

# The urinary passage

## Objectives:

By the end of this lecture, the student should be able to describe

1. The microscopic structure of the Renal pelvis and ureter.
2. The microscopic structure of the urinary bladder and male and female urethra

# Juxtaglomerular apparatus

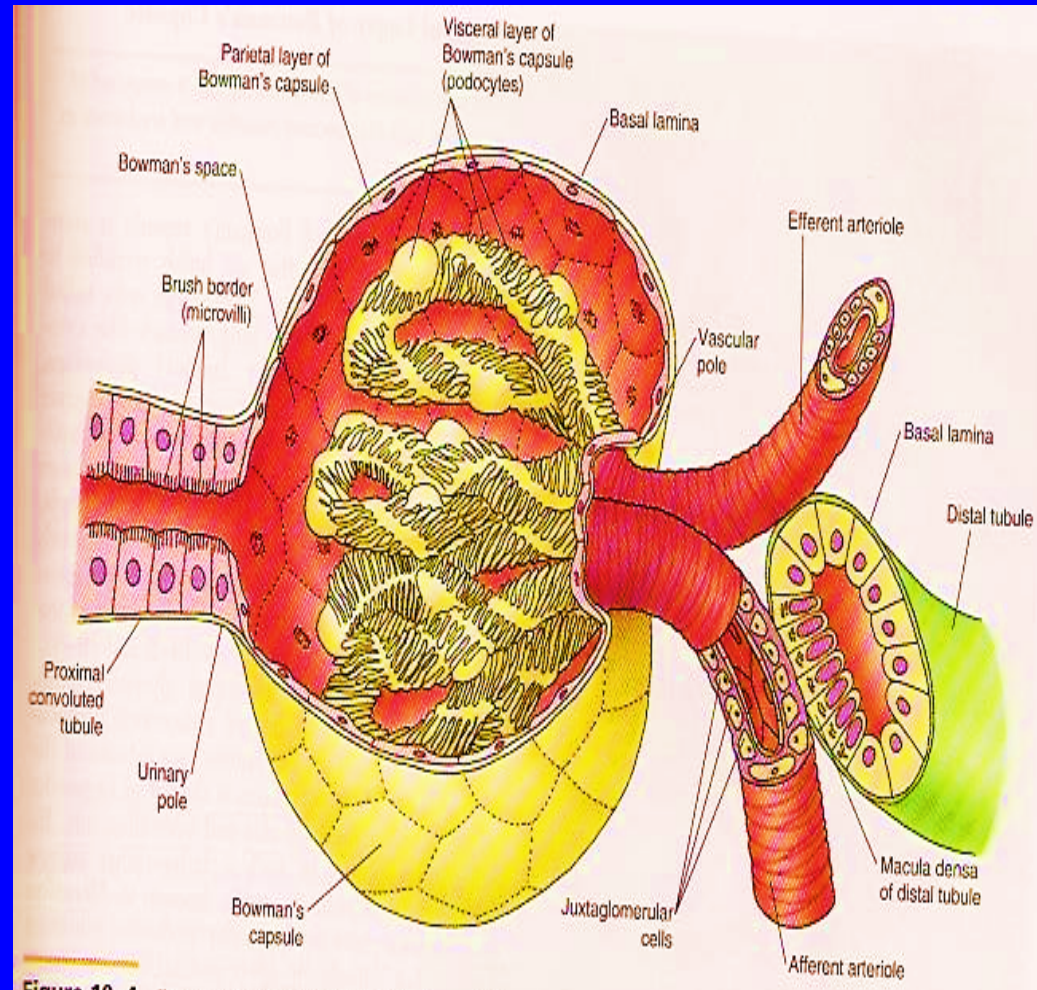
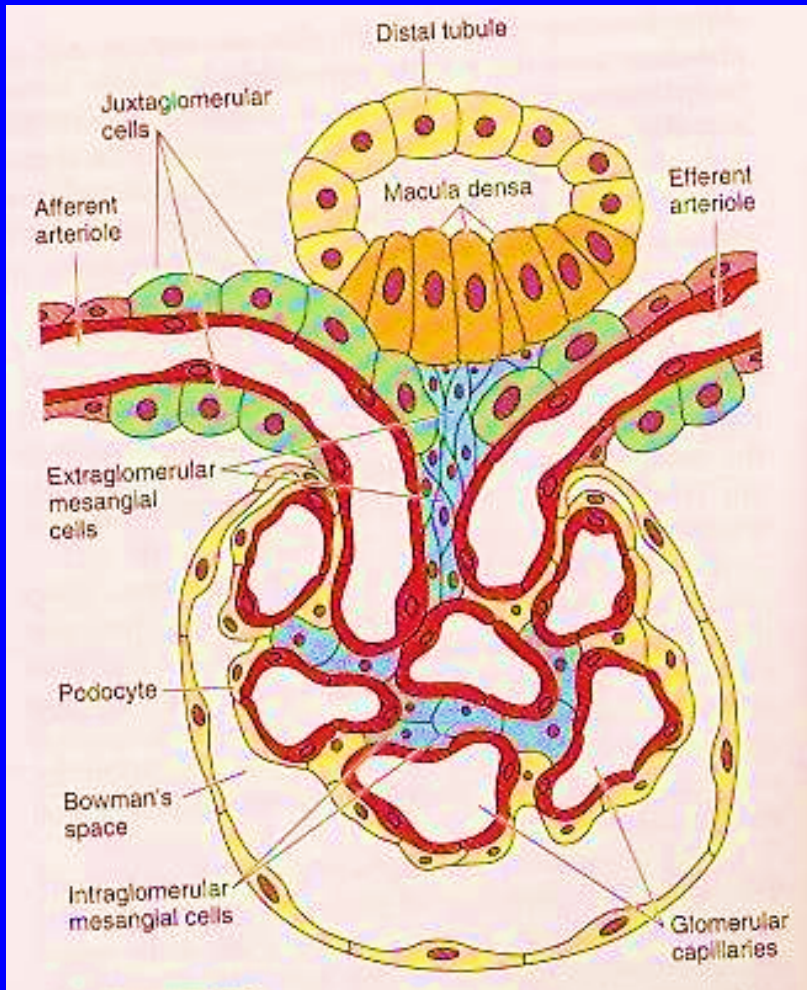


Figure 10-1

# *Juxtaglomerular apparatus*

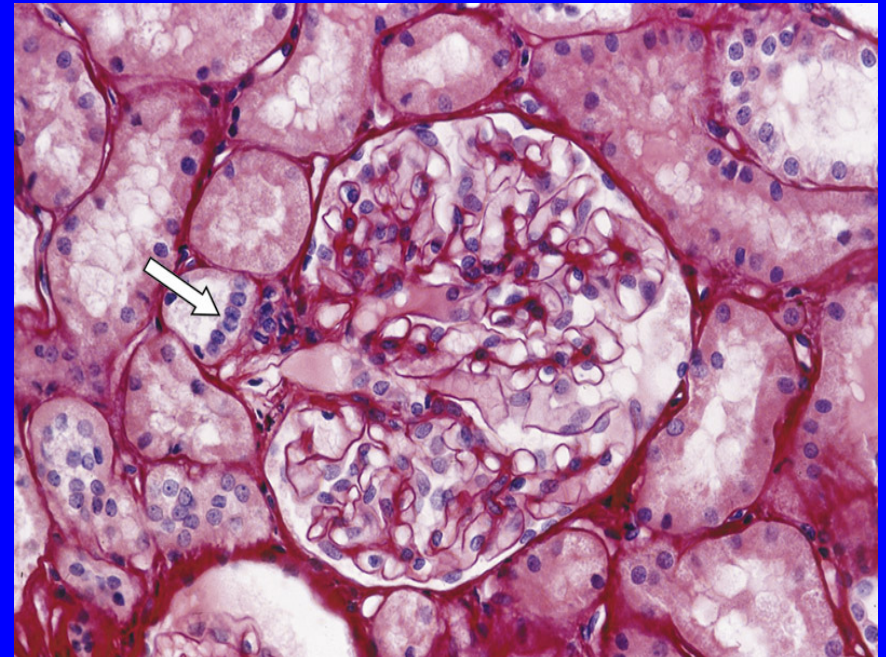
- It has 3 components:

**A-The macula densa** of distal tubule: Tall cells with centrally-placed nuclei

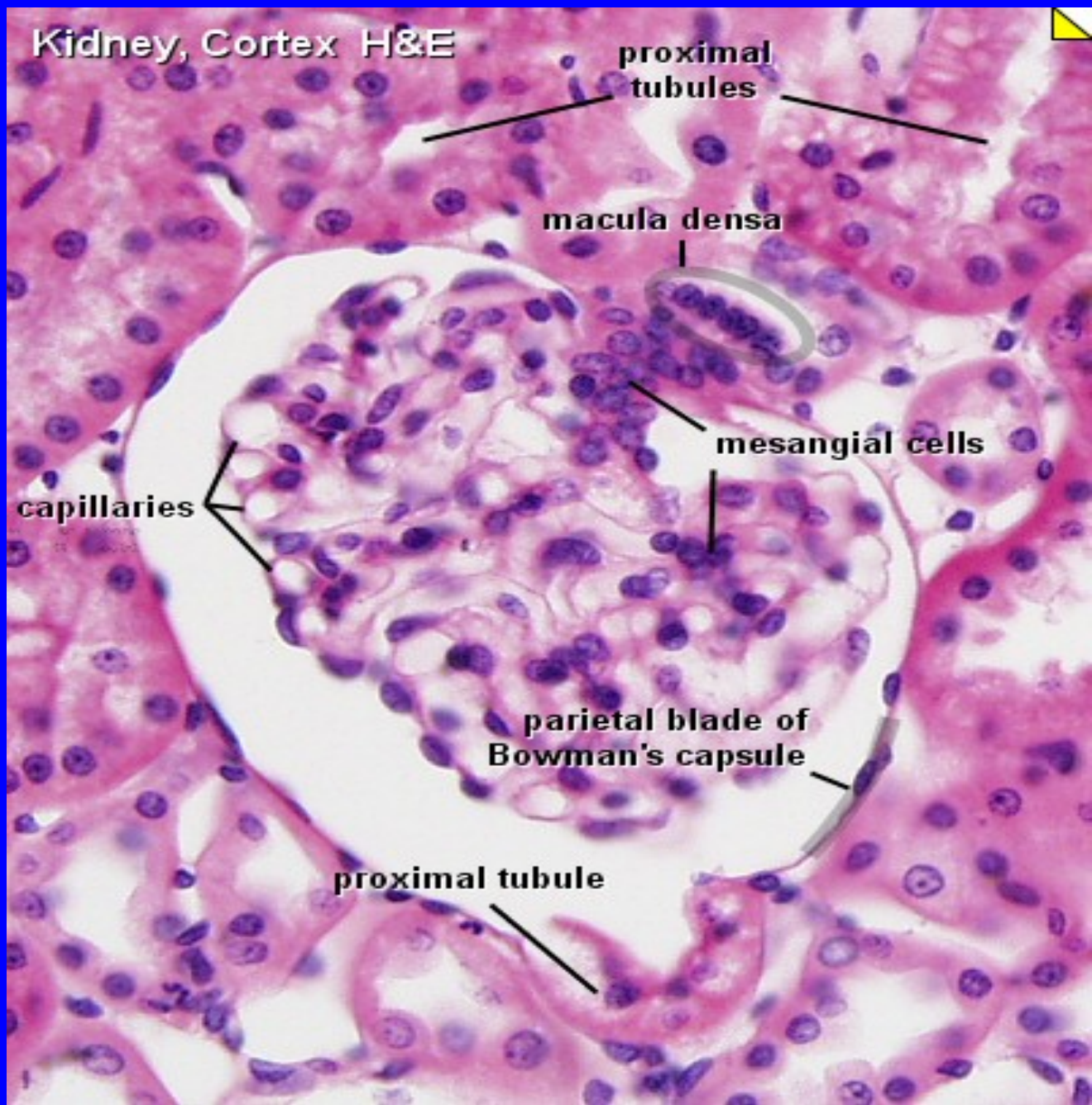
**B-Juxtaglomerular cells** of afferent glomerular arteriole (modified smooth muscle of tunica media). Nuclei are round with granular cytoplasm.

\*They secrete renin.

**C-The extraglomerular mesangial cells.**



**Kidney, Cortex H&E**



proximal tubules

macula densa

mesangial cells

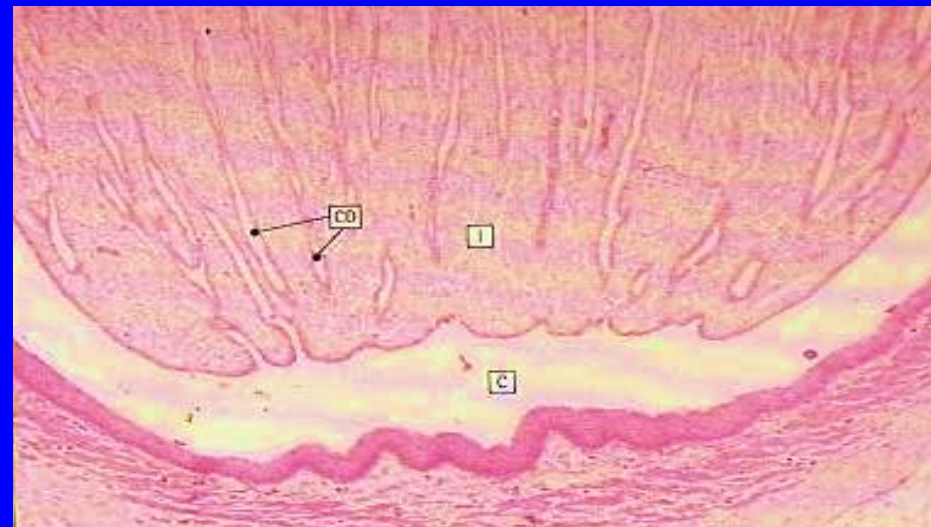
capillaries

parietal blade of Bowman's capsule

proximal tubule

# Renal Calyces

- Each calyx accepts urine from the renal papilla of a renal pyramid.
- They are lined with transitional epith., lamina propria and smooth muscle.
- Minor calyces merge to form major calyces (with same lining tissue as minor calyces).
- Major calyces open into renal pelvis.



# Ureter

## 1. Mucosa:

Is formed of transitional epith. and lamina propria.

## 2. Muscularis (muscular coat):

Is formed of 2 layers of smooth muscle in the upper 2/3:

A- Inner longitudinal.

B- Outer circular.

Is formed of 3 layers of smooth muscle in the lower 1/3:

A- Inner longitudinal .

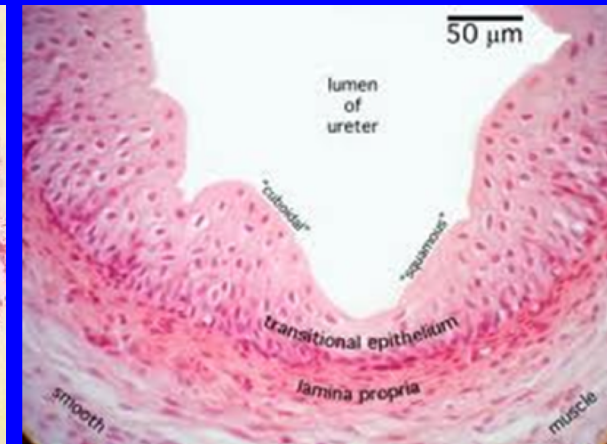
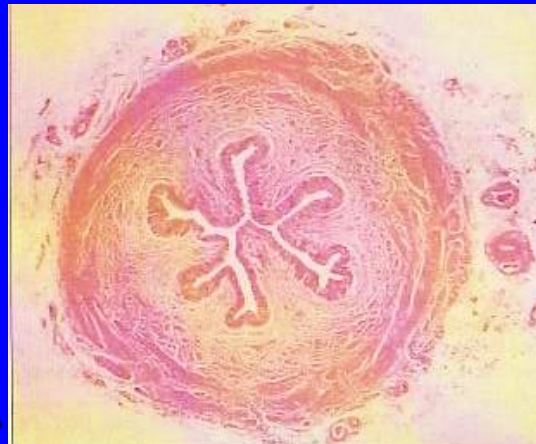
B- Middle circular.

C- Outer longitudinal.

## 3. Adventitia

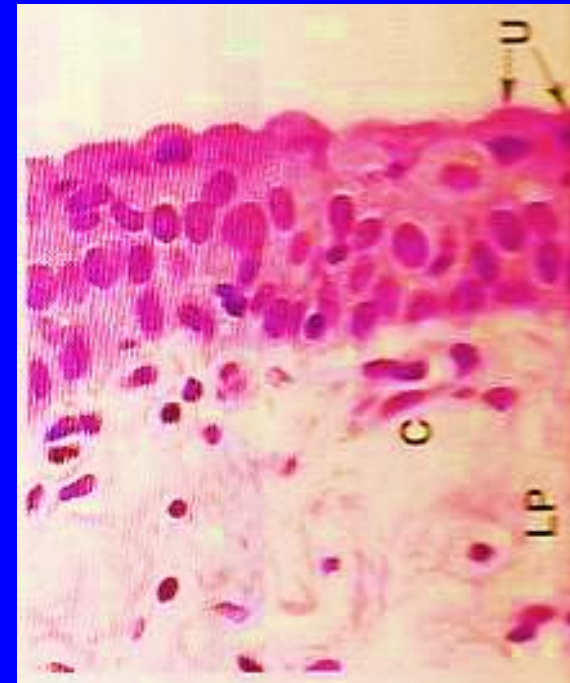
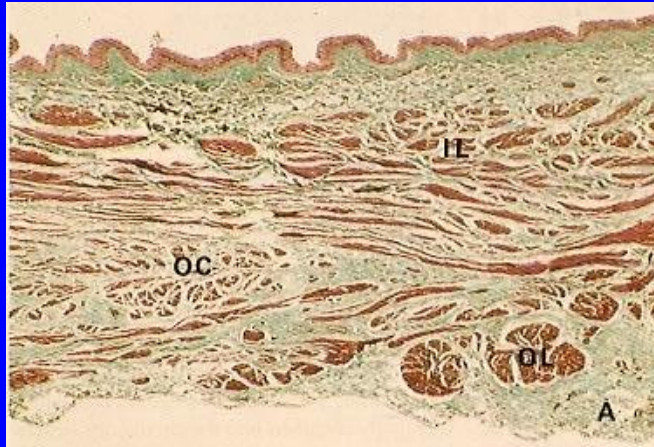
fibrous C.T. covering.

N.B. No serosa.

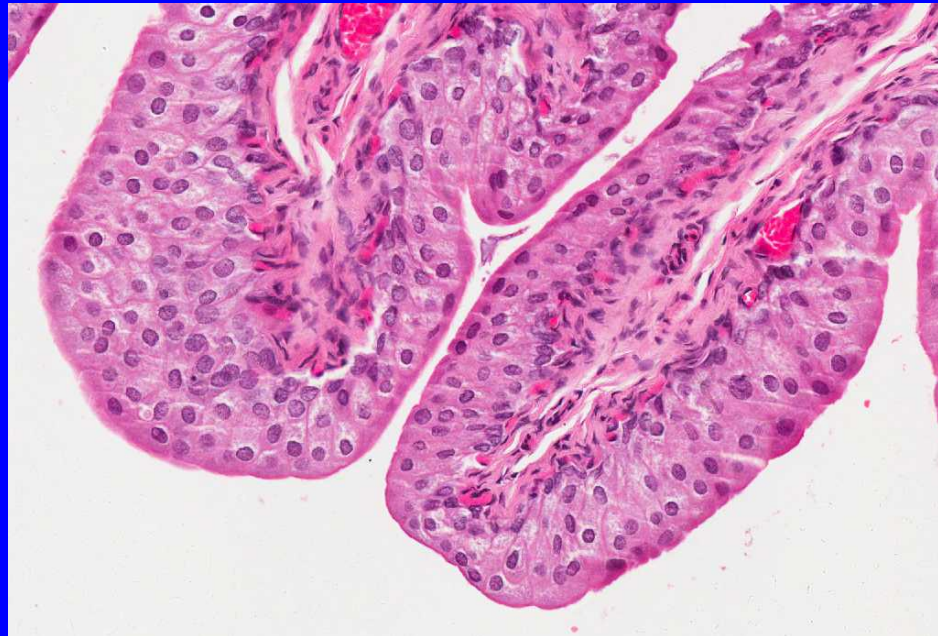
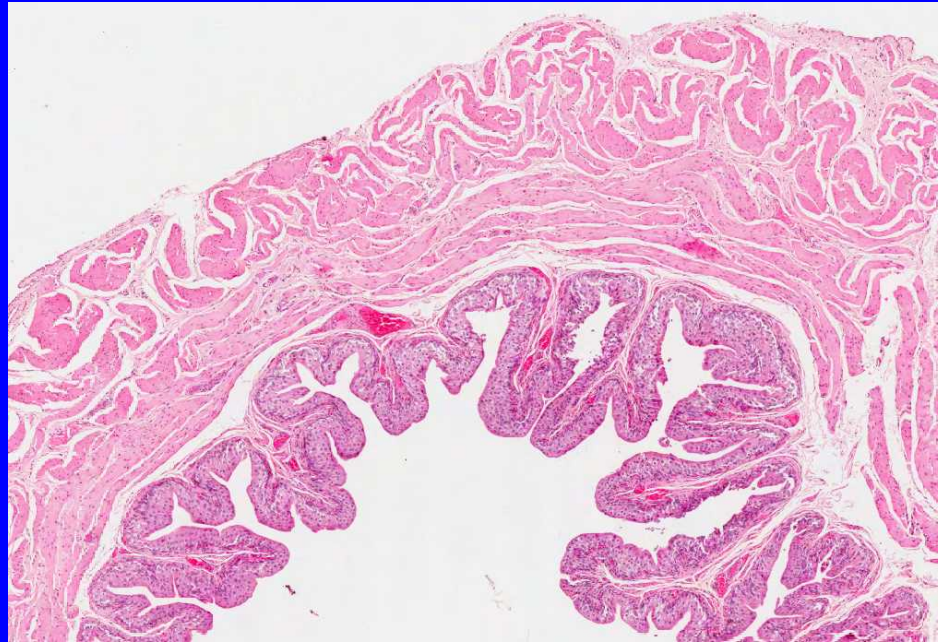


# Urinary bladder

- It has the same structure as the lower third of ureter.
- Superficial layer of transitional epithelium has dome-shaped cells (in empty bladder).
- It has 3 layers of smooth muscle: inner and outer longitudinal (thin) and middle circular (thick) layers.
- Its outer covering is adventitia or serosa.



*Urinary bladder*





# *Female Urethra*

- Female urethra is short and lined by :

## **A- Epithelium:**

- 1- Transitional epith. Near the bladder.
- 2- Pseudostratified columnar epith.
- 3- Stratified squamous non-keratinized epith.

## **B- Sub-epithelial fibroelastic CT**

that contains glands of Littre (mucus-secreting glands).

## **C- Smooth muscle:**

inner longitudinal and outer circular layers.

# Male Urethra

- It is long and is divided into 3 regions:
    - 1- **Prostatic urethra:** is lined with transitional epith.
    - 2- **Membranous urethra:** is lined with:  
Stratified columnar epith. with patches of  
pseudustratified columnar epithelium.
    - 3- **Penile (spongy) urethra:** is lined with:  
Stratified columnar epith. with patches of  
pseudustratified columnar epithelium.
- N.B. **In navicular fossa ( enlarged terminal portion):** Stratified squamous non-keratinized epith.

N.B. The lamina propria contains mucus-secreting glands of Littre.

**BEST WISHES**