

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Handwritten Arabic calligraphy in black ink on aged, stained paper. The text is written in a highly stylized, cursive script (likely Thuluth or similar). The words are arranged in a dense, overlapping manner. The paper shows signs of wear, including brown stains and discoloration.

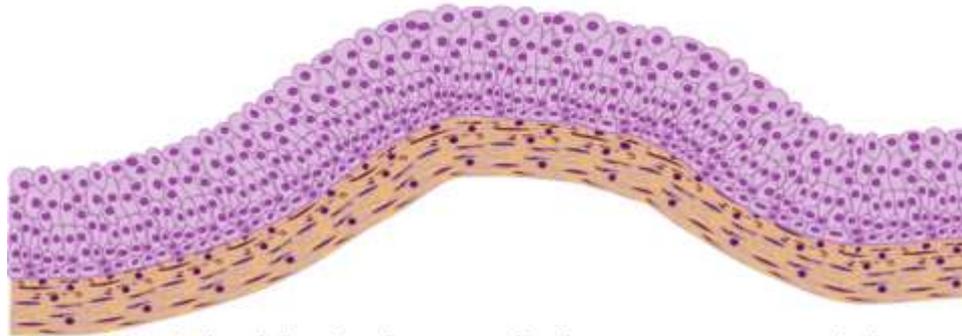


Renal Module

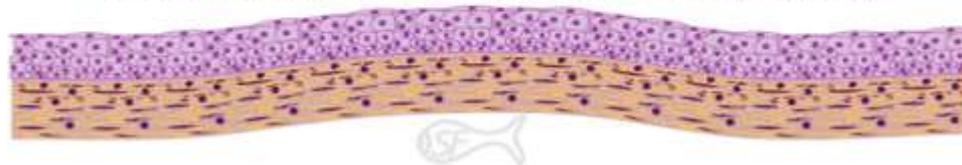
2nd Year MBBS(LGIS)

Histology of Ureter, Urinary Bladder & Urethra

Relaxed



Stretched (note dome cells become squamate)



Presenter: Dr. Maria Tasleem
(Assistant Professor)

Date: 21-04-25

Prof. Umar's Model of Teaching Strategy

Self Directed Learning Assessment Program

Objectives :To cultivate critical thinking, analytical reasoning, and problem-solving competencies.

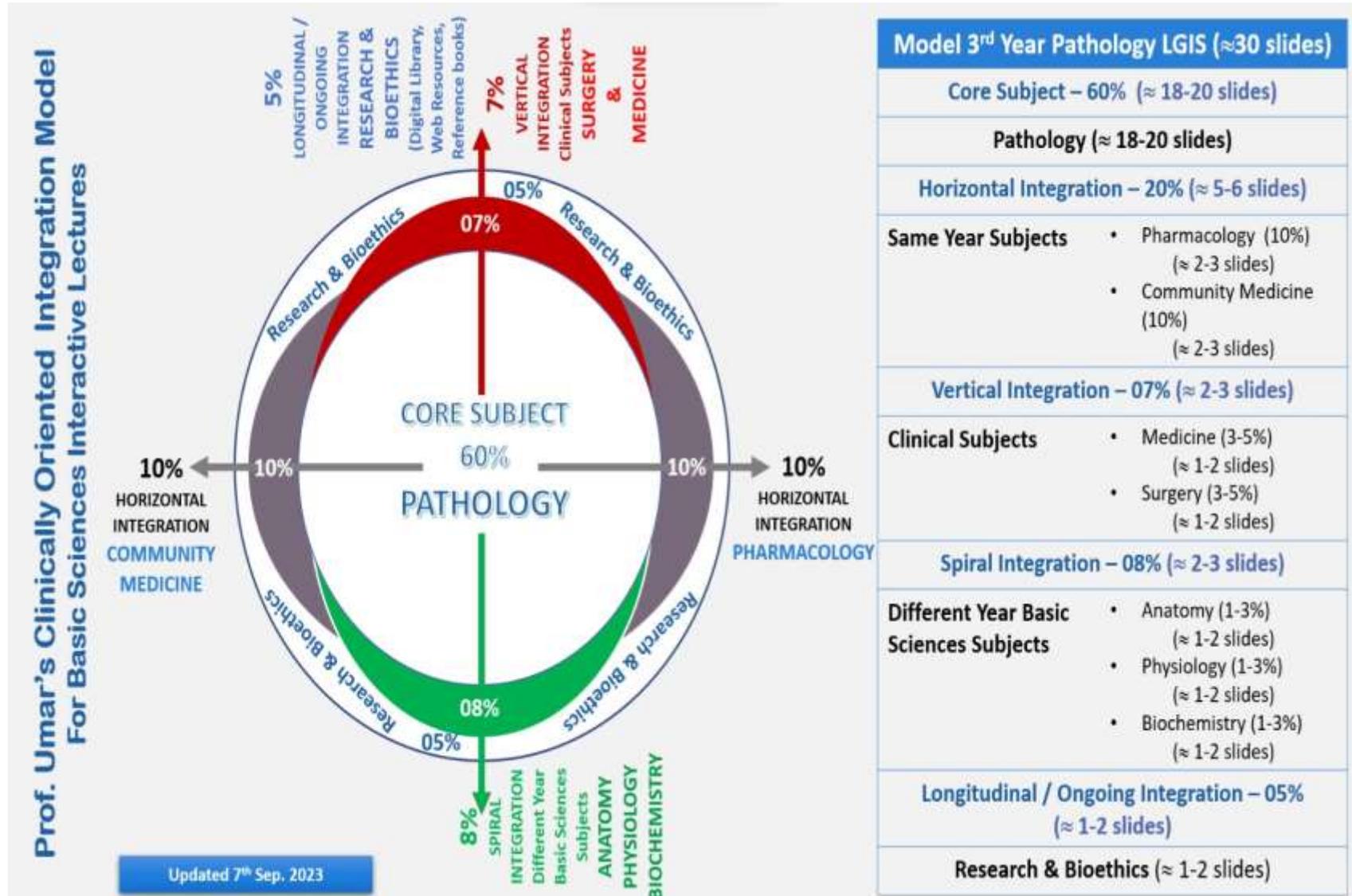
To instill a culture of self-directed learning, fostering lifelong learning habits and autonomy.

How to Assess?

- Ten randomly selected students will be evaluated within the first 10 minutes of the lecture through 10 multiple-choice questions (MCQs) based on the PowerPoint presentation shared on Students Official WhatsApp group, one day before the teaching session.
- The number of MCQs from the components of the lecture will follow the guidelines outlined in the Prof. Umar model of Integrated Lecture.

Component of LGIS	Core Knowledge	Horizontal Integration	Vertical Integration	Spiral Integration
No. of MCQs	6-7	1-2	1	1

Professor Umar Model of Integrated Lecture



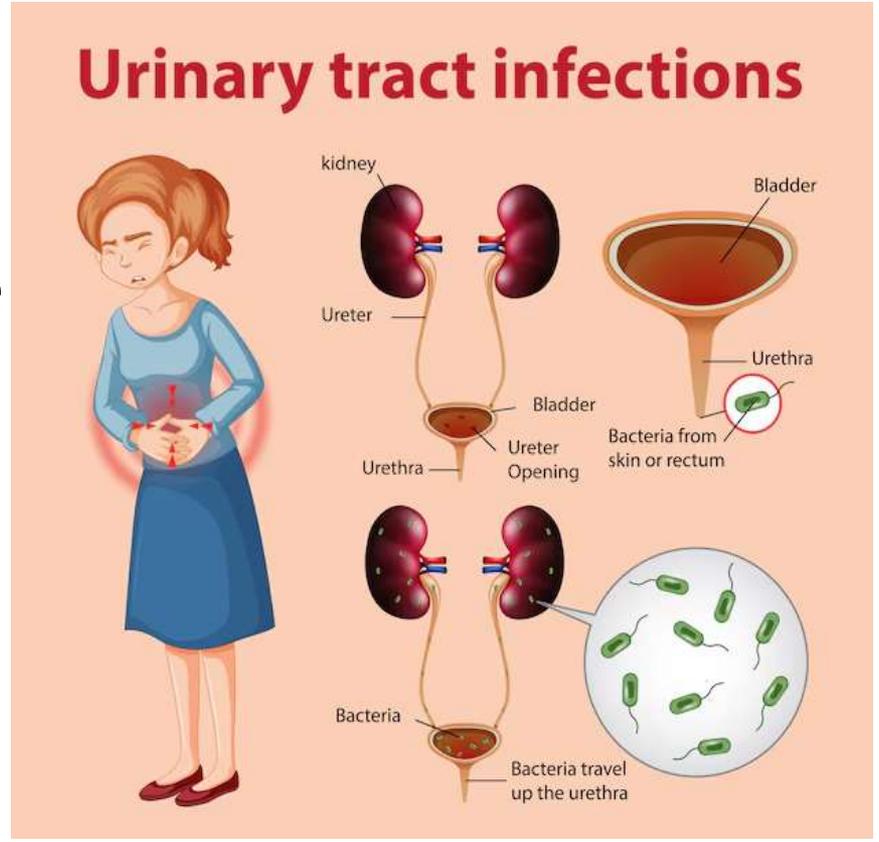
Learning Objectives

At the end of this session students should be able to

- Describe the microscopic structure of ureter
- Describe histological characteristics of urinary bladder.
- Explain the concept of umbrella cells and Uroplakins.
- Explain the concept of internalization
- Understand the bio-physiological effects of urinary epithelium
- Compare the histological changes of empty and full bladder.
- Discuss the histological features of urethra
- Distinguish the transition in epithelium in different types of urethra
- Understand curative and preventive health care

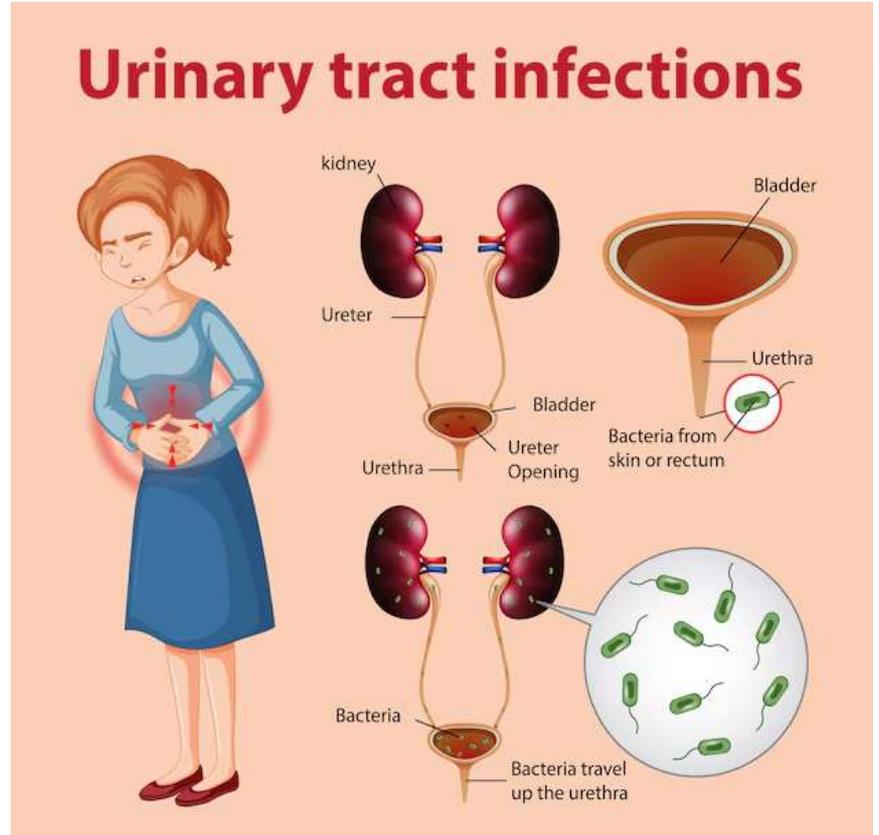
Interactive Session

- A 30 years old woman went to OPD with complain of frequent urination and pain while urinating. Urine sample was sent for culture which revealed growth of E.Coli.



Interactive Session

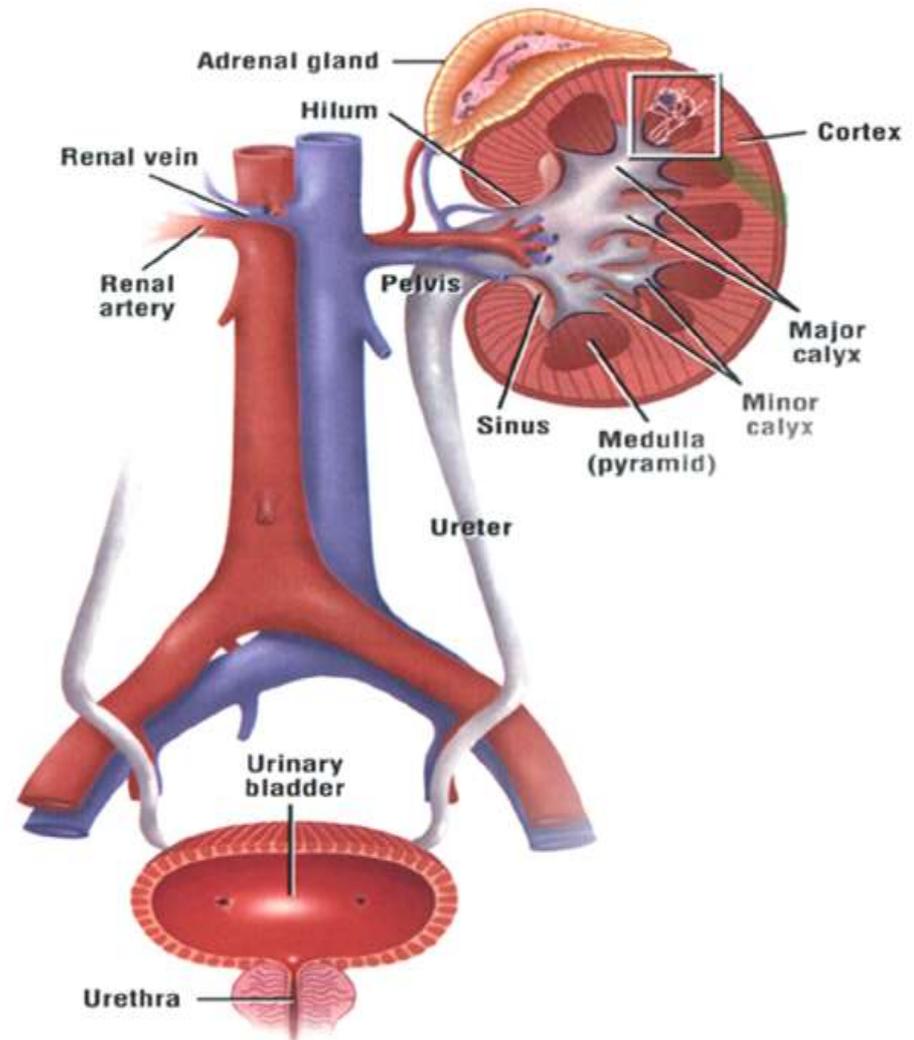
- Upon further investigation it was found out that she had multiple episodes of urinary tract infection in the past five years. From histological point of view what will be the most likely concern in doctor's mind?



Core Knowledge

Urinary Passages- Gross Anatomy

- Ureter
- Urinary Bladder
- Urethra



Core Knowledge

General Organization of Urinary Passages

All the passages have same organization

➤ Mucosa

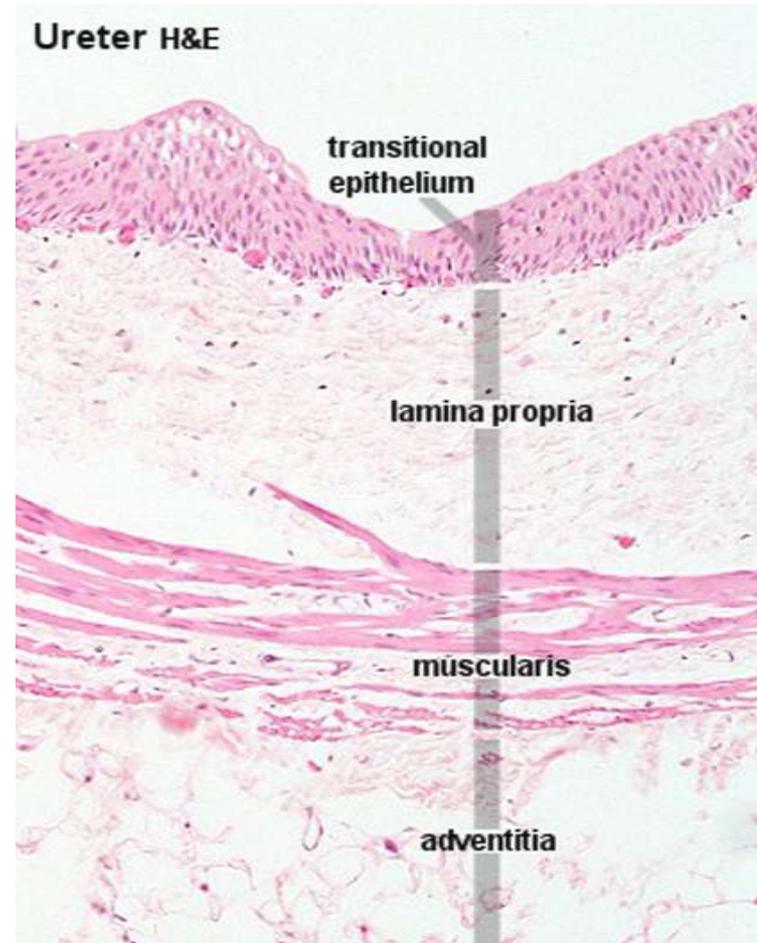
• Transitional epithelium / Urothelium

• Lamina propria

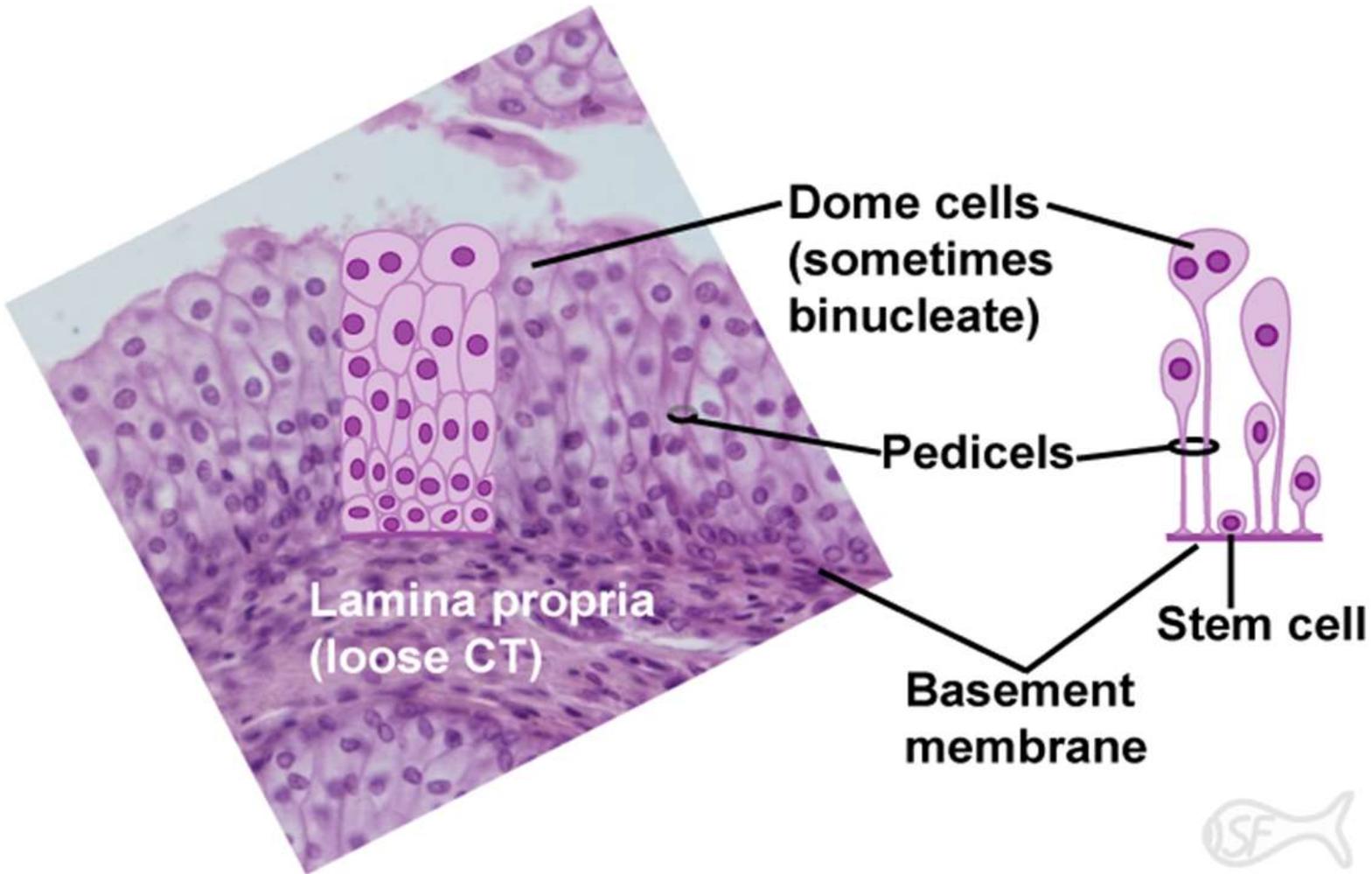
➤ Muscularis

➤ Adventitia

Except urethra

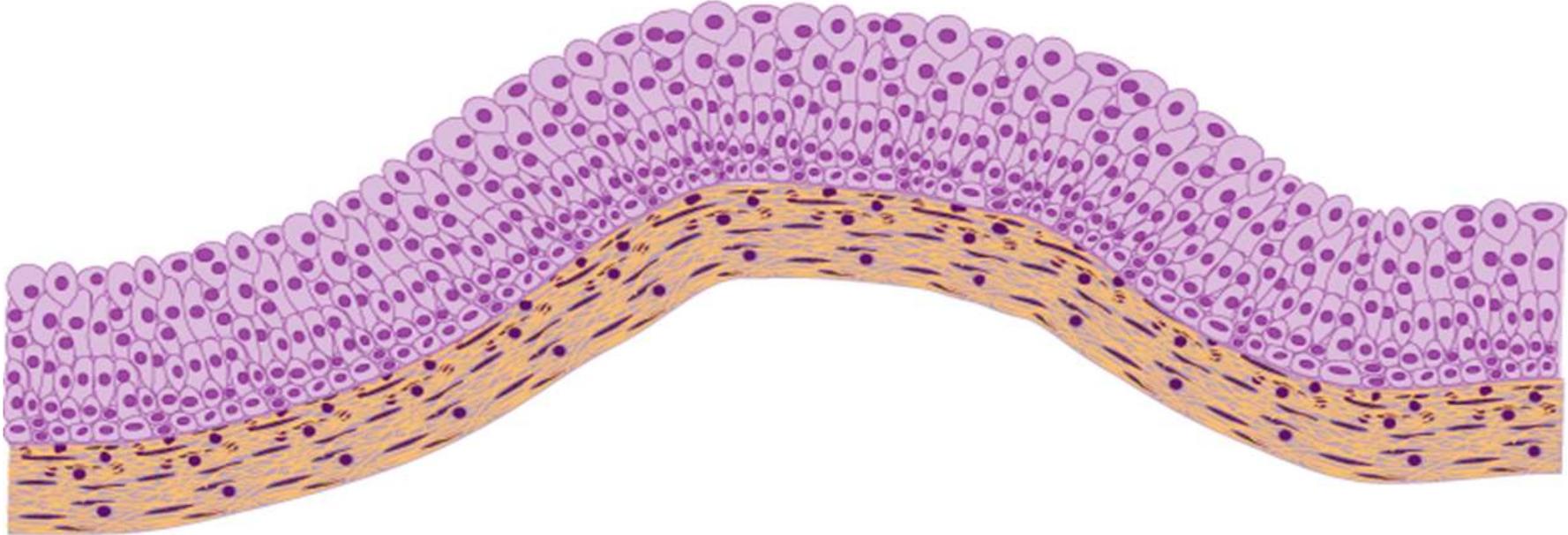


Transitional Epithelium

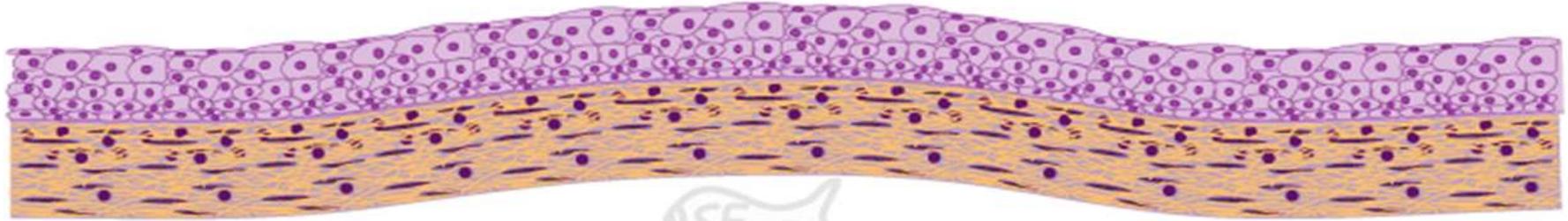


Core Knowledge

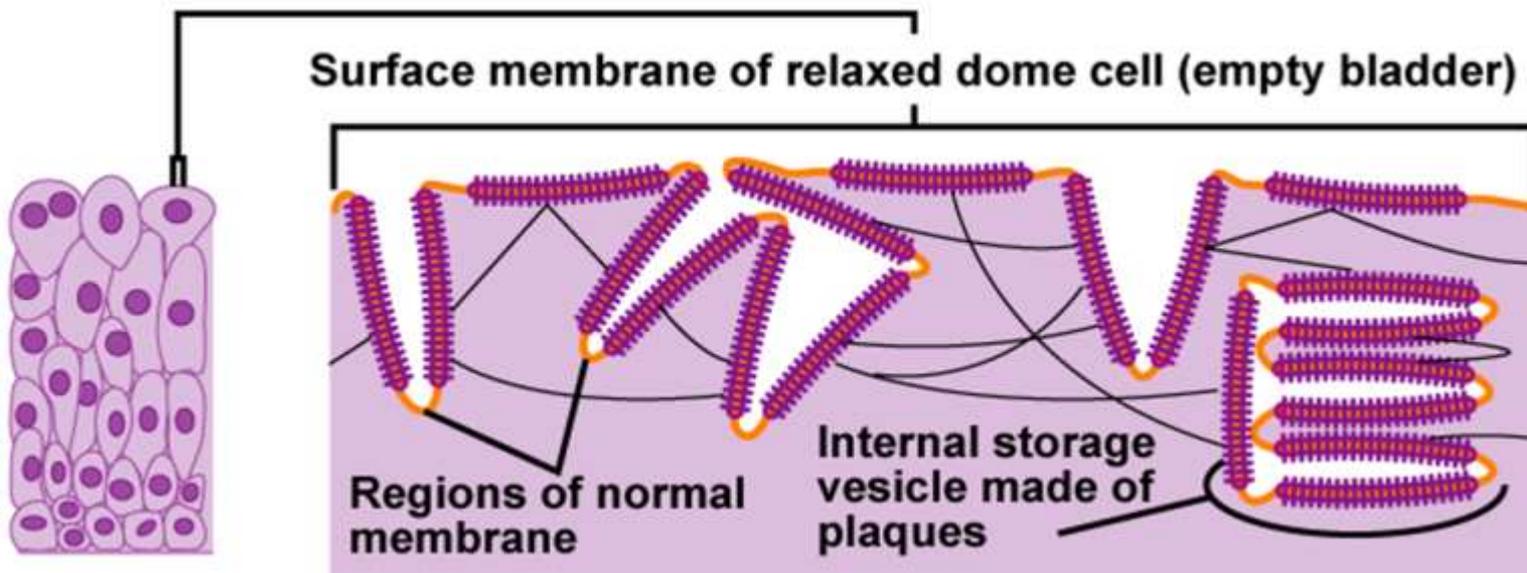
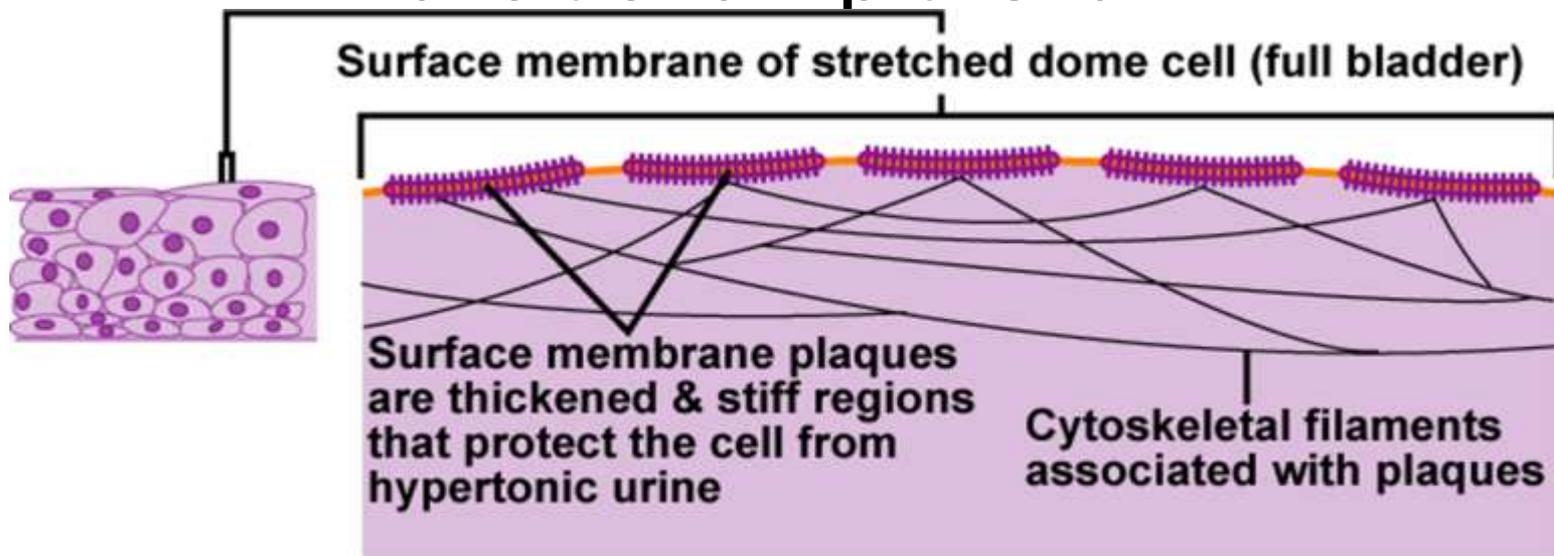
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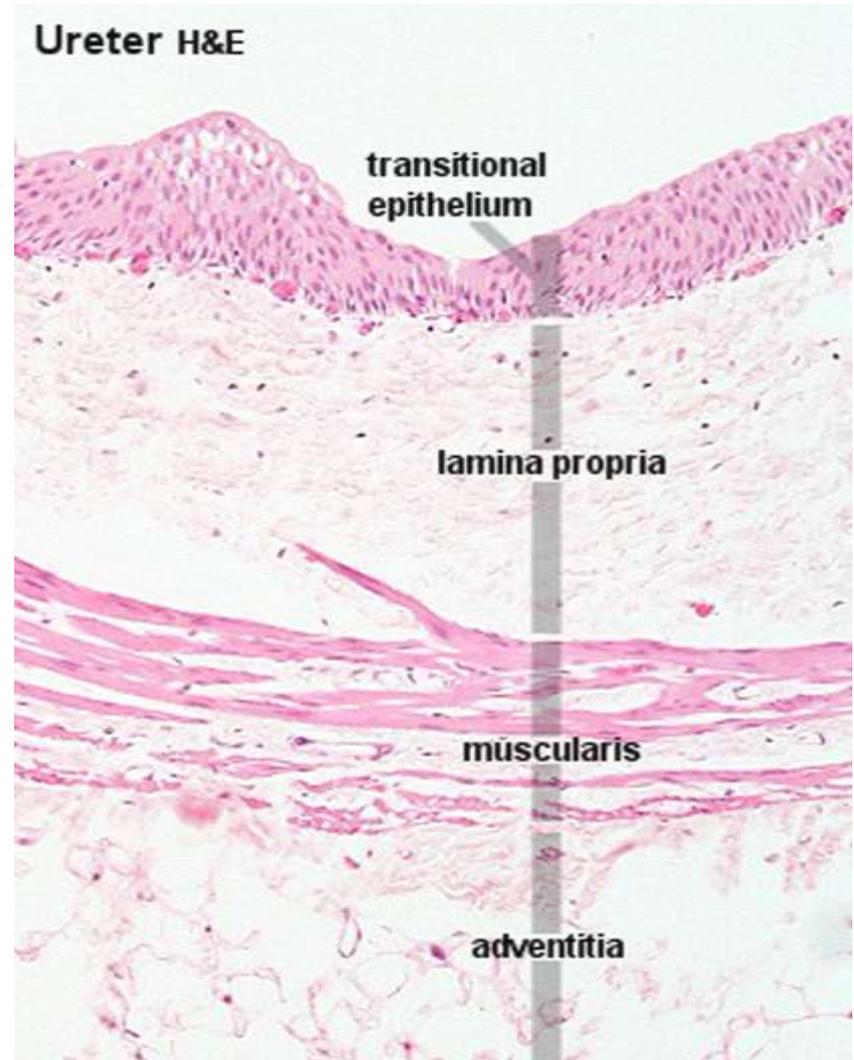
Transitional Epithelium



Core Knowledge

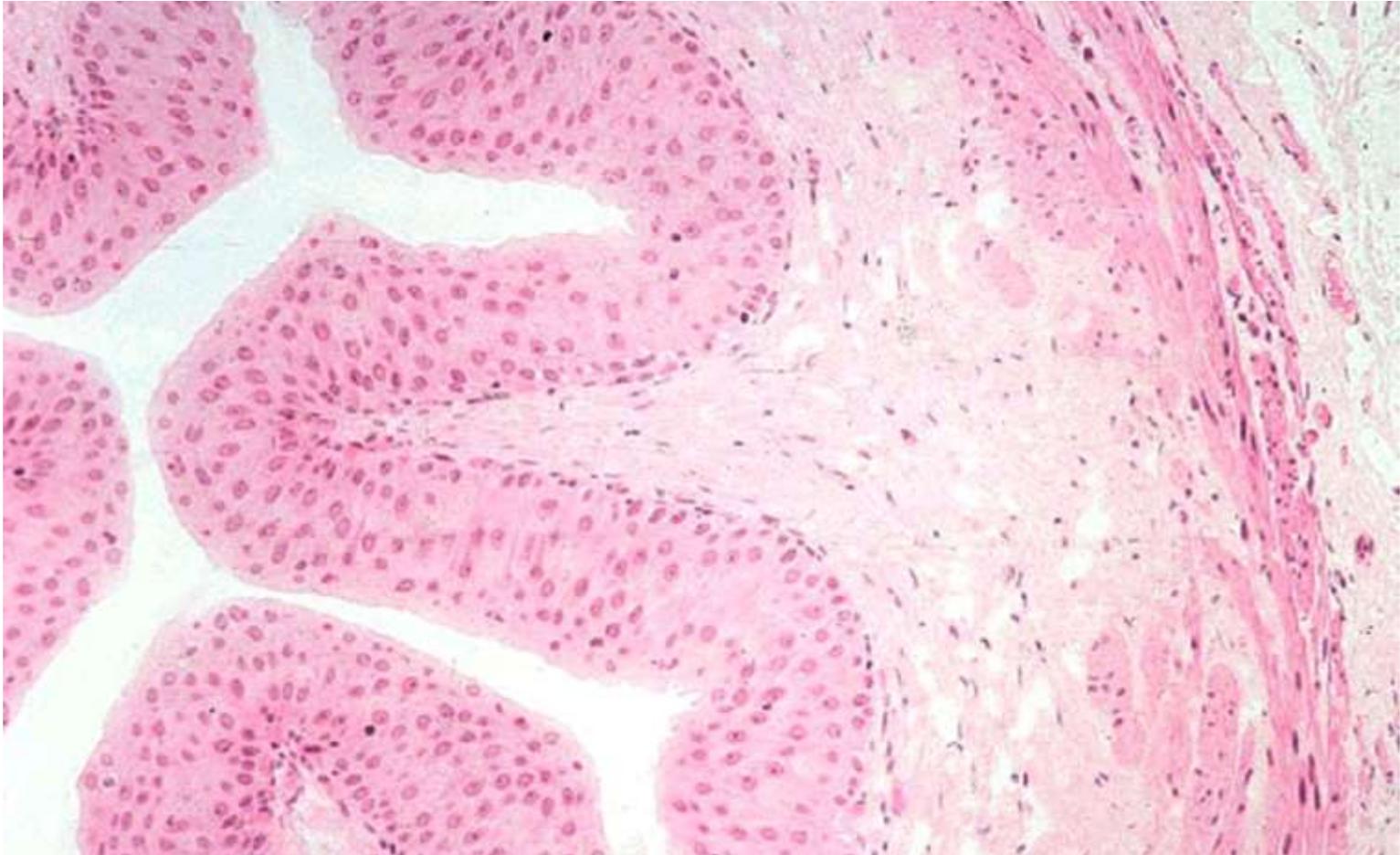
Ureter

- **Mucosa** - transitional epithelium underlain by a dense collagenous lamina propria of loose to moderately dense FECT
- **Muscularis Externa** - two or three layers of smooth muscle
 - The inner layer - longitudinal
 - The outer - circular
 - (An outer layer - longitudinal smooth muscle is present only in the lower 1/3 of the ureter)
- **Adventitia/Serosa** consists of loose to moderately dense FECT +/- mesothelium



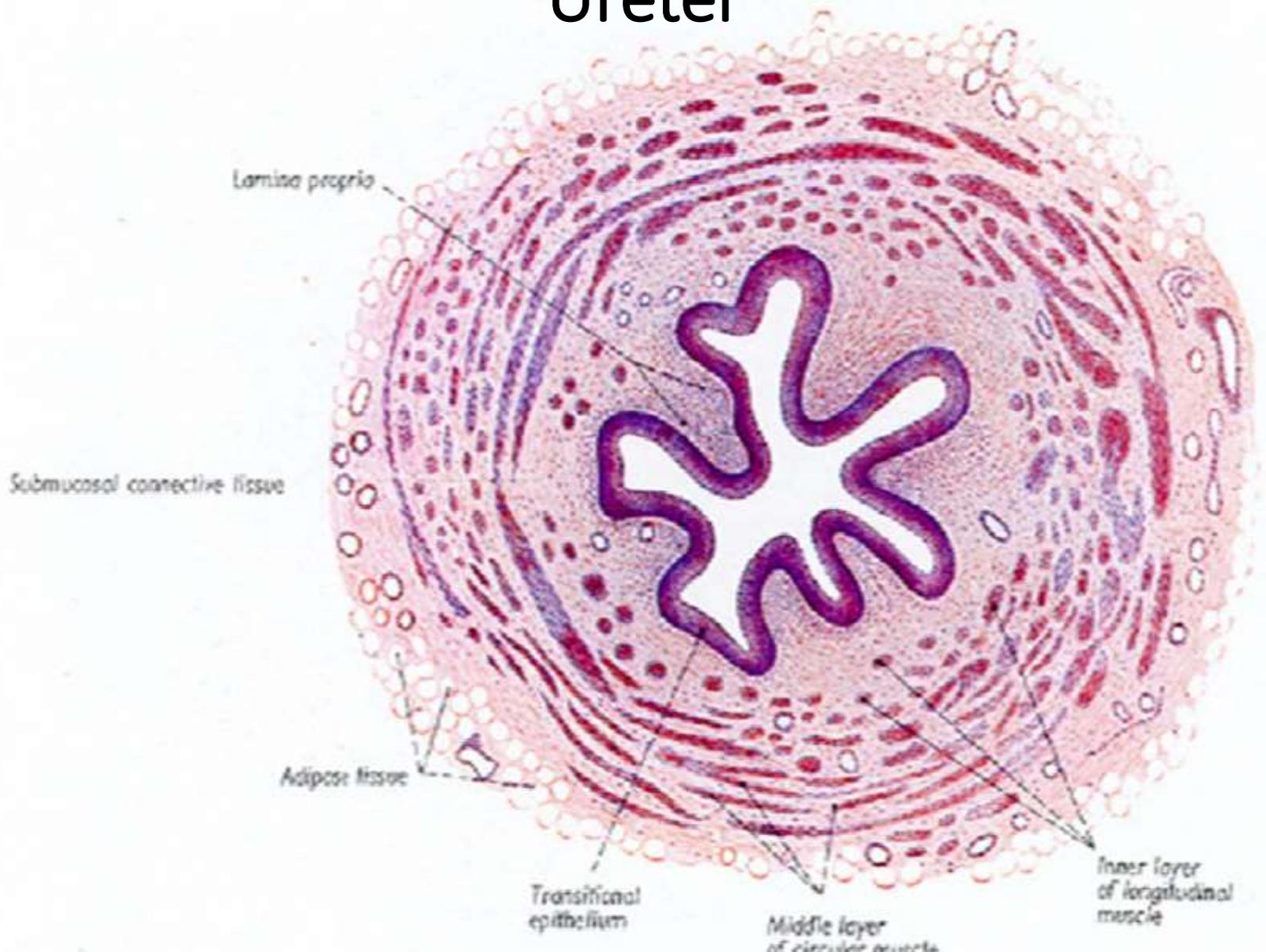
Core Knowledge

Ureter

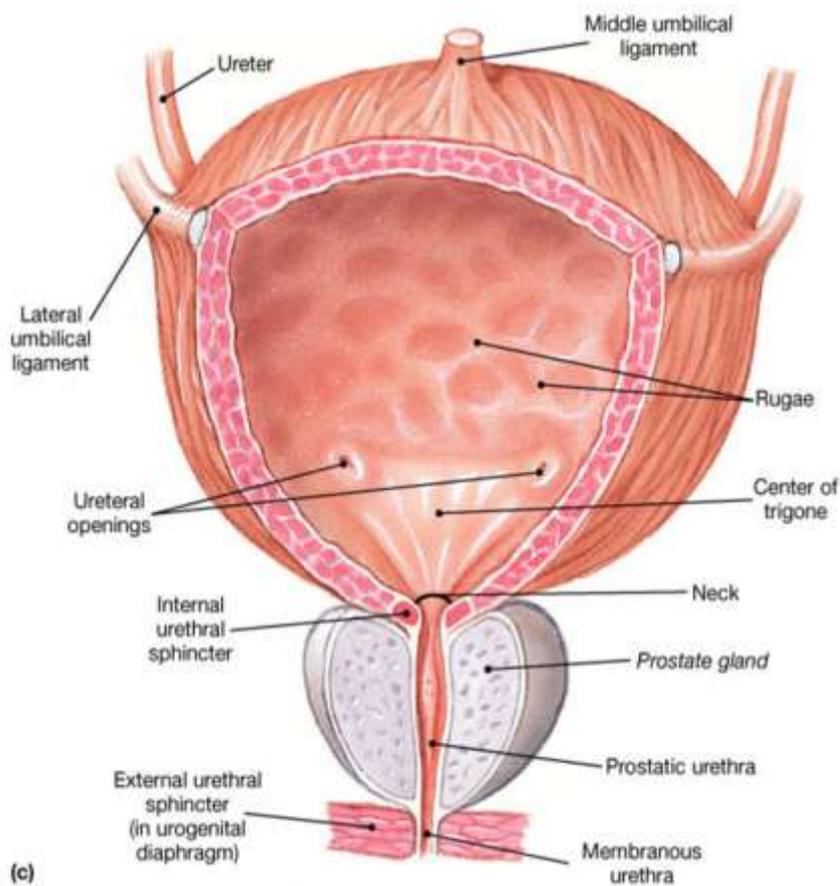
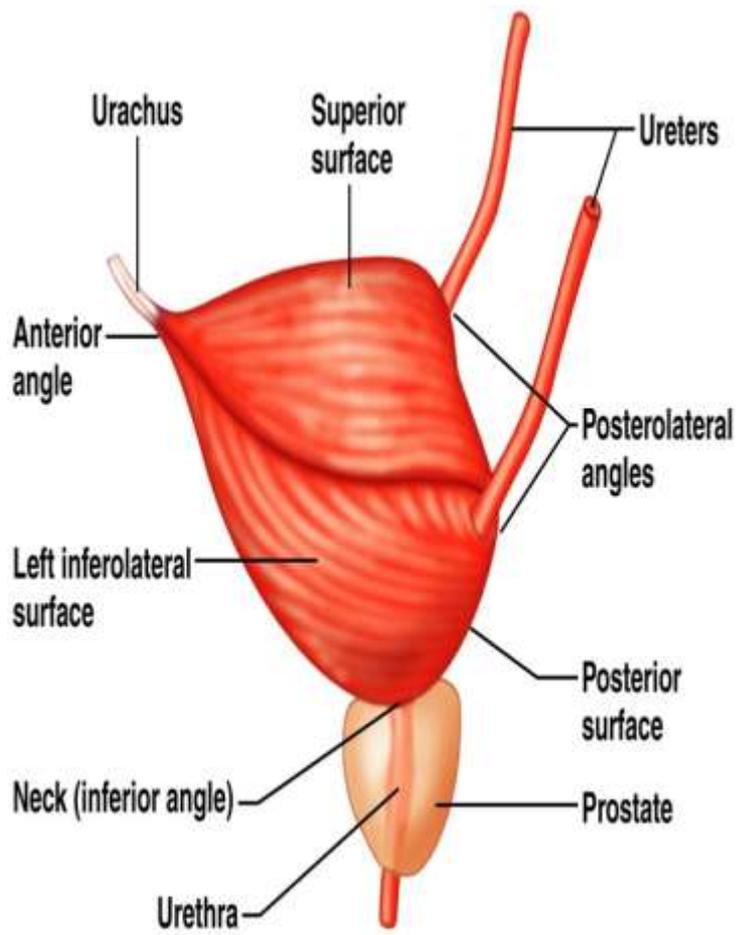


Core Knowledge

Ureter



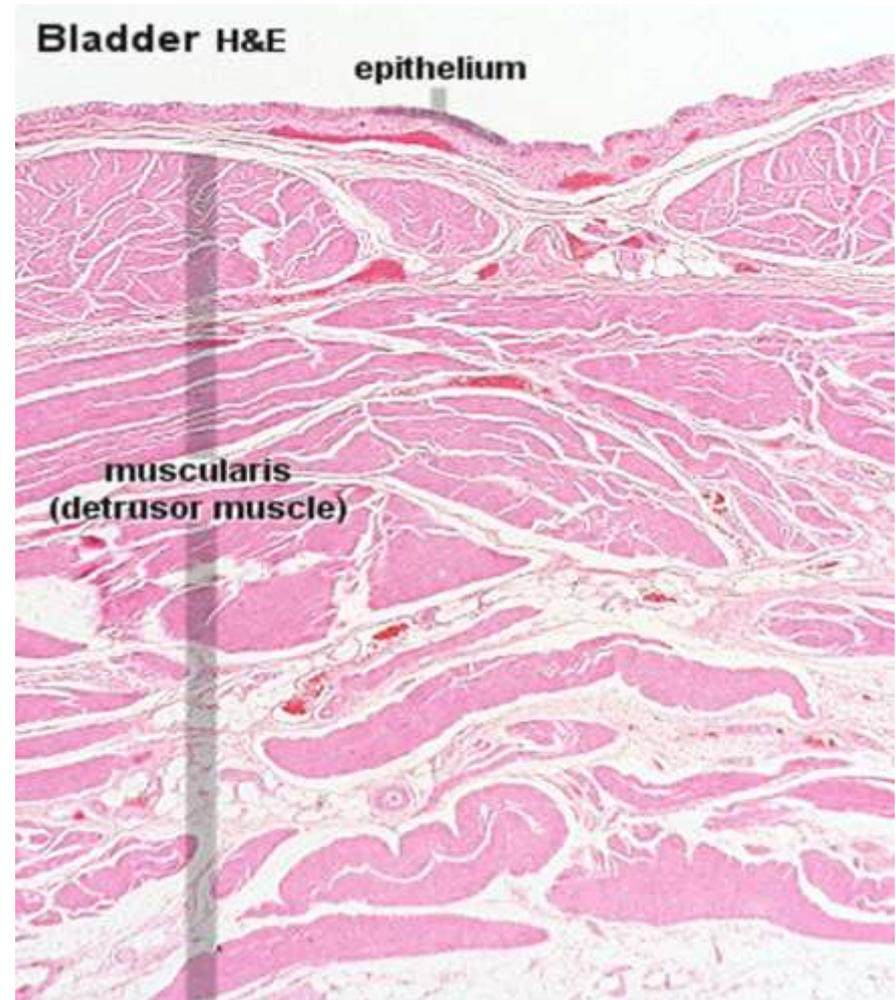
Urinary Bladder



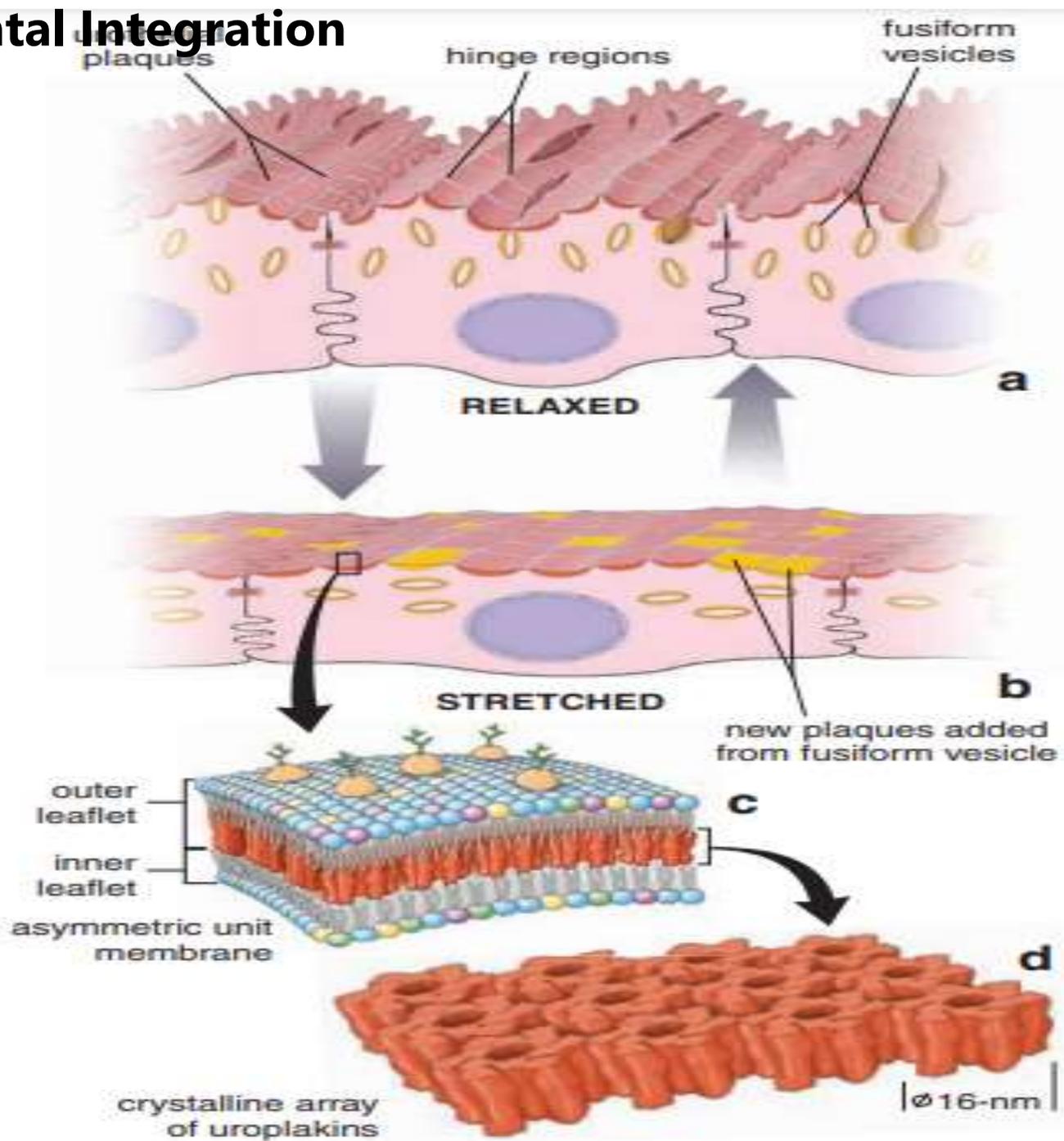
Urinary Bladder

- **Mucosa** transitional epithelium underlain by a lamina propria
- **Muscularis externa** consists of smooth muscle bundles (detrusor muscles) with no special arrangement. Orientation in different directions

Adventitia/serosa contains loose to moderately dense FECT +/- mesothelium.

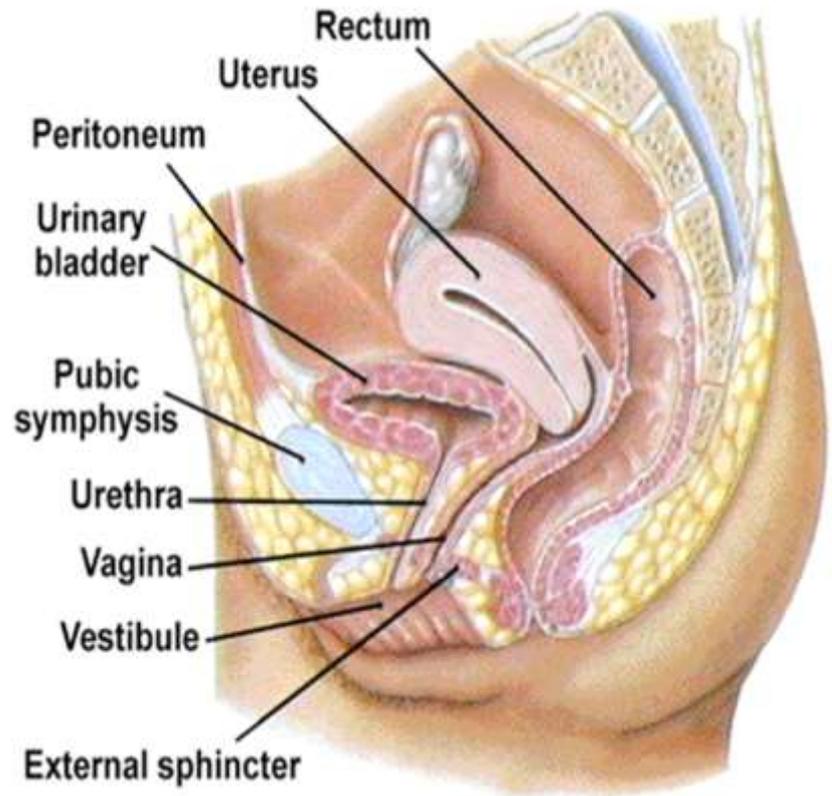


Horizontal Integration



Female Urethra

- 3-5 cm – from base of bladder to vestibule
- Initial Portion - Transitional epithelium changes to stratified squamous epithelium before termination (paraurethral and urethral glands)
- Lamina propria – highly vascularized CT
- External urethral sphincters – voluntary at pelvic floor

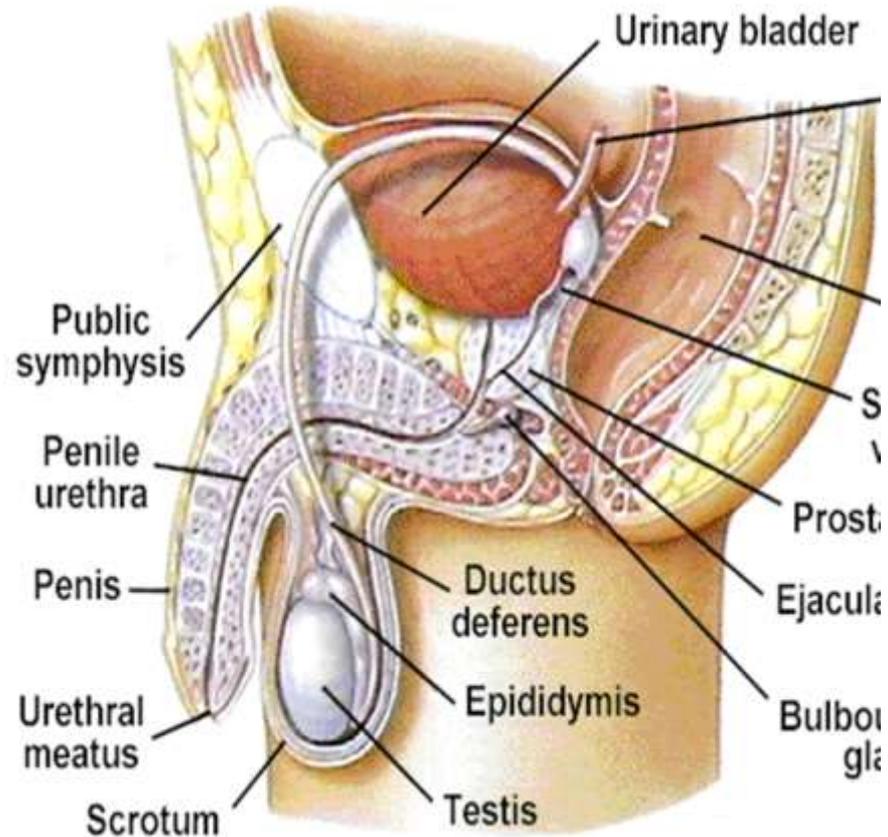


Core Knowledge

Male Urethra

Male – 18-20 cm

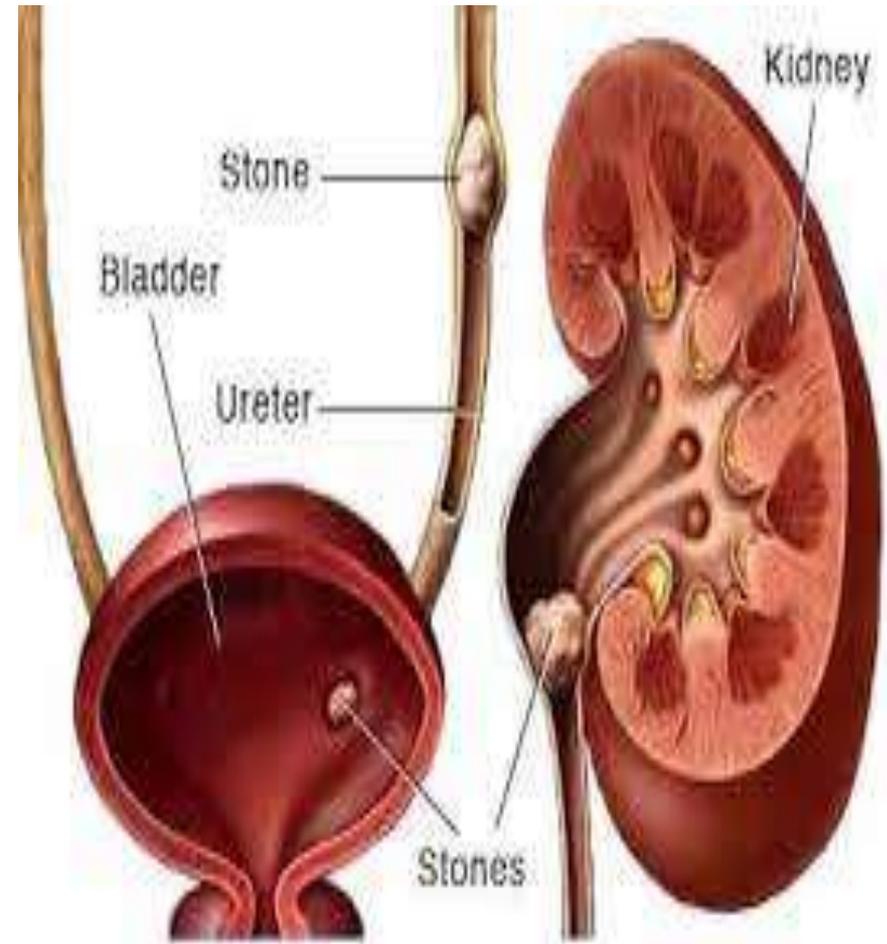
1. Prostatic urethra –lined by transitional epithelium
2. Membranous urethra – mixture of stratified and pseudostratified columnar epithelium
3. Penile (spongy) urethra – pseudostratified columnar epithelium, at distal end stratified squamous epithelium(bulbourethral and urethral glands)



Vertical Integration

Ureteric stones

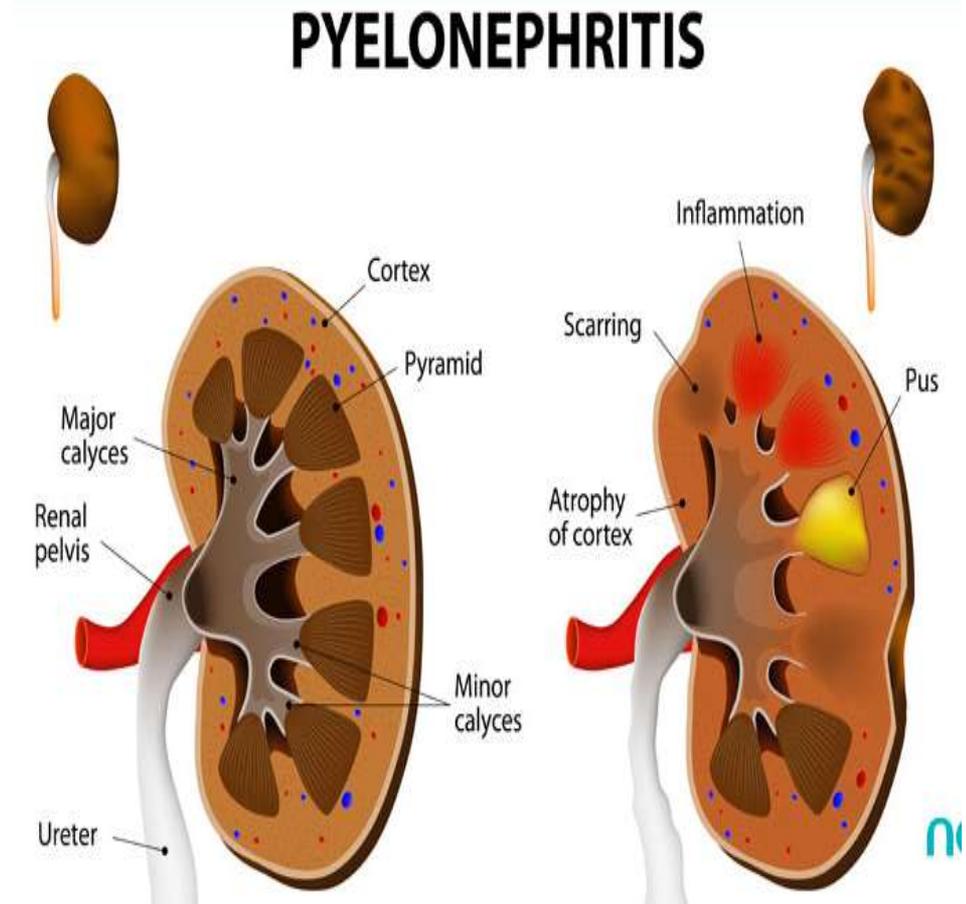
- Renal stones made up of either calcium or urate crystals
- When slips in ureter extremely painful
- Lithotripsy



Vertical Integration

Pyelonephritis

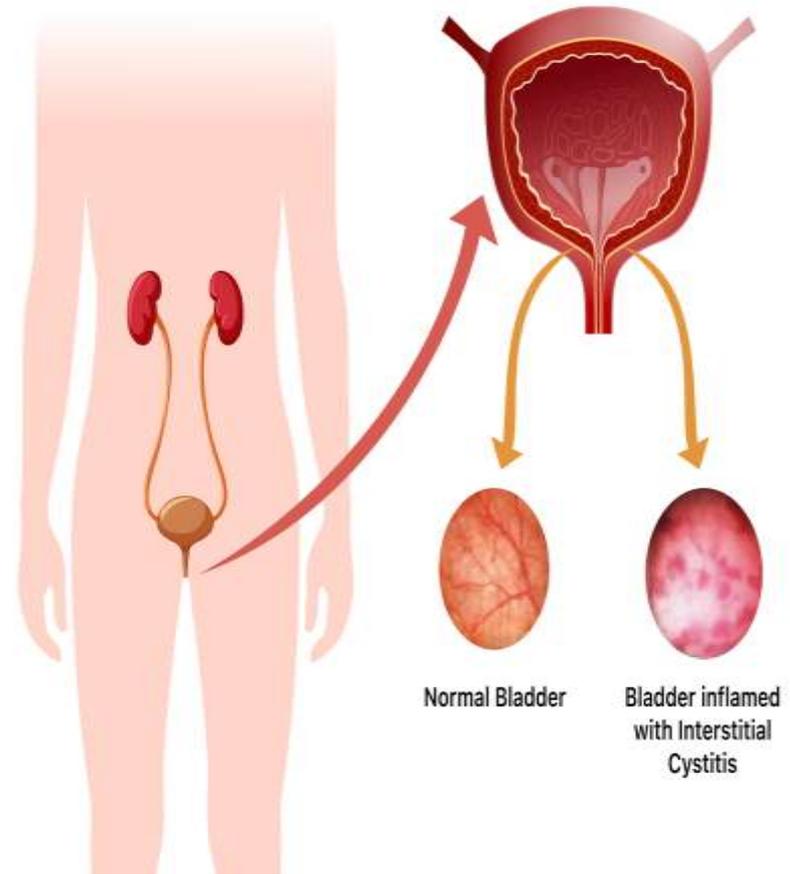
- Inflammation of renal pelvis and calyces
- Bacteria can even move into the collecting ducts



Vertical Integration

Cystitis

- Inflammation of bladder mucosa
- Causes
 - Urinary tract infections
 - Immunodeficiency
 - Urinary catheterization
 - Radiation
 - Chemotherapy
- Chronic cystitis-unstable urothelium, bladder cancer can arise from metaplastic urothelium



Management of Urinary Tract Infections

- The primary treatment for UTIs is a course of antibiotics
- Drink plenty of water helps to flush bacteria out
- Pain relievers such as ibuprofen
- Avoid irritants such as caffeine, alcohol, spicy foods, and artificial sweeteners

Ethical Considerations

- From an ethical standpoint, the scenario raises considerations regarding **patient autonomy, informed consent, and confidentiality**
- The physician must ensure that patient fully understands her diagnosis, treatment options, and potential implications
- Additionally, the physician must respect patient's privacy and confidentiality throughout the diagnostic and treatment process

Role of AI in UTI Management

- AI can potentially aid in **enhancing diagnostic accuracy and efficiency.**
- AI-powered decision support systems can also help clinicians in **selecting appropriate treatment modalities**
- AI-driven predictive models may help **anticipate the risk of disease occurrence** in susceptible populations

What is the Significance of Variant Histology in Urothelial Carcinoma?

Niyati Lobo , Shahrokh, F. Shariat Charles Chuanhai Guo , Mario I. Fernandez

<https://doi.org/10.1016/j.euf.2019.09.003>

It is important to recognize histological variants of urothelial carcinoma as they indicate aggressive disease. When compared with patients with pure urothelial carcinoma of the same disease stage, survival does not appear to be significantly worse. In most cases, patients with invasive variant histology should be treated with neoadjuvant chemotherapy and radical cystectomy.

Learning Resources

- Junqueira's Basic Histology 14th Edition, Chapter 19, pages 398-402
- Histology , A text and Atlas by Michael H.Ross 7th Edition, Chapter 20, pages 724-727
- DiFiore's Atlas of Histology with Functional Correlations 11th Edition, Chapter 14, pages 372-379
- Google images

THANK YOU