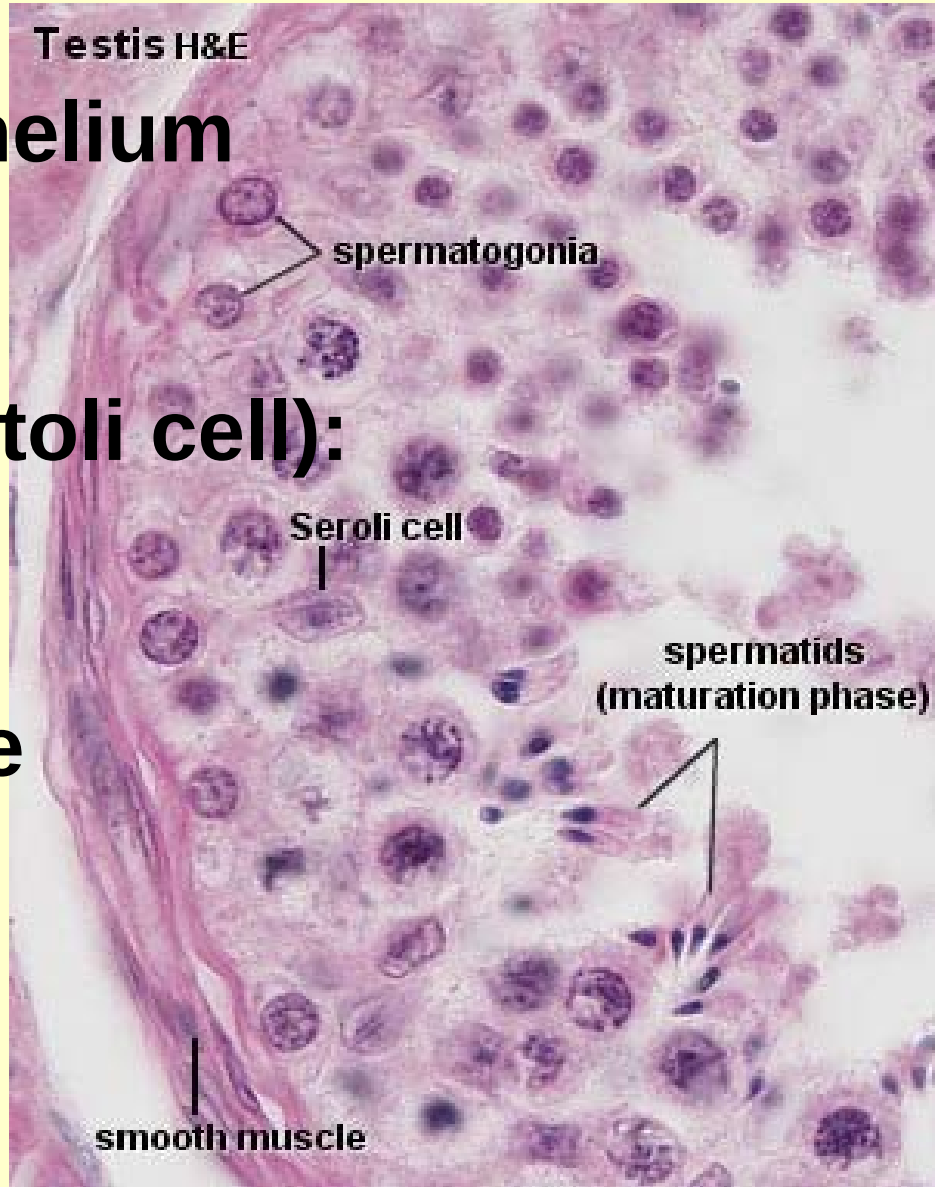
seminiferous tubule

- Spermatogenic epithelium

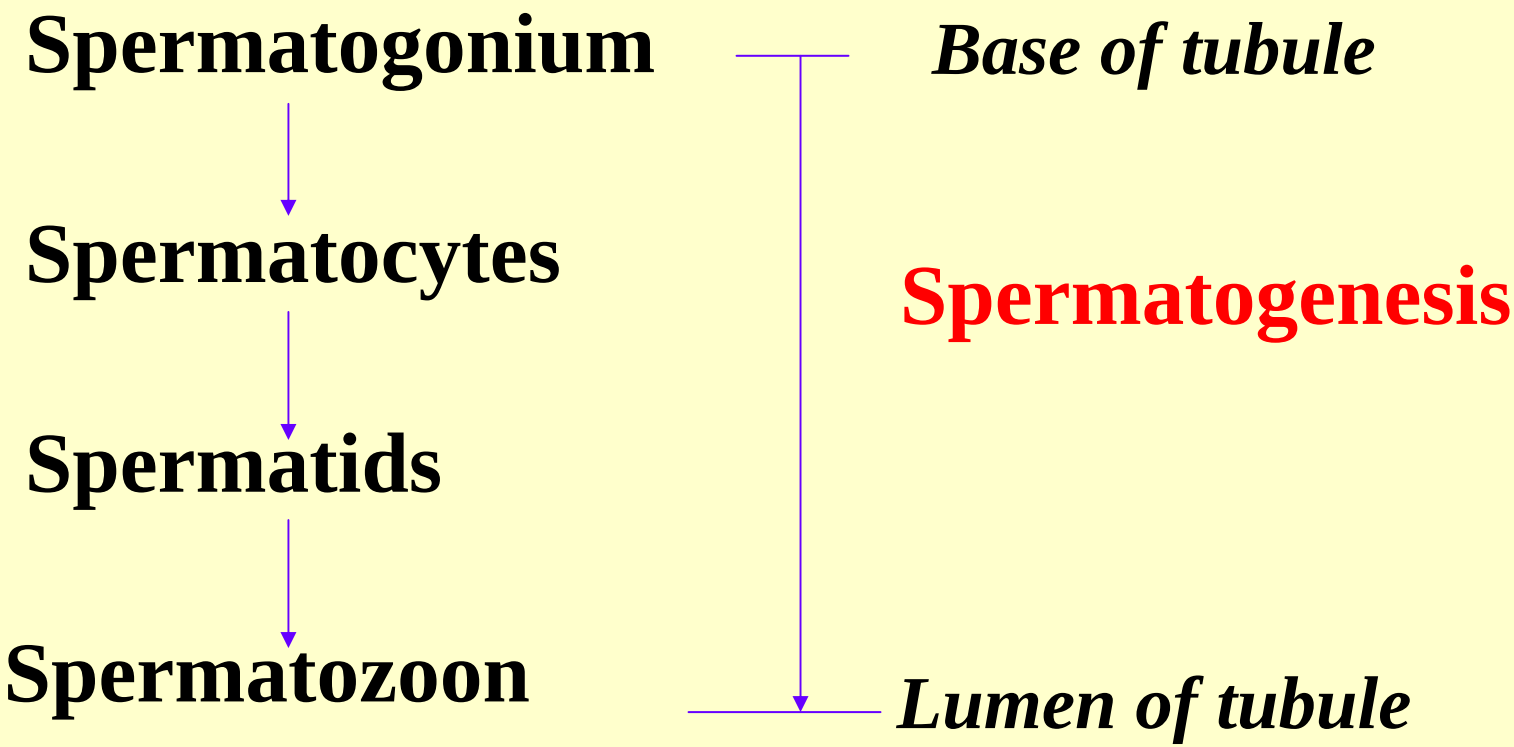
*Spermatogenic cell:

*sustenacular cell (Sertoli cell):

- basement membrane
- myoid cell



Stages of spermatogenic cell development



Spermatogonium

*at the base of epithelium

*two types

-type A

type Ad: maintains the germ cell pool

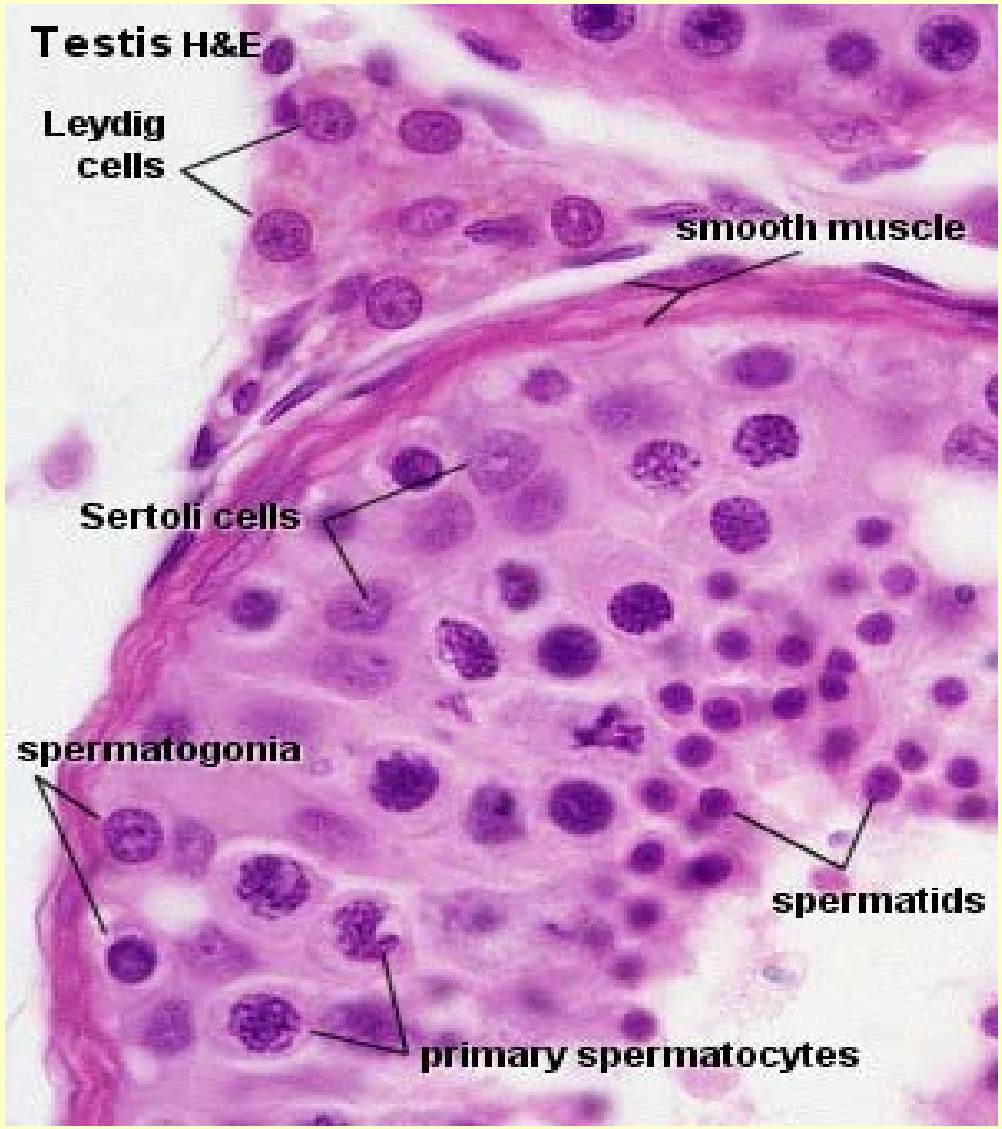
type Ap

↓ developed

-type B

↓

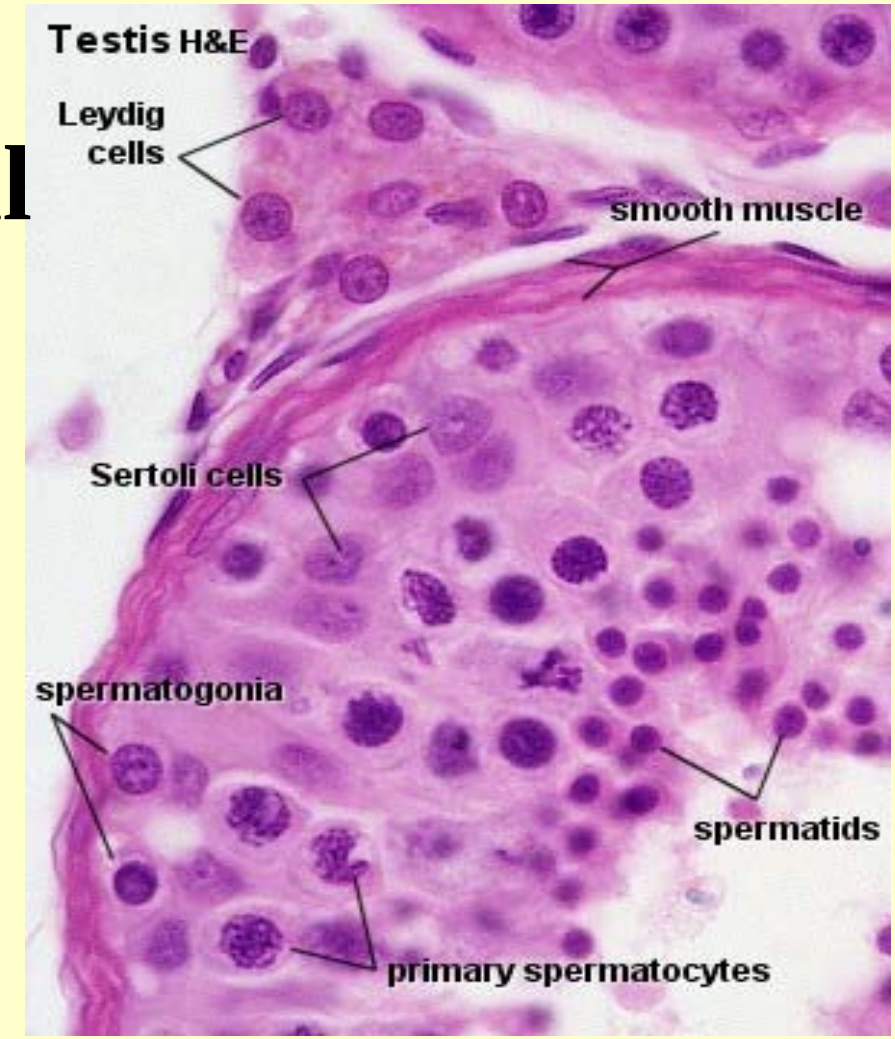
primary spermatocytes



Primary spermatocyte

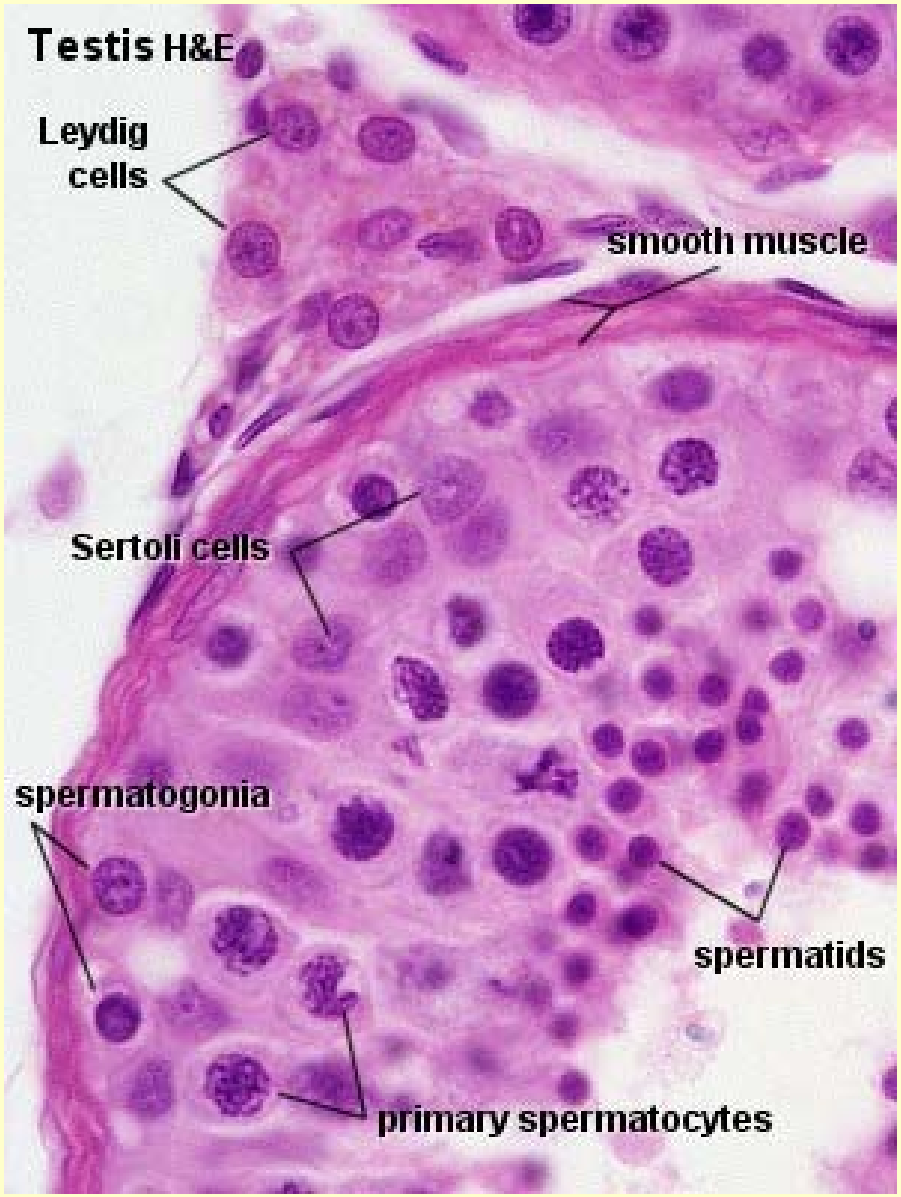
*the largest germ cell (18 µm in diameter)

*large nuclei with chromosome



Secondary spermatocyte

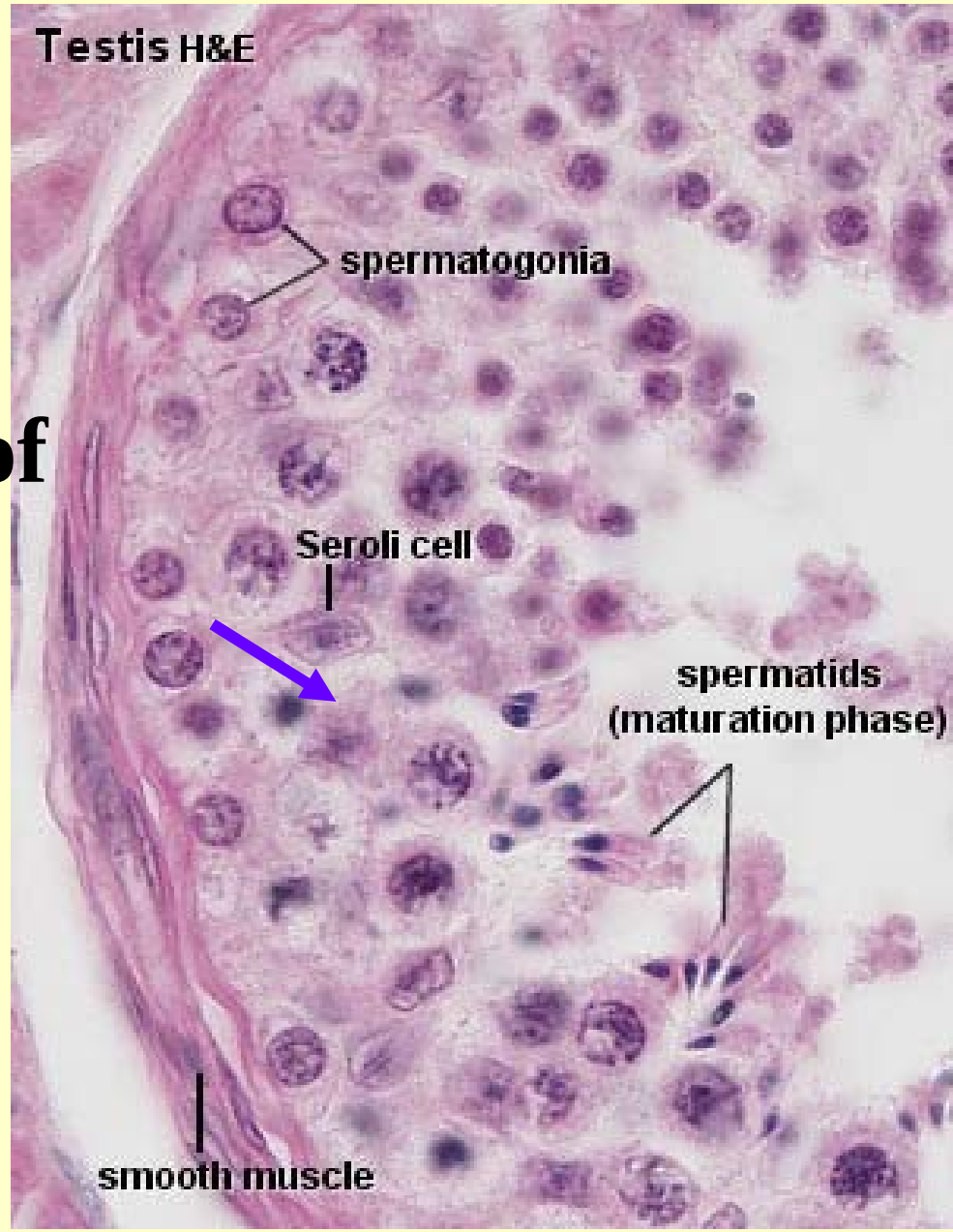
*hardly identify in sections due to short 2th meiotic division



Spermatid

* close to the lumen

* with half number of chromosomes



Spermatozoon

consisting of two main components.

head:

nucleus with condensed chromatin

acrosome

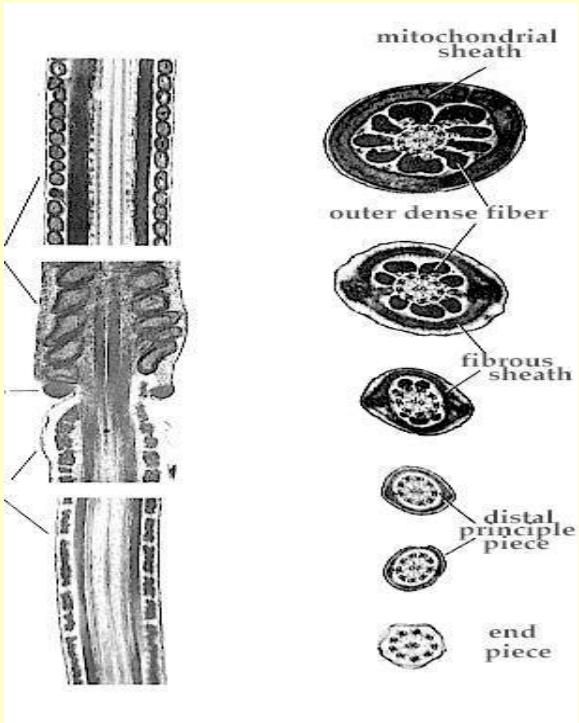
tail:

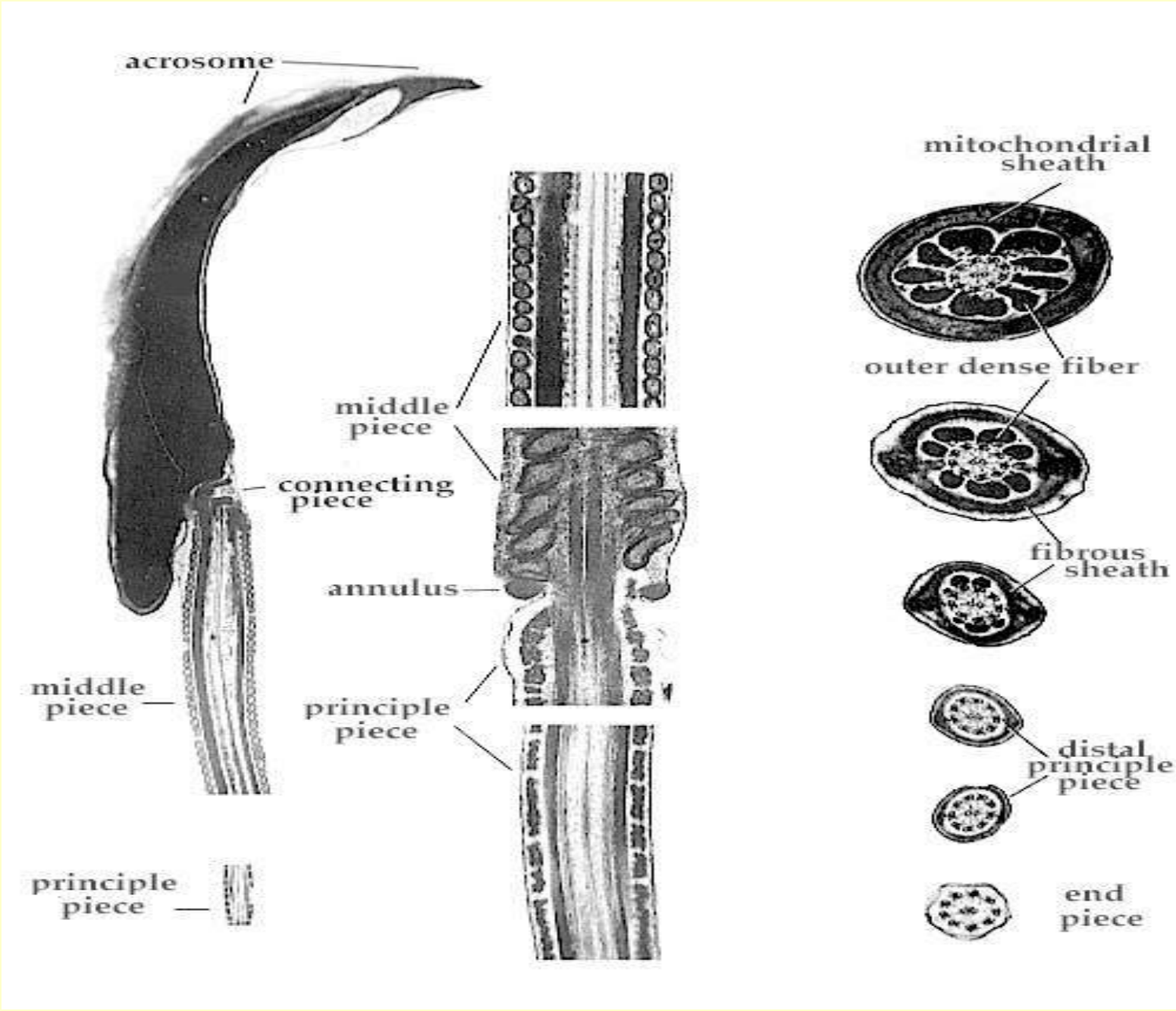
neck

middle piece

principal piece

end piece




acrosome
middle piece
connecting piece
middle piece
principle piece
principle piece
annulus
principle piece
mitochondrial sheath
outer dense fiber
fibrous sheath
distal principle piece
end piece

Structure of spermatozoon tail

neck------centriole

middle piece:

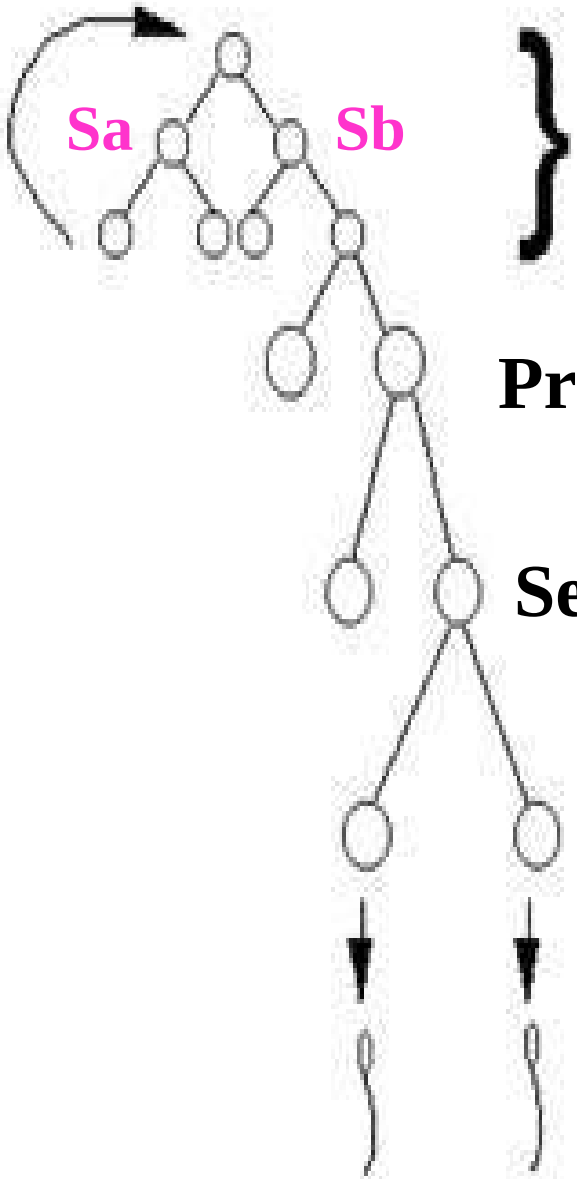
- **“9+2” arrangement of microtubule**
- **nine coarse fibers arranged longitudinally**
- **mitochondrial sheath**

principal piece------ longest portion

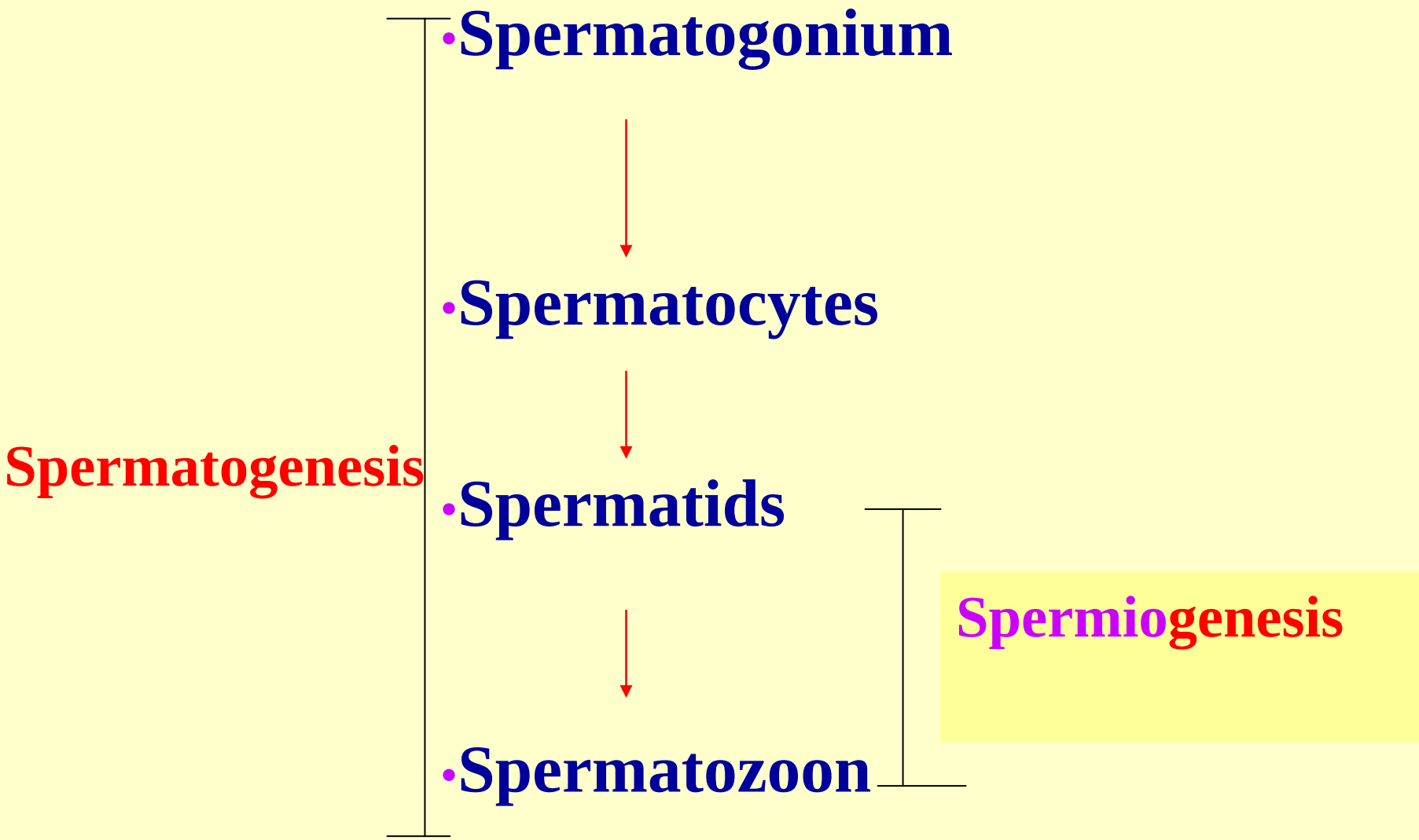
- **axoneme**
- **a sheath of circumferential fiber**

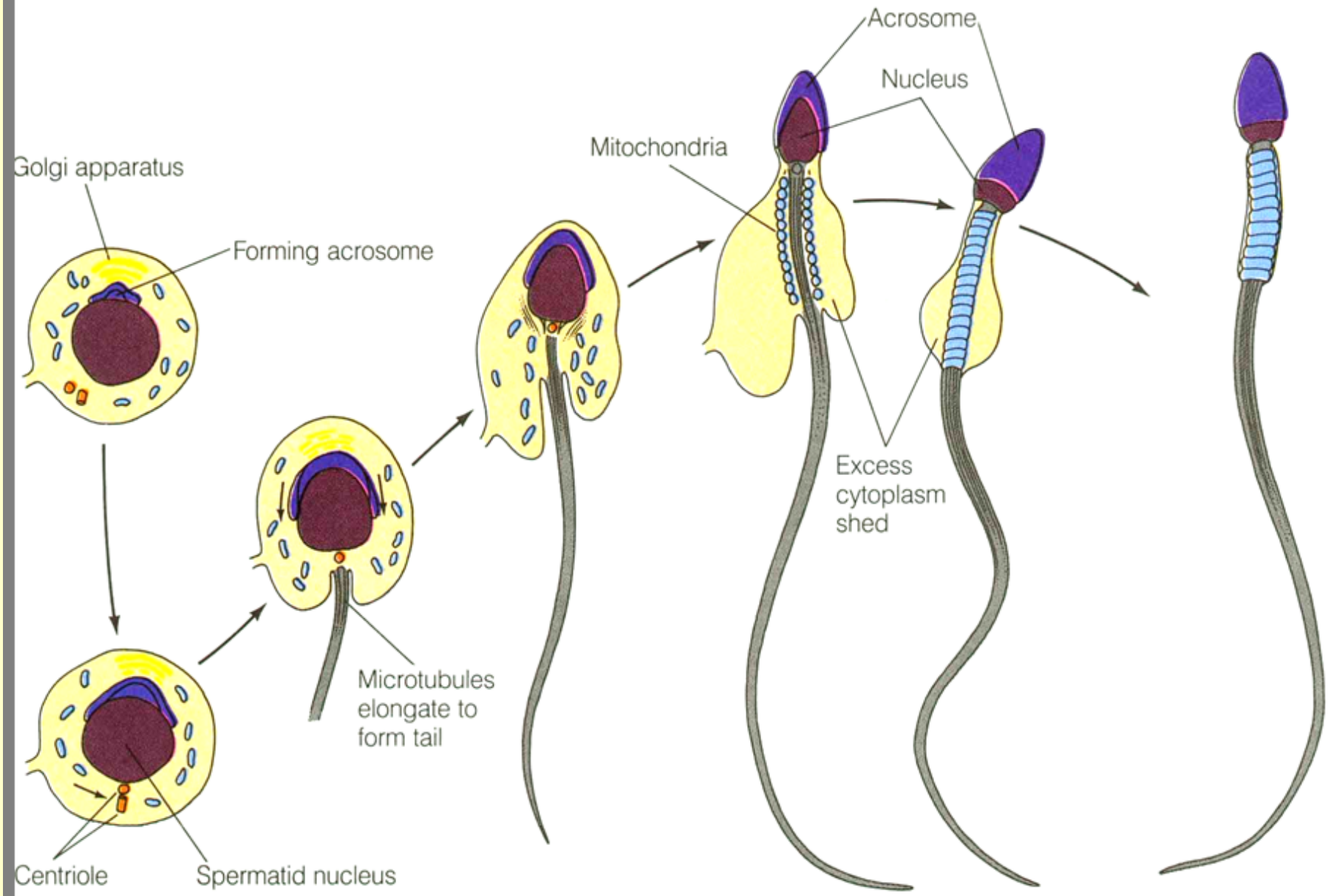
end piece

- **only axoneme**



	chromosome Per cell	chromatids per chromosome
spermatogonium	46	2
↓ mitosis		
Primary spermatocyte	46	2
↓ 1st meiotic division		
Secondary spermatocyte	23	2
↓ 2nd meiotic division		
Spermatid	23	1
↓ spermiogenesis		
spermatozoon	23	1


Spermatogonium
Spermatocytes
Spermatids
Spermatozoon
Spermatogenesis
Spermiogenesis



IGURE 16–5 **Sperm Formation** Sperm form from formation, alignment of the mitochondria, and

Main change during the spermiogenesis

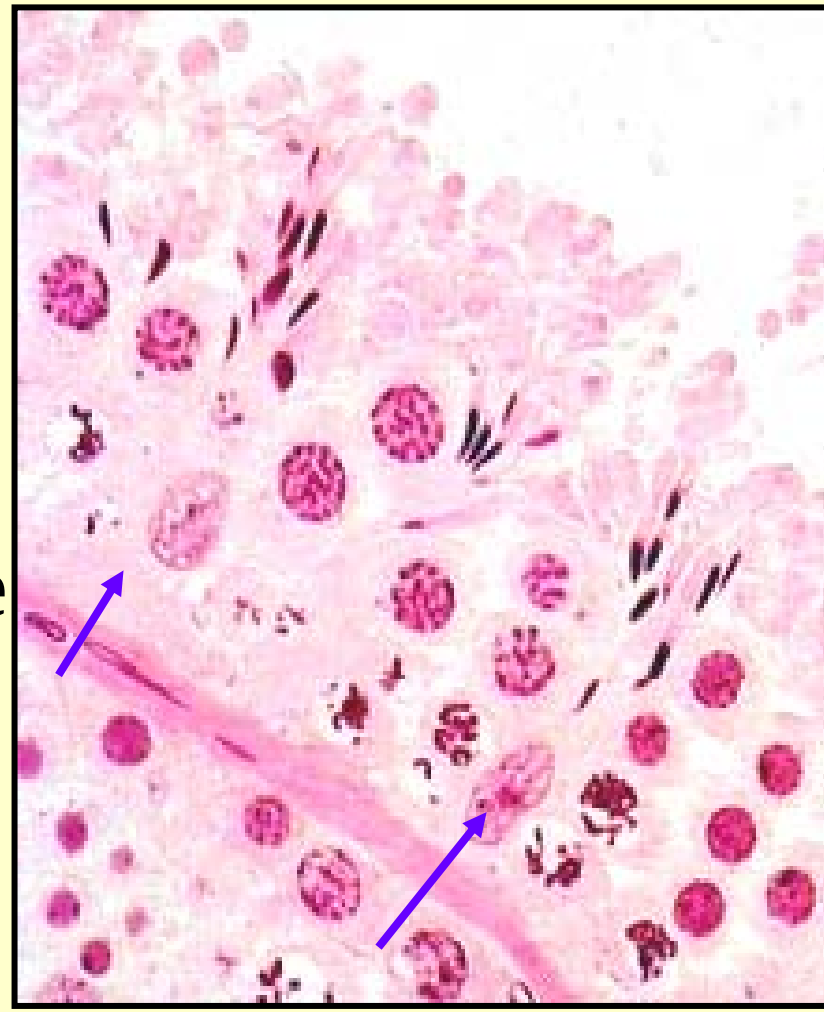
* **nucleus** condensed and elongated
* **Golgi apparatus** becomes acrosome vesicle and forms the acrosome
* **centrioles elongate to form a flagellum**
* **mitochondria** migrate around the flagellum
* removing **excess cytoplasm**

Sustentacular cell (Sertoli cell)

* irregular outline of cell

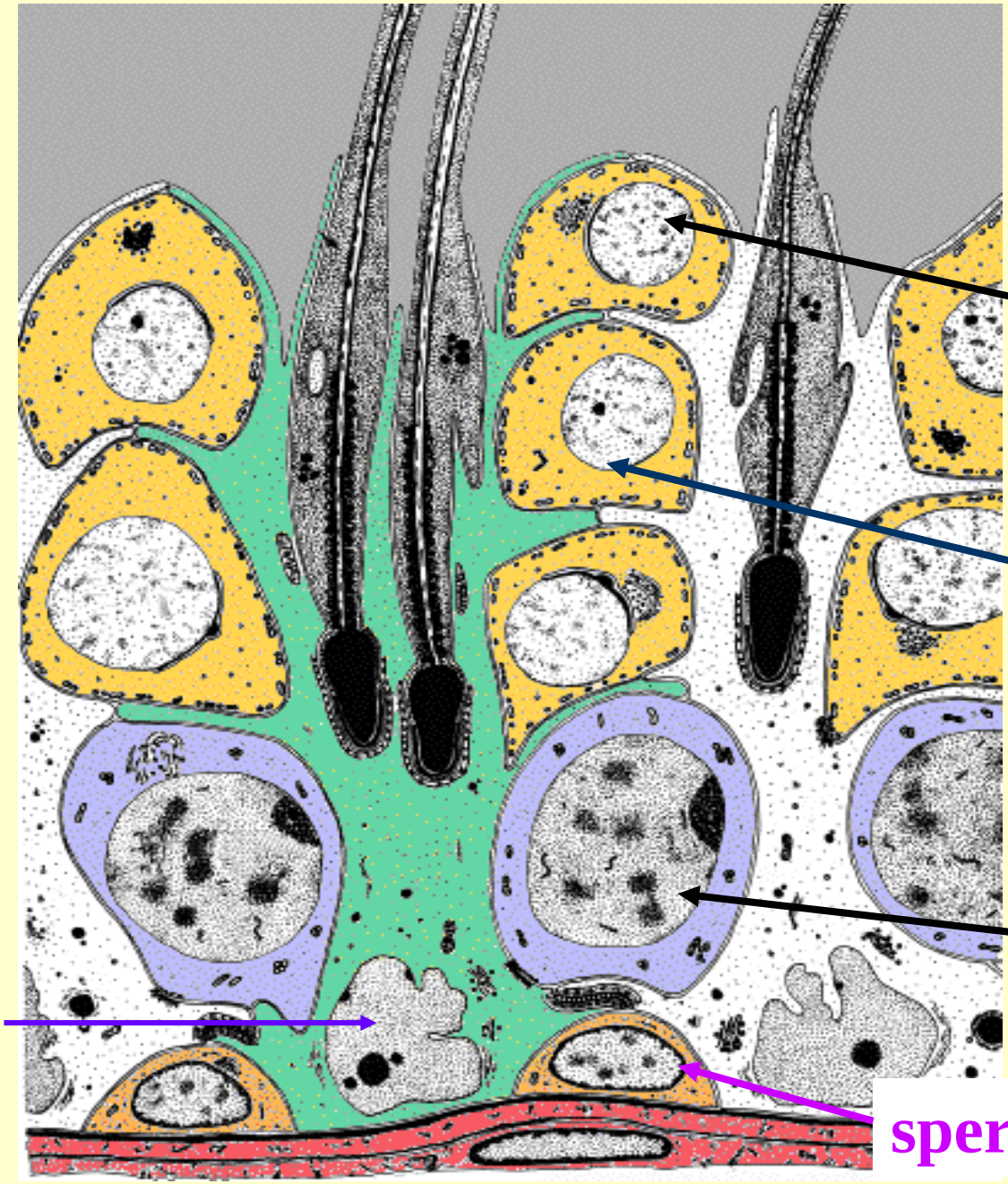
* nucleus with an definite nucleoli

* Its cytoplasm extends to the lumen of the seminiferous tubule



Sustentacular cell

* enriched organelles
* bound to one another by tight junction which separates the tubule into two compartments:
  * luminal compartment
  * basal compartment


spermatid
Secondary
Spmatocyte
Primay
Spmatocyte
Sertoli cell
spermatogonium

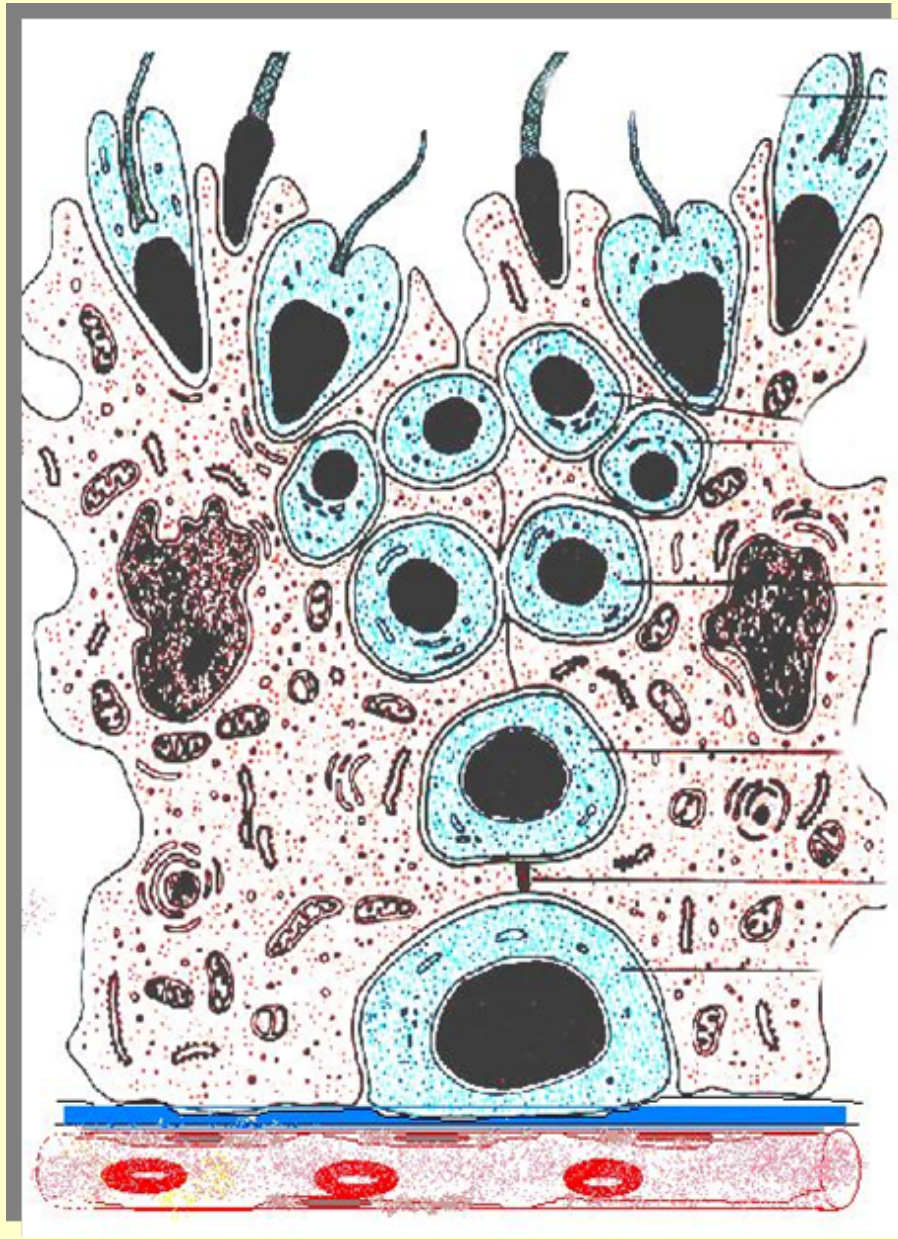
Function of Sustentacular cell

- **Availability of nutrients and supports**

- **phagocytosis of discarded spermids cytoplasm**
- **Regulation for the release of spermatozoa**
- **Secreteion of**
  - **tubular fluid**
  - **androgen-binding protein (ABP)**
  - **inhibin which regulates hormone production**
- **Form a part of the blood-testis barrier**

blood-testis barrier

* endothelium of capillary
* basement membrane of capillary
* connective tissue
* basement membrane of spermatogenic epithelium
* tight junction of Sustentacular cell



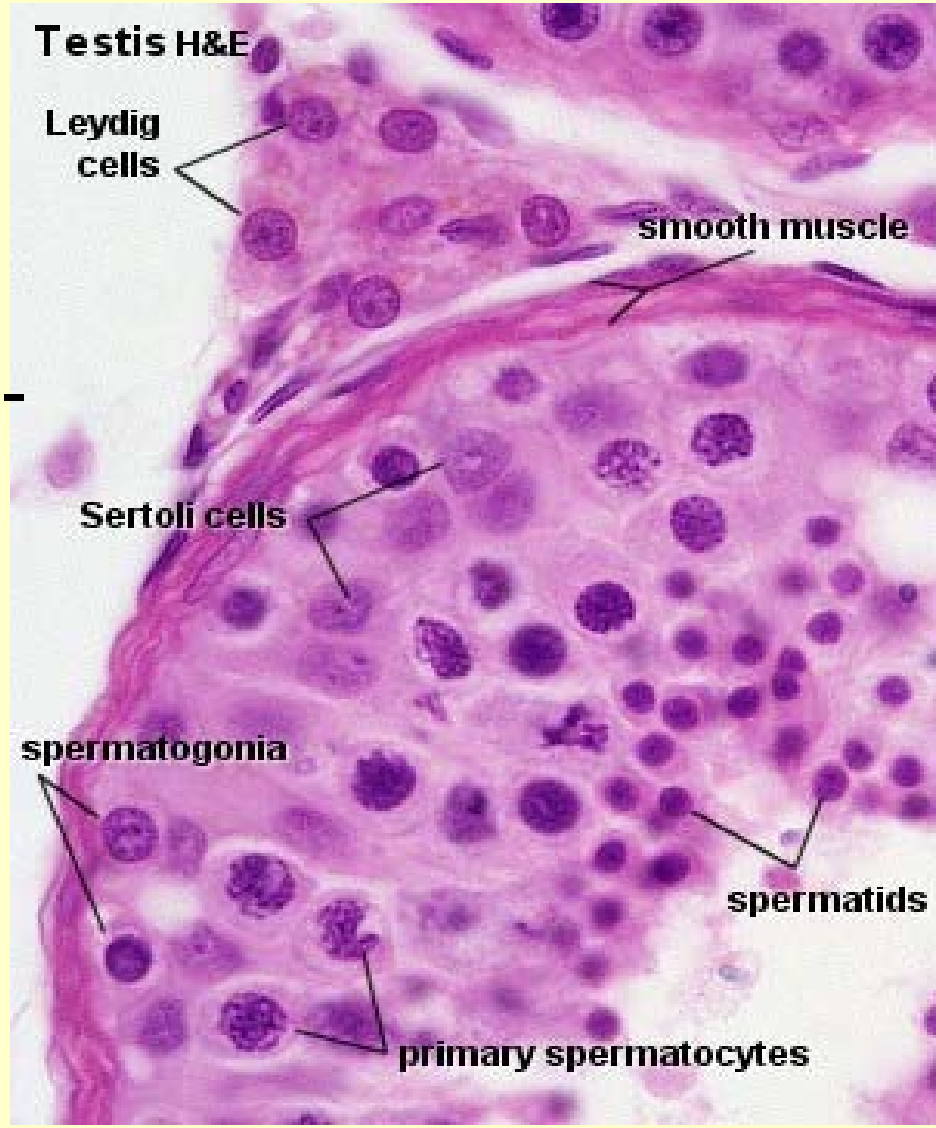
Interstitial area of testis

*** Contains loose connective tissue with rich blood and lymphatic vessels**

*** Testicular interstitial cell: - large, ovoid acidophilic Cell**

- round nucleus with dispersed chromatin and apparent nucleoli

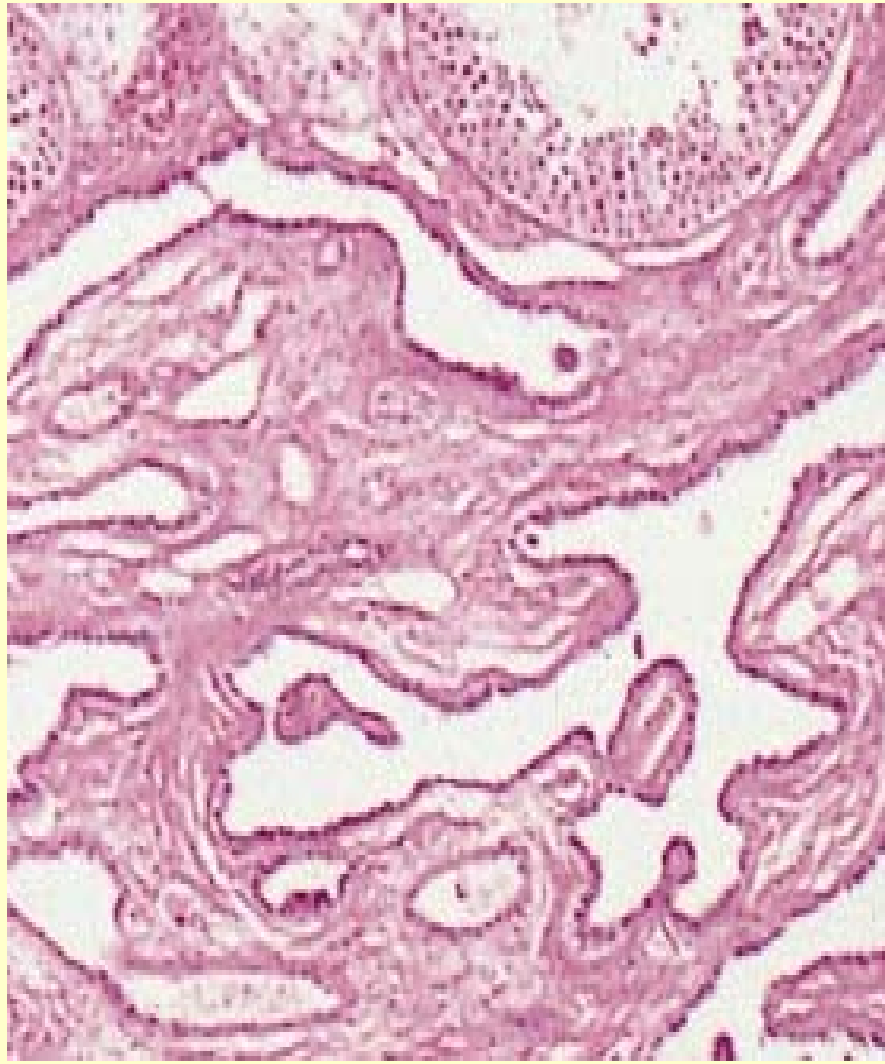
- secrecte androgen

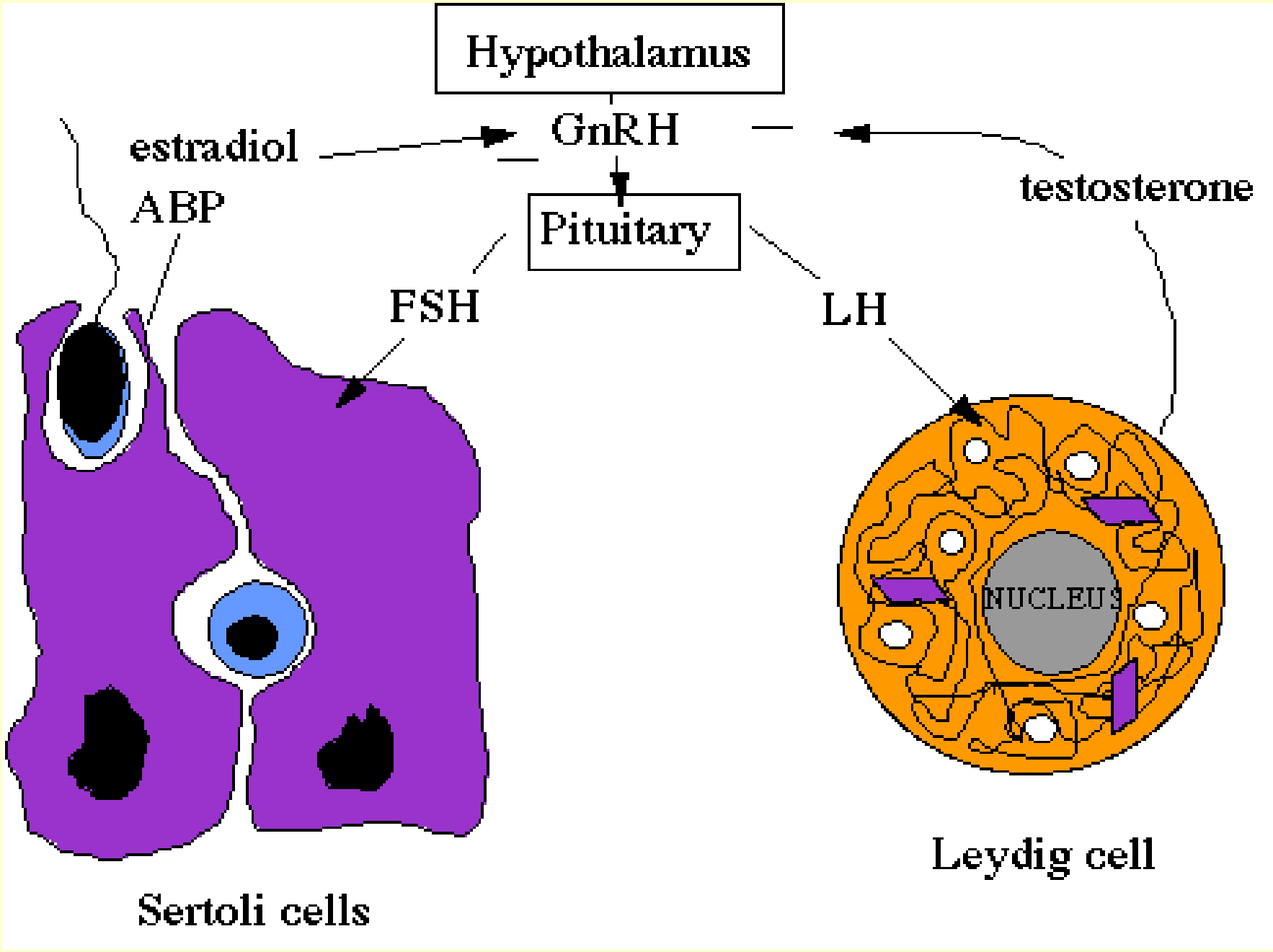


Tubule rectus & Rete testis

***no spermatogenic cells**

***simple cuboidal epithelium**




Hypothalamus
GnRH
estradiol
testosterone
ABP
Pituitary
FSH
LH
NUCLEUS
Sertoli cells
Leydig cell

Epididymis

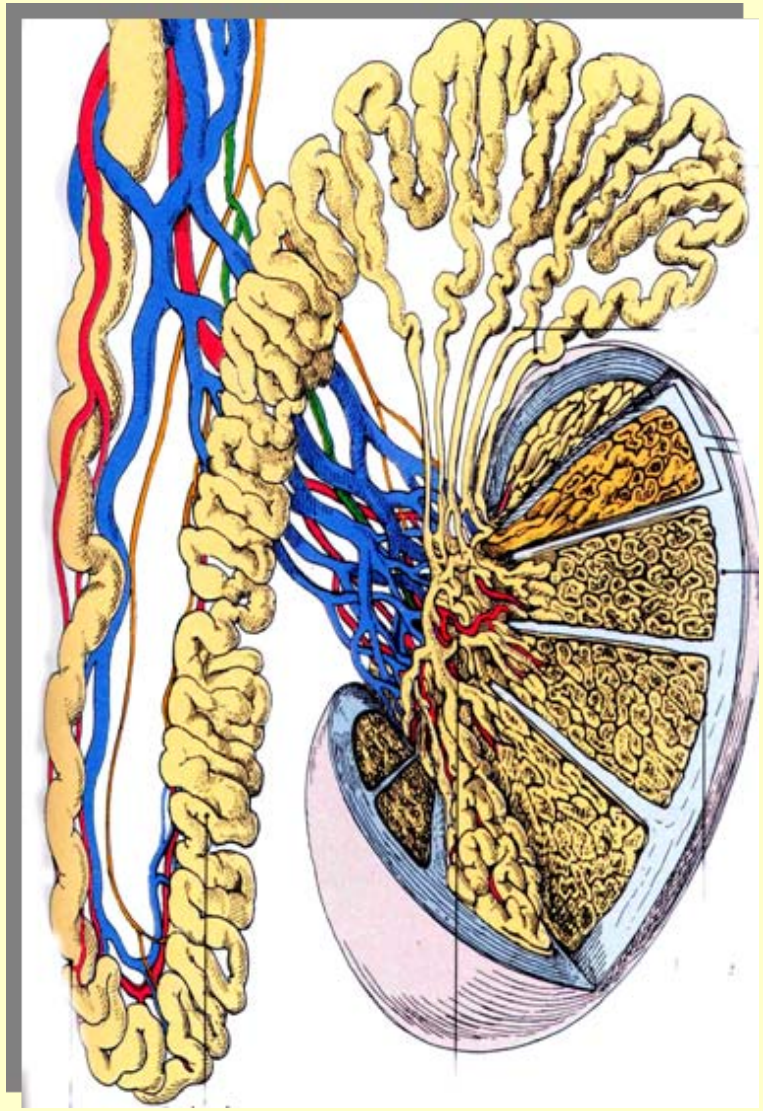
* **divided into three parts:**

  head: efferent duct

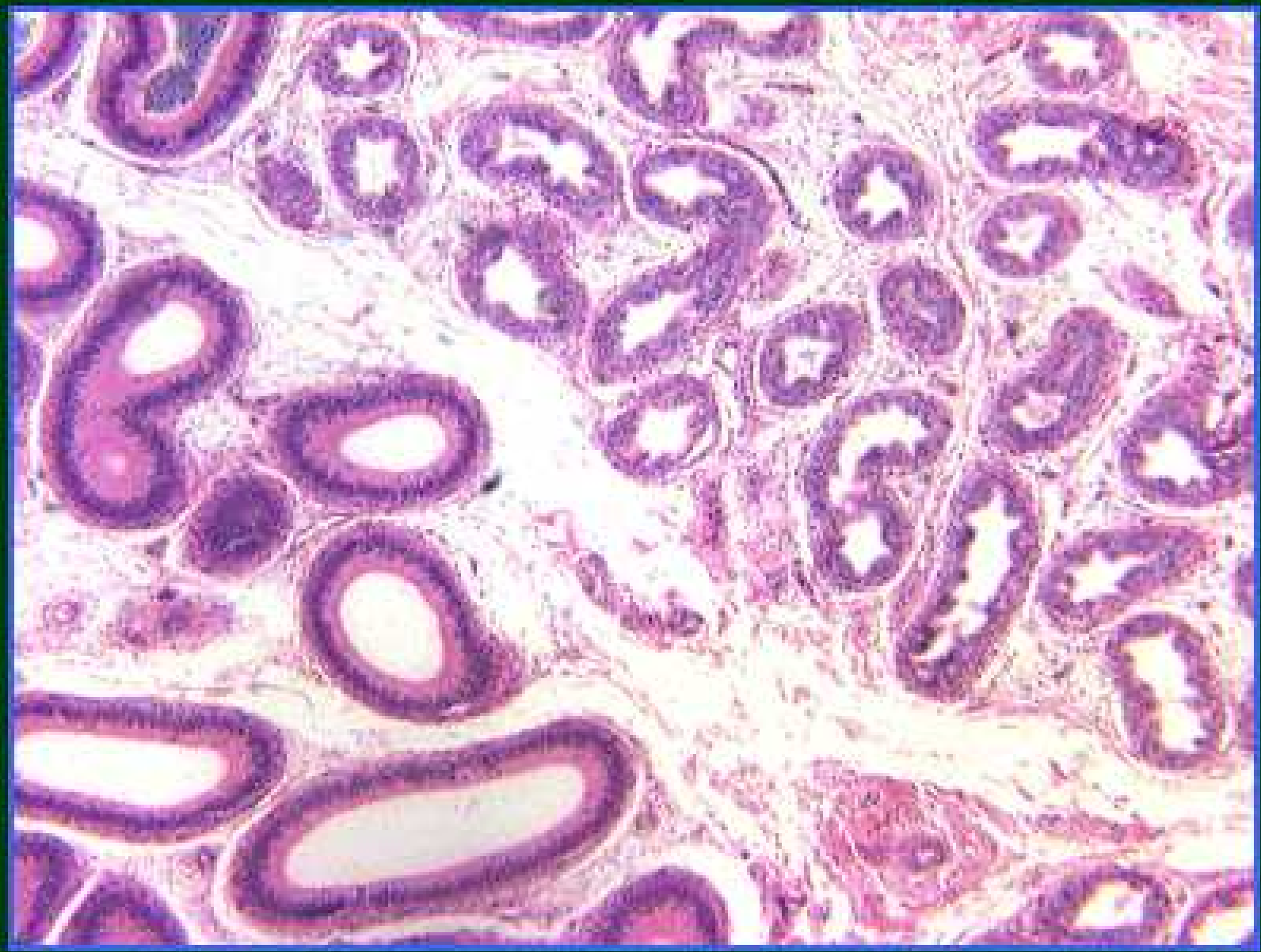
  body } **epididymal duct**

  tail

* **functions as accumulation, storage and maturation of spermatozoon**



Slide 170
Image 1/5

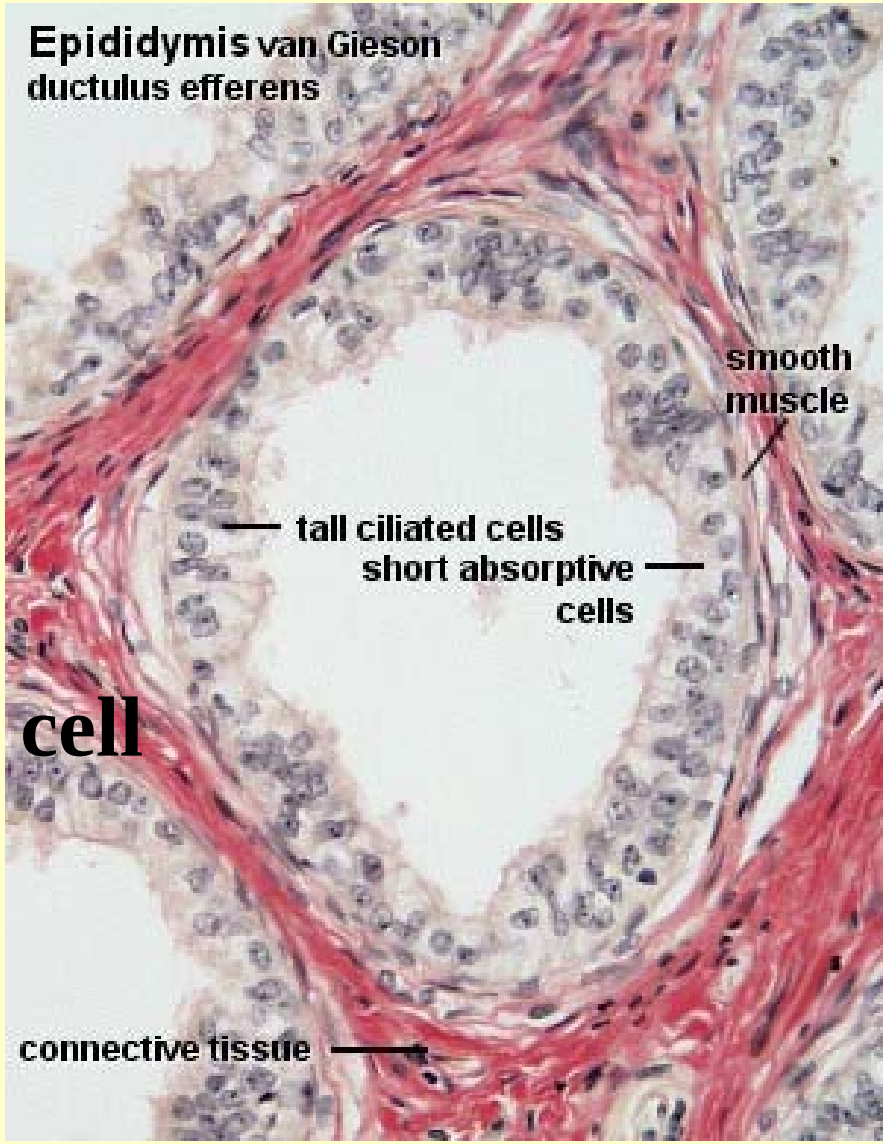


★ ***Efferent Ductules/Epididymis*** - low power

The rete testis empties into a series of ducts called the **efferent ductules**, which carry the non-motile sperm from the testis to the epididymis. The ducts eventually lead into the **epididymis**. In this image note that even at low power the two structures look different.

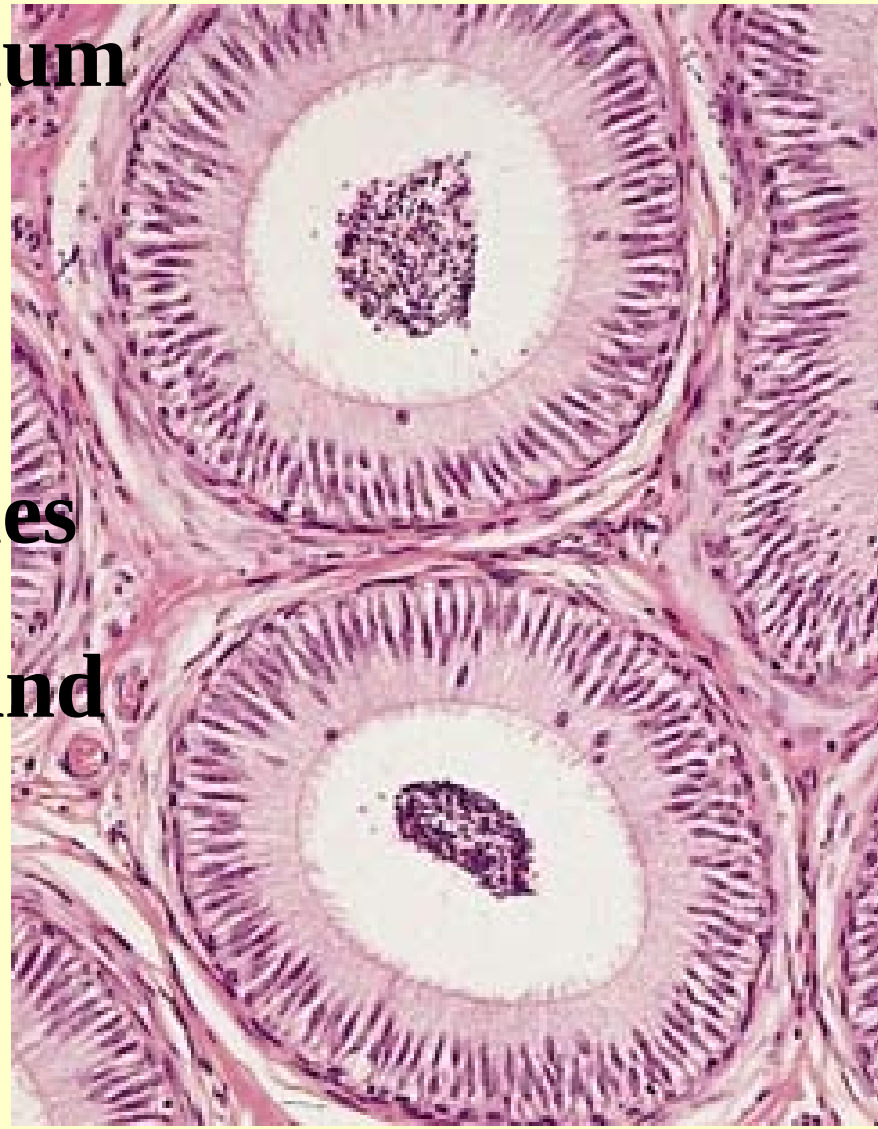
Efferent duct

* connecting with rete testis
* lining by a single layer of epithelial cells which have two different types:
  - tall columnar & cilliated cell
  - short non-ciliated cell



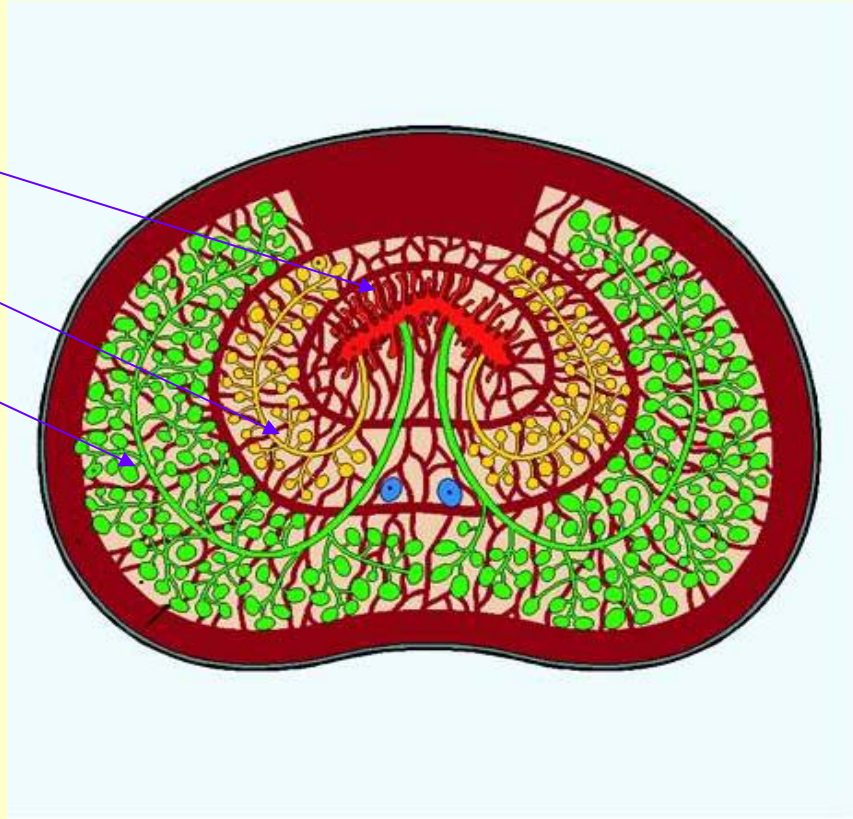
Epididymal duct

- pseudostratified epithelium of uniform height
- sterocilia (microvilli）
- abundant smooth muscles
- function of absorption and secrection



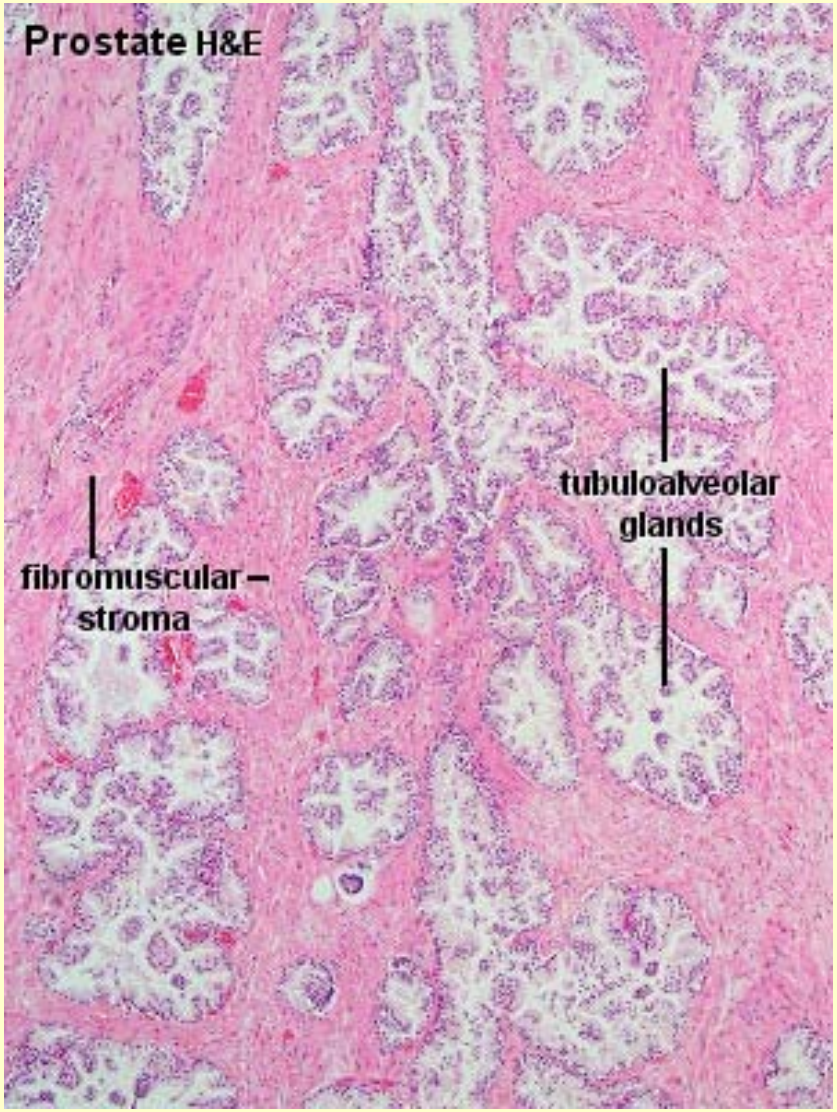
Prostate

* An aggregative of 3 group of glands
  - Mucosal glands
  - Submucosal glands
  - Main prostate glands



* The epithelium ranges from simple cuboidal-columnar to pseudostratified columnar

* The glands are embeded within a fibromuscular stroma


Prostate H&E
tubuloalveolar glands
fibromuscular stroma


Prostate H&E
corpora amylacea