جامعة الملك سعود
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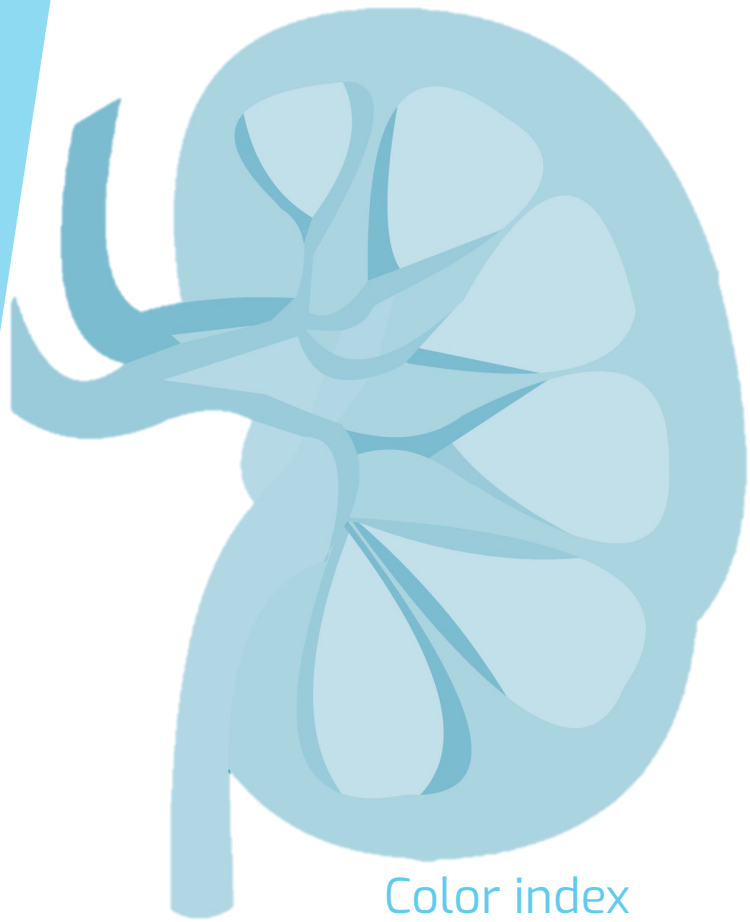

URINARY PASSAGE

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MED439
KING SAUD UNIVERSITY

Color index

- boys & girls slides
- important
- notes
- extra

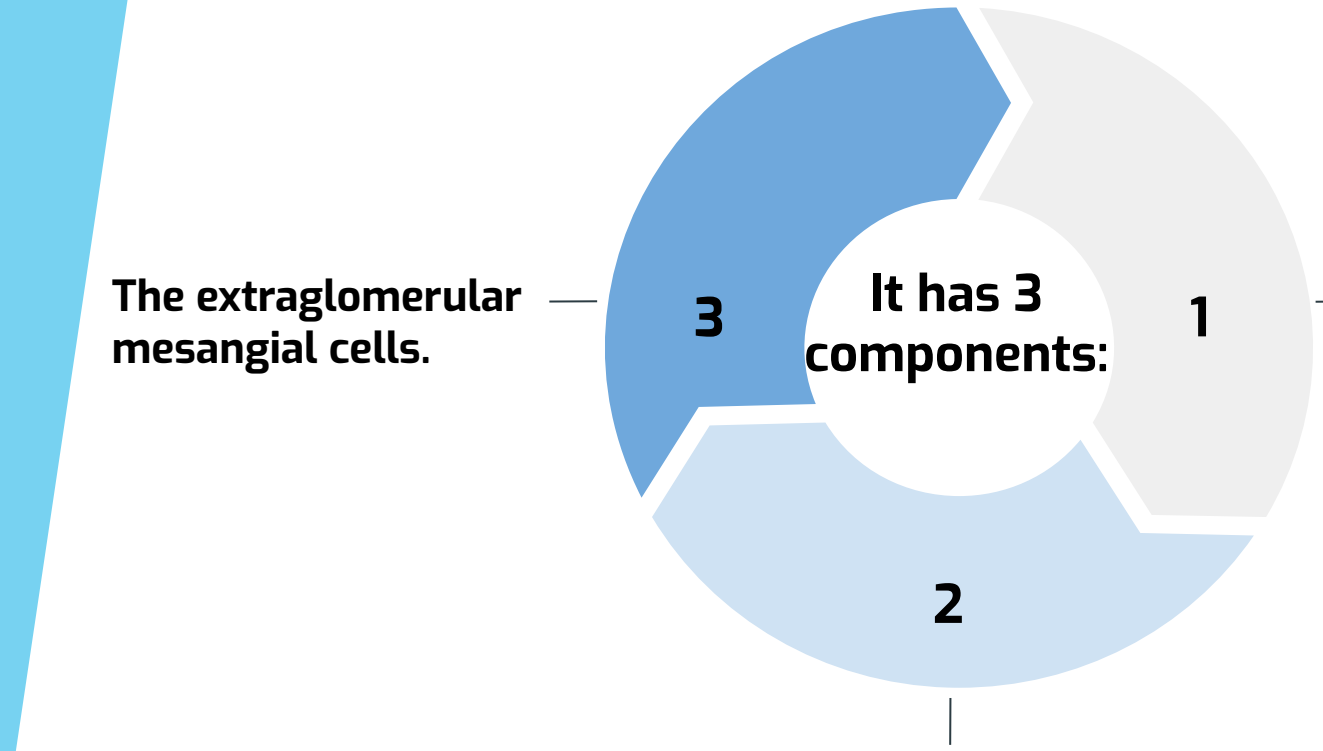
Editing file

Objectives:

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

- **The Renal pelvis and ureter.**
- **The urinary bladder and male and female urethra.**

Juxtaglomerular apparatus

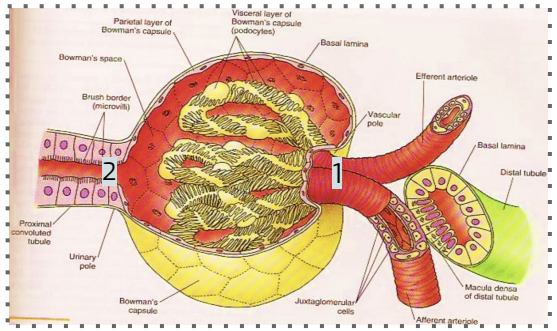


The macula densa of distal tubule: tall cells with centrally-placed nuclei

Juxtaglomerular cells of afferent glomerular arteriole (modified smooth muscle of tunica media) Nuclei are round with granular cytoplasm, **they secrete renin.**

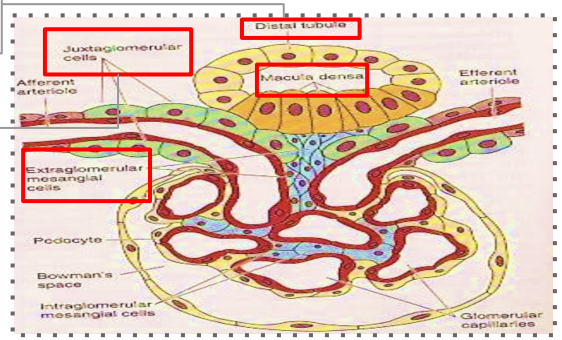
The extraglomerular mesangial cells.

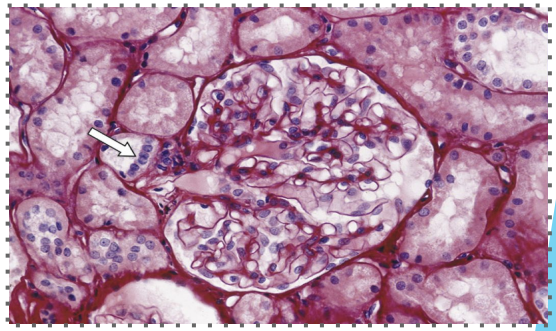
The renal corpuscle has 2 pores:
1- vascular pore.
2- pore that continue with the proximal tubules.

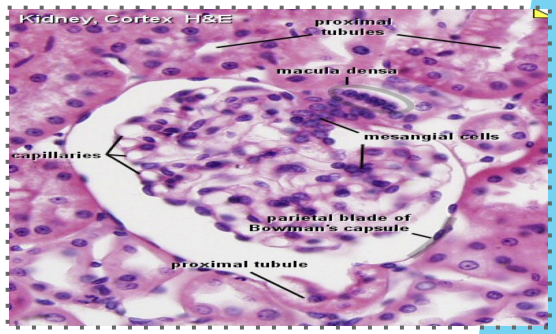


Part of the wall of the distal tubule is connected with Afferent arteriole.

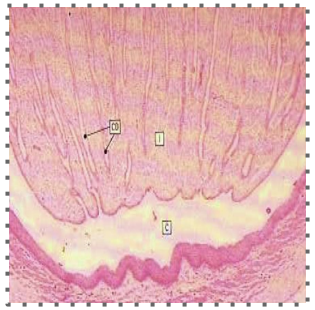
It's modified from smooth muscle cells of the afferent arteriole, it secret renin







Renal Calyces



- Each calyx accepts urine from the renal papilla of a renal pyramid.
- They are lined with **transitional epithelium**, 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

Mucosa	Muscularis (muscular coat)	Adventitia
• is formed of transitional epithelium and lamina propria.	• Is formed of 2 layers of smooth muscle in the **upper 2/3:** 1- Inner longitudinal. 2- Outer circular. • Is formed of 3 layers of smooth muscle in the **lower 1/3:** 1- Inner longitudinal . 2- Middle circular. 3- Outer longitudinal.	• fibrous C.T. covering. N.B. **No serosa**.

The lumen is narrow because urine does not accumulate due to gravity

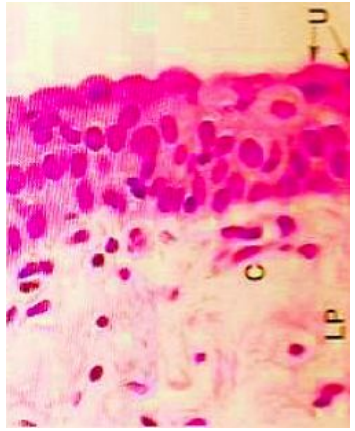
Urinary bladder

- It has the same structure as the lower third of ureter

Urinary bladder

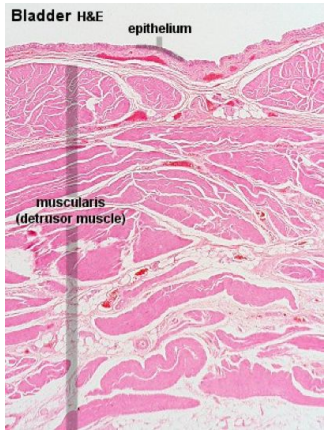
Superficial layer

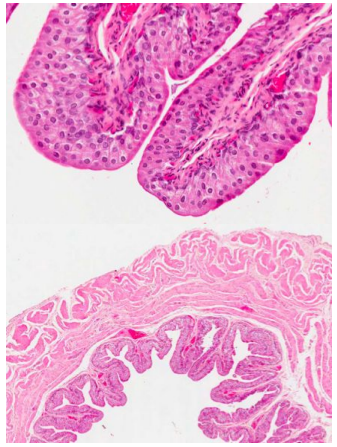
transitional epithelium has dome-shaped cells (in empty bladder)



3 layers of smooth muscle

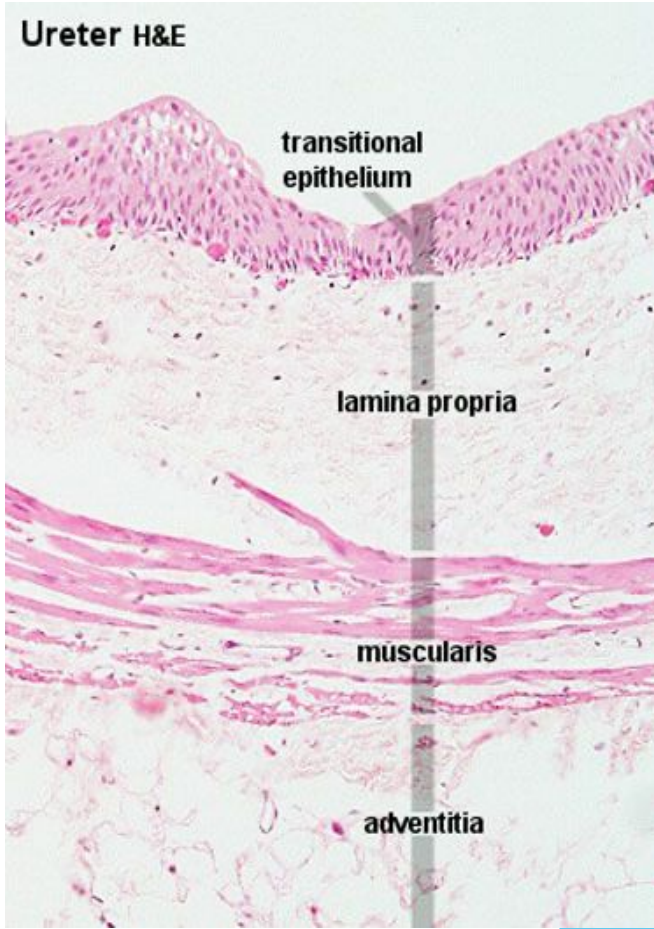
inner and outer longitudinal (thin) and middle circular (thick) layers.





outer covering

is adventitia or serosa.
part of urinary bladder cover with Adventitia and other part cover with Serosa



Urethra

Male urethra
It's long & Divided by 3 regions:

Prostatic urethra
lined with transitional epithelium

Membranous urethra
is lined with: Stratified columnar epith. With patches of pseudustratified columnar epithelium.

Penile (spongy) urethra(the longest)
is lined with: Stratified columnar epith. with patches of pseudustratified columnar epithelium.

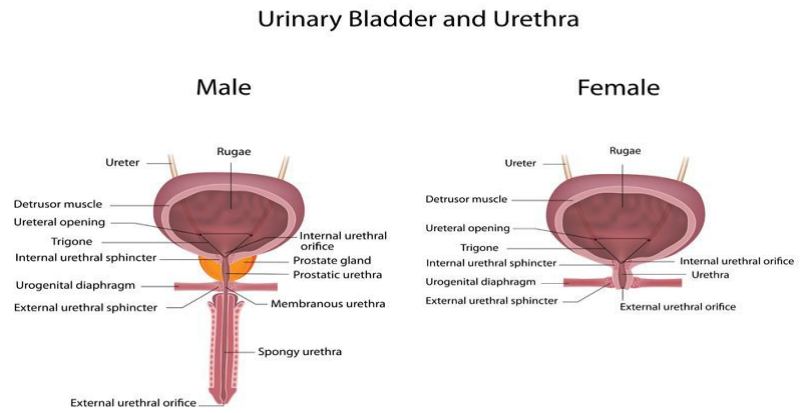
In navicular fossa (enlarged terminal portion):
Stratified squamous non-keratinized epith.
The lamina propria contains mucus-secreting glands of Littre.

Female urethra
is short and lined by:

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

Sub-epithelial fibroelastic CT
that contains glands of Littre (mucus-secreting glands).

Smooth muscle
inner longitudinal and outer circular layers.



SUMMARY

Renal calyces	Each calyx accepts urine from the renal papilla of a renal pyramid. They are lined with transitional epithelium, lamina propria & smooth muscle. Minor calyces merge to form major calyces (with same lining tissue as minor calyces). Major calyces open into renal pelvis.		
Ureter	**Mucosa**	Formed of transitional epithelium and lamina propria	
	Muscularis (muscular coat)	Formed of 2 layers of smooth muscle in the upper 2/3: 1- Inner longitudinal 2- Outer circular Formed of 3 layers of smooth muscle in the lower 1/3: 1- Inner longitudinal 2- Middle circular 3- Outer longitudinal	
	Adventitia	Fibrous C.T. covering (without 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) Formed of 3 layers of smooth muscle: Inner & outer longitudinal (thin) & middle circular (thick). Its outer covering is adventitia or serosa		
Urethra	**Female urethra (Short)**	Epithelium	1- Transitional epithelium near the bladder 2- Pseudostratified columnar epithelium 3- Stratified squamous non-keratinized epithelium
		Sub-epithelial fibroblasts C.T.	Contains glands of Littre (mucus-epithelial secreting glands)
		Smooth muscle	Inner longitudinal & outer circular layers
	Male urethra (Long)	Prostatic urethra	Lined with transitional epithelium
		Membranous urethra	Lined with stratified columnar epithelium, with patches of pseudostratified columnar epithelium
		Penile (spongy) urethra	
		N.B. In navicular fossa (enlarged terminal portion): Stratified squamous non-keratinized epithelium N.B. The lamina propria contains mucus secreting glands of Littre	

1) Which of the following can not be found in female urethra?

A) Prostate
B) Penis
C) Epithelium
D) Both A & B

2) Which of the following can be found in the wall of urinary bladder?

A) Serosa
B) 2 layers of smooth muscles
C) Stratified columnar epithelium
D) pseudostratified columnar epithelium

3) The navicular fossa is lined with:

A) Pseudostratified columnar epithelium
B) Stratified squamous non-keratinized epithelium
C) Stratified columnar epithelium
D) Stratified squamous keratinized epithelium

4) Which cell is found in Afferent arteriole?

A) Macula densa
B) Juxtaglomerular cells
C) Principal cells
D) Mesangial cells

5) The renal calyces lined with all of the following except:

A) Transitional epithelium
B) Lamina propria
C) Smooth muscle
D) Adventitia

6) Which of the following structures is found in the ureter?

A) Serosa
B) Submucosa
C) Single layer of smooth muscles
D) Transitional epithelium

1) D
2) A
3) B
4) B
5) D
6) D

Team members

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Abdullah Alburikan

اللهم إنا نسألك باسمك العظيم الأعظم، الذي إذا دعيت به أجبت، وإذا سئلت به أعطيت، وبأسمائك الحسنى كلها ما علمنا منها وما لم نعلم، أن تجيب لنا الدعاء وترفع عن البلاء والوباء

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