

Microscopy of excretory system  
To be continued.....

## Certain species specific differences

- In Ox and pig, numerous renal pyramids are present with the formation of minor and major calyces.
- In horse, sheep and dog the apices of the pyramids do not appear separate and the inner part of medulla forms the renal crest (results of fusion of papillae in the embryo), which shows numerous openings the area cribrosa

The renal crest projects into the renal pelvis the dilated origin of ureter **No minor and major calyces are formed.**

➤ The proximal convoluted tubules in cats contain many fat droplets and a similar condition in terminal portions of the tubule in the dog is also observed

The excretory passages are renal calyces, pelvis, ureter, urinary bladder and urethra.

From the renal papillae urine passes into the renal pelvis of the kidney, hence it flows through the ureter into the urinary bladder and leaves the body by way of urethra

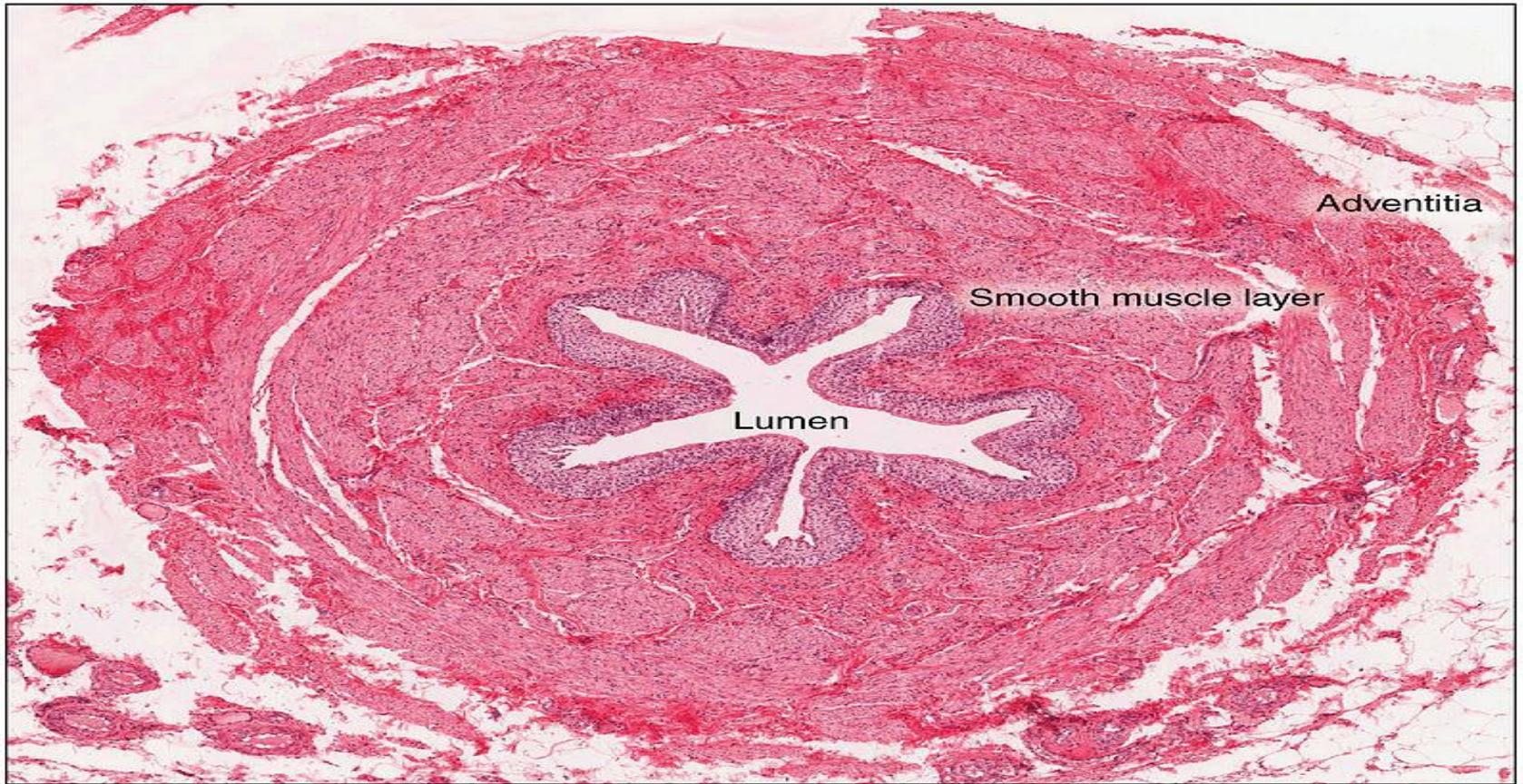
## Renal pelvis and calyces

- These are lined by transitional epithelium resting on loose connective tissue proper.
- The tunica muscularis consists of two ill-defined layers of smooth muscle
- sphincter-like arrangement of the circular layer is found in each minor calyx at the base of each papilla and at the beginning of the ureter
  
- A connective tissue coat containing fat cells, large blood vessels and nerves covers the muscular coat.
- *In horse:* Goblet cells occur in the epithelium and tubulo-alveolar mucous gland are present in the lamina propria of the renal pelvis. A distinct submucosa is present in the horse and the ox.

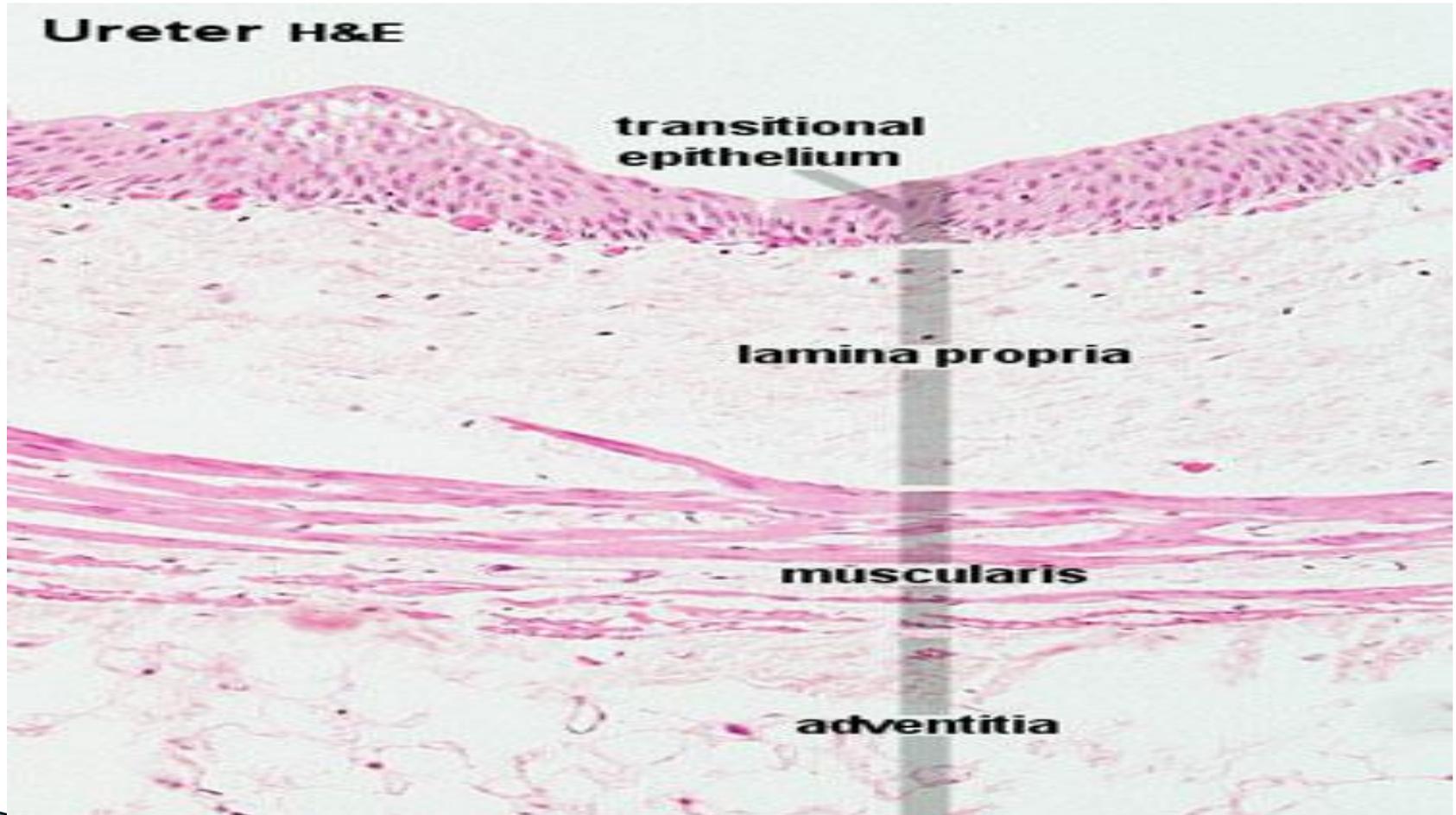
## Ureter

- It has connective tissue coat externally.
- The muscular coat consists of an outer circular and an inner longitudinal layer of smooth muscle fibres.
- In the lower third there is an additional external longitudinal layer.
- The mucous membrane is thrown into folds and is lined by transitional epithelium

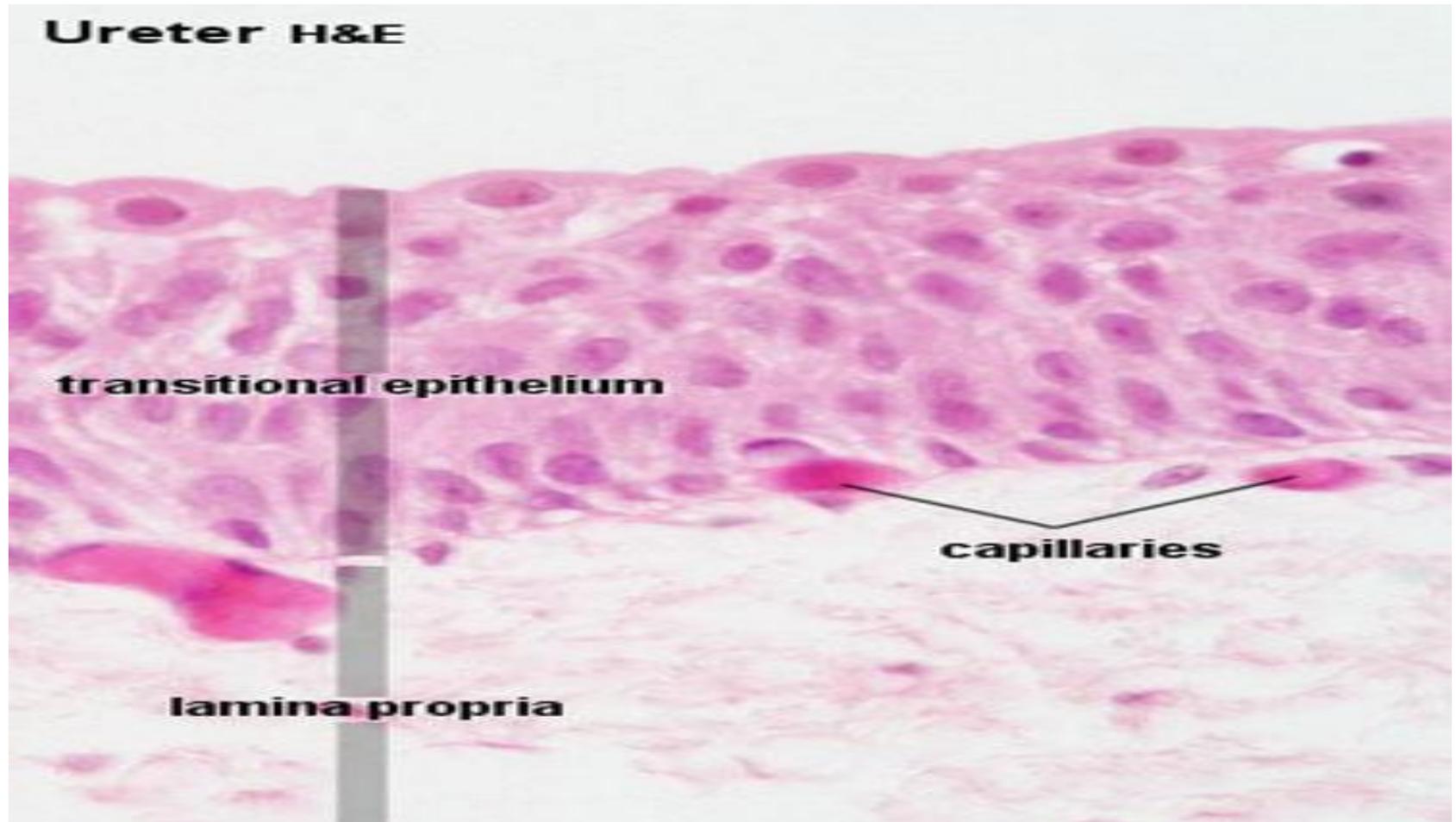
# Microscopy of ureter



# Section of ureter



# Structure of ureter



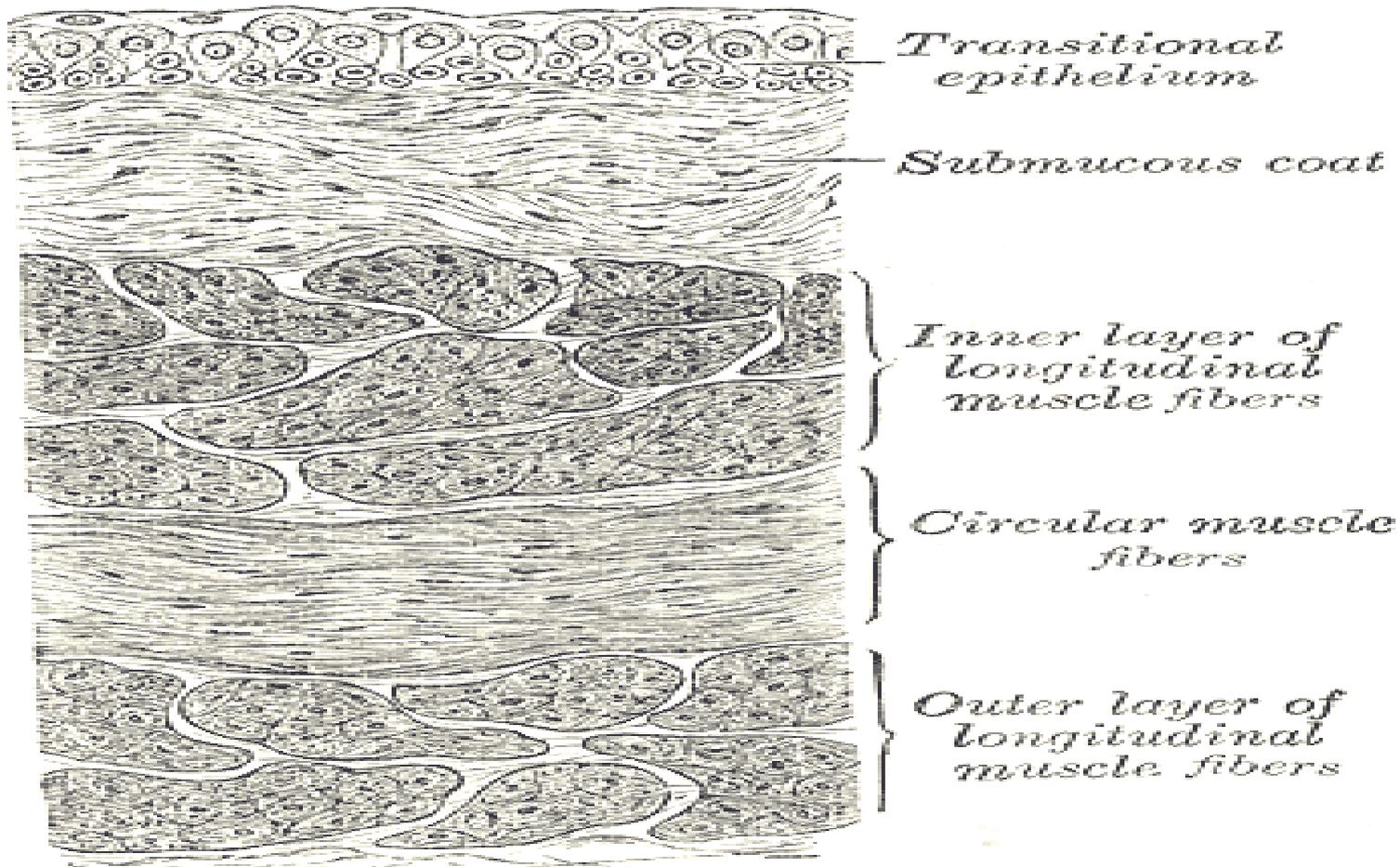
## Urinary bladder

- The anterior part of the bladder is covered by serous membrane.
- The muscular coat is very thick and consists of three layers, an outer longitudinal, middle circular and inner longitudinal layers made up of smooth muscle
- The mucous membrane is lined by transitional epithelium which is thick when the bladder contracted and thin when distended with urine.
- In the distended condition, the cells are thin, flattened and stretched parallel to the wall resembling narrow spindle.

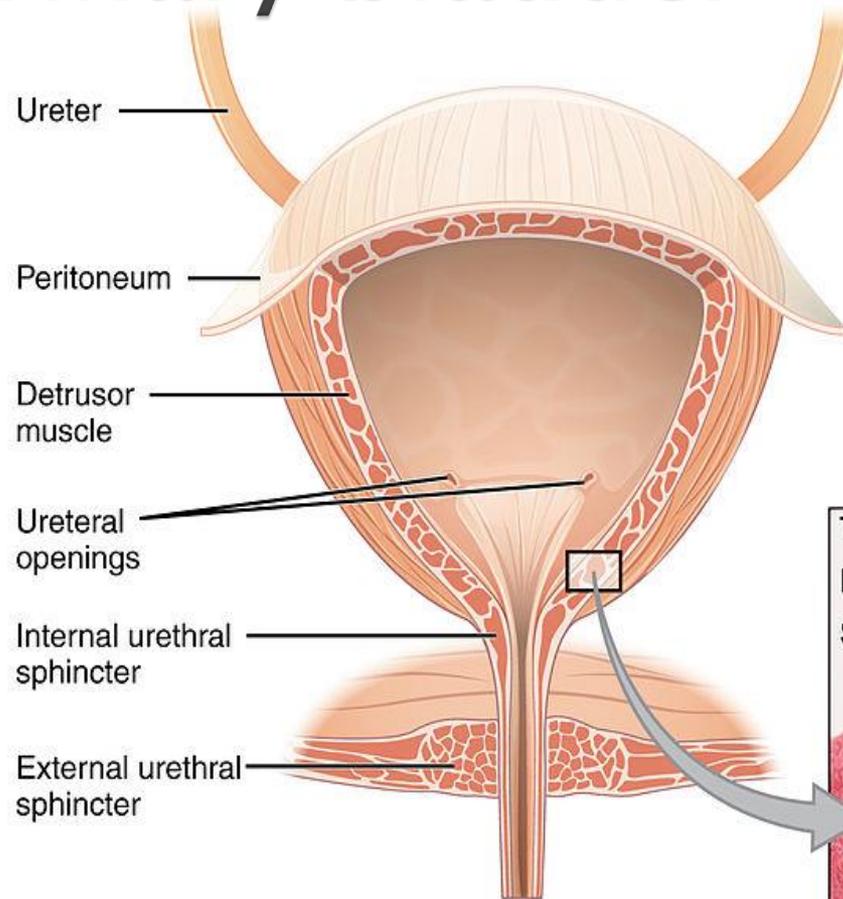
The deeper layers of propria have a looser arrangement and so help to form thick folds.

- In addition to capillary nets in the muscular coat and propria a rich capillary plexus is seen immediately under the epithelium
- Capillaries also enter the epithelium
- In the bladder there is a submucosa separated from propria by bundles of plain muscle running longitudinally

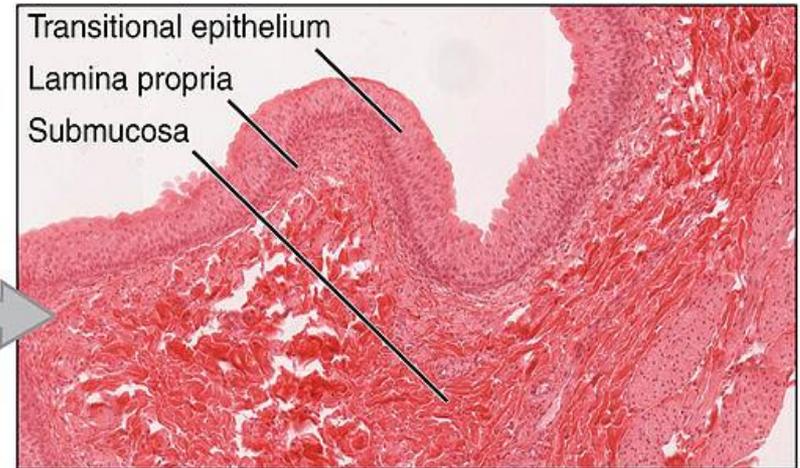
# Microscopy of urinary bladder



# Urinary bladder

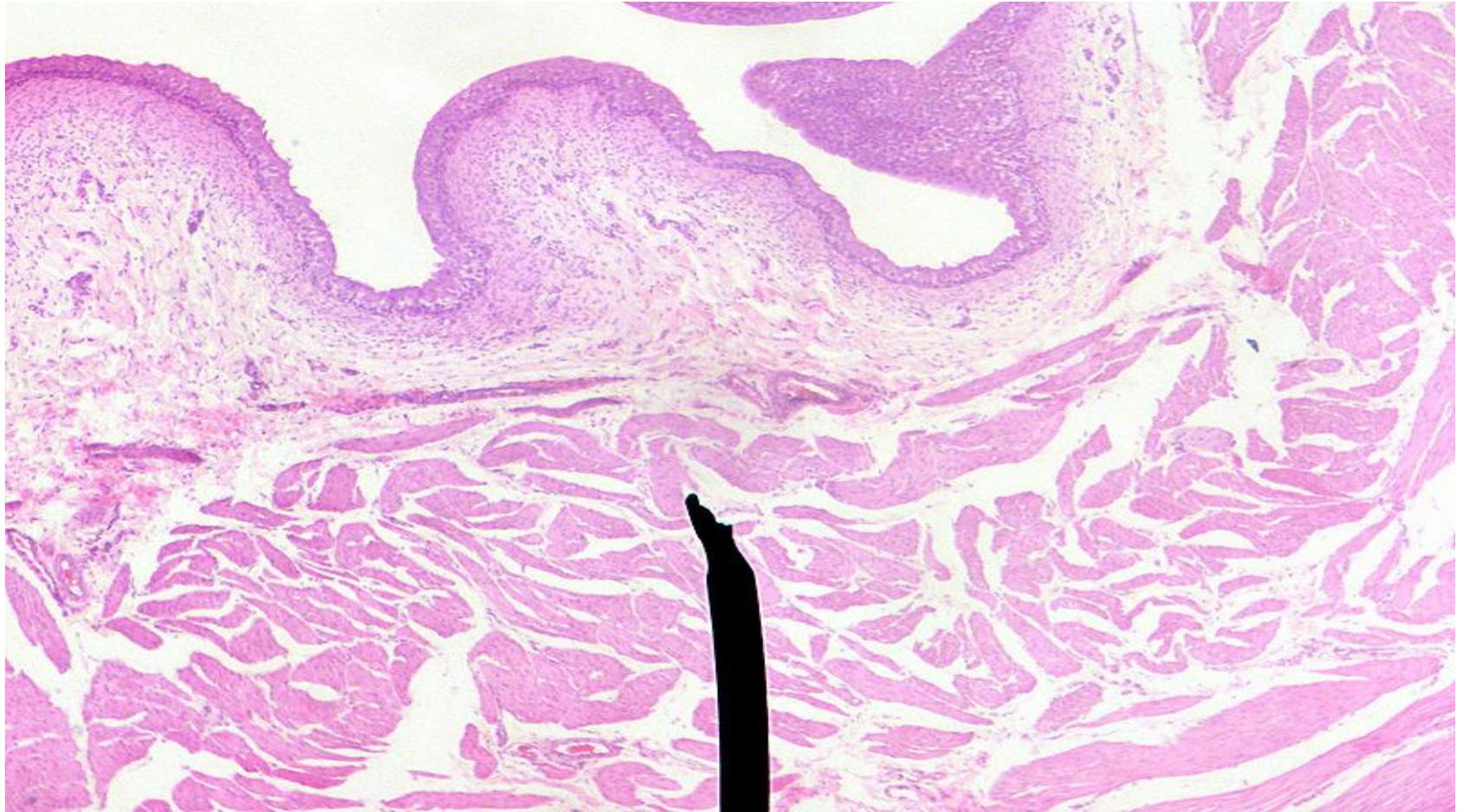


(a)

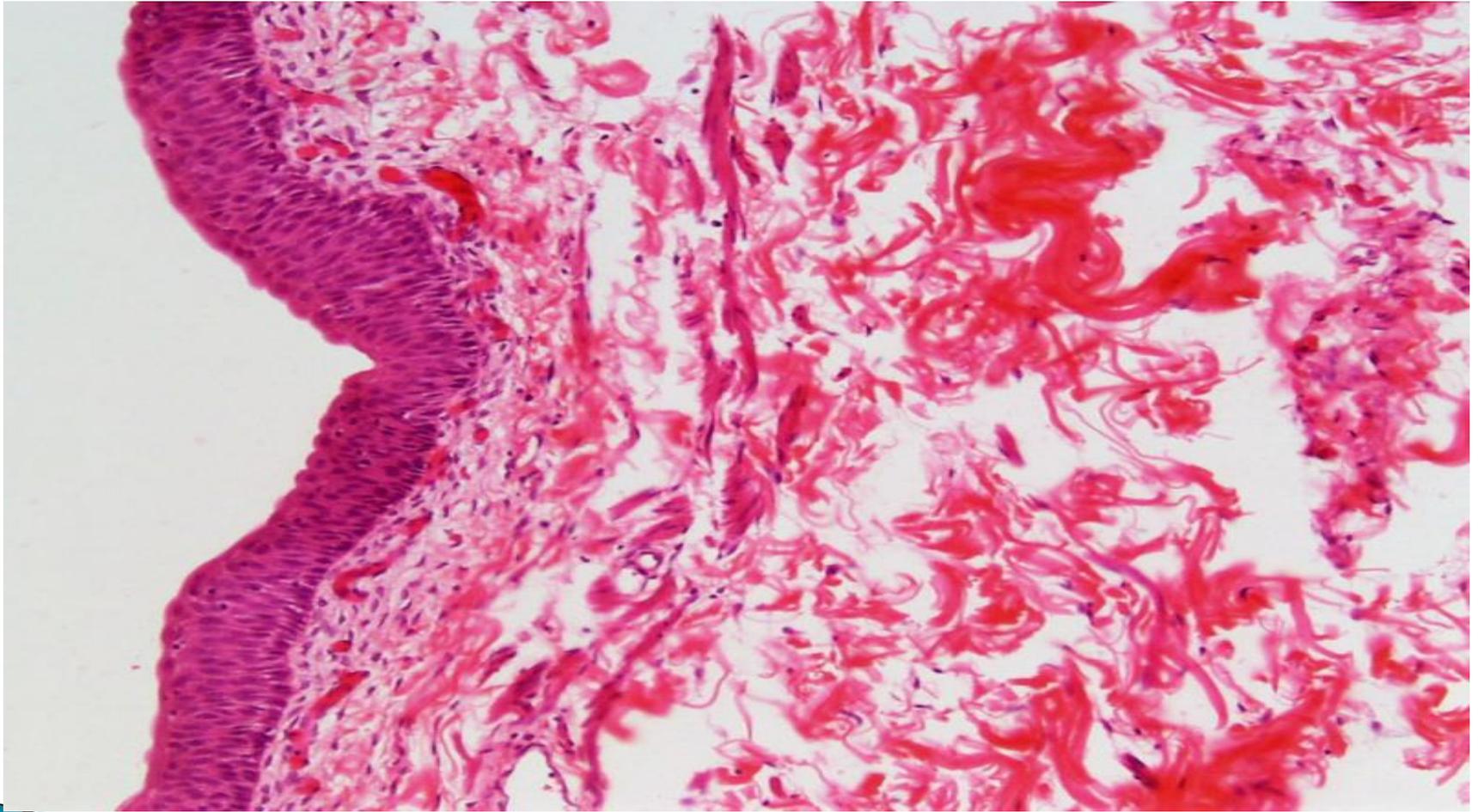


(b)

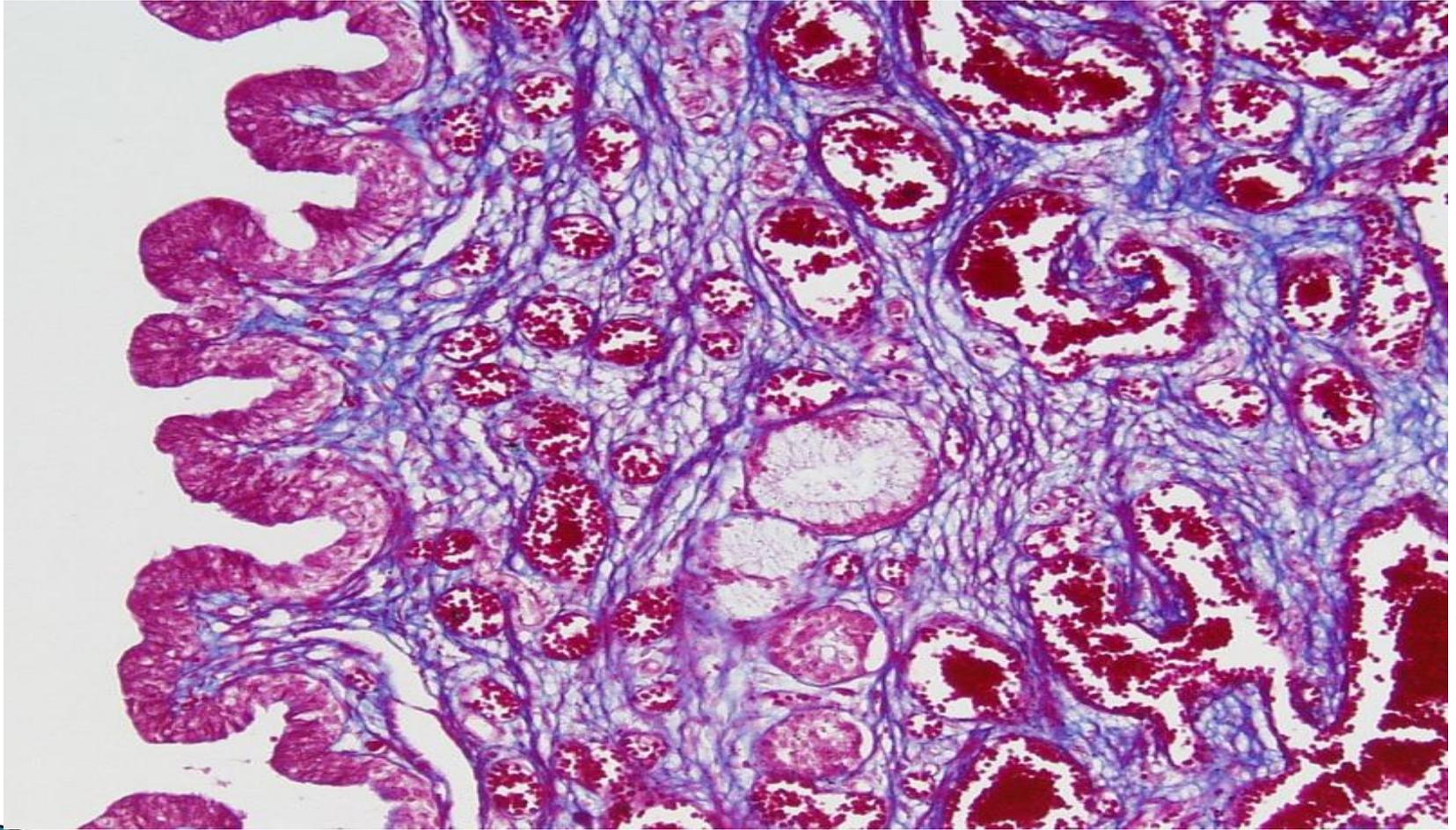
# Microscopy of urinary bladder



# Transitional epithelium of bladder



# Magnified view



# Magnified view of transitional epithelium

