

URETERS, BLADDER, & URETHRA

By

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A/P Anatomy kgmc

URETERS, BLADDER, & URETHRA

Urine is transported by the ureters from the renal pelvis to the urinary bladder.

Urine is stored until emptying by micturition via the urethra.

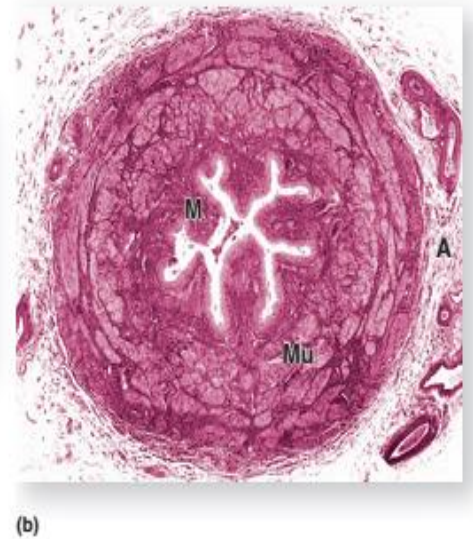
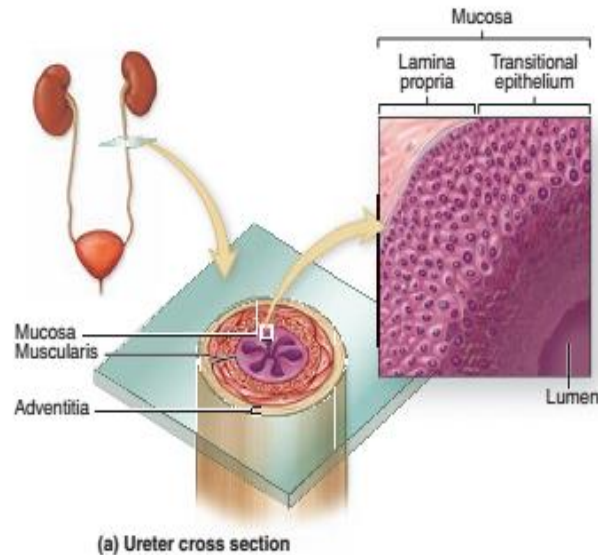
The calyces, renal pelvis, ureter, and bladder have somewhat similar histologic structure.

URETER

The walls becoming gradually thicker closer to the bladder.

The mucosa of these organs is lined by the unique stratified transitional epithelium or urothelium .

Muscularis is much thicker than the mucose and adventatitia.



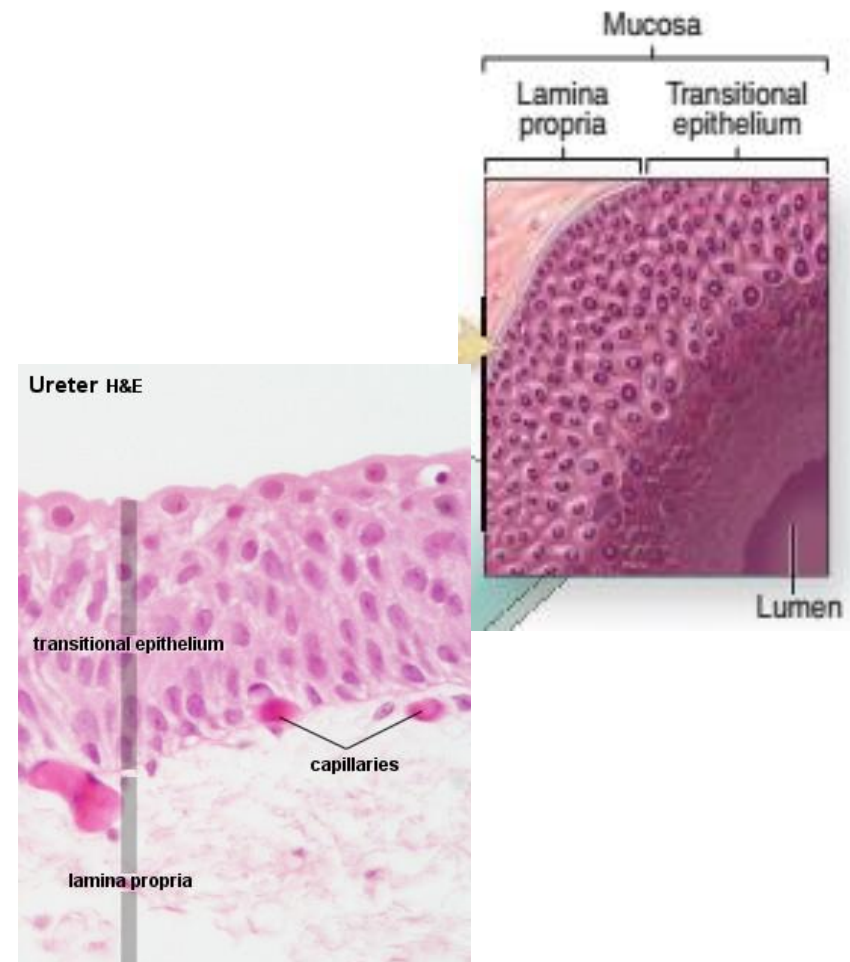
Cells of this epithelium are organized as three layers

A single layer of small basal cells resting on a very thin basement membrane;

- An intermediate region containing from one to several layers of more columnar cells; and
- A superficial layer of very large, bulbous cells called umbrella cells that are occasionally bi- or multinucleated

Highly differentiated

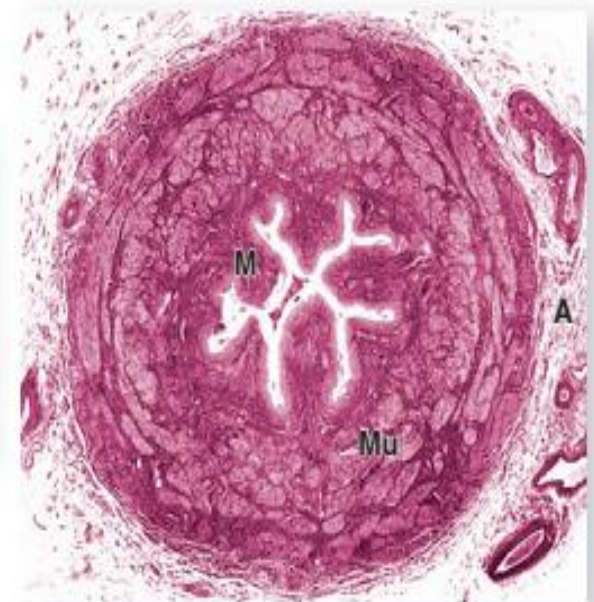
To protect underlying cells against the cytotoxic effects of hypertonic urine.



Urothelium

Urothelium is surrounded by a folded lamina propria and submucosa, and is covered by a dense sheath of interwoven smooth muscle layers and adventitia.

The bladder's lamina propria and dense irregular connective tissue of the submucosa are highly vascularized.



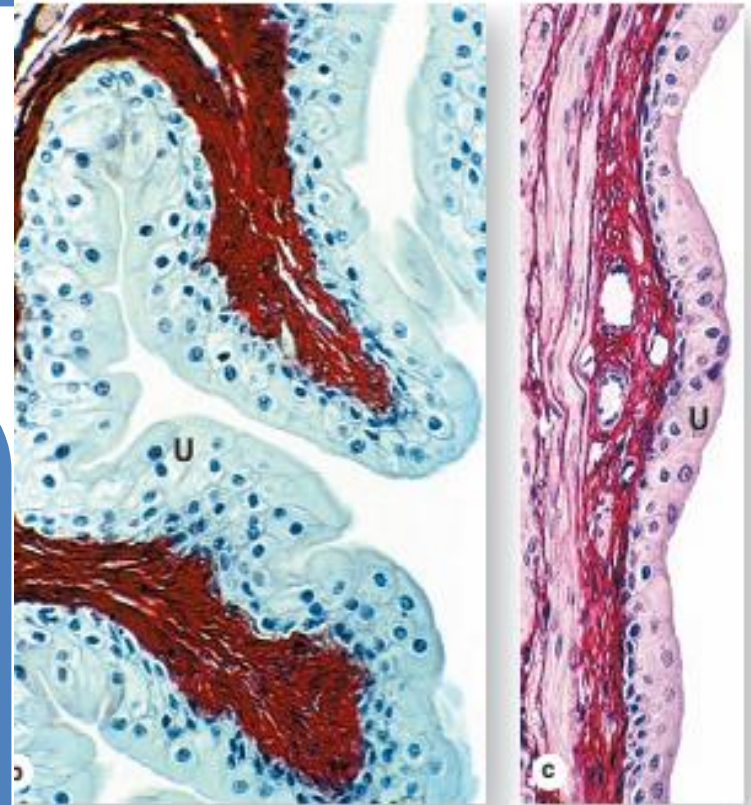
(b)

Urinary bladder

Umbrella cells are especially well developed in the bladder

where contact with urine is greatest.

These cells, up to 100 μm in diameter, have extensive intercellular junctional complexes surrounding unique apical membranes

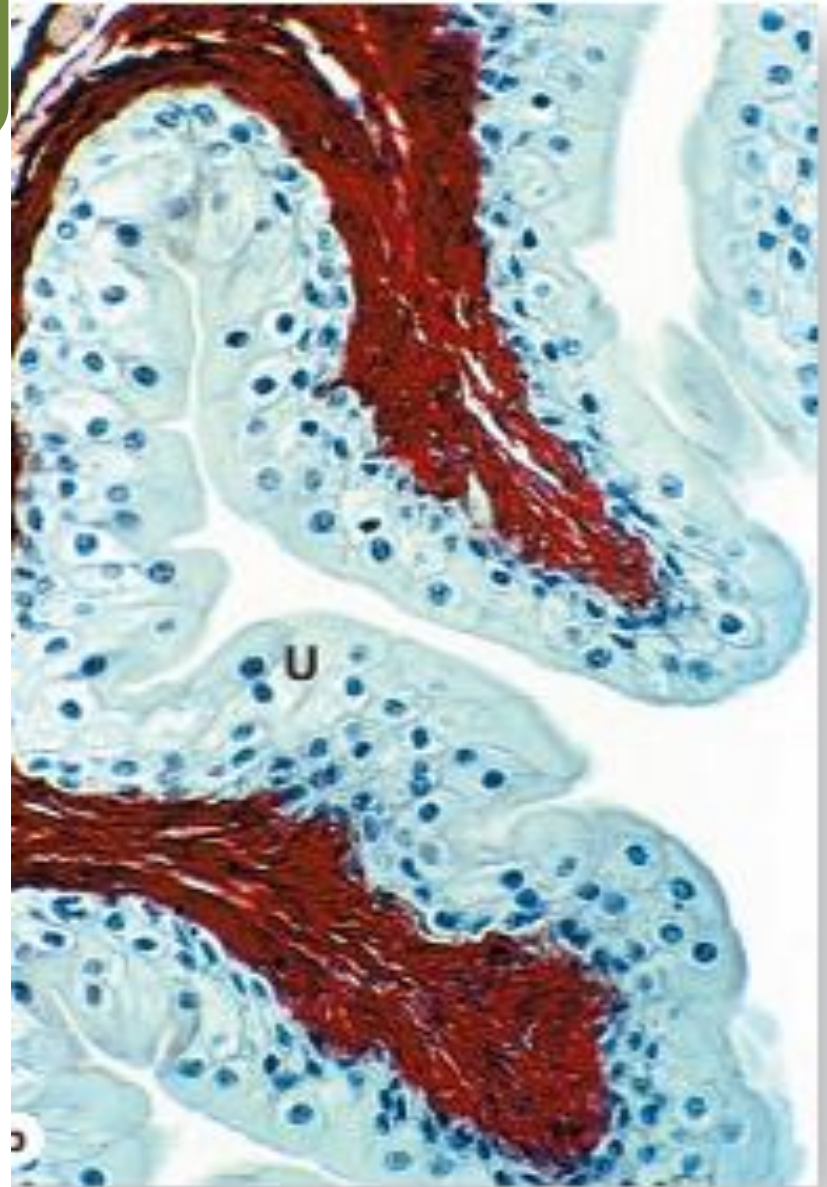


(b) When the bladder is empty, the mucosa is highly folded and the urothelium (U) has bulbous umbrella cells. X250. PSH.
(c) When the bladder is full, the mucosa is pulled smooth, the urothelium (U) is thinner, and the umbrella cells are flatter. X250. H&E.

UROPLAKIN

These regions are composed of lipid containing mostly integral membrane proteins called uroplakins

These membranous plaques are impermeable to water and protect cytoplasm and underlying cells from the hyperosmotic effects of urine.



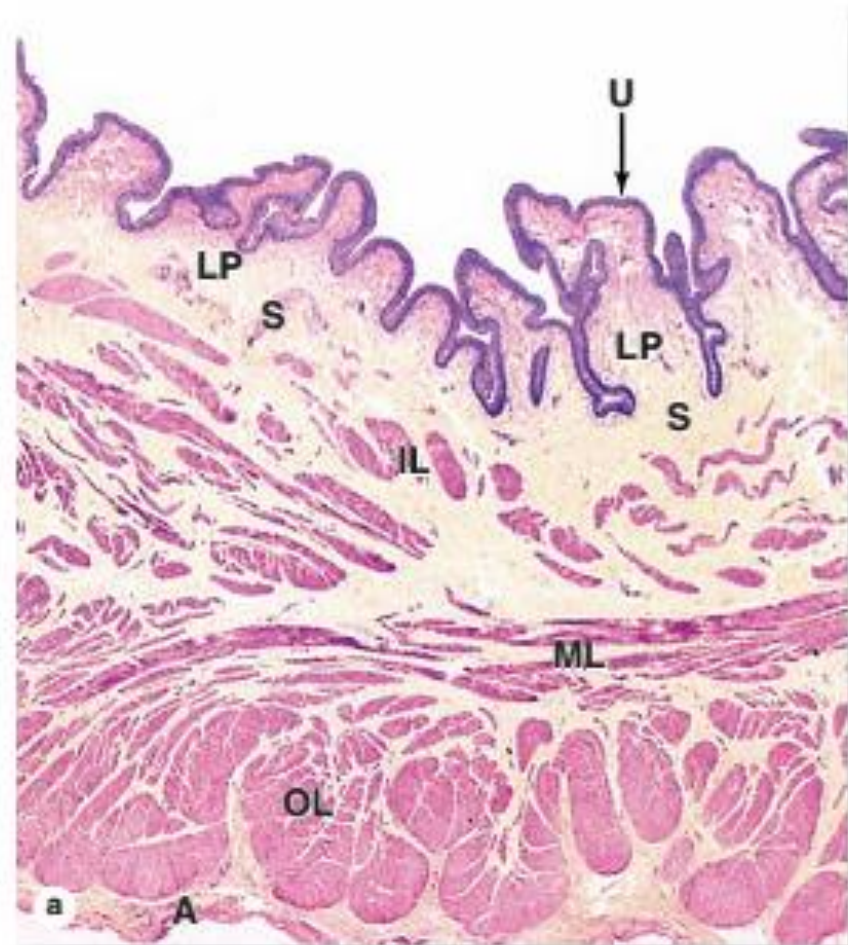
Detrusor muscle

The muscularis consists of three layers, collectively called the detrusor muscle, which contract to empty the bladder .

Three muscular layers are seen most distinctly at the neck of the bladder near the urethra

The ureters pass through the wall of the bladder obliquely, forming a valve that prevents the backflow of urine into the ureters as the bladder fills.

All the urinary passages are covered externally by an adventitial layer, except for the upper part of the bladder that is covered by serous peritoneum



MEDICAL APPLICATION

Cystitis, or inflammation of the bladder mucosa, is the most frequent problem involving this organ.

Such inflammation is common during urinary tract infections.

but it can also be caused by immunodeficient, urinary catheterization, radiation, or chemotherapy.

Chronic cystitis can cause an unstable urothelium, with benign urothelial changes involving hyperplasia or metaplasia.

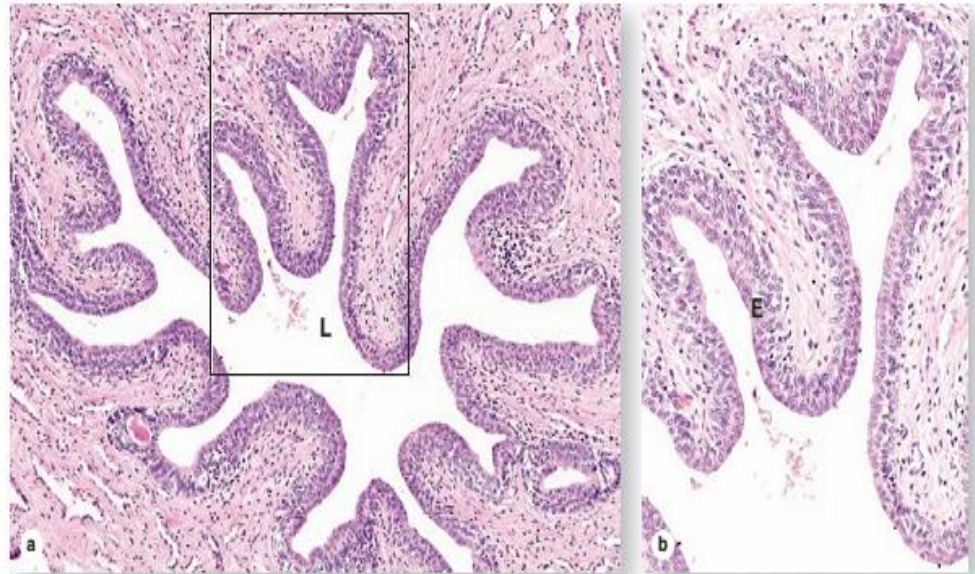
Bladder cancer is usually some form of transitional cell carcinoma arising from unstable urothelium.

THANK YOU

URETHERA

Urethra is a tube that carries the urine from the bladder to the exterior .

The urethral mucosa has prominent longitudinal folds, giving it a distinctive appearance in cross section.



Male Urethra

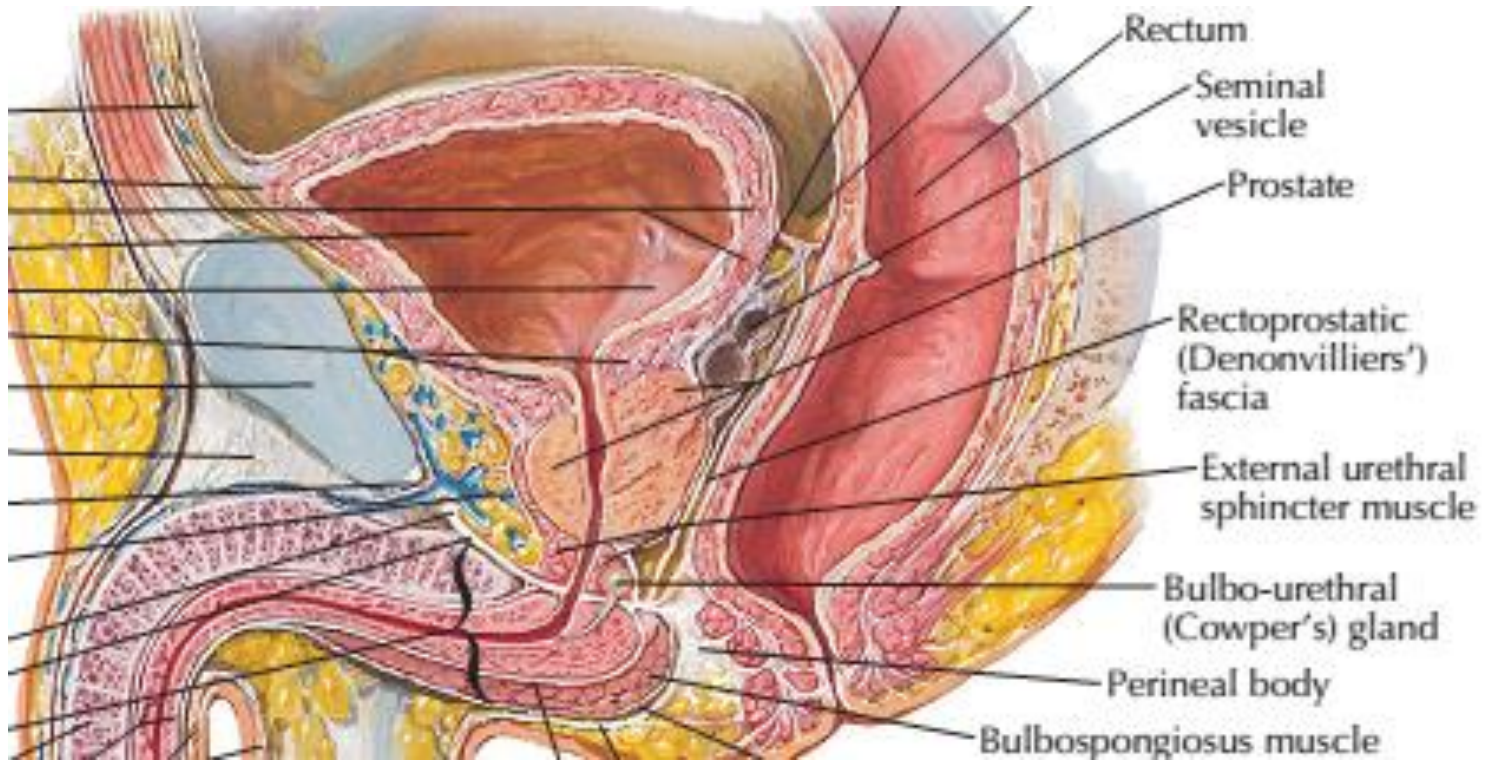
The male urethra is longer and consists of three segments:

1-Prostatic Urethra

2-Membranas urethra

3-Penile urethra

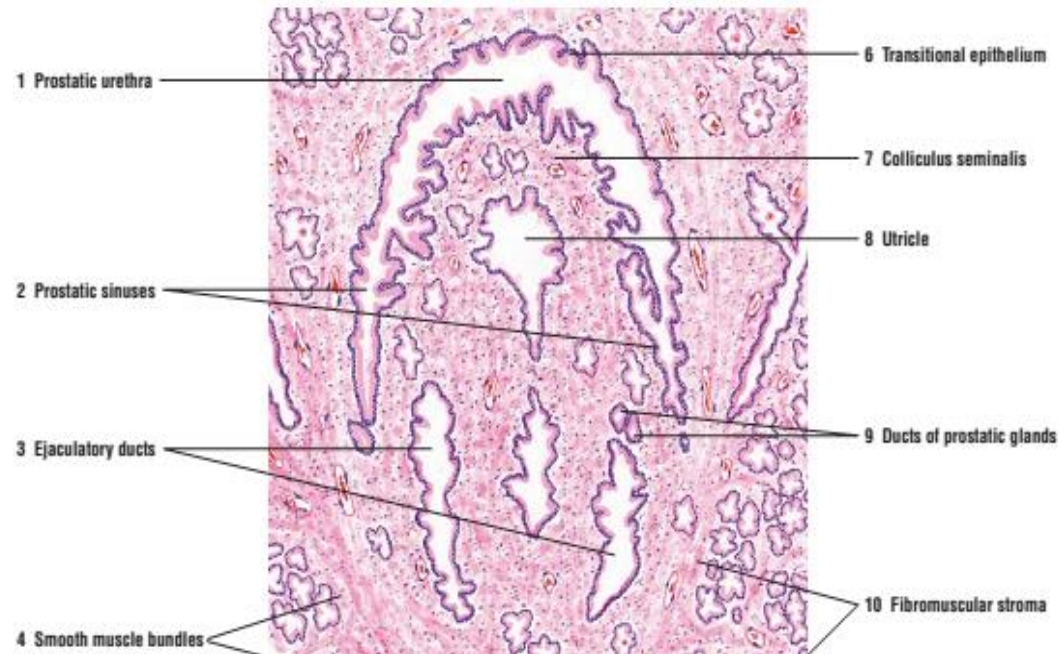
Prostatic Urethra



Prostatic Urethra

The prostatic urethra is 3 to 4 cm long.

Extends through the prostate gland and is lined by urothelium.



Membranous Urethra

The membranous urethra, a short segment

Passes through an external sphincter of striated muscle

and is lined by stratified columnar and pseudostratified epithelium.

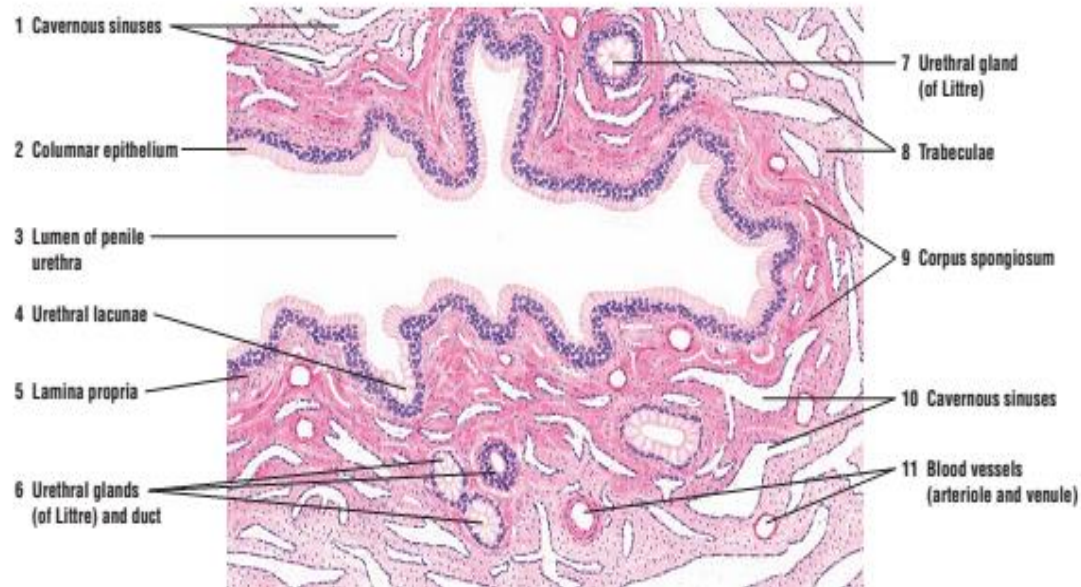
Spongy Urethra

The spongy urethra, about 15 cm in length

Is enclosed within erectile tissue of the penis

And is lined by stratified columnar Epithelium

And then pseudostratified columnar epithelium, with stratified squamous epithelium distally



Female urethra

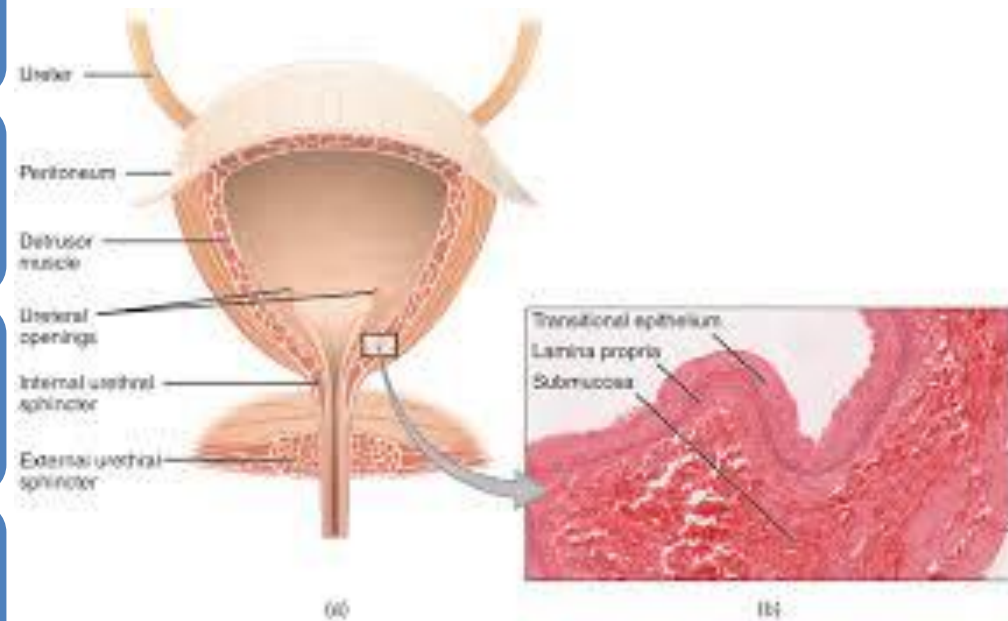
The female urethra is a 4- to 5-cm-long

lined initially with transitional epithelium

then by stratified squamous epithelium and

some areas of pseudostratified columnar epithelium.

The middle part of the female urethra is surrounded by the external striated muscle sphincter.



MEDICAL APPLICATION

Urinary tract infections, usually involving

coliform bacteria or *Chlamydia*, often produce urethritis

and in women often lead to cystitis because of the short urethra.

Such infections are usually accompanied by

a persistent or more frequent urge to urinate,

and urethritis may produce pain or difficulty during urination (dysuria).

THANK YOU