

**MALE REPRODUCTIVE**

# Objectives

**Students should be able to:**

- 1. Recognise and draw and label the main structures of a section of functional testis and immature testis.**
- 2. Identify the levels of the epididymis according to their cellular structural variations.**
- 3. Label the regions of the spermatozoon.**

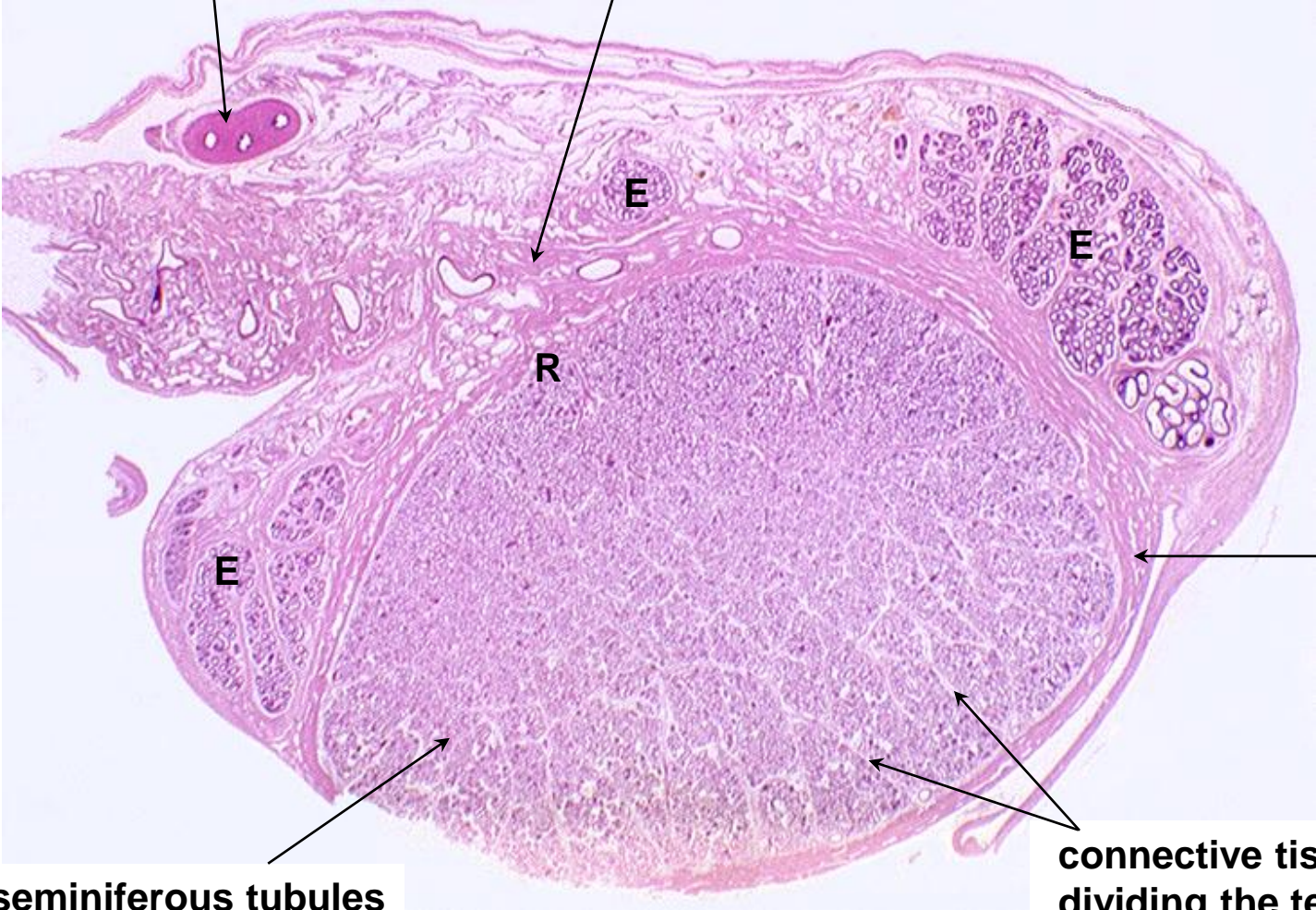
# Mature testis

Section of whole testis : Identify the main features of the section.

ductus deferens

mediastinum testis

E : epididymis  
R : rete testis



5.0 mm

tunica albuginea

seminiferous tubules

connective tissue septa  
dividing the testis into lobules

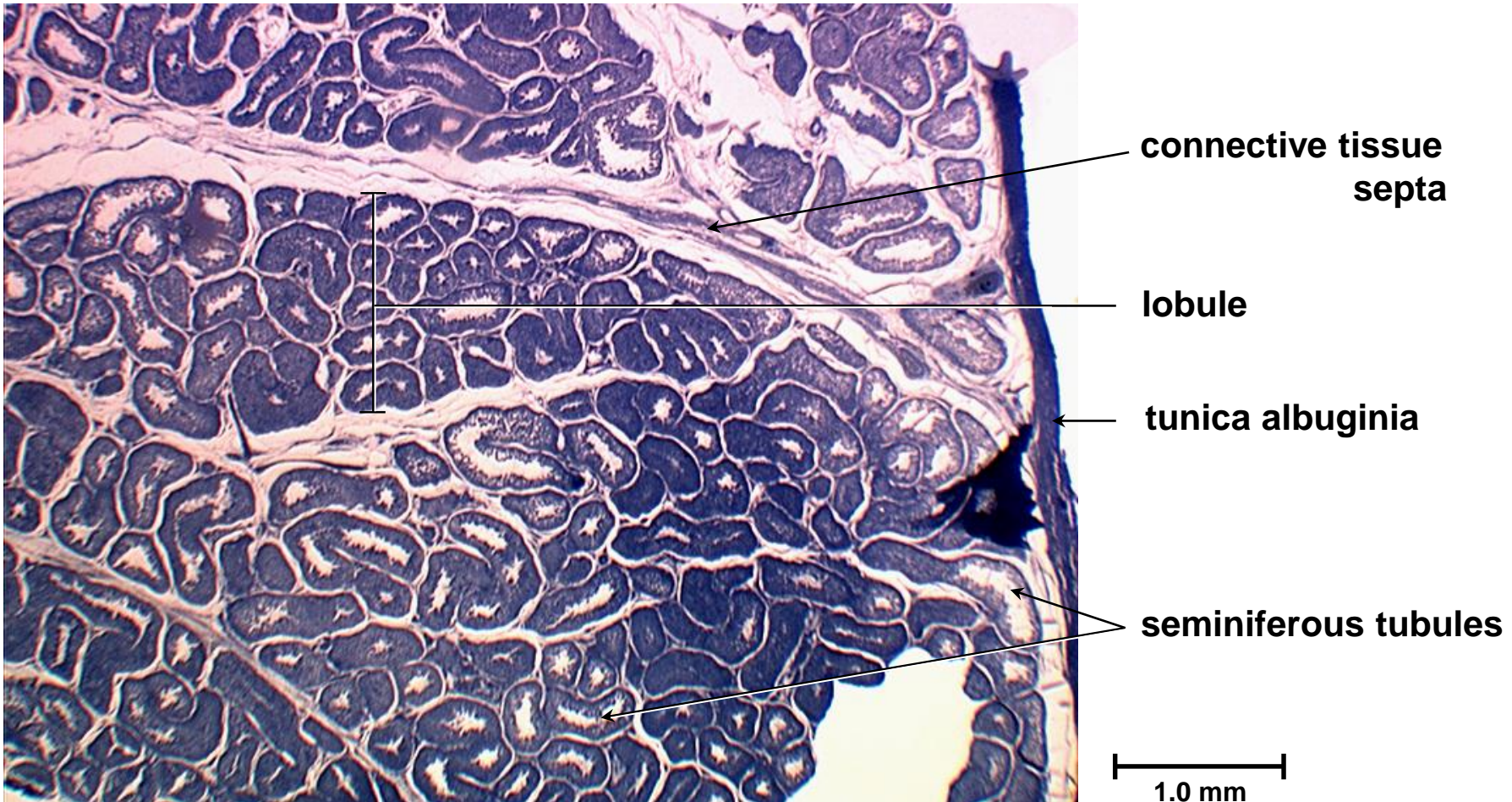
# Mature testis

At low magnification identify :

tunica albuginea  
connective tissue septa

lobules  
seminiferous tubules

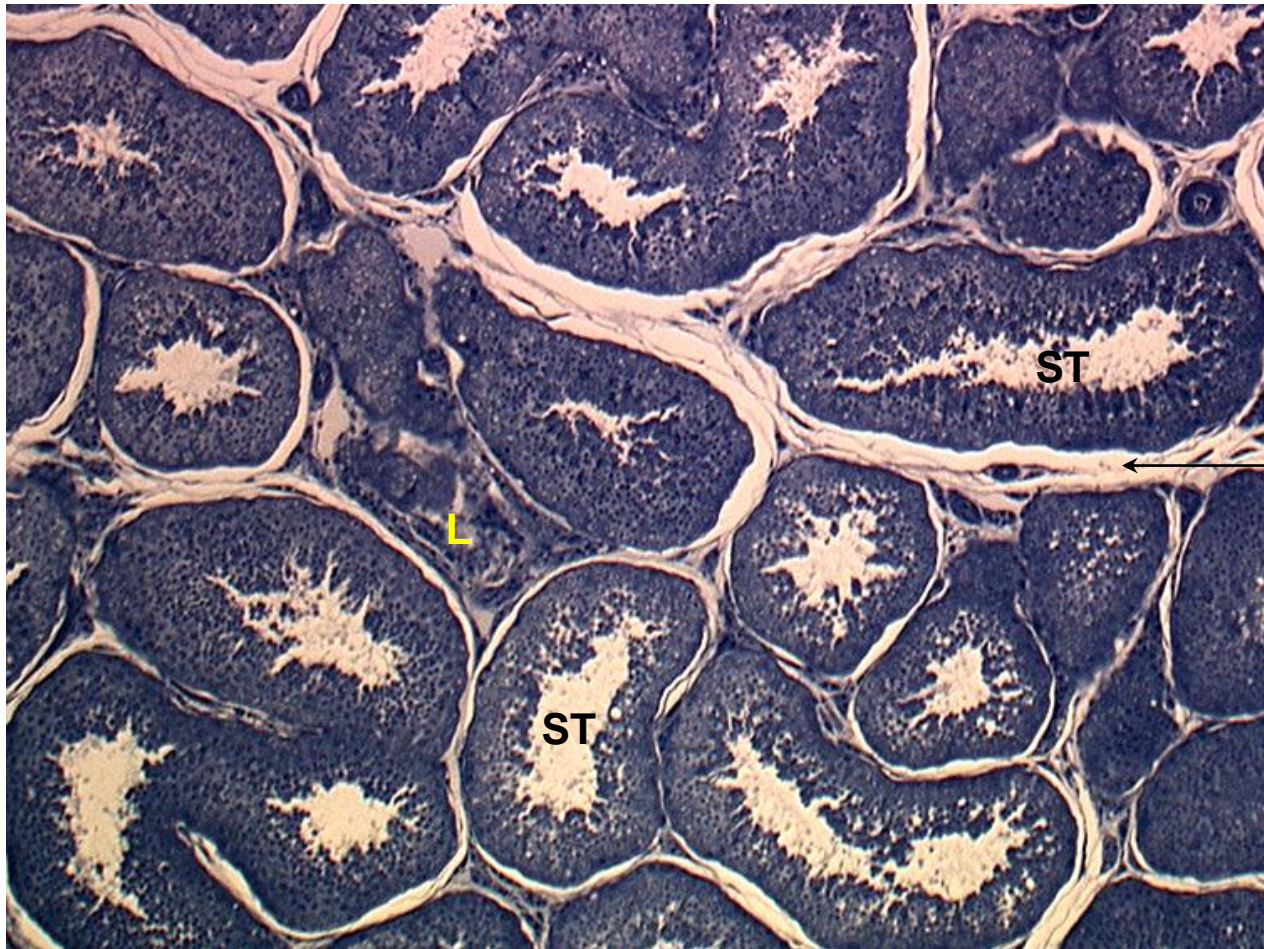
Septa extend from the tunica albuginea across the testis dividing it into lobules.



# Mature testis

The lobules are composed of convoluted seminiferous tubules.

Lying between these tubules in the interstitial tissue are found Leydig cells (endocrine cells).



ST : seminiferous tubules

L : area of Leydig cells

connective tissue  
septum

250  $\mu$ m

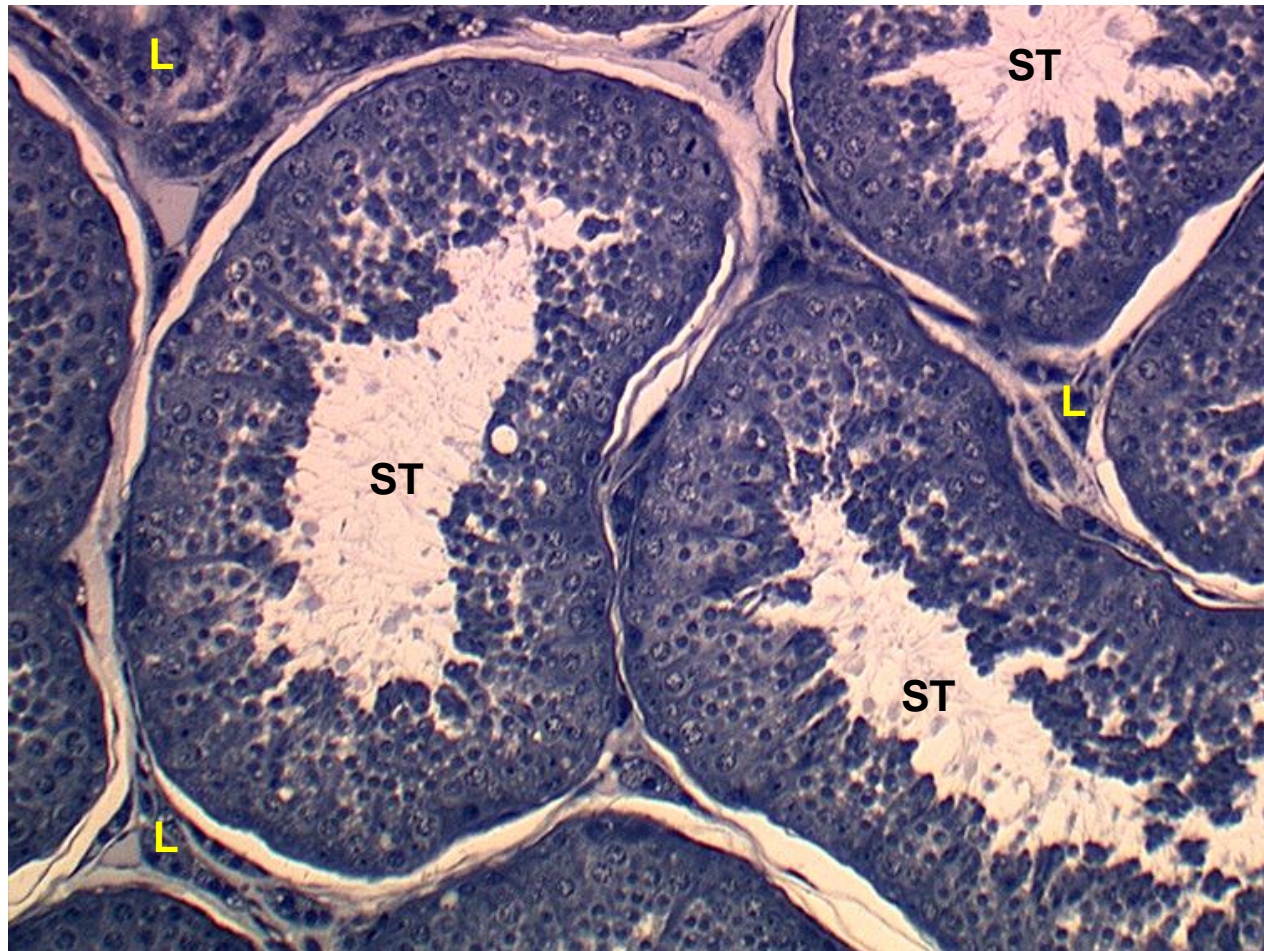
# Mature testis

What magnification is best for identifying this section? Give reasons.

Higher magnifications are best.

It is then possible to distinguish the different cell types present.

At low magnification the tissue can be confused with epididymis.



ST : seminiferous tubules

L : Leydig cells

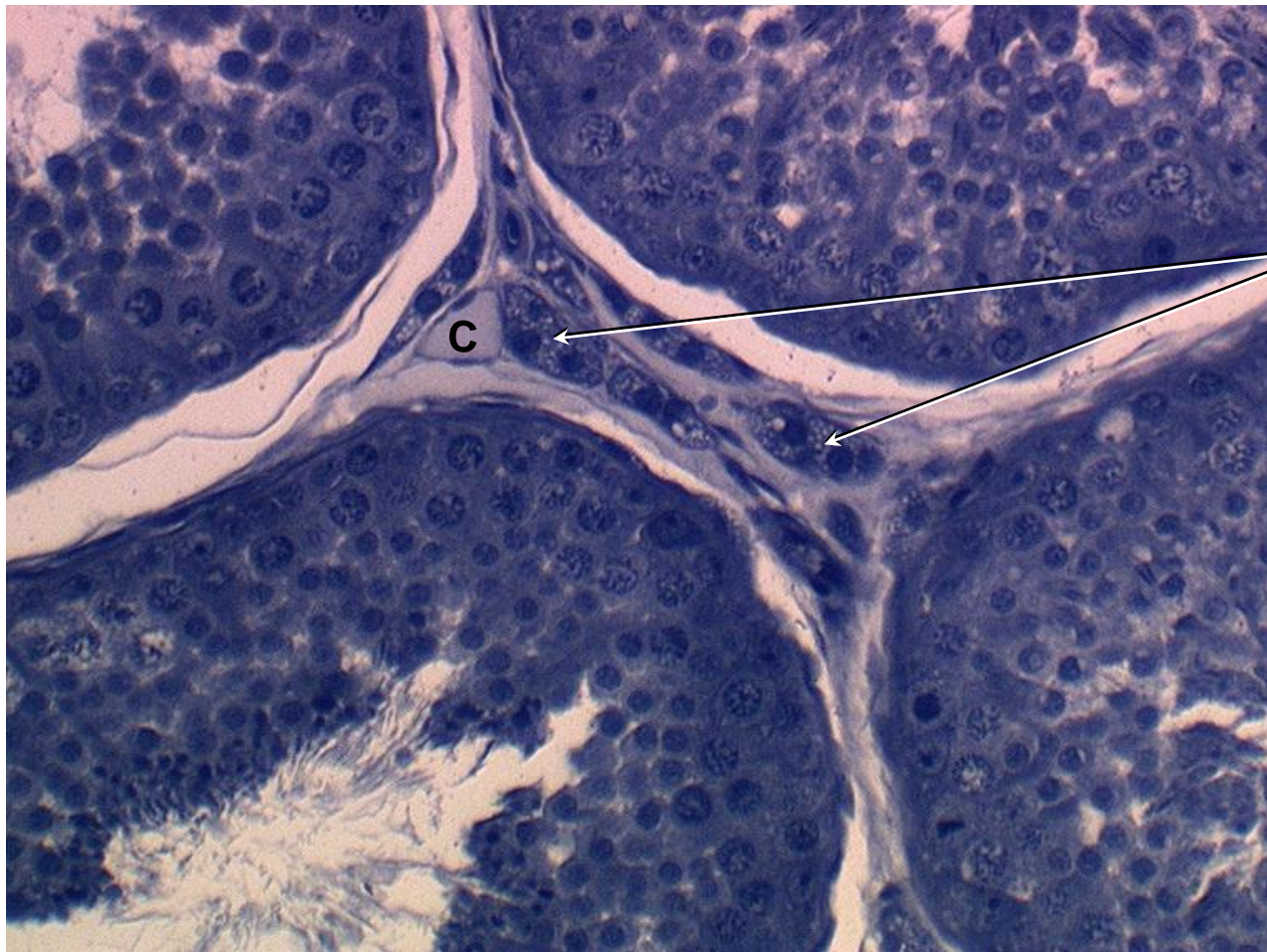
100  $\mu$ m

# Mature testis

What is secreted by the Leydig cells?

**Leydig cells synthesize and secrete testosterone.**

These cells have a 'foamy' appearance due to the presence of lipid droplets and granules.



C : capillary

Leydig cells

50  $\mu$ m

# Mature testis

Can you explain the appearance of tubules and cells from your knowledge of the architecture of the organ?

**Seminiferous tubules are surrounded by lymph spaces in the interstitium and Leydig cells. These tubules are lined by Sertoli cells.**

**Germ cells differentiate and mature in compartments between the Sertoli cells.**



L : Leydig cells

blood capillary

50  $\mu$ m

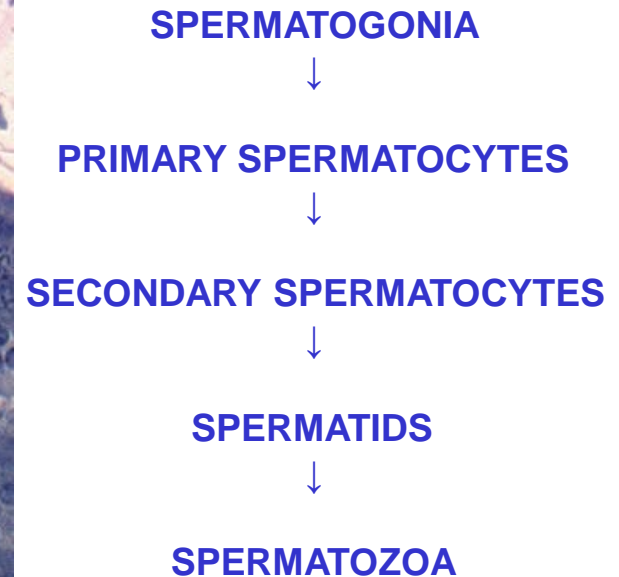
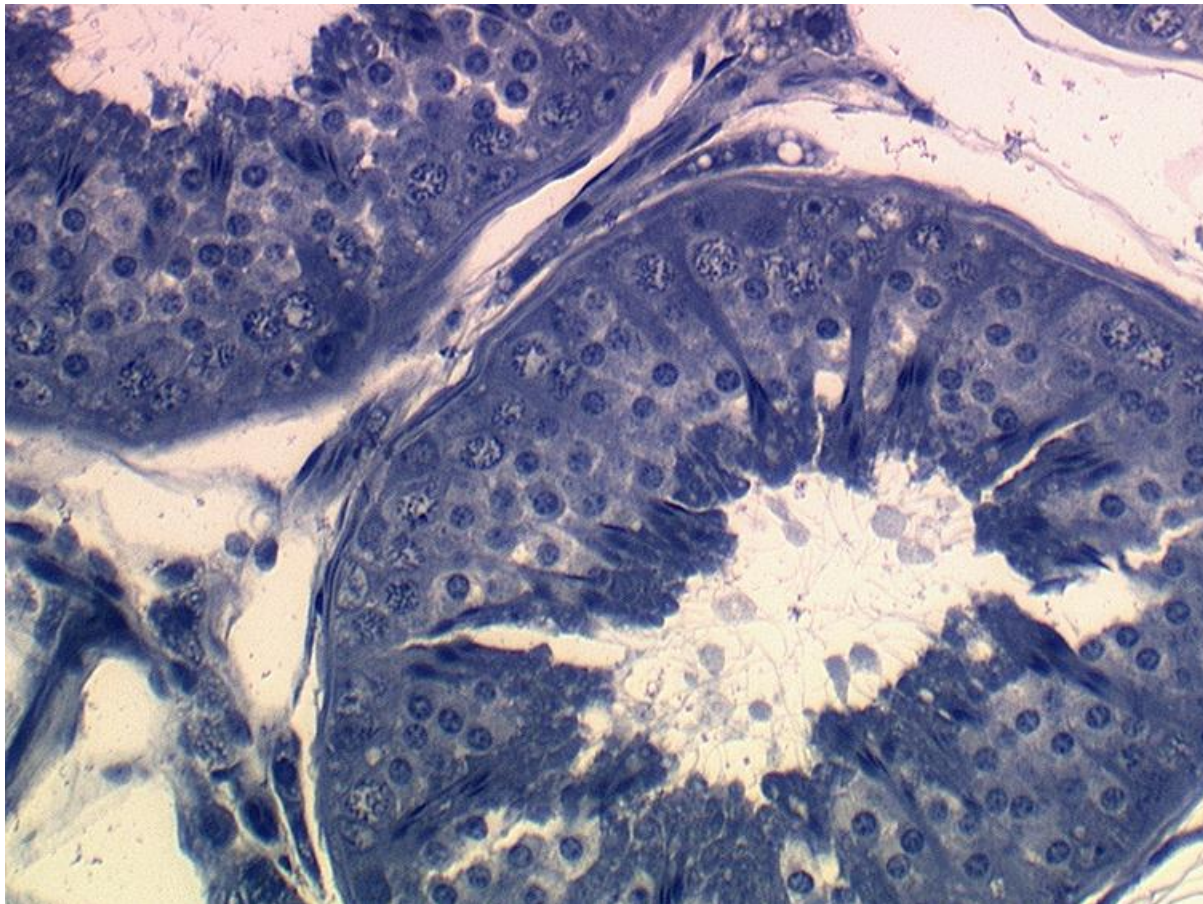


# Mature testis

In sections; adjacent seminiferous tubules show different stages of spermatogenesis.

Tight junctions between Sertoli cells divide the basal and luminal compartments.

As germ cells progress from the basal to the luminal compartment they undergo division and differentiation :



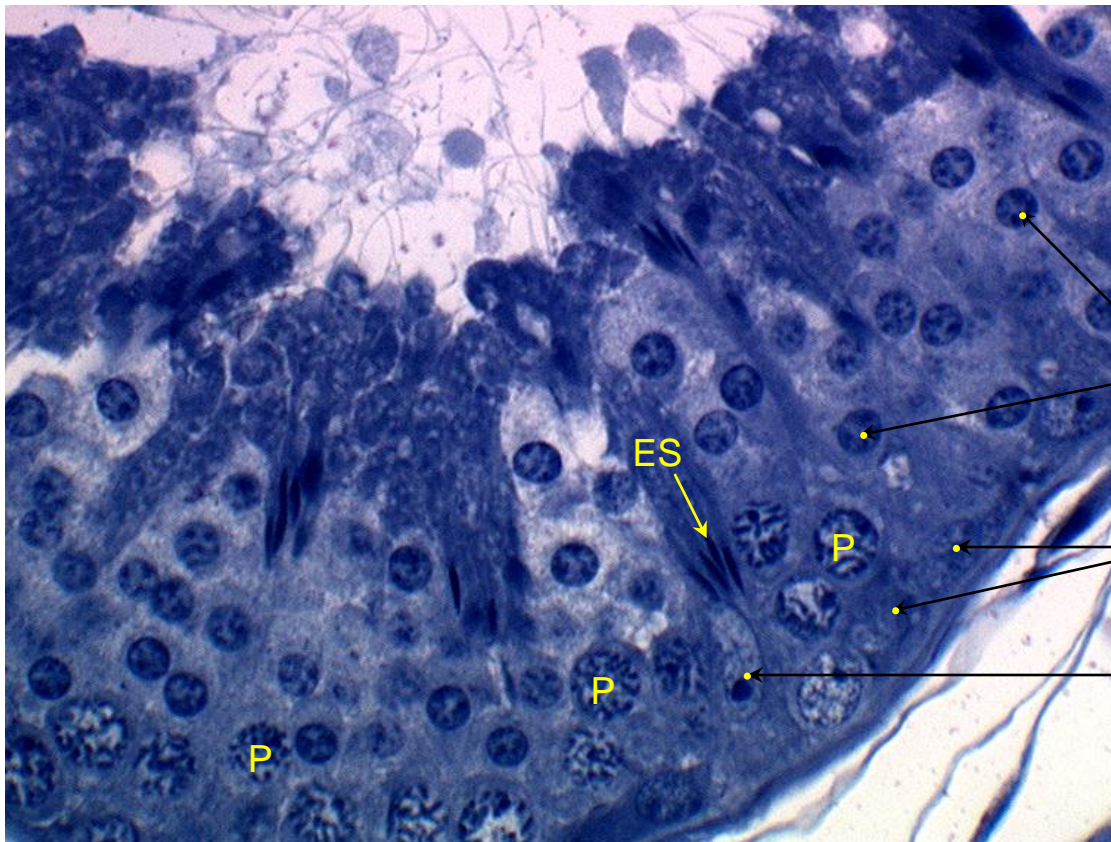
50 μm

# Mature testis

Examine the tubules at higher power (X40). Are they structurally identical?

**No, adjacent tubules are at different stages of spermatogenesis.**

**Tubules also vary in the angle at which they have been sectioned (not all true TS).**



**P : primary spermatocytes**

**ES : elongated spermatids**

**spherical spermatids**

**spermatogonia**

**nucleus of Sertoli cell**

**25  $\mu$ m**

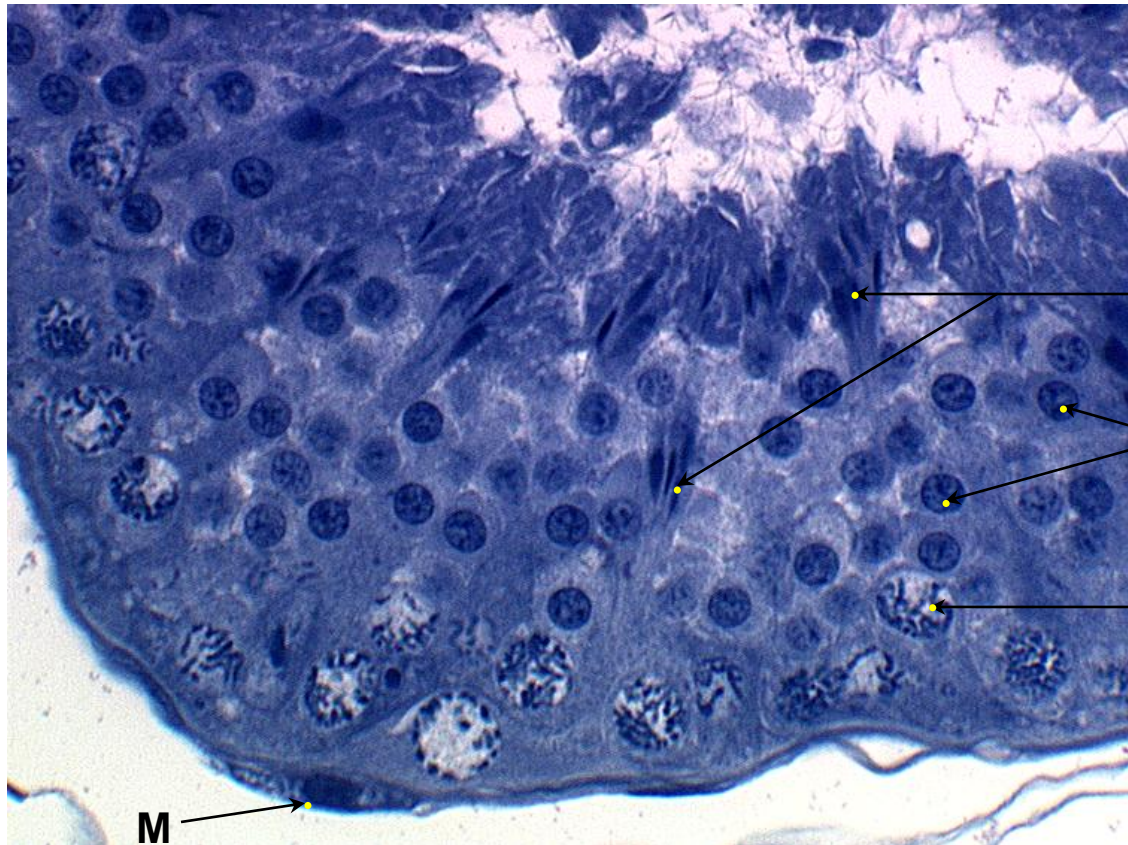
# Mature testis

Describe what you see.

In this tubule many primary spermatocytes are visible.

Many spherical spermatids are seen in the mid regions and elongated spermatids with tails protruding into the lumen towards the apical margins of the Sertoli cells.

A prominent myoid or myoepithelial cell can be seen outside the tubule.



M : myoid (myoepithelial) cell

elongated spermatids

spherical spermatids

primary spermatocytes

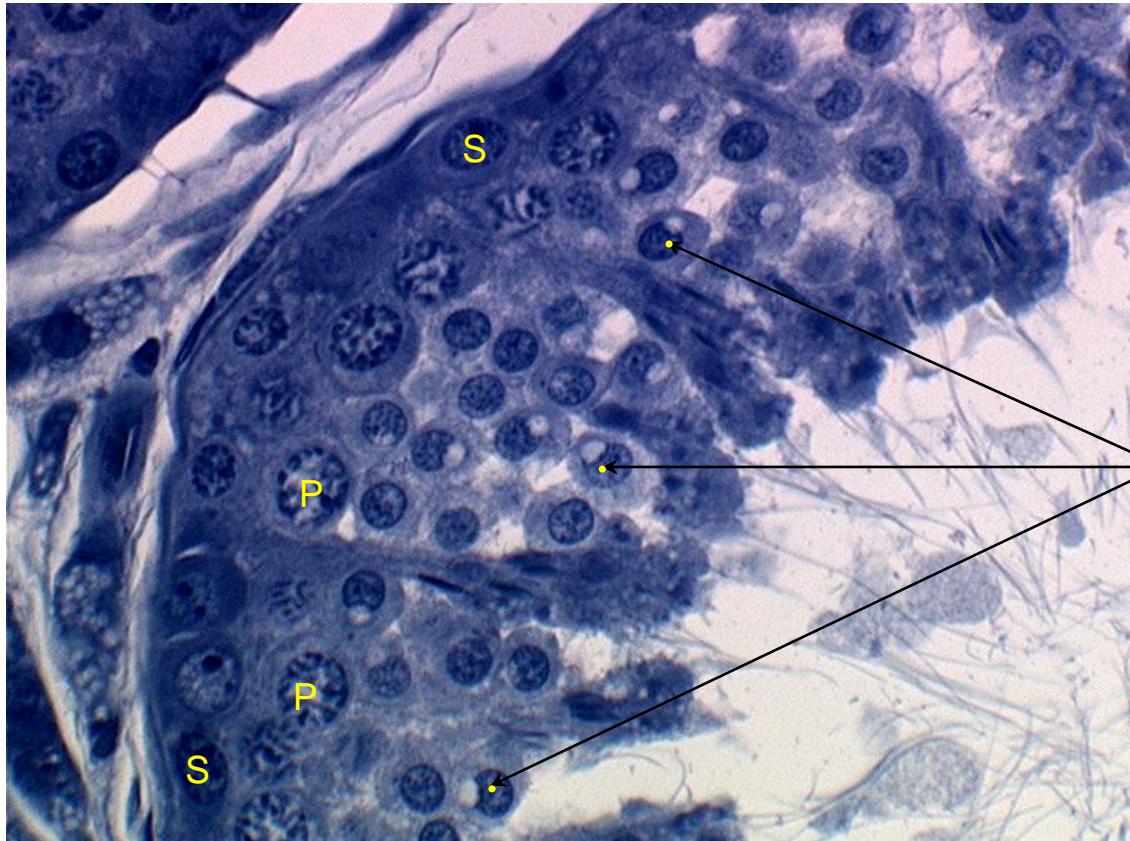
25  $\mu$ m

M

# Mature testis

Describe what you see.

Prominent in this tubule are spherical spermatids many of which are in the cap phase.  
Note also sperm tails in the lumen of the tubule.



S : spermatogonia

P : primary spermatocytes

spherical spermatids  
with acrosomal caps

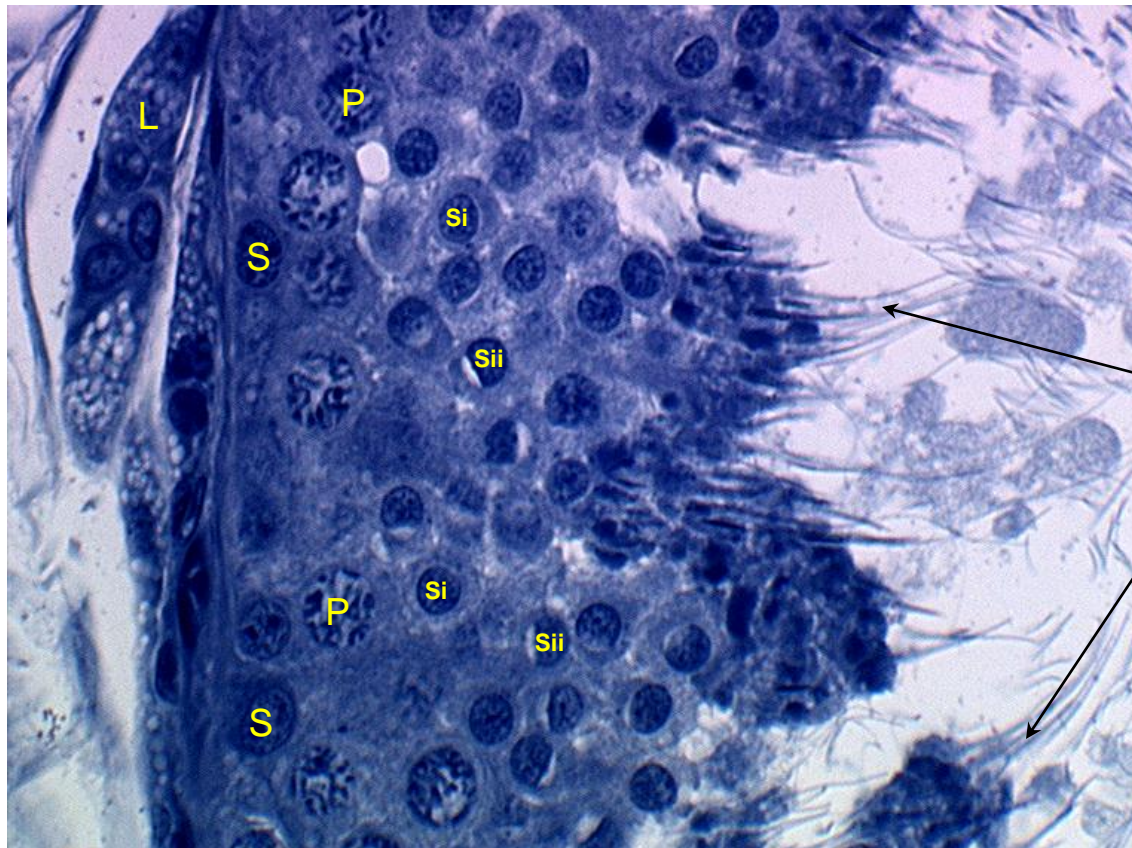
25  $\mu$ m

# Mature testis

Describe what you see.

This section of tubule has both prominent spherical spermatids in the golgi phase and cap spermatids.

The elongated spermatids are still enveloped by the apical portions of the Sertoli cells.



- S : spermatogonia
- P : primary spermatocytes
- Si : spherical spermatids
- Sii : cap spermatids
- L : Leydig cells

sperm tails

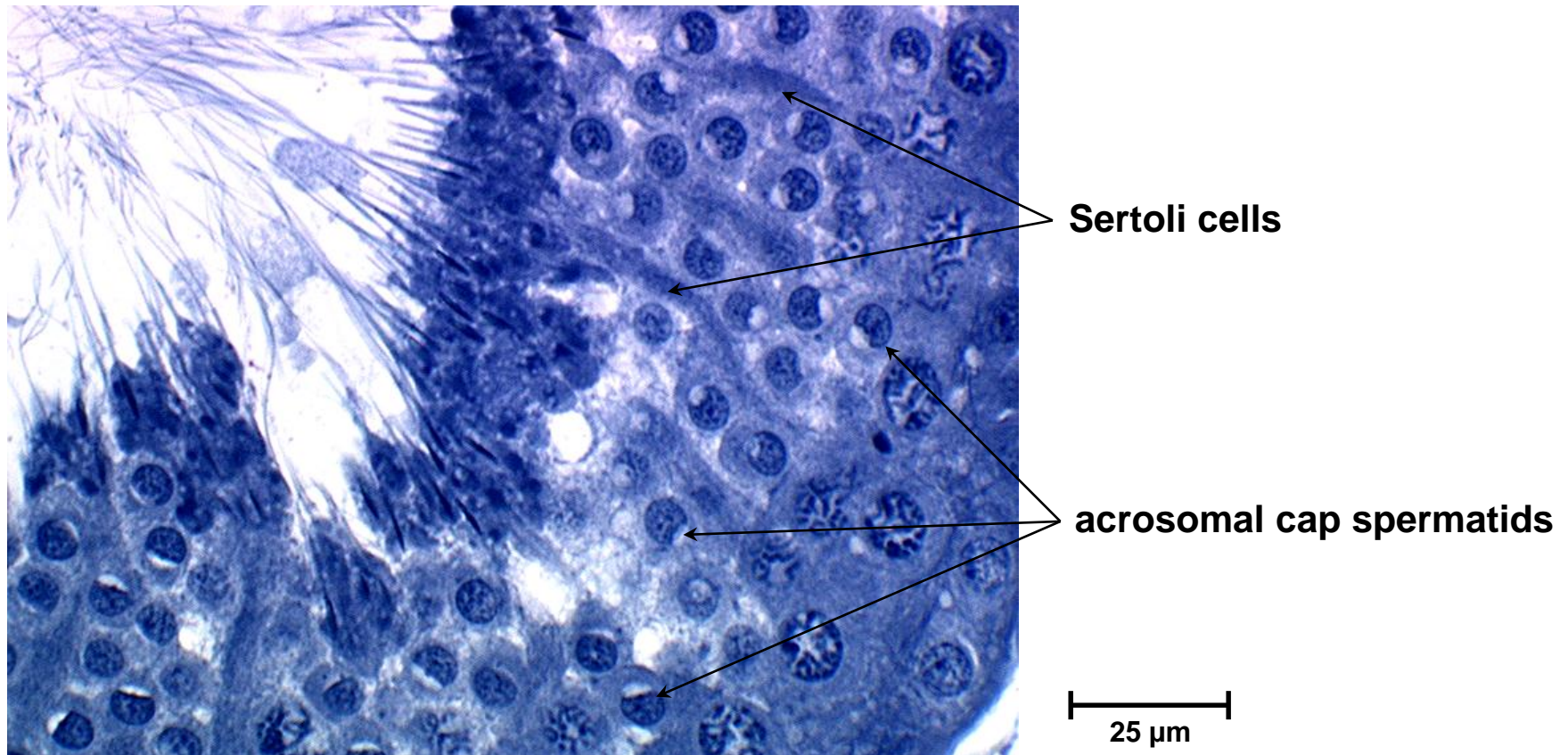
25  $\mu$ m

# Mature testis

Describe what you see.

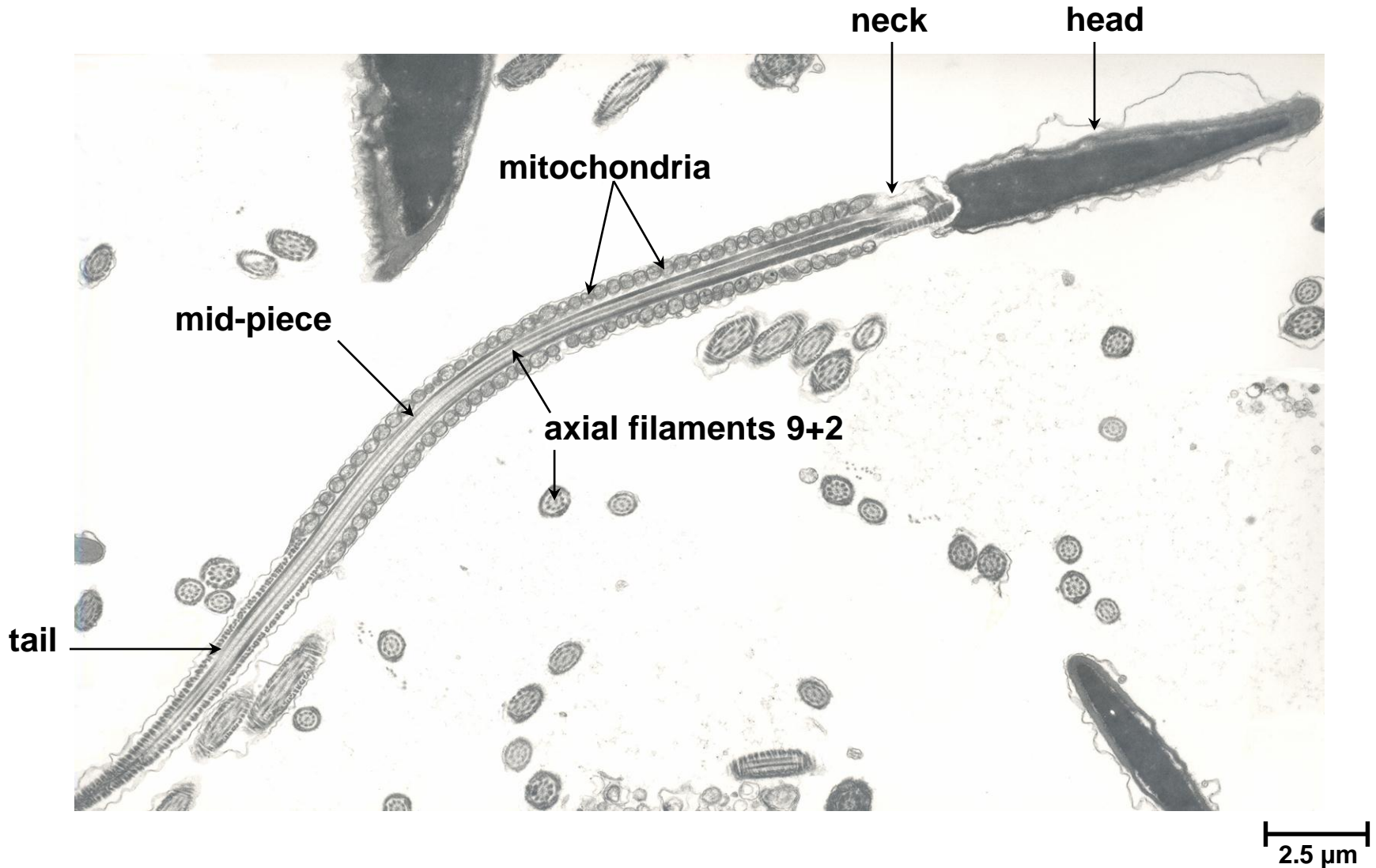
Again most of the spherical spermatids are in the acrosomal cap phase.

The darker strands of tissue are the bodies of the Sertoli cells.



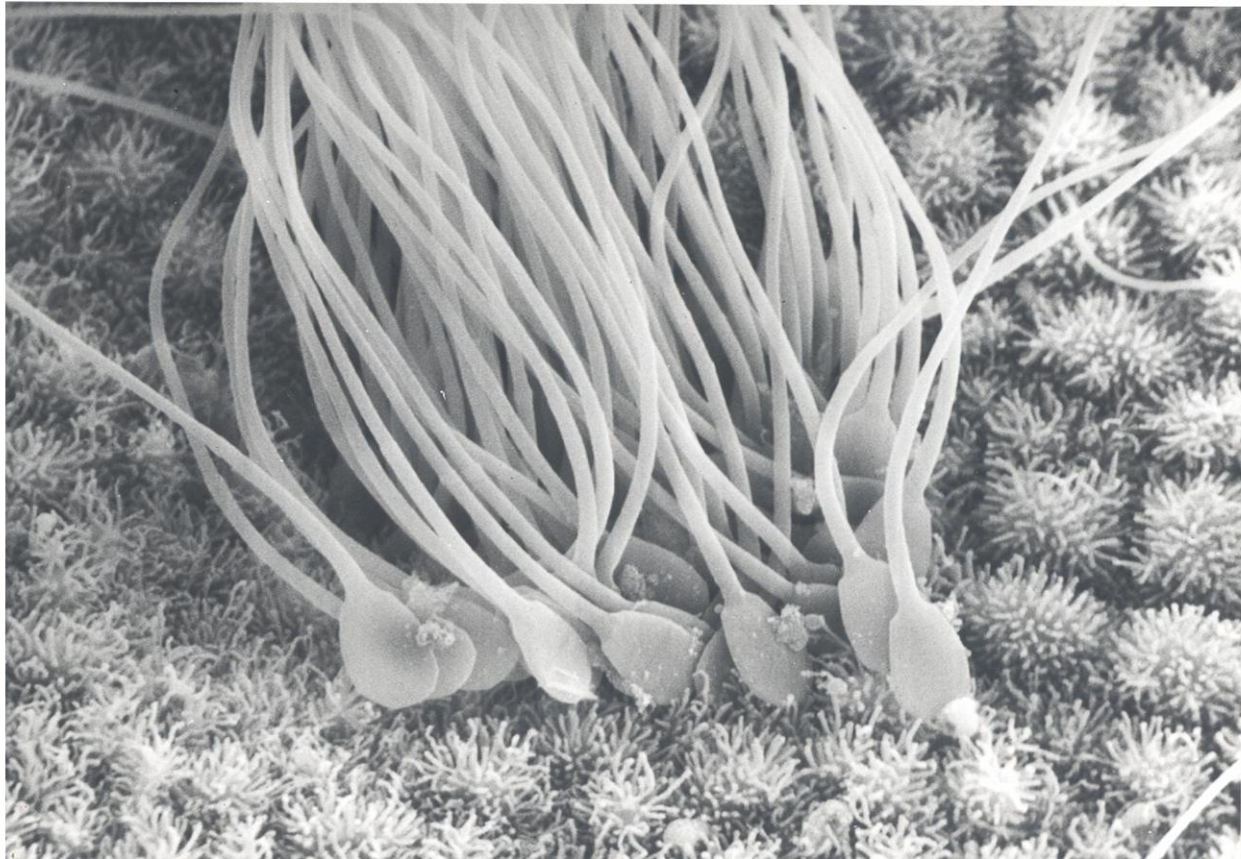
# TRANSMISSION ELECTRON MICROGRAPH OF SPERMATOZOA

head containing nucleus covered by acrosome



# SCANNING ELECTRON MICROGRAPH OF SPERMATOZOA

A group of spermatozoa on the surface of the uterine horn.  
Note the surface processes of the uterine epithelial cells.

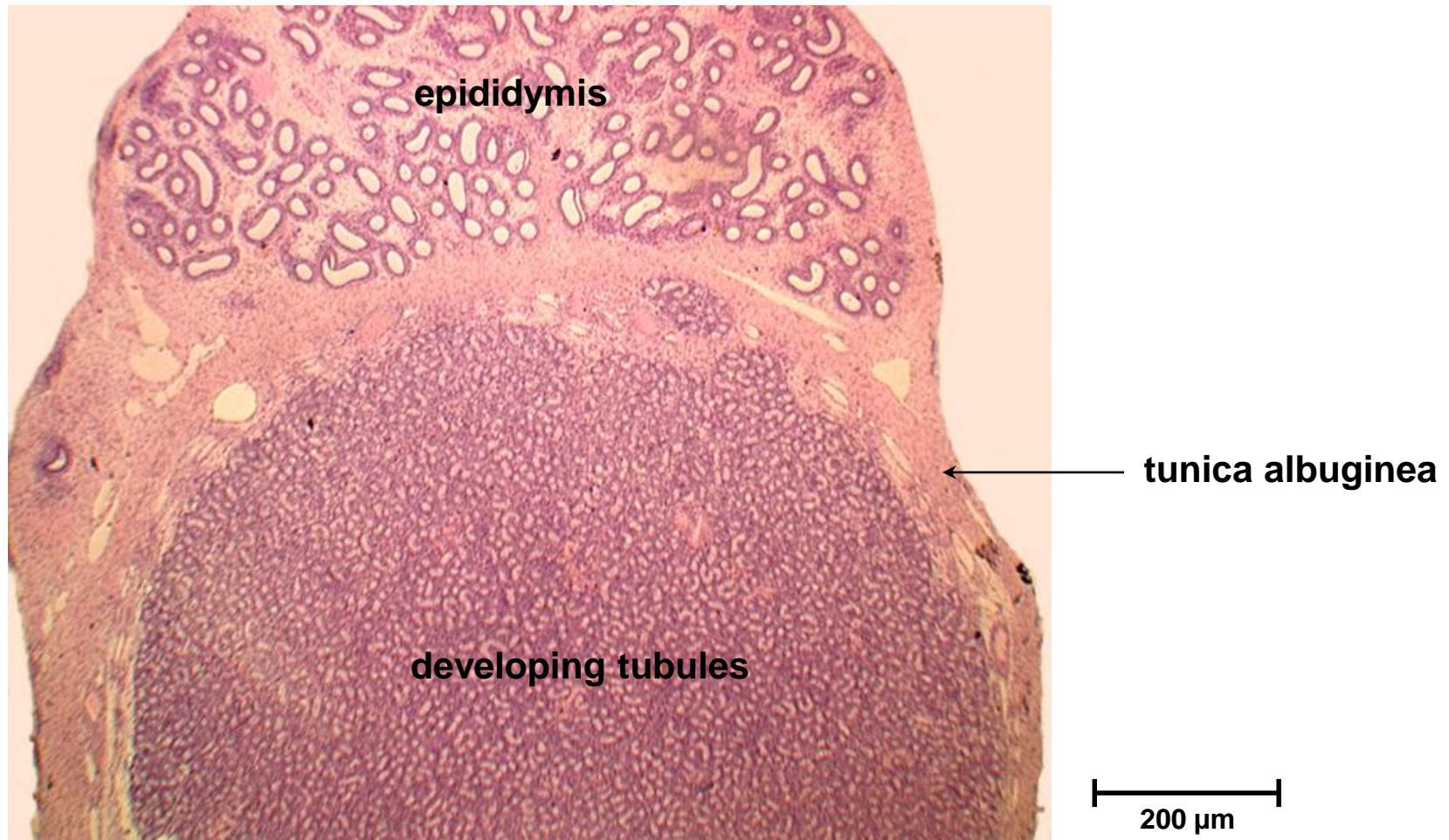


10  $\mu\text{m}$



# Immature testis (ferret)

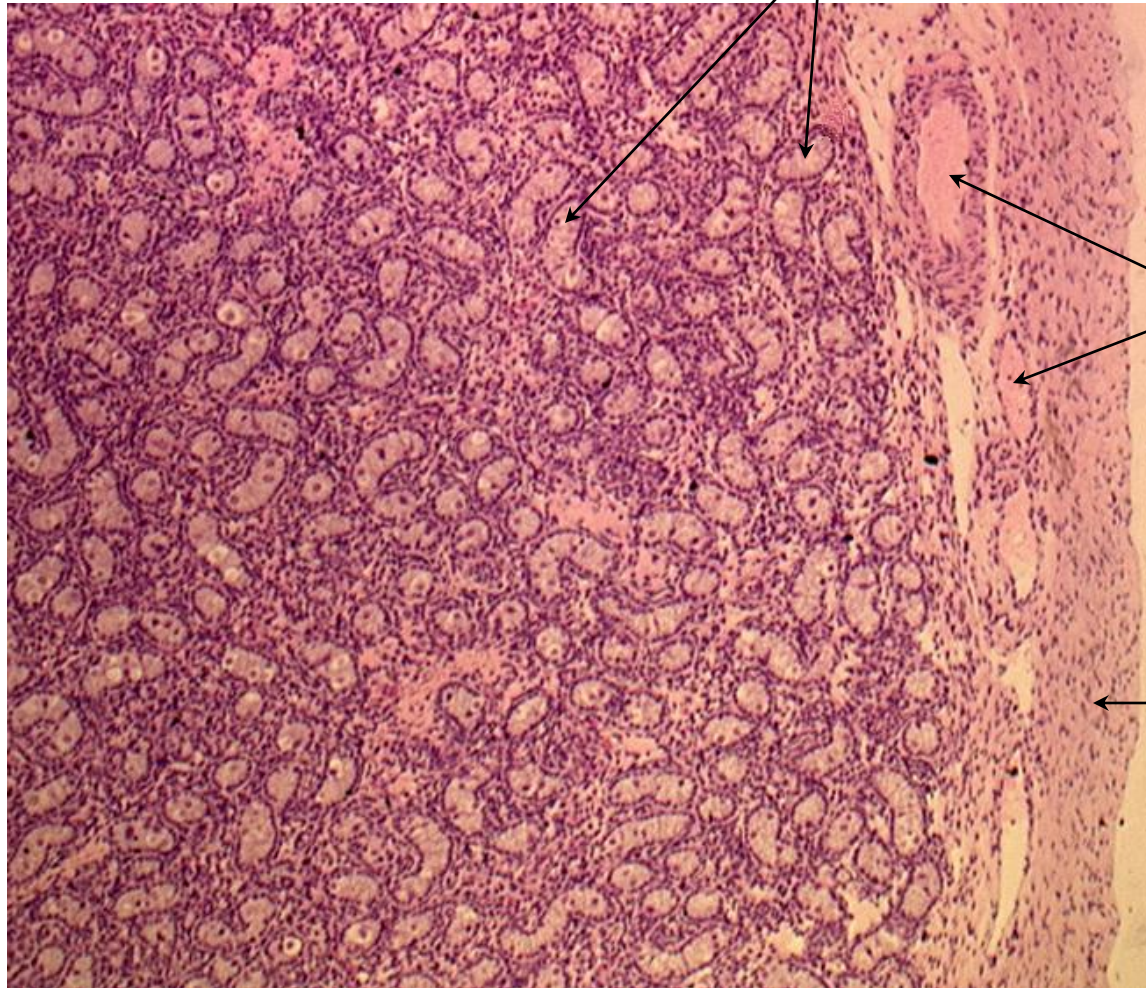
Low magnification showing main body surrounded by tunica albuginea.  
At the top is the epididymis.



# Immature testis (ferret)

Compare with previous slide.

tubules



blood vessels

tunica albuginea

250  $\mu$ m

# Immature testis (ferret)

List the similarities and differences.

## Similarities.

Both have tubules.

Leydig cells present, but function at low level.

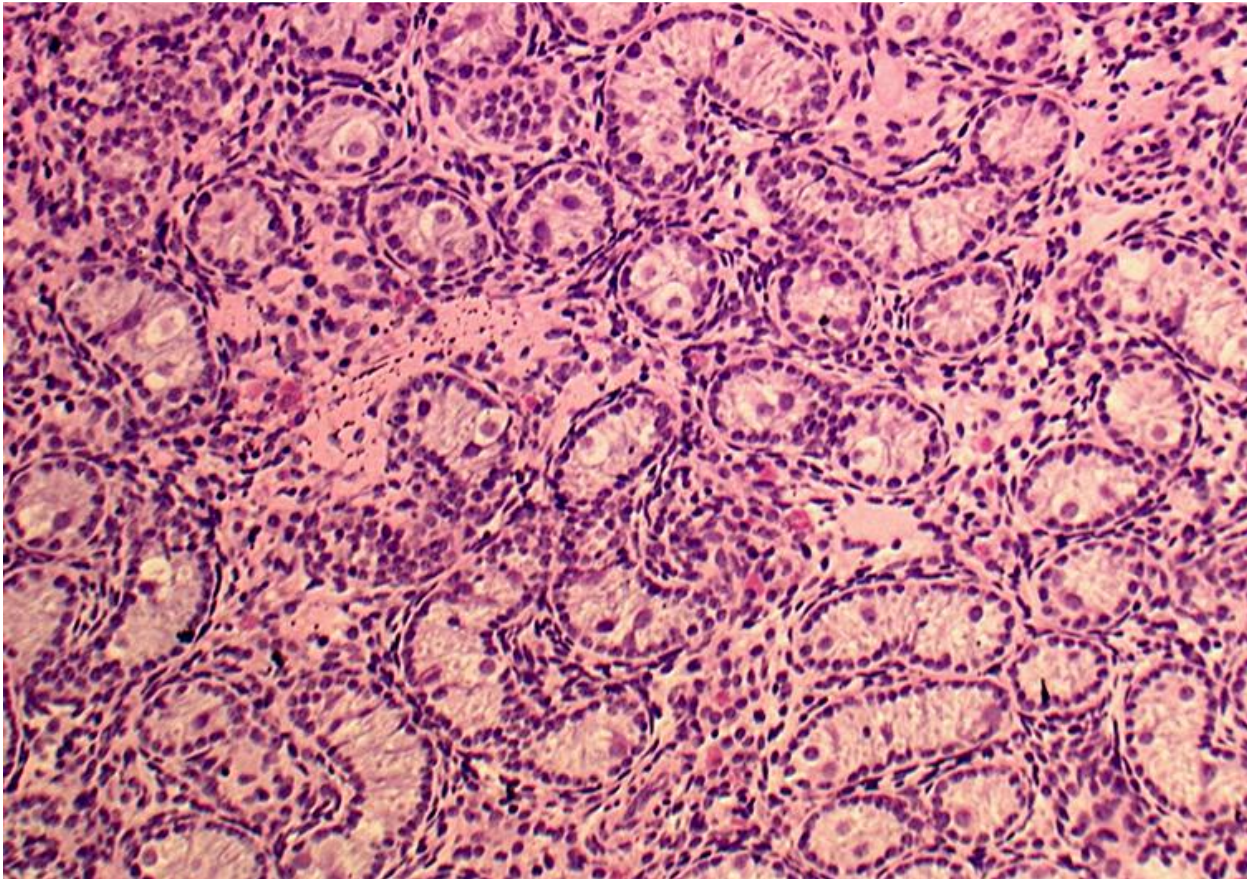
## Differences.

Closely packed tubules, little or no lumen.

No spermatogenesis.

Immature Sertoli cells.

Giant gonocytes present.



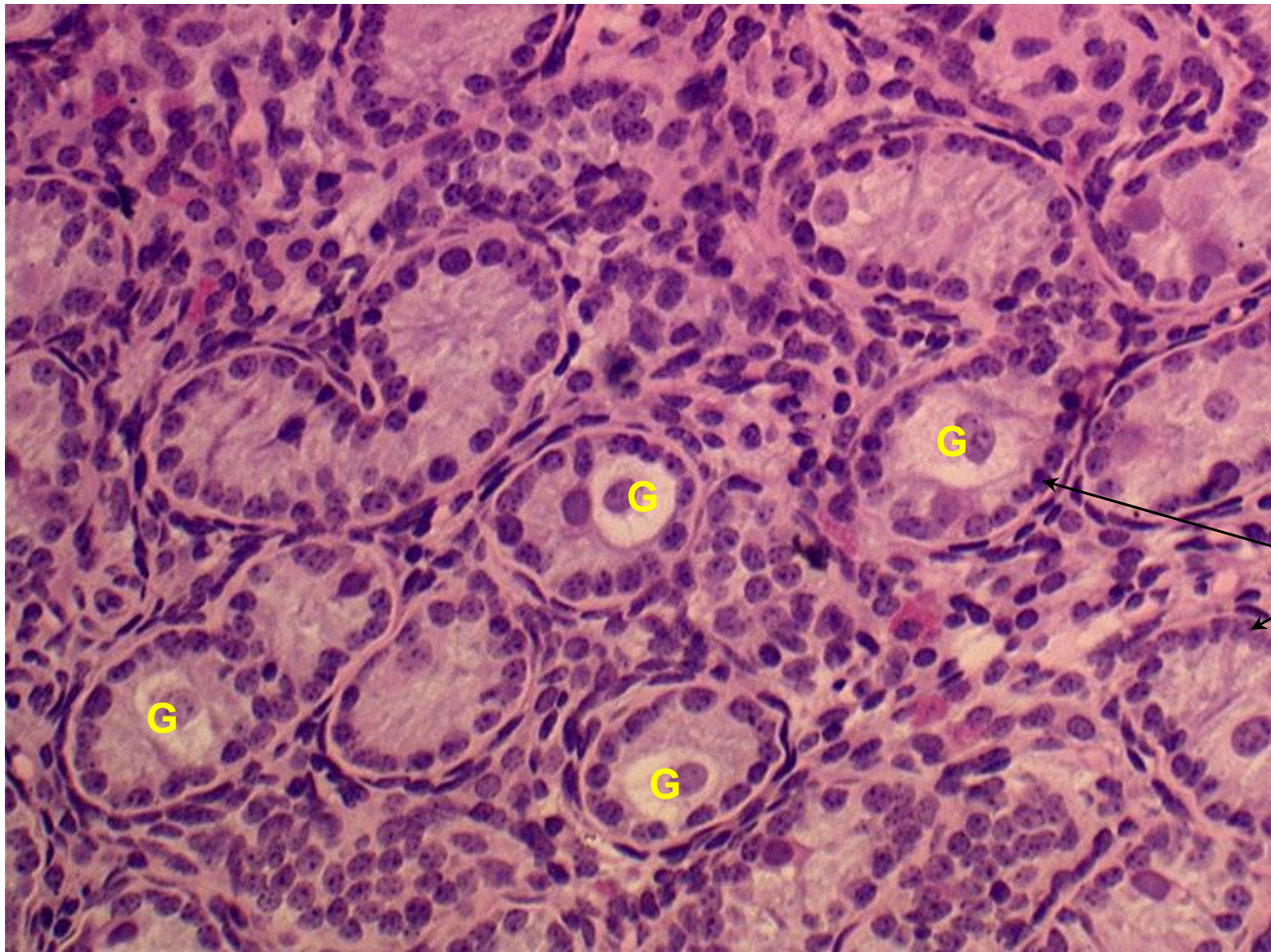
100  $\mu$ m

# Immature testis (ferret)

What cell types indicated below are evident in the tubular sections?

**Gonocytes (pre-spermatogonia).**

**Sertoli cells.**



**G : gonocytes**

**Sertoli cells**

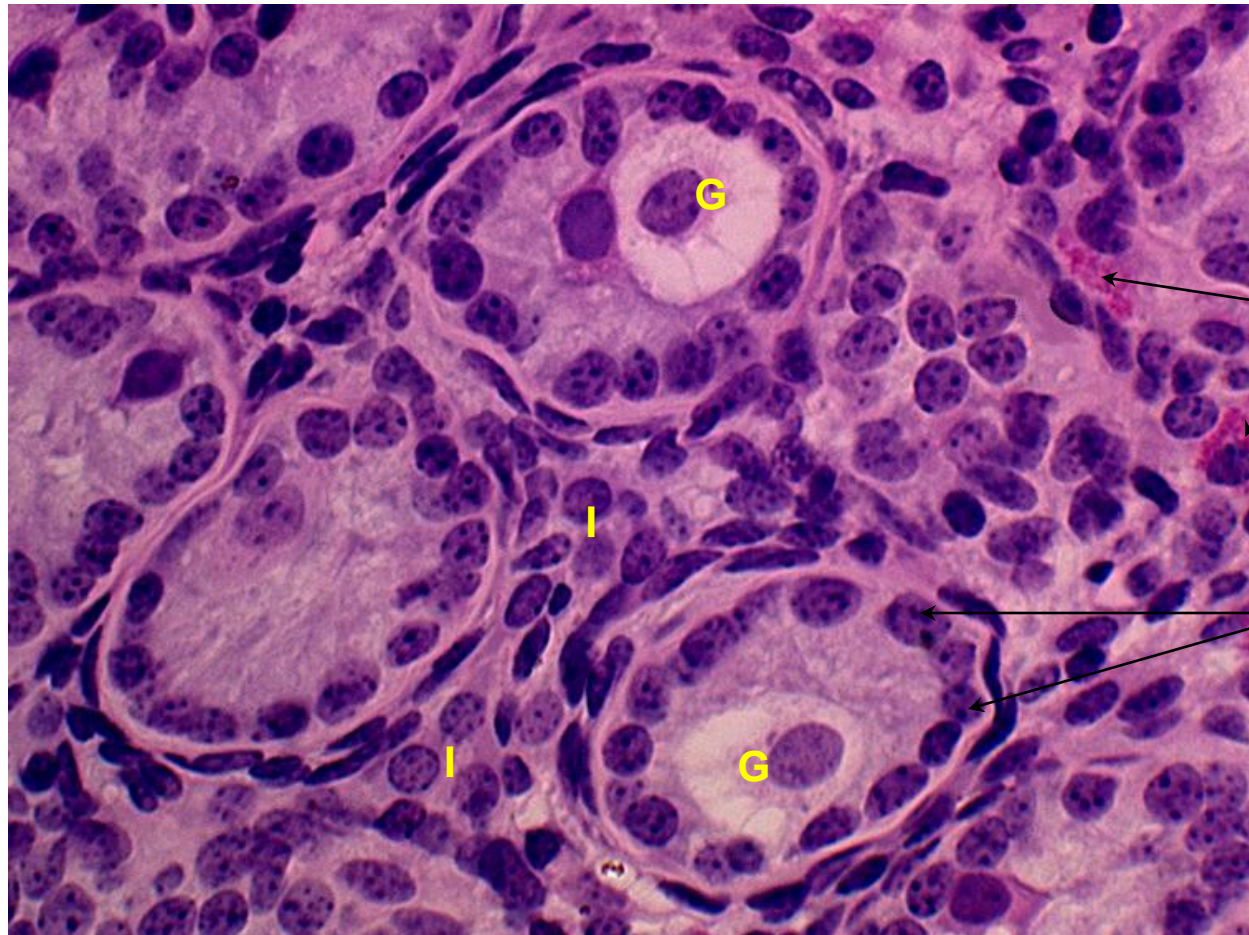
50  $\mu$ m

# Immature testis (ferret)

Higher magnification of developing germ cells, Gonocytes within the tubules.

These will become spermatogonia.

Leydig cells develop in the interstitial areas.



I : interstitial tissue  
site of Leydig cells

G : gonocytes  
within tubules

capillaries

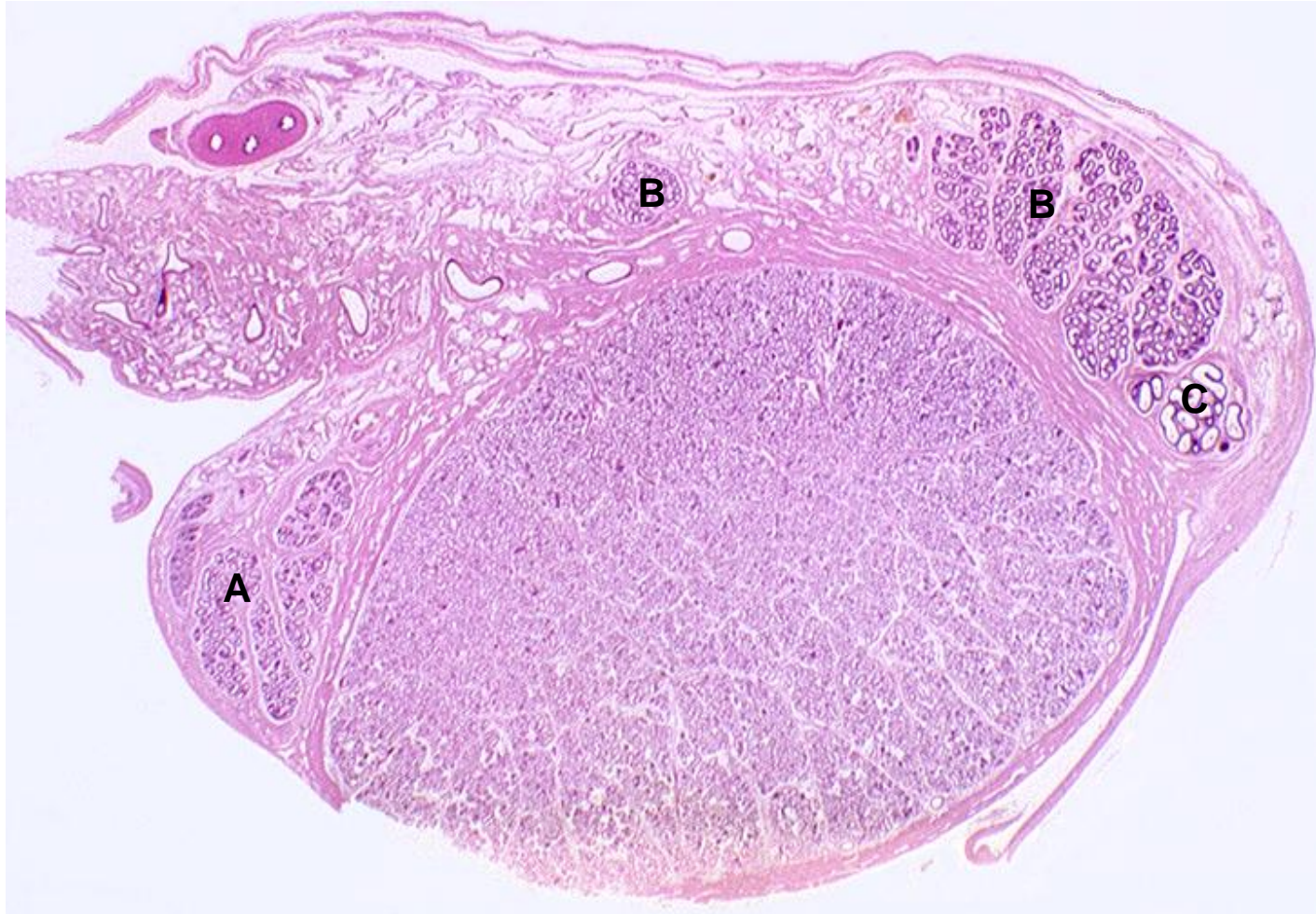
Sertoli cells forming  
the epithelial lining  
of tubules

25  $\mu$ m

# Mature testis

Section of whole testis : Identify the regions of the epididymis.

Efferent ductules lead from the rete testis and join to form the head of the epididymis.

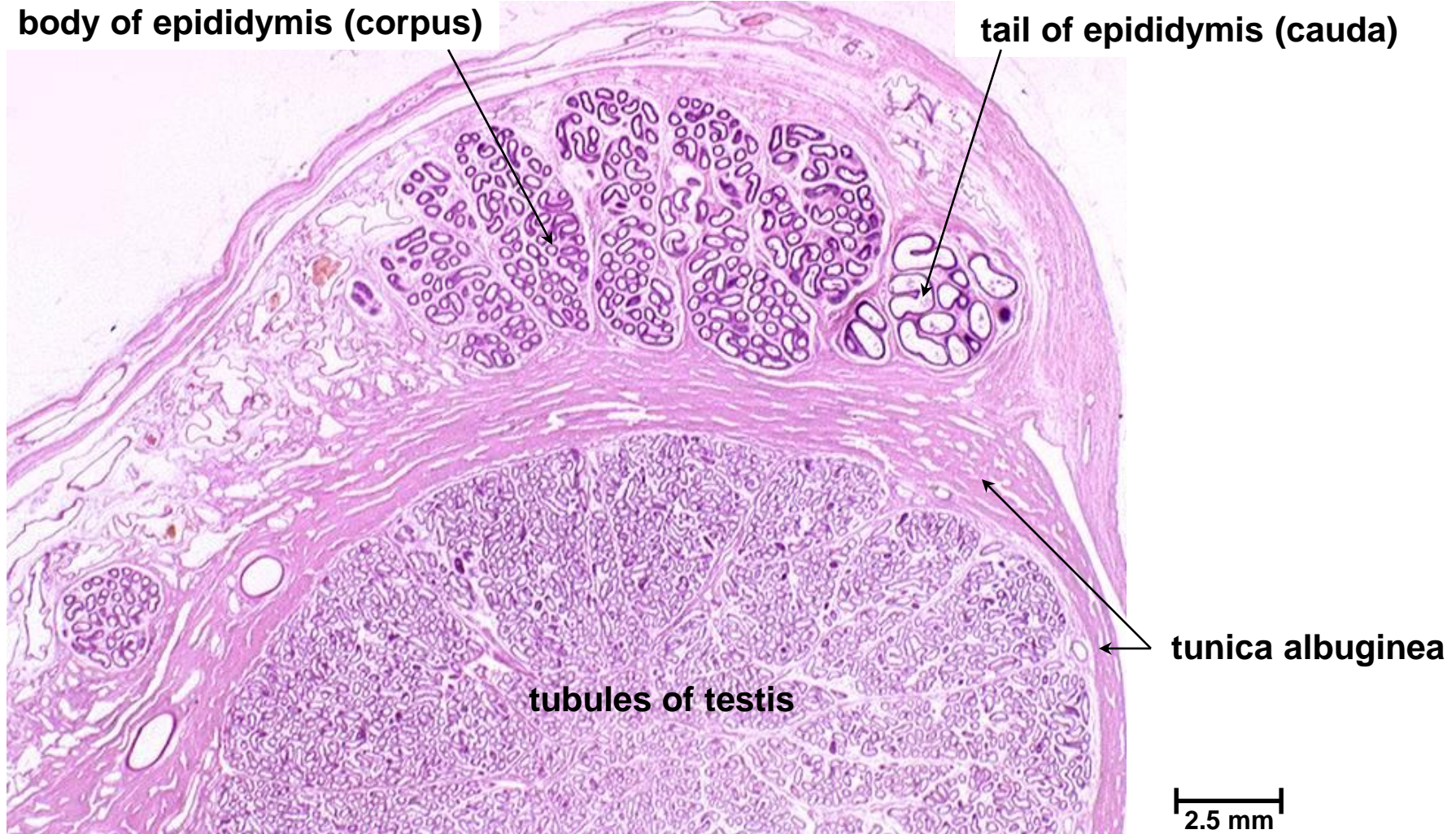


A : head  
B : body  
C : tail

5.0 mm

# Mature testis

At low magnification identify the main features of the section.



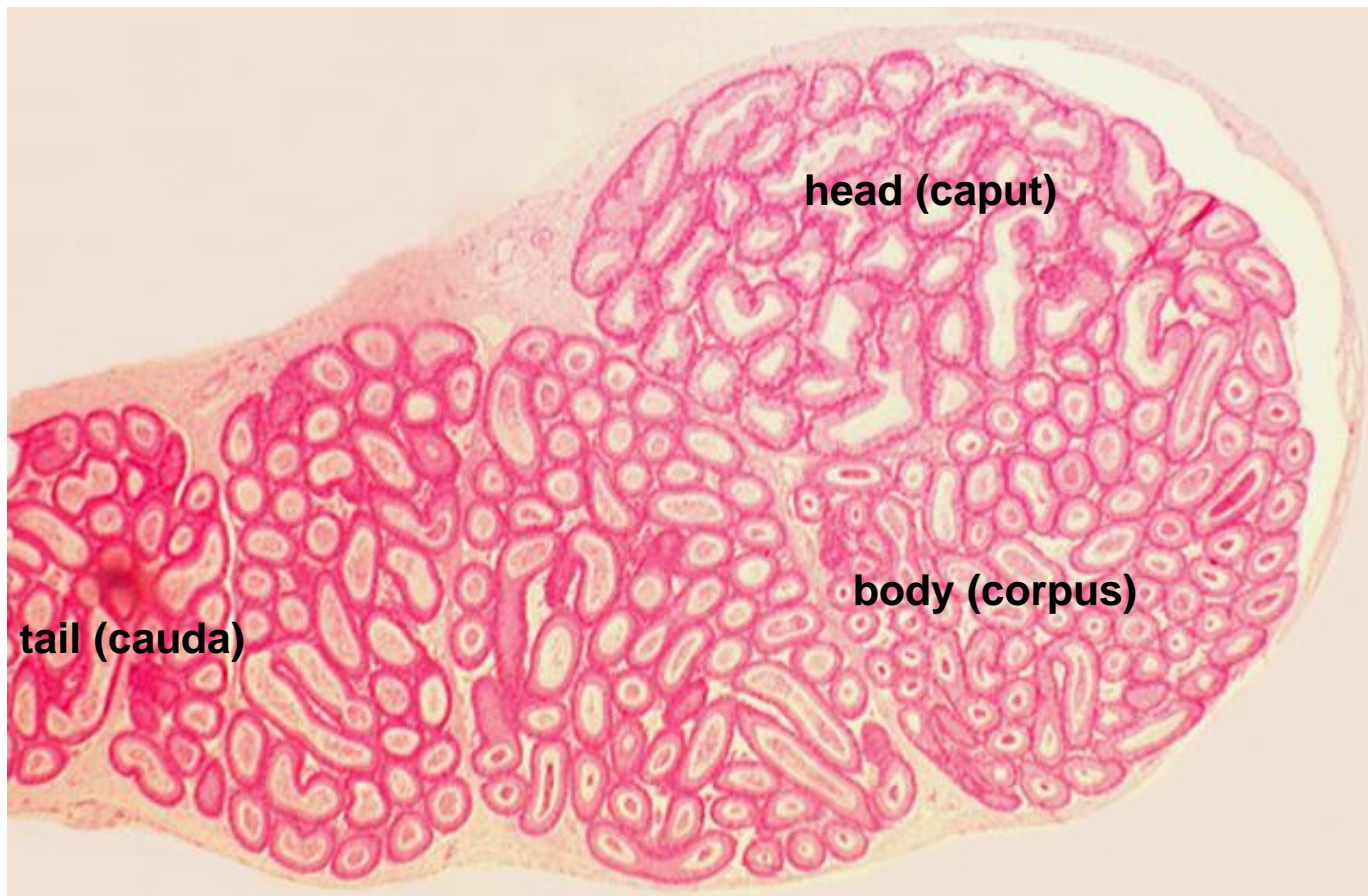
# Epididymis

What might this organ be confused with?

**Testis.**

**Differential vesicular glands, bulbourethral gland, prostate gland.**

**At higher magnification with kidney tubules.**





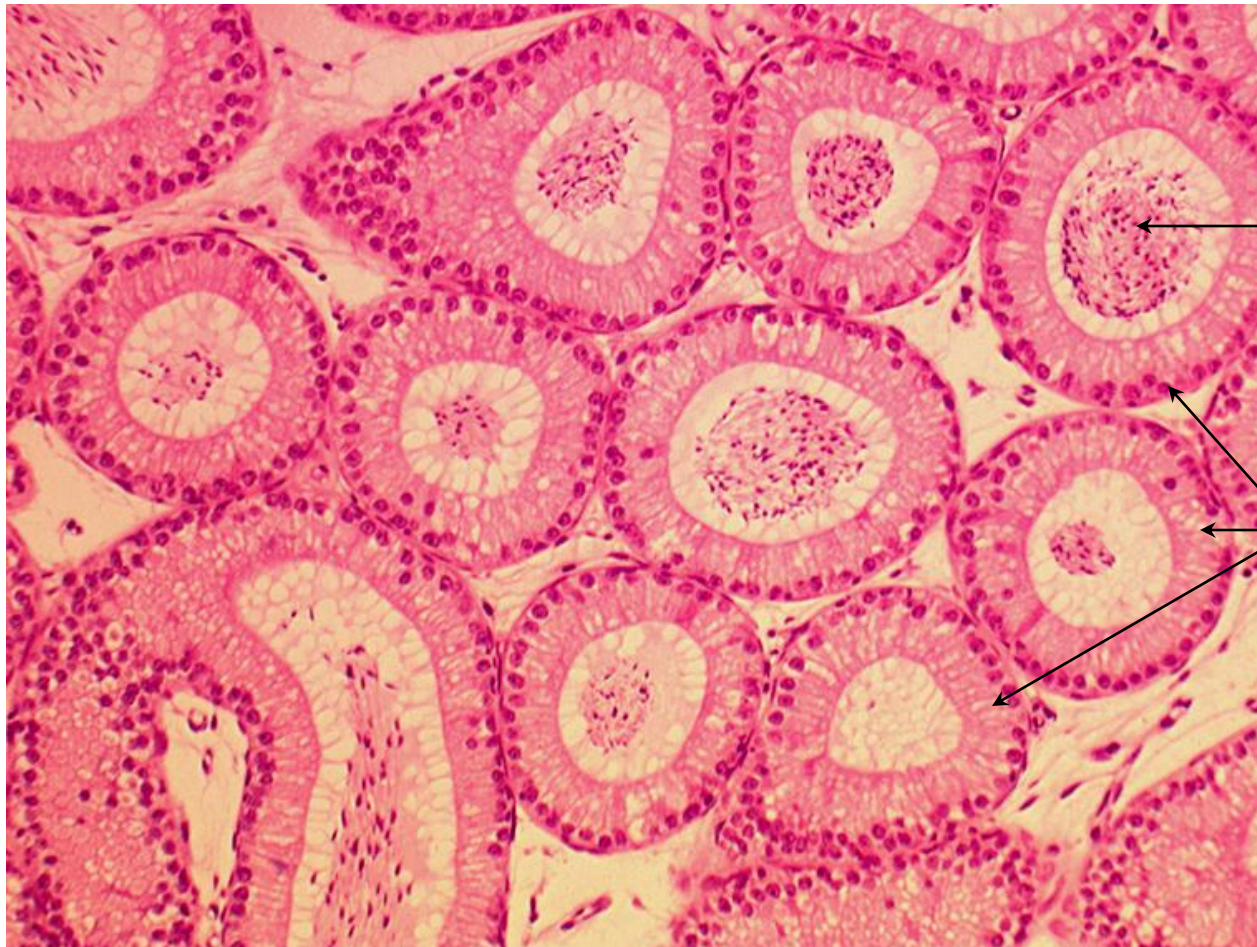
# Epididymis

What distinguishing features can you identify?

**Pseudostratified epithelium with stereocilia.**

**No interstitial cells.**

**Spermatozoa in lumen of duct.**



spermatozoa in lumen

pseudostratified  
columnar epithelium  
(principal cells) and  
smaller basal cells  
forming wall of tubules

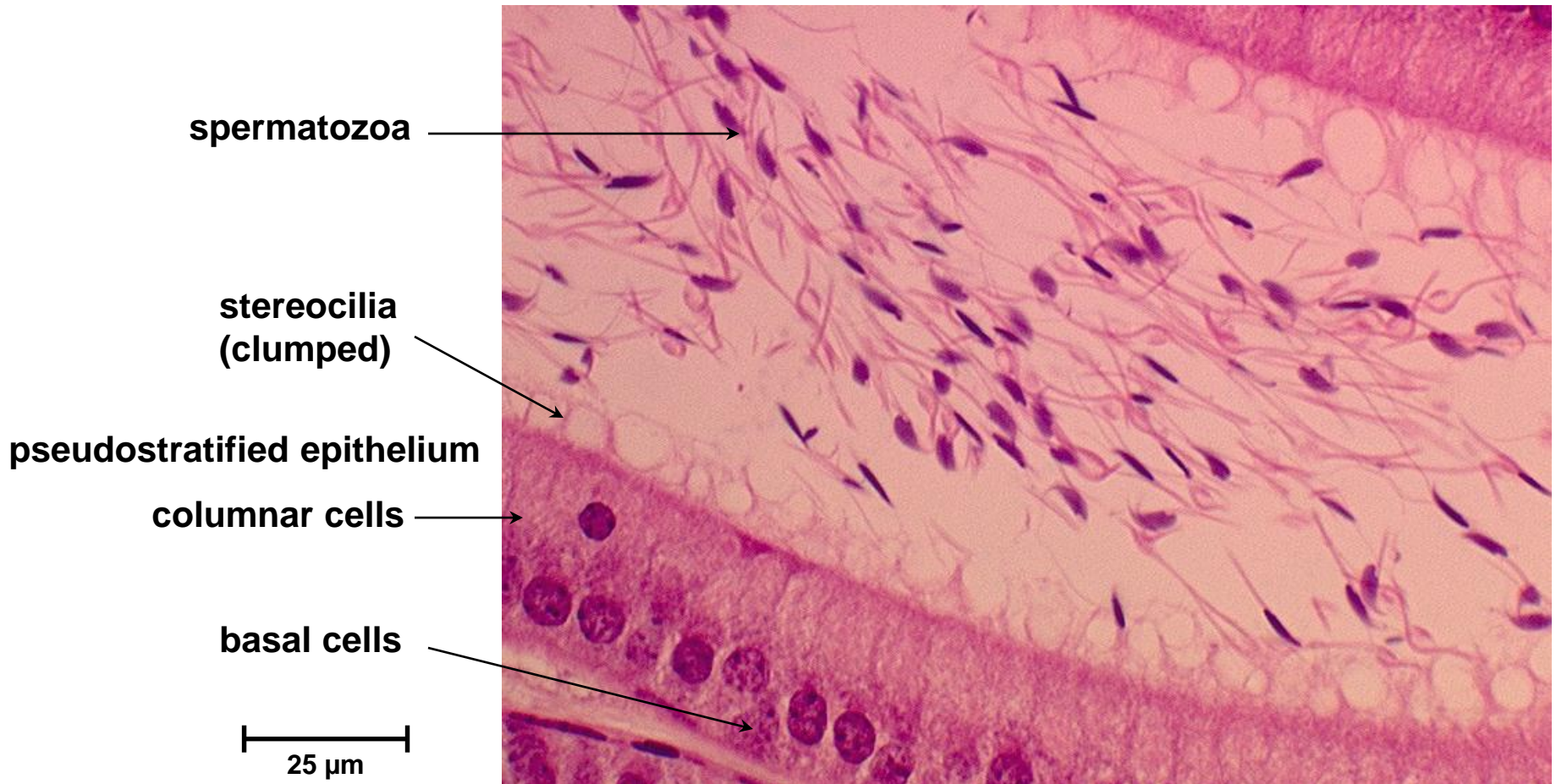
100  $\mu$ m

# Epididymis

What is the function of the cellular extensions projecting into the lumen?

These are **stereocilia (long branching microvilli)**.

They are often **clumped together** and indicate a **resorptive function** of these cells.

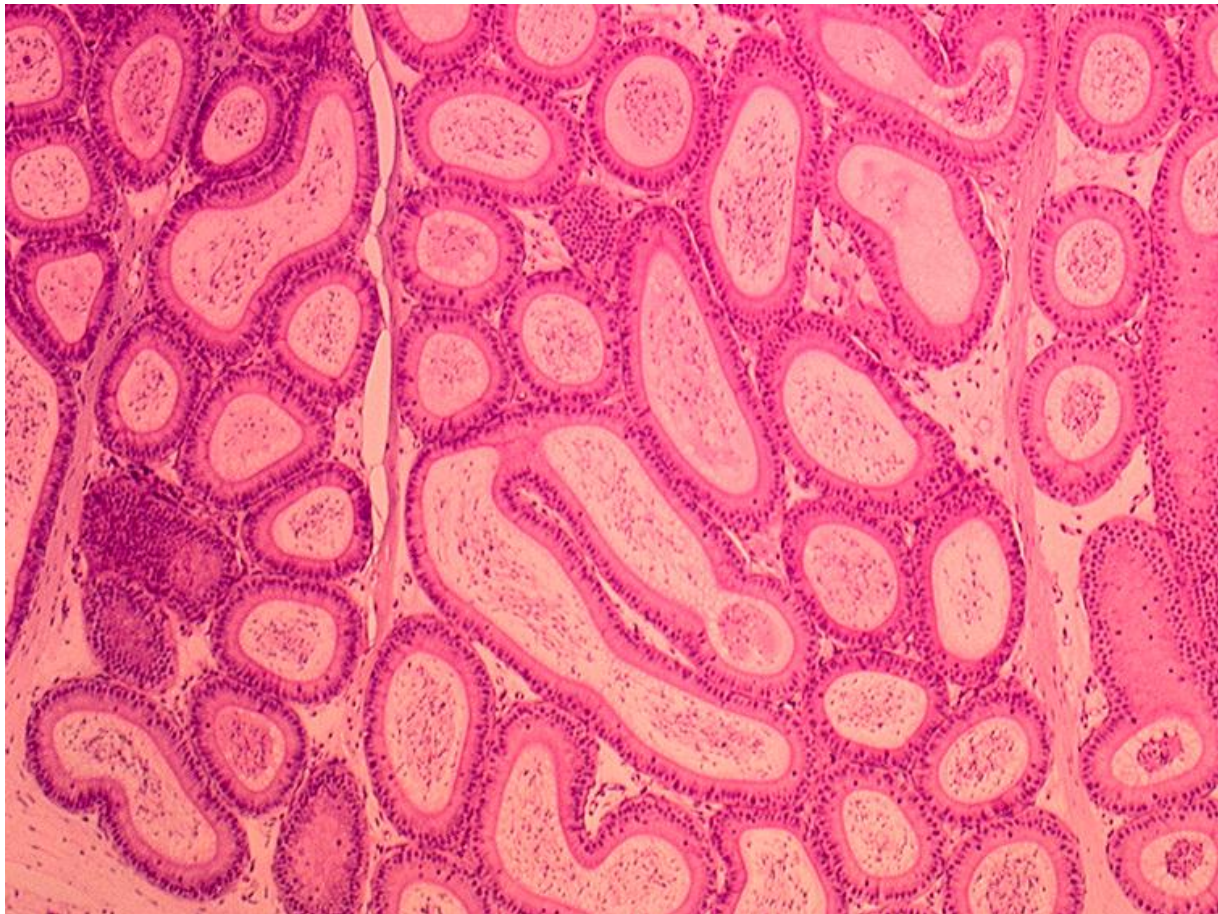


# Epididymis

Is this tubular structure single or multiple and can you decide that from the slide?

**A single, highly convoluted tube.**

**This is not apparent from the slide.**



**the epididymis :  
tubule cut in TS, LS  
and oblique section.**

250  $\mu$ m

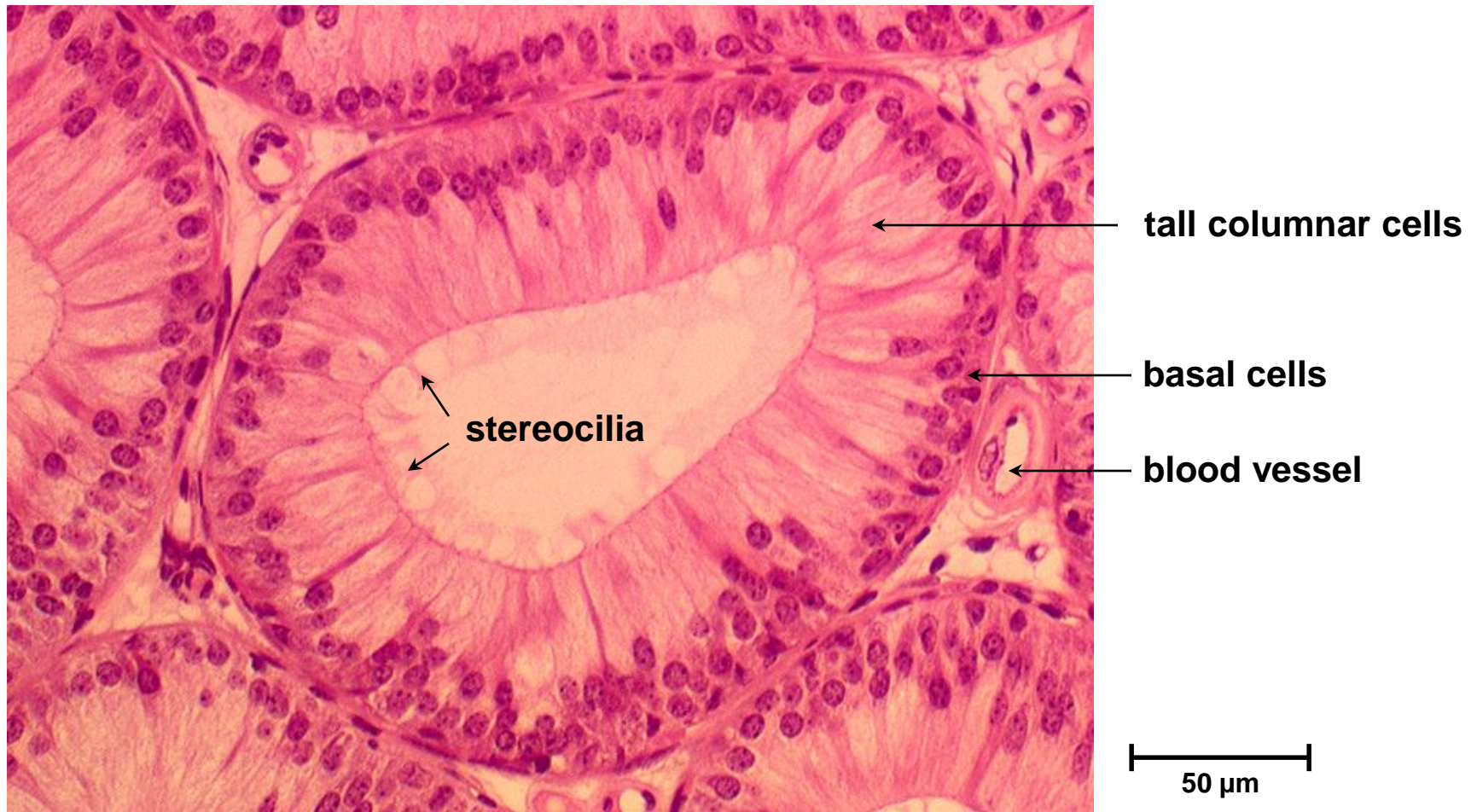
# Epididymis      Head (caput)

Are all the sections of the tubule identical?

No, the head (caput), body (corpus) and tail (cauda) are distinct in structure and function.

This is a section through the head; here the pseudostratified epithelium is highest.

The head is an area of resorption.

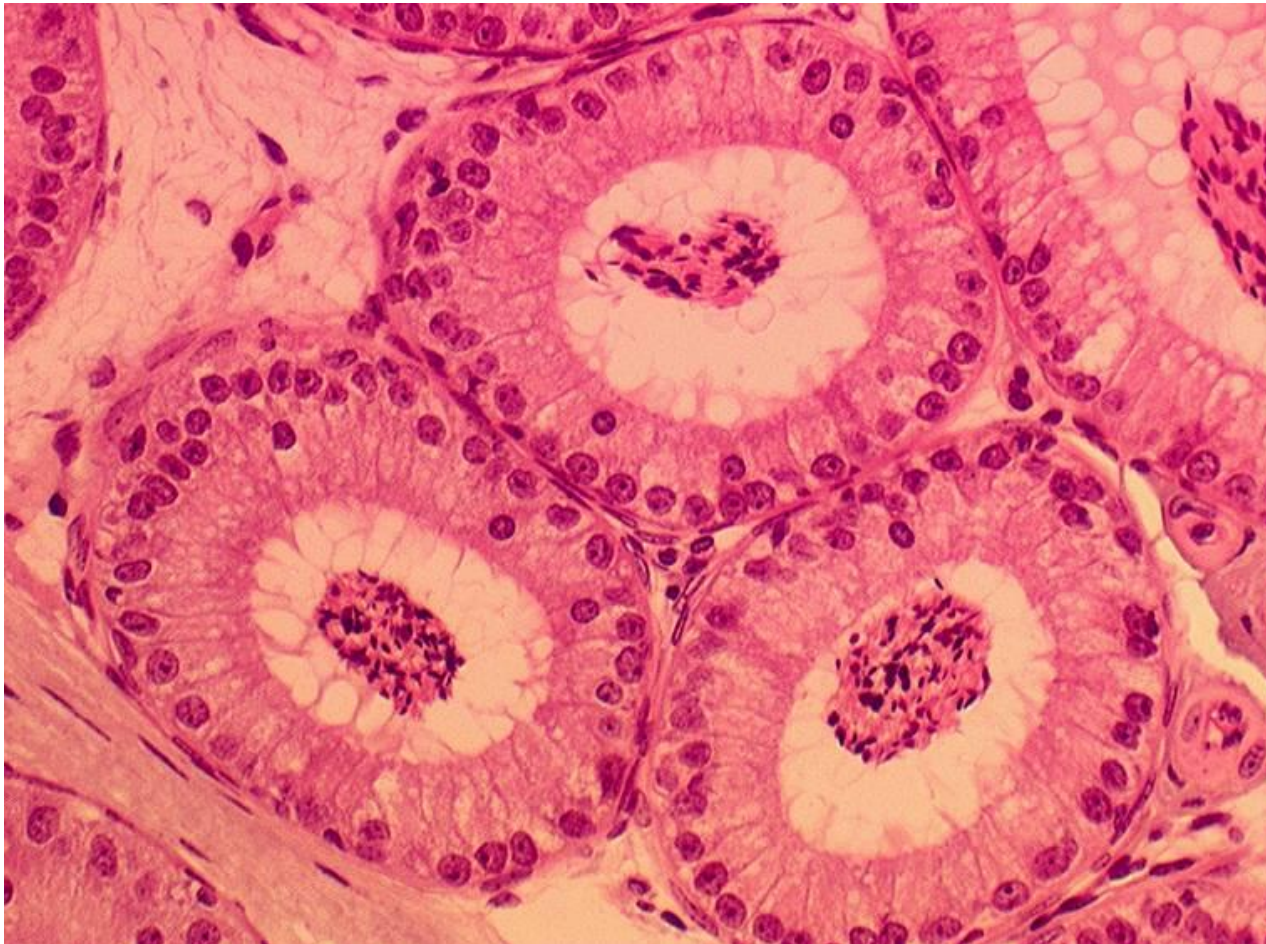


# Epididymis      Body (corpus)

Tubule sections from the body or corpus epididymis.

The epithelium is lower in height than in the head portion.

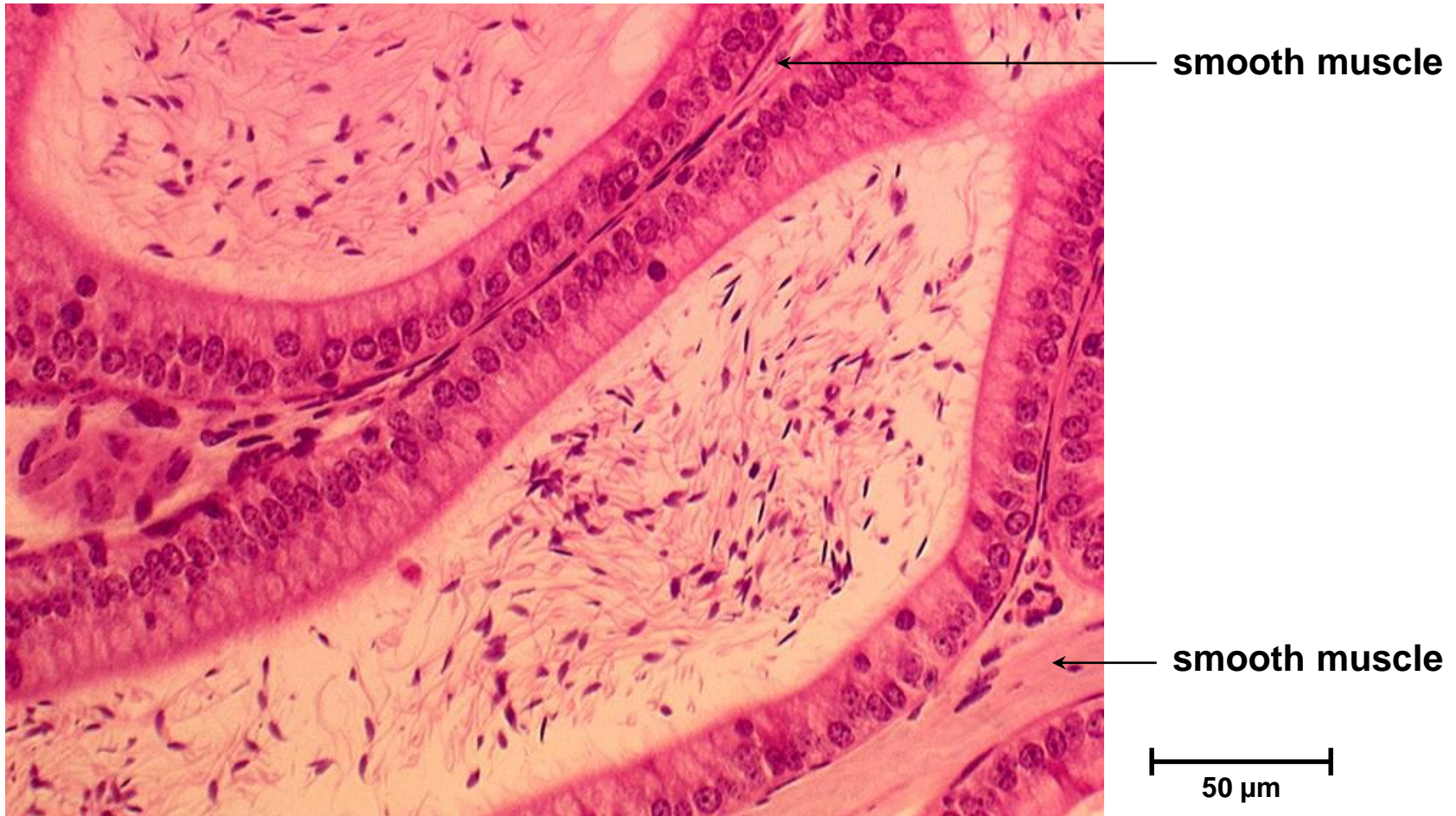
As spermatozoa pass through the body of the epididymis, they acquire the ability to move and to fertilize.



50  $\mu$ m

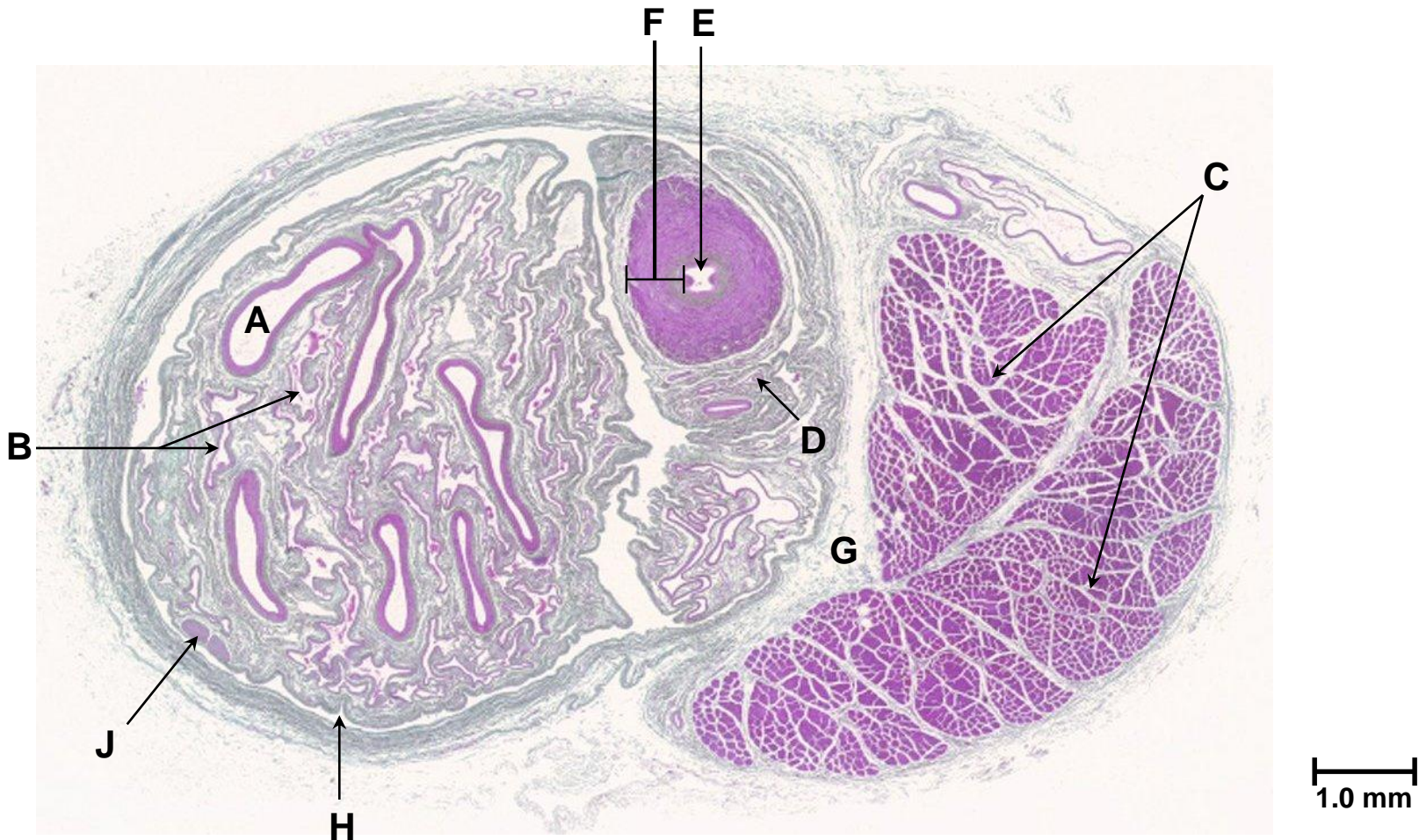
# Epididymis Tail (cauda)

The tail or cauda epididymis is where spermatozoa are stored prior to ejaculation. The tubule in the tail has a lower epithelium and less prominent stereocilia. Bands of smooth muscle can be seen between the tubule.



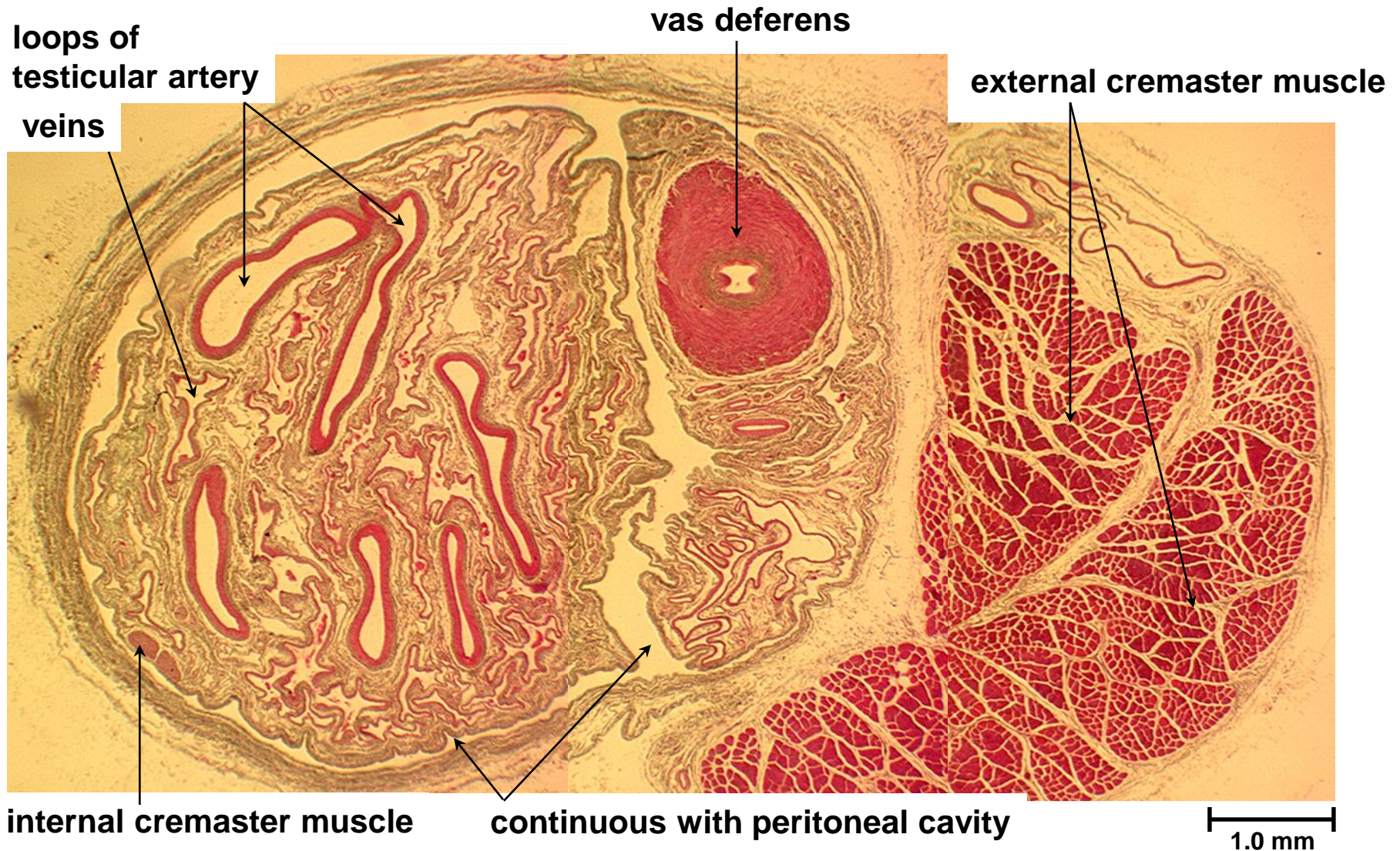
# Spermatic cord

- A : testicular artery.**                      **B : veins providing heat transfer and forming the pampiniform plexus.**  
**C : external cremaster muscle.**        **D : nerve fibres.**                              **E : ductus (vas) deferens.**  
**F : wall of ductus deferens.**            **G : connective tissue.**  
**H : space continuous with peritoneal cavity and lined by visceral and parietal serous membrane.**  
**J : internal cremaster muscle (runs on the inside of the peritoneum).**



# Spermatic cord

Whole section at slightly higher magnification.





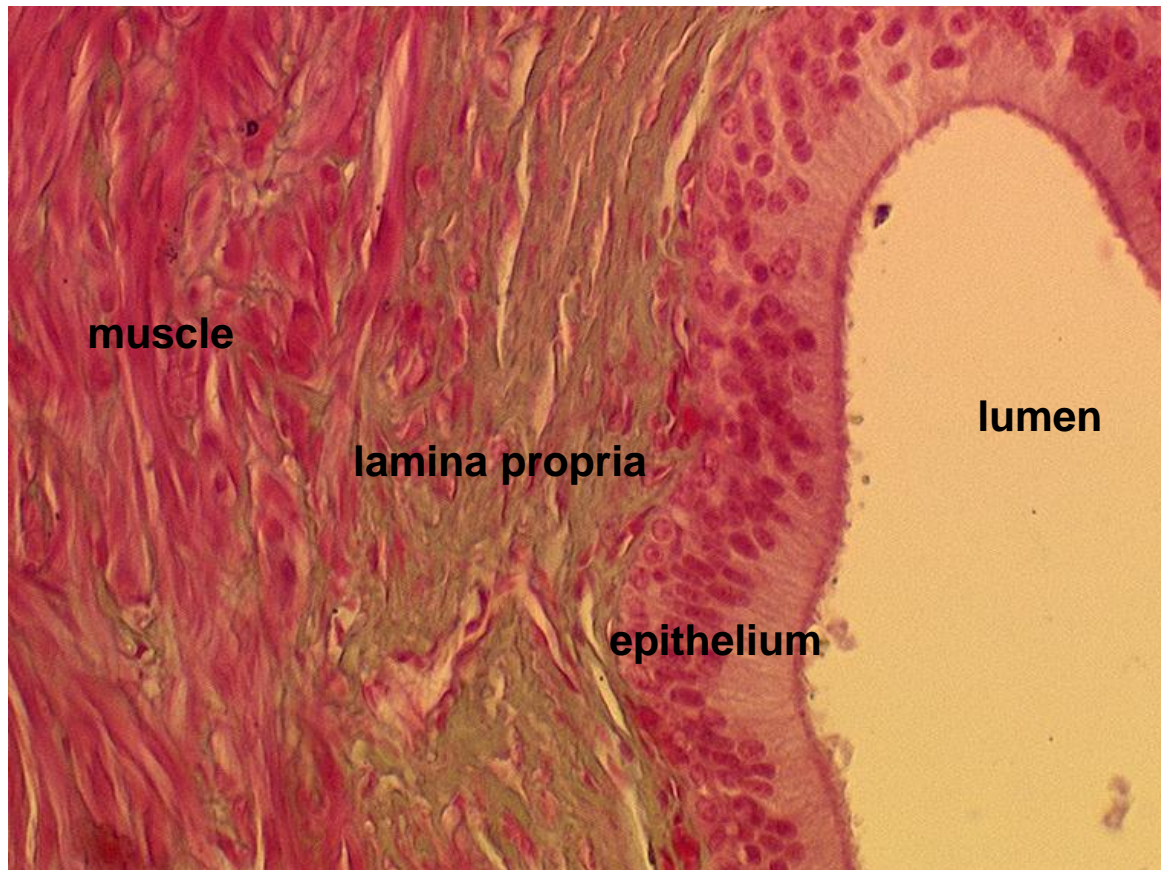
# Spermatic cord

The vas deferens or ductus deferens.

Runs from the epididymis and joins with the urethra.

It is lined with pseudostratified columnar epithelium.

The smooth muscle in the wall has inner circular and outer longitudinal fibres, these may be interwoven.



250  $\mu$ m

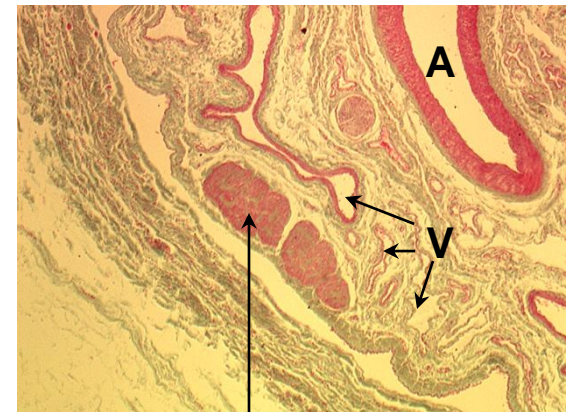
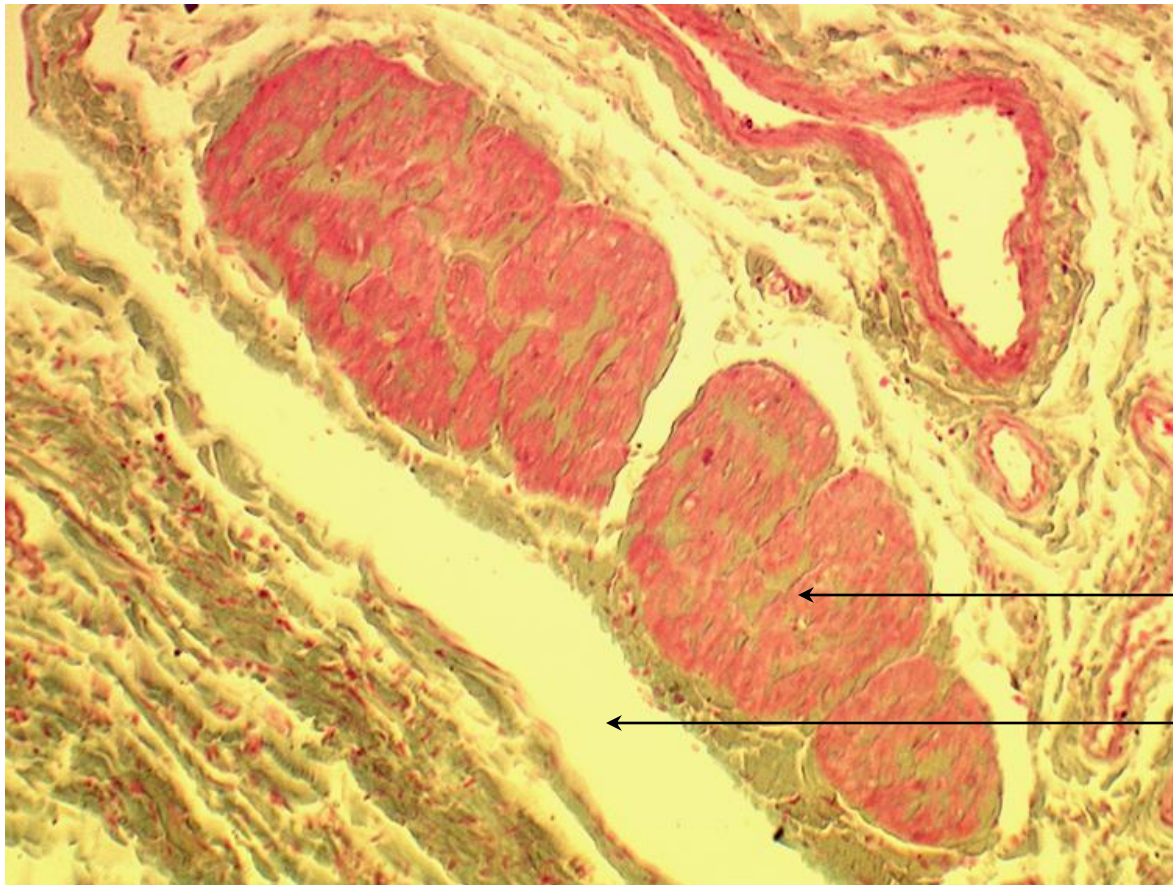
50  $\mu$ m

# Spermatic cord

The internal cremaster muscle lies on the inside of the peritoneum.

V : veins of pampiniform plexus

A : artery



250 μm

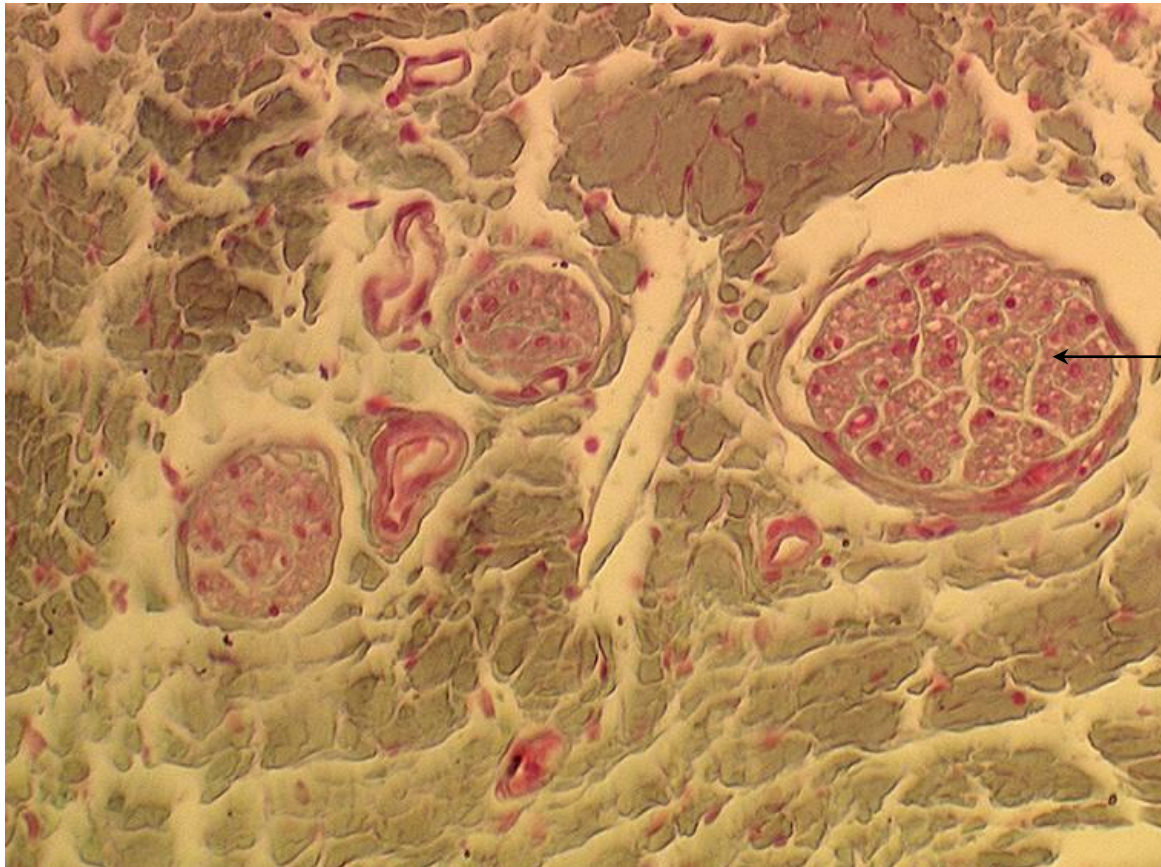
internal cremaster muscle

space continuous with  
peritoneal cavity

100 μm

# Spermatic cord

Bundle of nerve fibres in the connective tissue proximal to the vas deferens.



← nerve fibre

50  $\mu$ m

# Vesicular gland

The vesicular glands (seminal vesicles), are not found in all species and are not seen in the dog.

Does the organ possess a tubular structure?

**Yes, a compound tubulo-alveolar gland.**



# Vesicular gland

Is the gland secretory or not?

**Yes : a fluid gelatinous secretion is produced.**



# Vesicular gland

Is the epithelium stratified, pseudostratified or simple?

**Epithelium is formed of pseudostratified, columnar cells with shorter basal cells.**

interlobular septum with smooth muscle



pseudostratified epithelium  
columnar and basal cells

25  $\mu$ m

# Vesicular gland

What kind of reproductive organ is it?

**An accessory gland.**

What might be its function?

**The secretory product is gelatinous and is rich in fructose; so providing an energy source for the spermatozoa.**

interlobular septum →

pseudostratified  
epithelium →

secretion

100 μm

