

UROGENITAL SYSTEM

THE URETER & URINARY BLADDER

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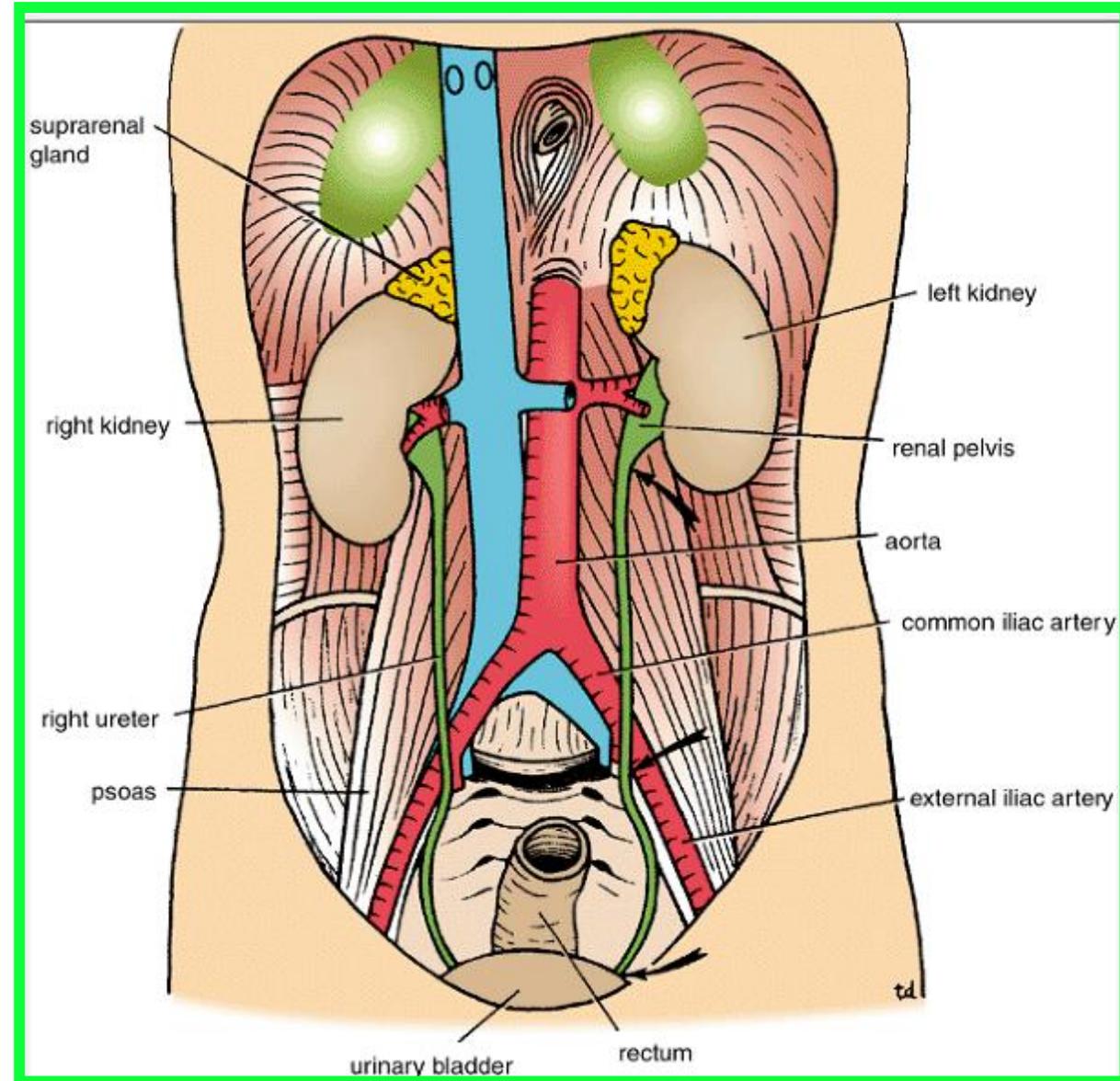
College of Medicine / University of Mutah

Sunday 5 May 2024

Ureter

❖ The two ureters are muscular tubes that extend from the kidneys to the **posterior surface of the urinary bladder**

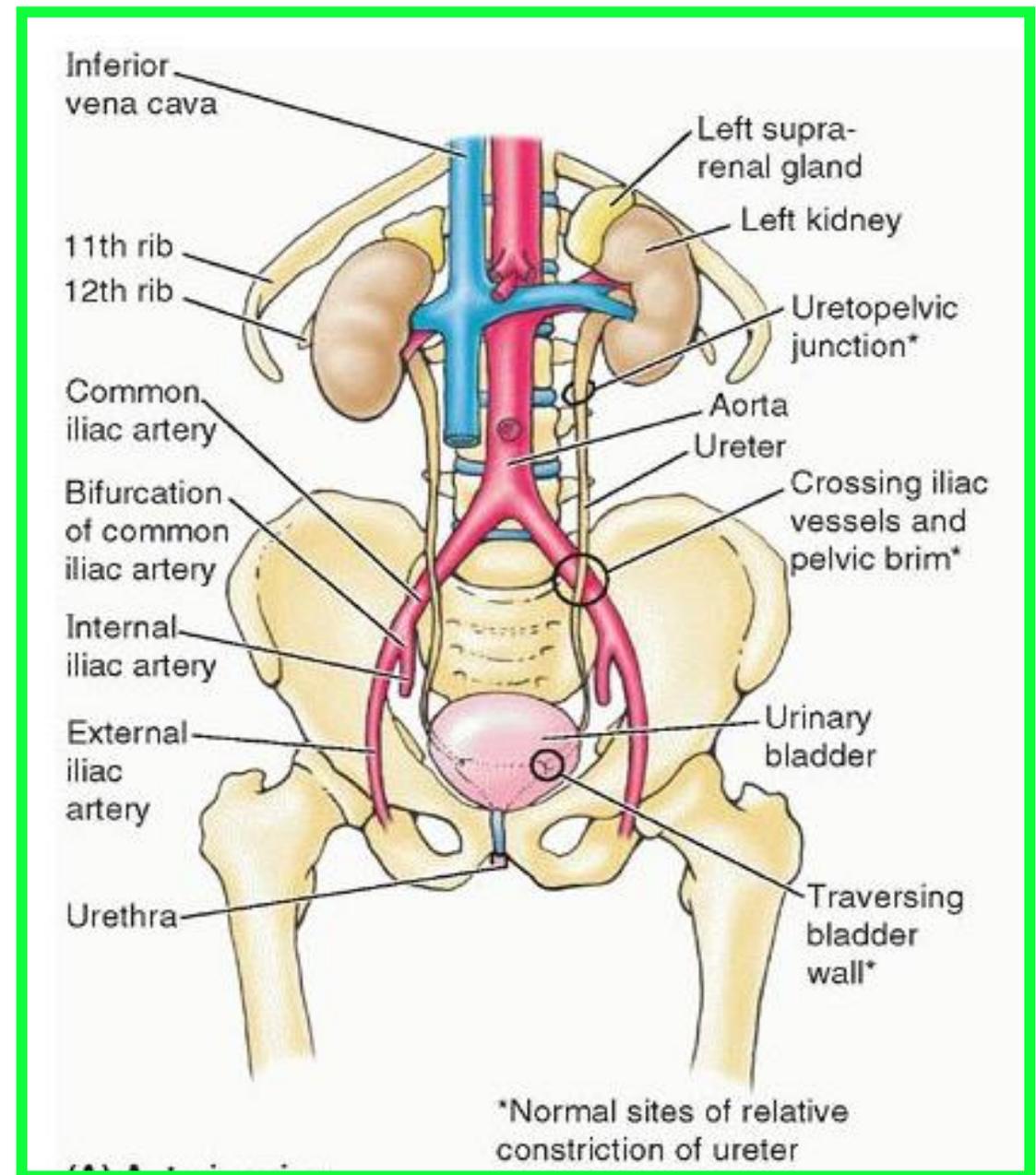
❖ The urine is propelled along the ureter by peristaltic contractions of the muscle coat, assisted by the filtration pressure of the glomeruli.



Ureter

Each ureter measures about **10 in. (25 cm)** long and resembles the esophagus (also 10 in. long) in having **three constrictions** along its course:

- ❖ where the renal pelvis joins the ureter in the abdomen,
- ❖ where it is kinked as it crosses the pelvic brim to enter the pelvis.
- ❖ where it pierces the bladder wall.

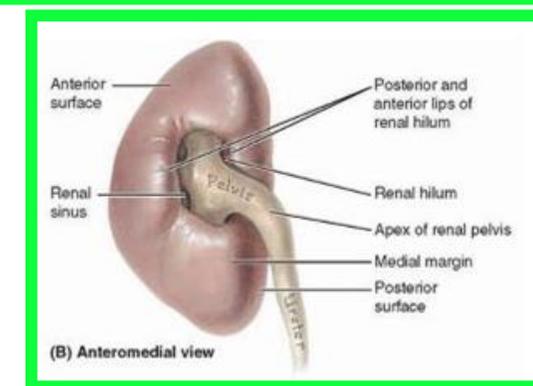
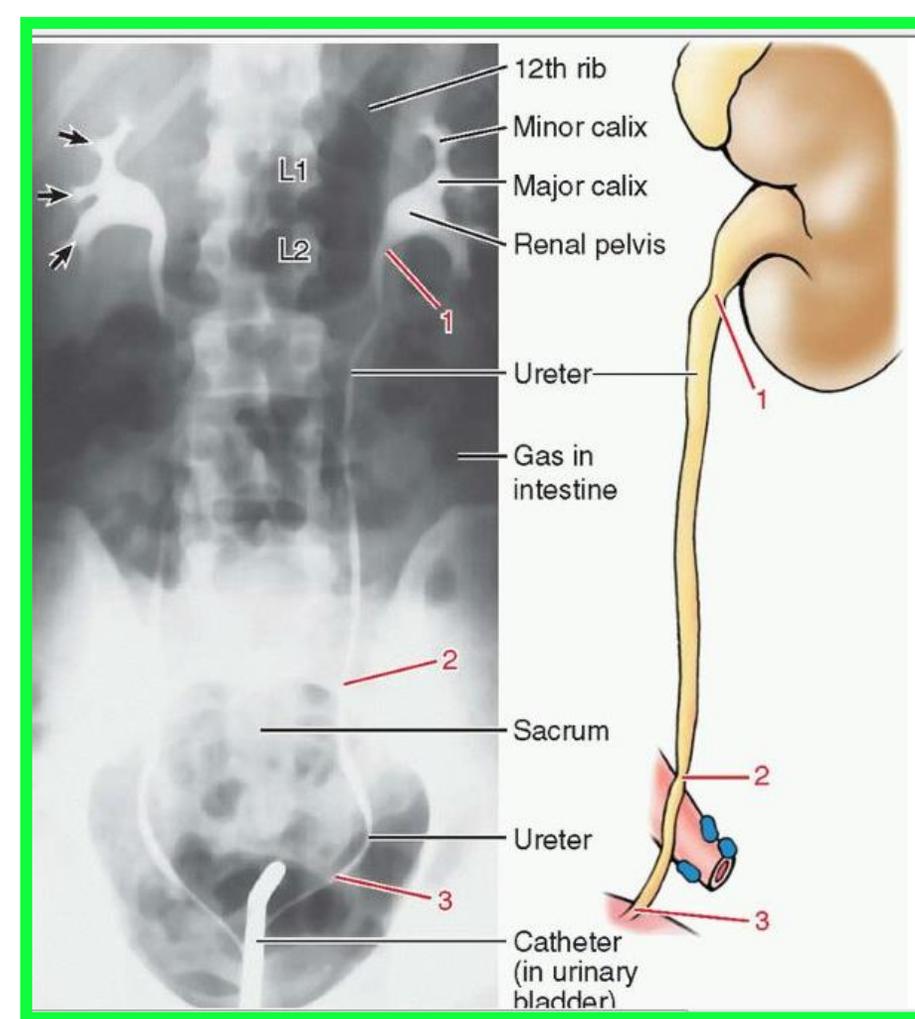


Ureter

□ The renal pelvis is the funnel-shaped expanded upper end of the ureter.

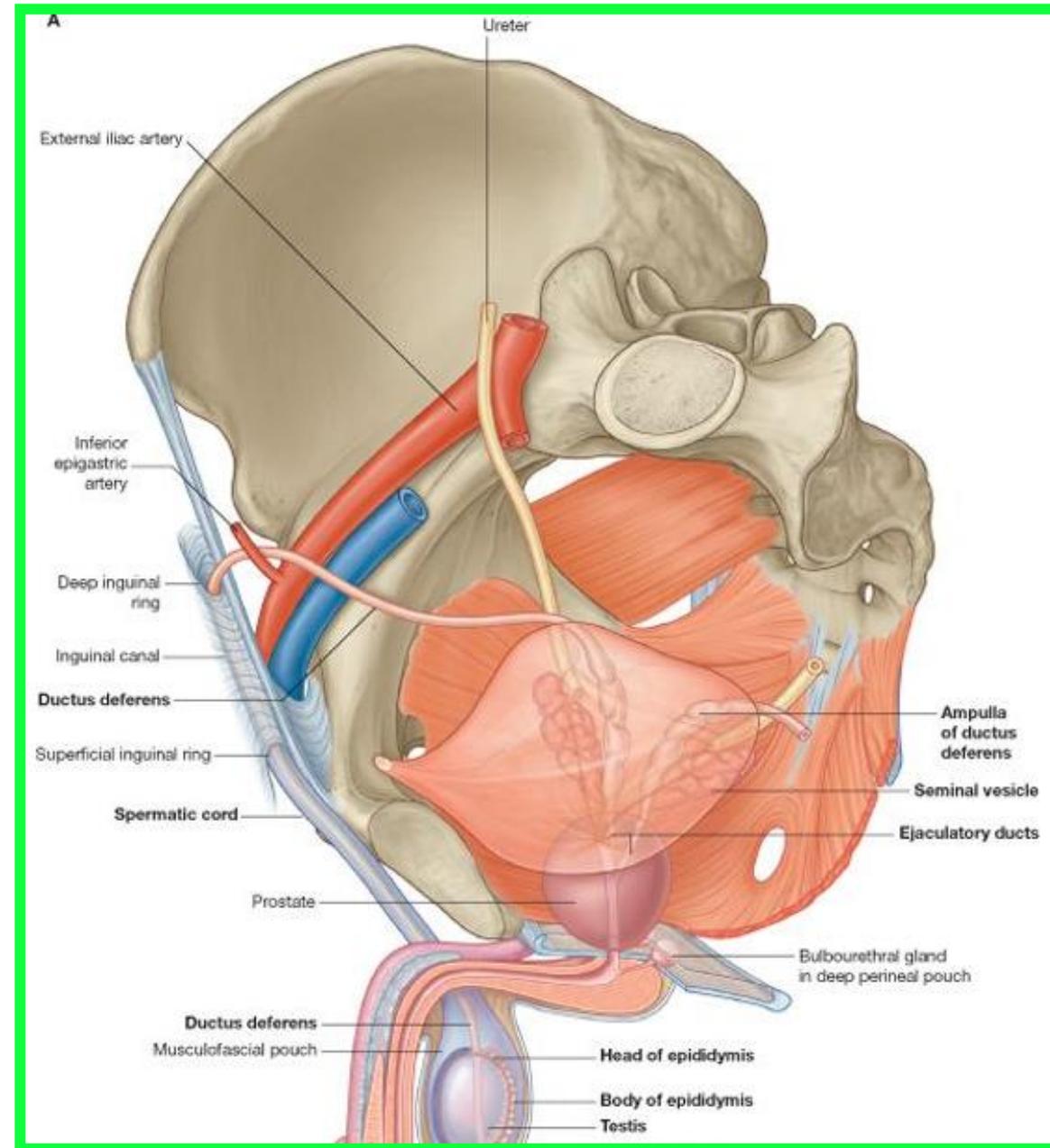
□ It lies within the hilum of the kidney and receives the major calyces.

□ The ureter emerges from the hilum of the kidney and runs vertically downward **behind the parietal peritoneum** (adherent to it) on the **psoas muscle**, which separates it from the **tips of the transverse processes of the lumbar vertebrae**.



Ureter

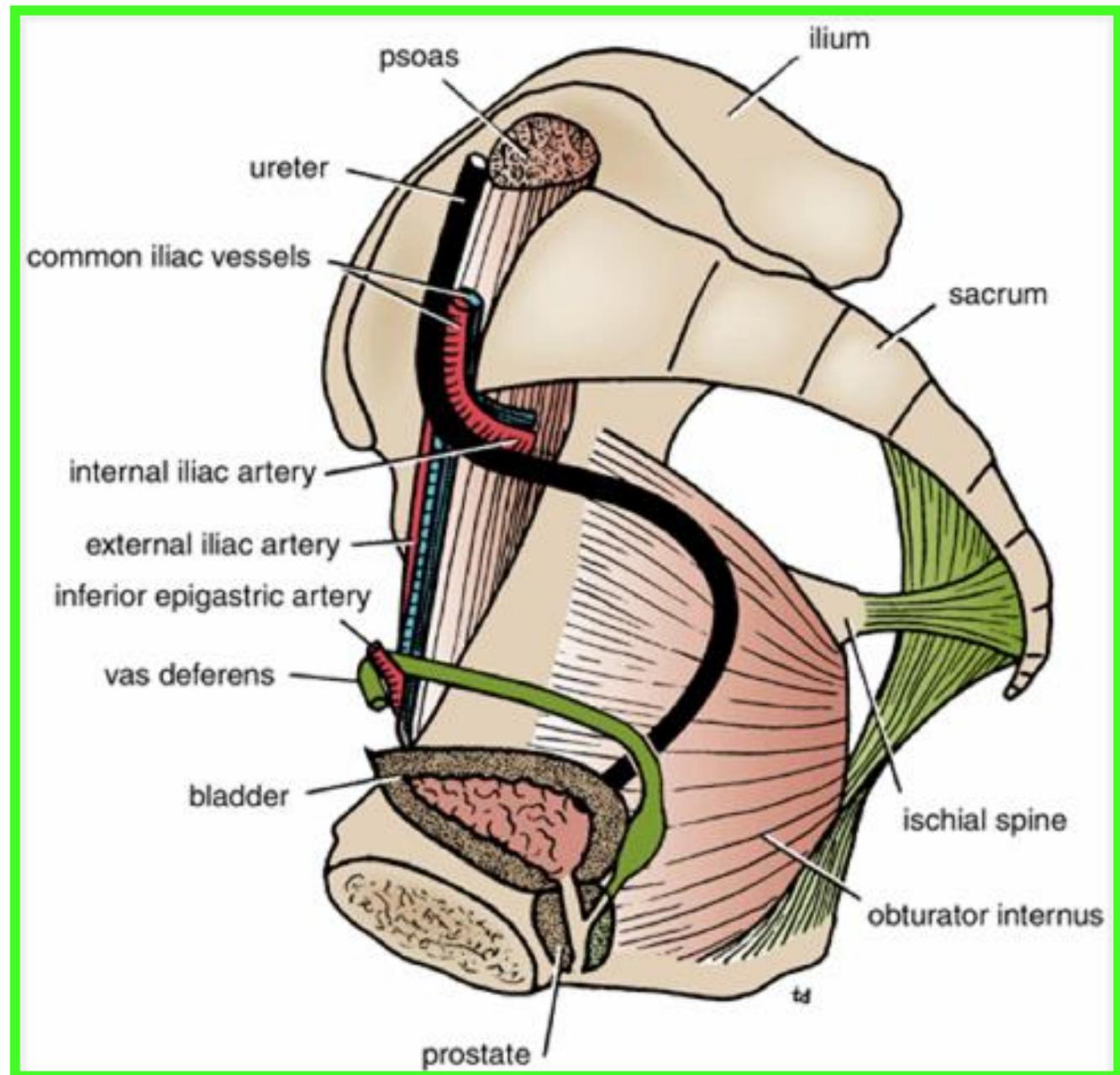
- ✓ It enters the pelvis by crossing the bifurcation of **the common iliac artery** in front of **the sacroiliac joint**
- ✓ The ureter then runs down the lateral wall of the pelvis to the region of the **ischial spine in front of the internal iliac artery** and turns forward to **enter the lateral angle of the bladder**.



Ureter

❖ The ureter passes obliquely through the wall of the bladder for **about 0.75 in. (1.9 cm)** before opening into the bladder

❖ Near its termination, it is crossed by the vas deferens.



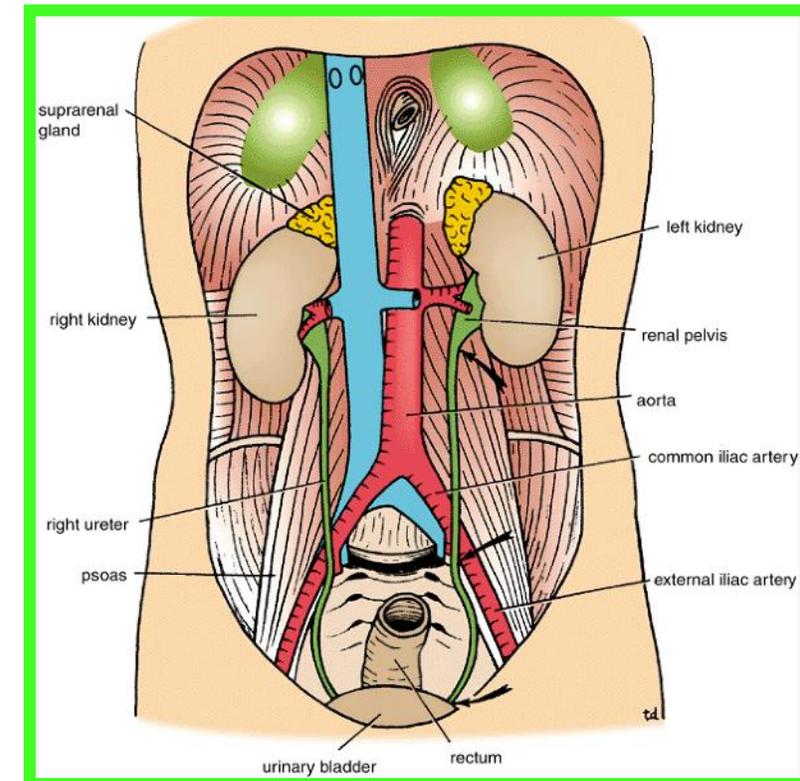
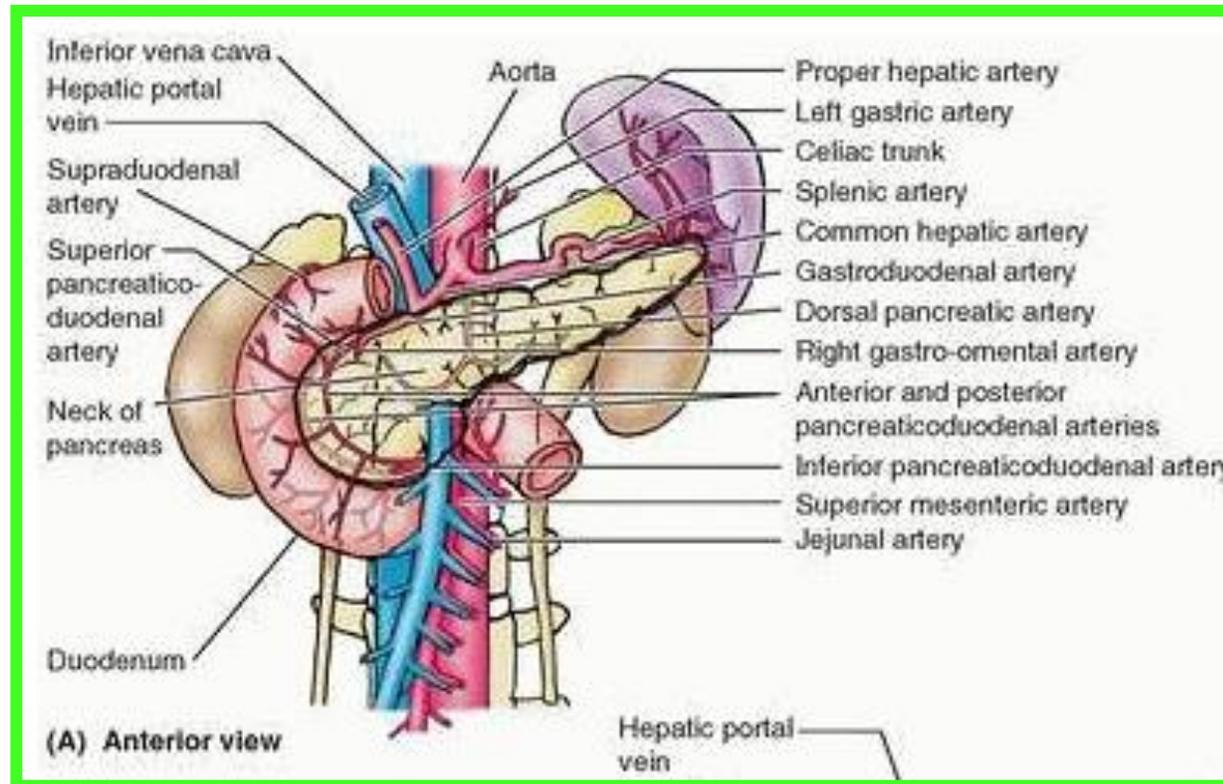
Ureter Relations, Right Ureter

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Anteriorly: The **duodenum**, the terminal part of the ileum, the right colic and ileocolic vessels, **the right testicular or ovarian vessels**, and the **root of the mesentery of the small intestine**

Posteriorly: The **right psoas muscle**, which separates it from the lumbar transverse processes, and the bifurcation of the right common iliac artery

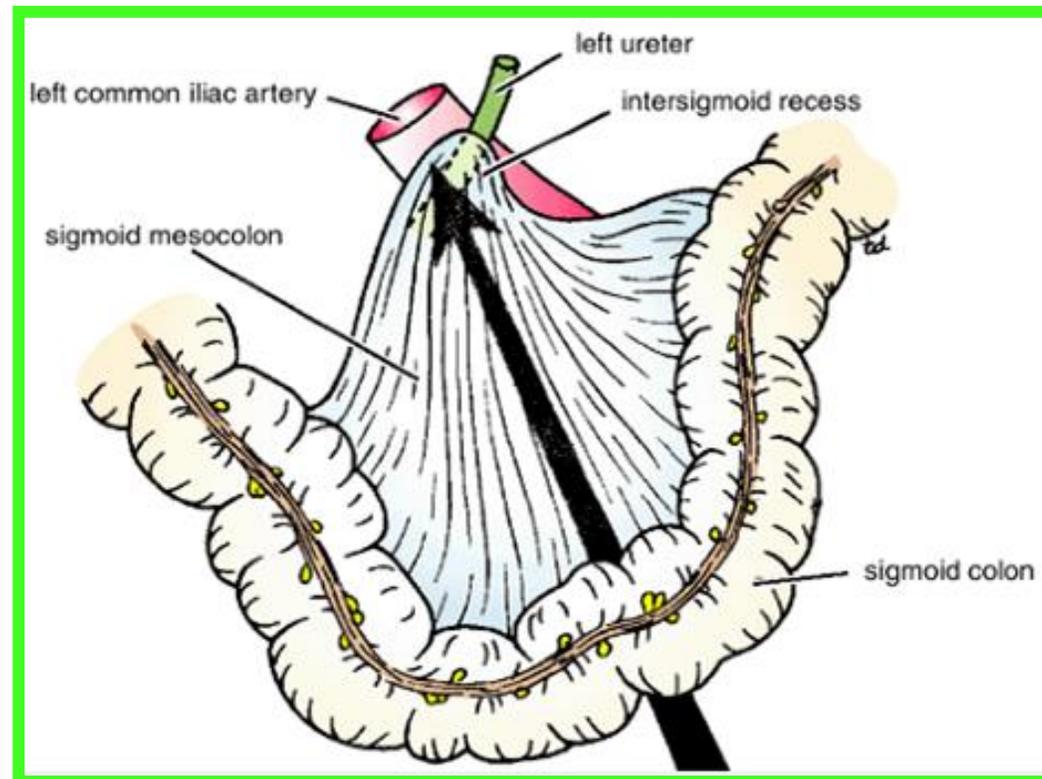
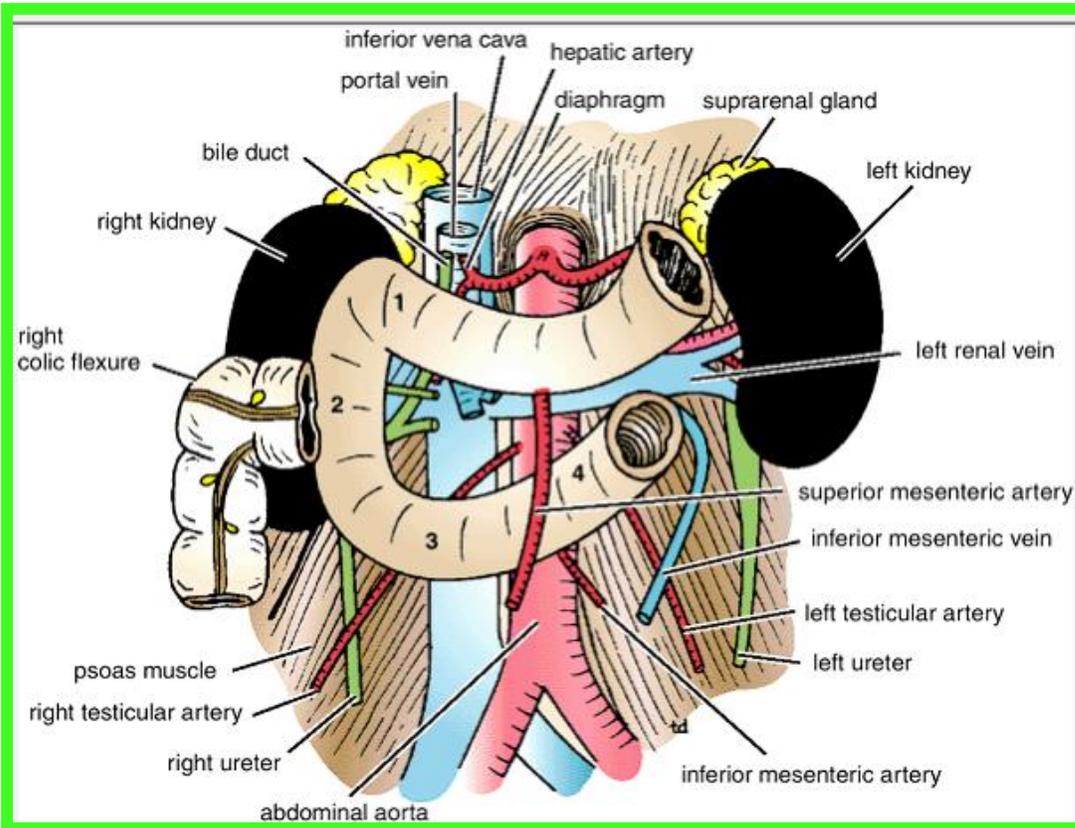


Ureter Relations, Left Ureter

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Anteriorly: The sigmoid colon and sigmoid mesocolon, the left colic vessels, and the left testicular or ovarian vessels

Posteriorly: The left psoas muscle, which separates it from the **lumbar transverse processes**, and the bifurcation of the left common iliac artery

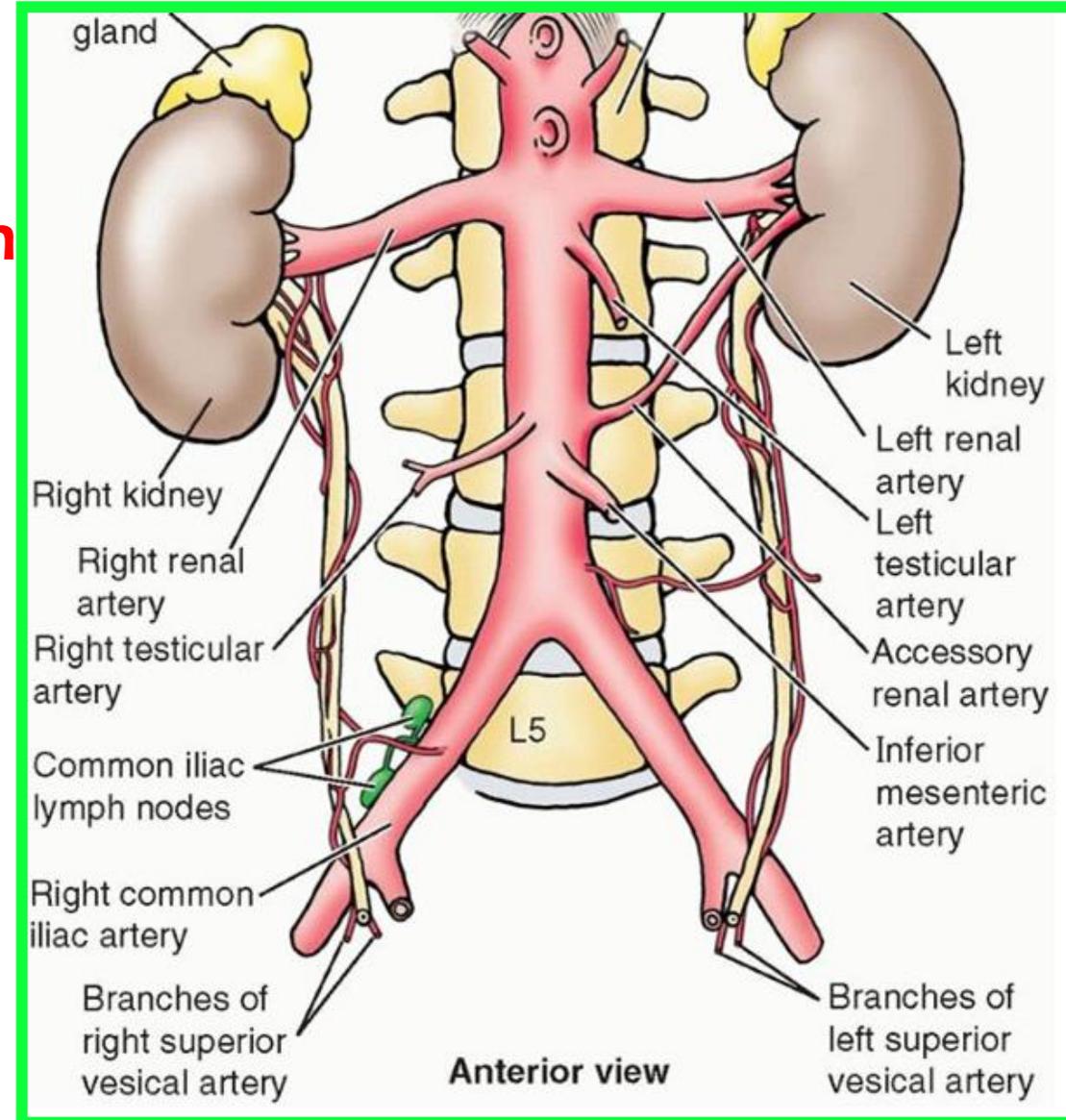


As follows:

- ❖ upper end, the renal artery
- ❖ middle portion, the testicular or ovarian artery
- ❖ in the pelvis, the superior vesical artery

Veins

Venous blood drains into veins that correspond to the arteries.



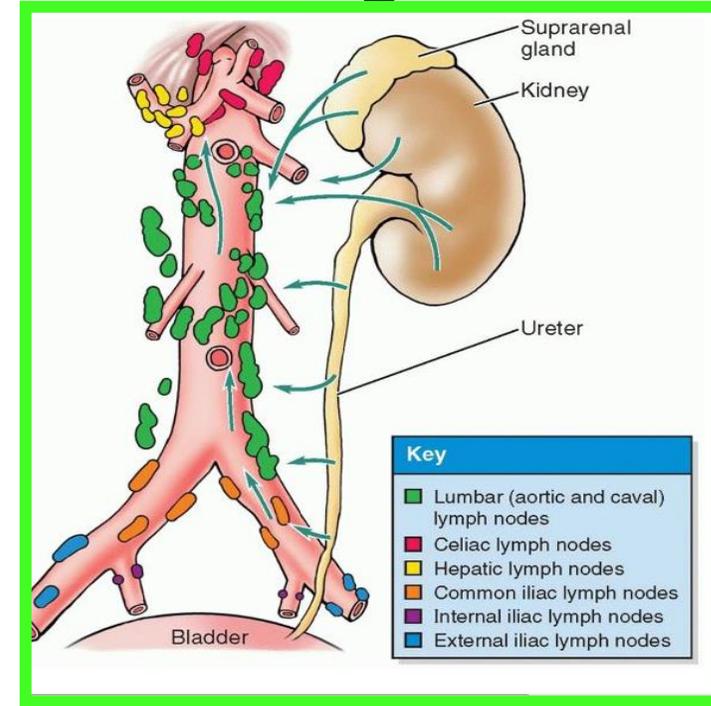
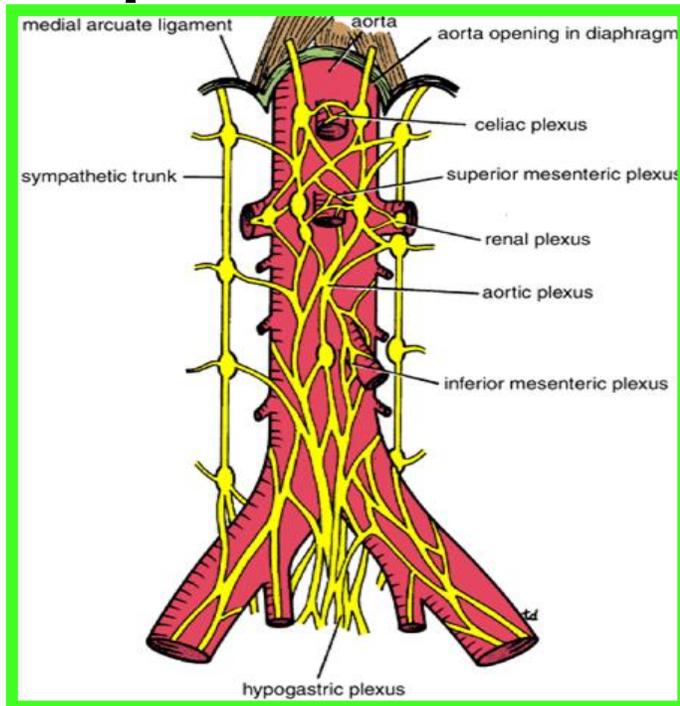
Ureter

Lymph Drainage

The lymph drains to **the lateral aortic nodes** and **the iliac nodes**.

Nerve Supply

The nerve supply is **the renal, testicular (or ovarian), and hypogastric plexuses** (in the pelvis). Afferent fibers travel with the sympathetic nerves and enter the spinal cord in the first and second lumbar segments



Urinary Bladder

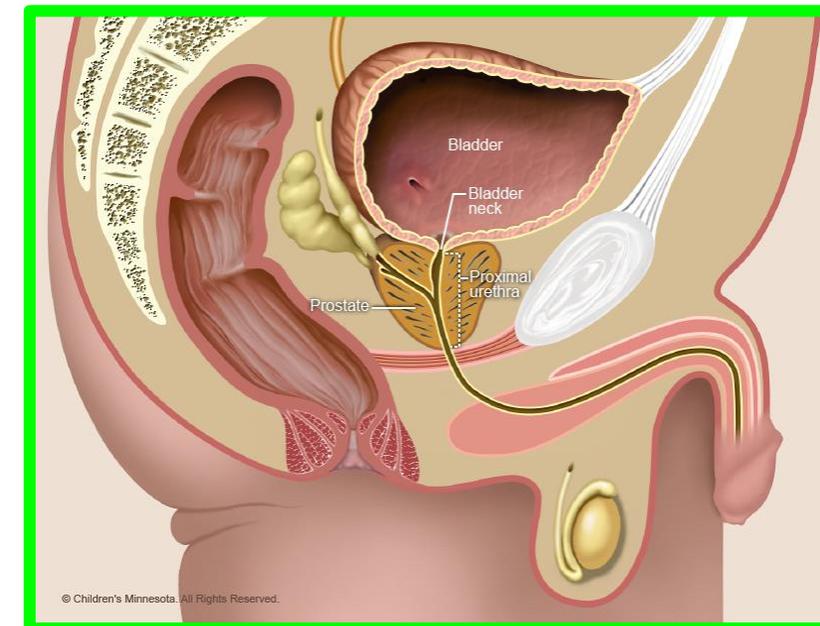
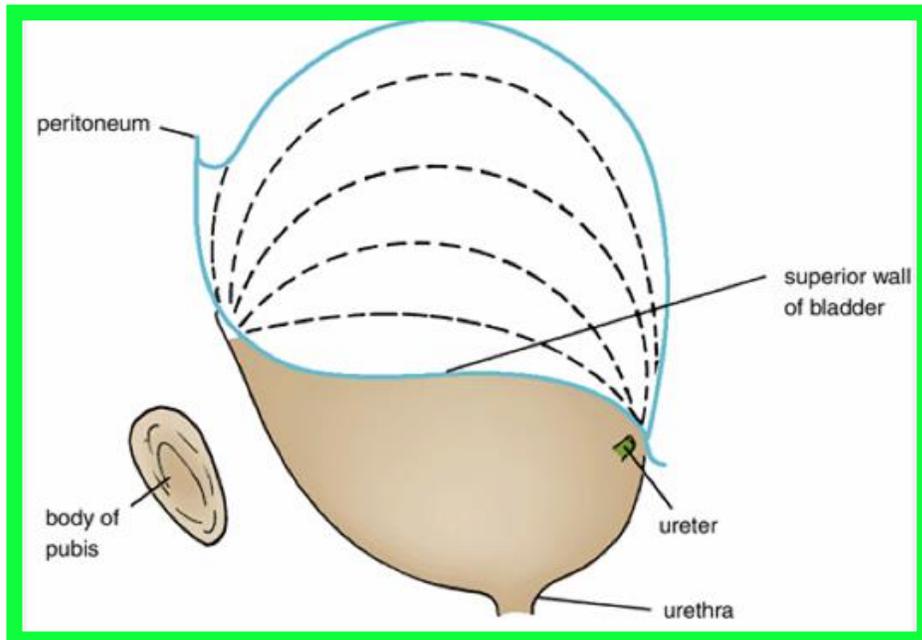
** Site:

1- During childhood, it is an abdominal organ because the pelvis is narrow.

2- At puberty, it lies in the pelvic cavity.

❖ When the bladder is distended, it raises upwards above the upper border of the symphysis pubis and comes into direct contact with the anterior abdominal wall.

❖ a full bladder may ascend to the level of the umbilicus.

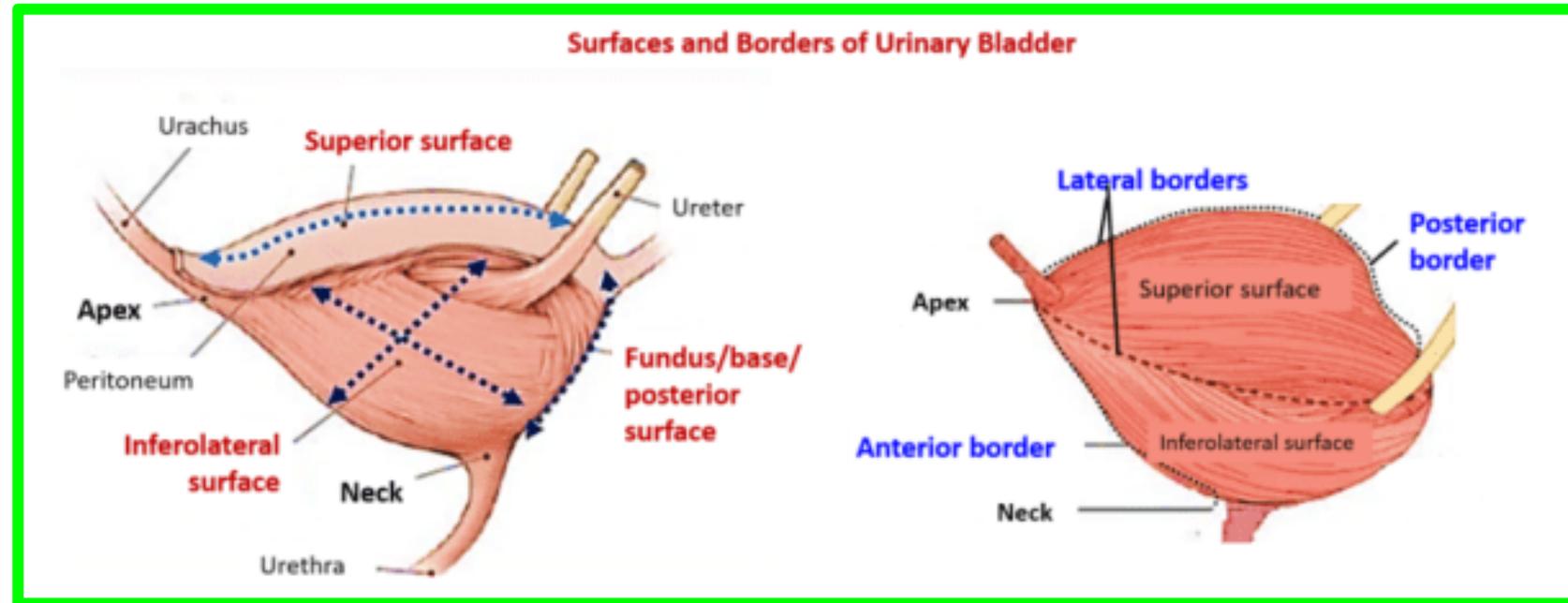


Urinary Bladder

**** Size:** the average capacity of the bladder is **250 cc** but it can accommodate up to **500 cc** of urine without discomfort. The walls of the bladder are composed chiefly of **the detrusor muscle**.

**** Shape and surfaces:**

❖ When the bladder is hardened in situ, it has the shape of a **four-sided pyramid**.



- ✓ It has 4 surfaces, **superior**, **posterior (base)** and right and left **inferior-lateral**.
- ✓ 4 angles, anterior (**apex**), inferior (**neck**), and 2 **posterior-superior**.

Urinary Bladder

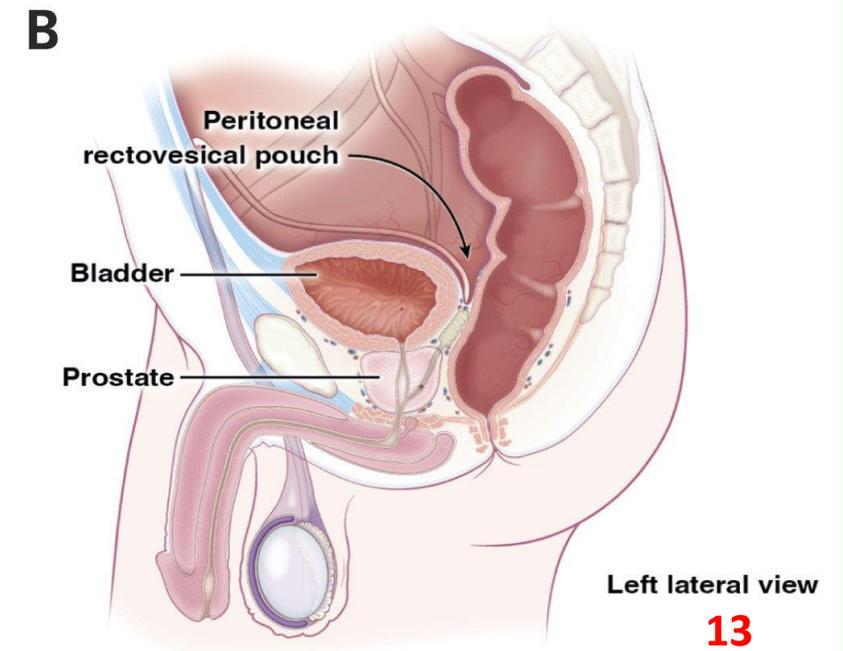
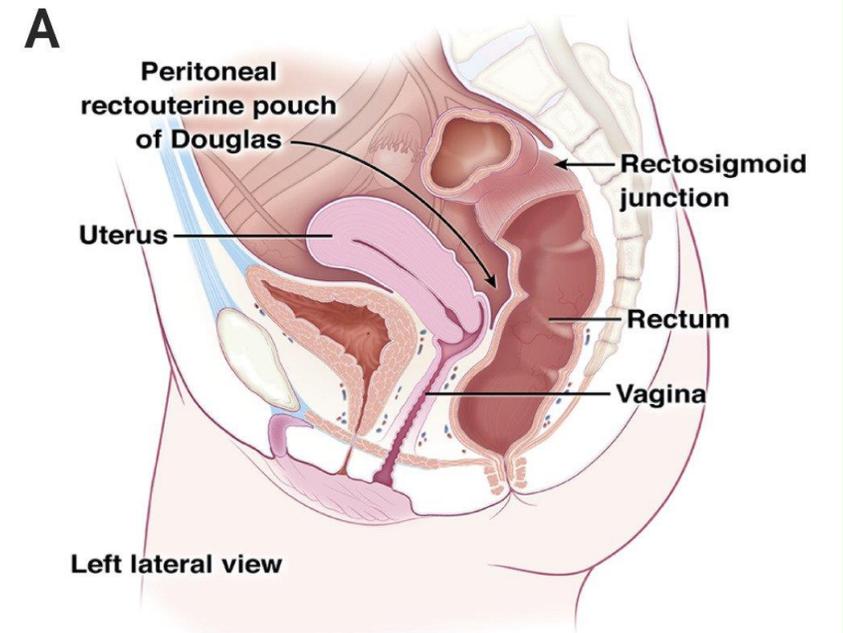
** Peritoneal covering:

a- In male the peritoneum covers the superior surface and upper part of the base.

✓ The reflection of the peritoneum from the rectum to the upper part of the base forming **the recto-vesical pouch**.

b- In female only the superior surface is covered by peritoneum.

✓ The reflection of the peritoneum from the uterus to the superior surface of the bladder forming **the utero-vesical pouch**.



Urinary Bladder

**** Relations of the urinary bladder:**

A- Relations of the surfaces

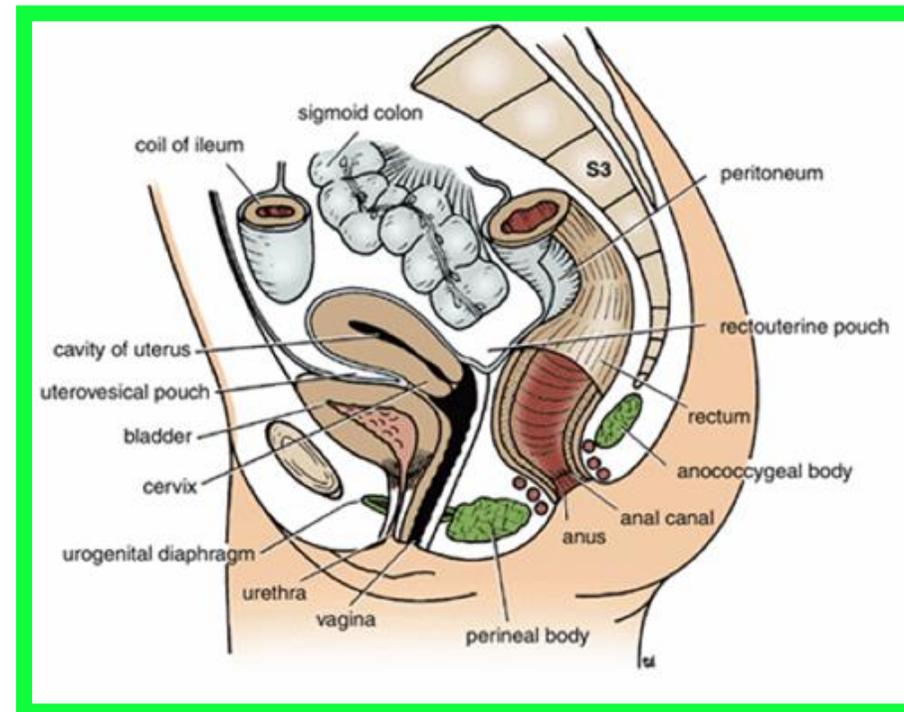
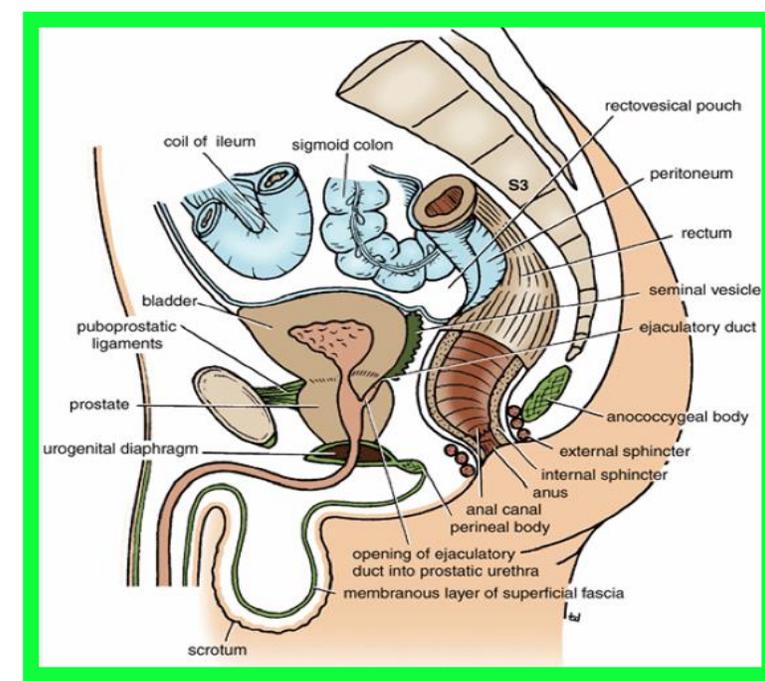
1- Superior surface: is covered by peritoneum

a- In male: It is related to

- 1) Sigmoid colon.
- 2) Coils of small intestine.

b- In female: It is related to

- 1) Anterior surface of the uterus.
- 2) Coils of small intestine.



Urinary Bladder

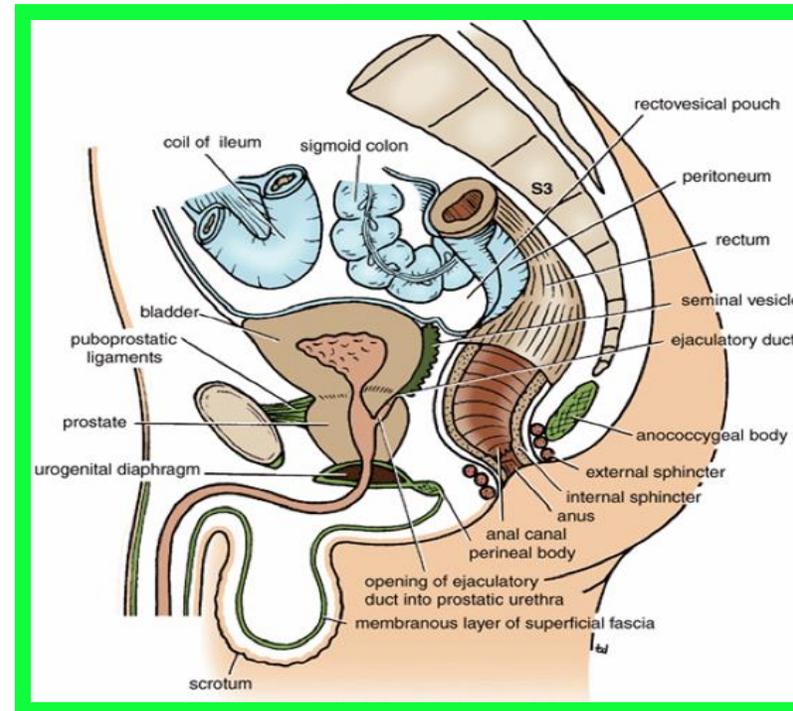
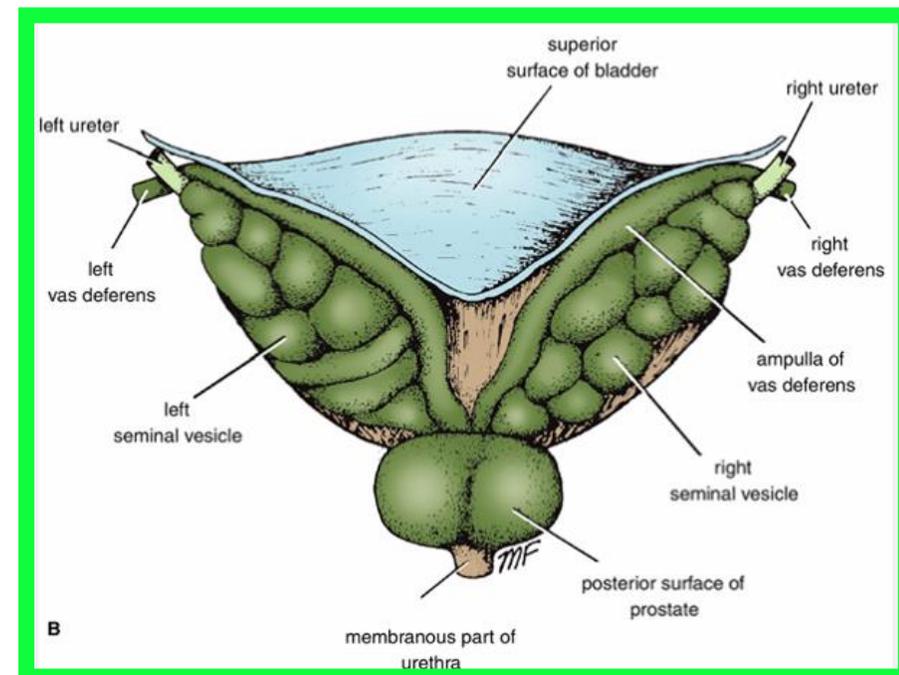
2- Base (posterior surface) of the urinary bladder;

a- In male:

1. **The upper part** is covered by peritoneum of the rectovesical pouch containing coils of small intestine.

2. **The lower part** is related to the rectum separated from it by

- 1) 2 Seminal vesicles.
- 2) 2 Ampulla of the vas deference.
- 3) 2 Ejaculatory ducts.



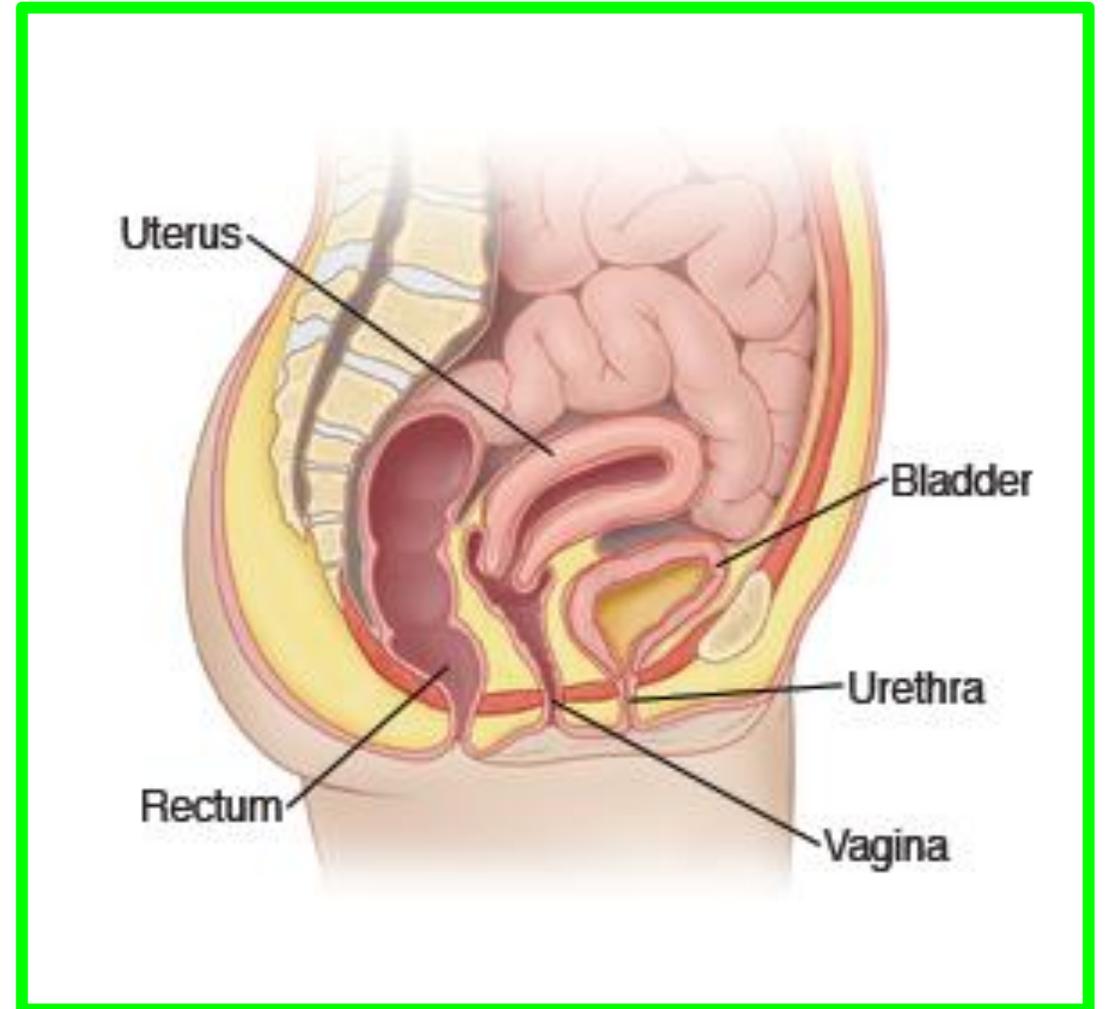
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Urinary Bladder

b- In female: has no peritoneal covering

✓ It is related to the rectum separated from it by

- 1) Cervix of the uterus.
- 2) Anterior wall of the vagina.

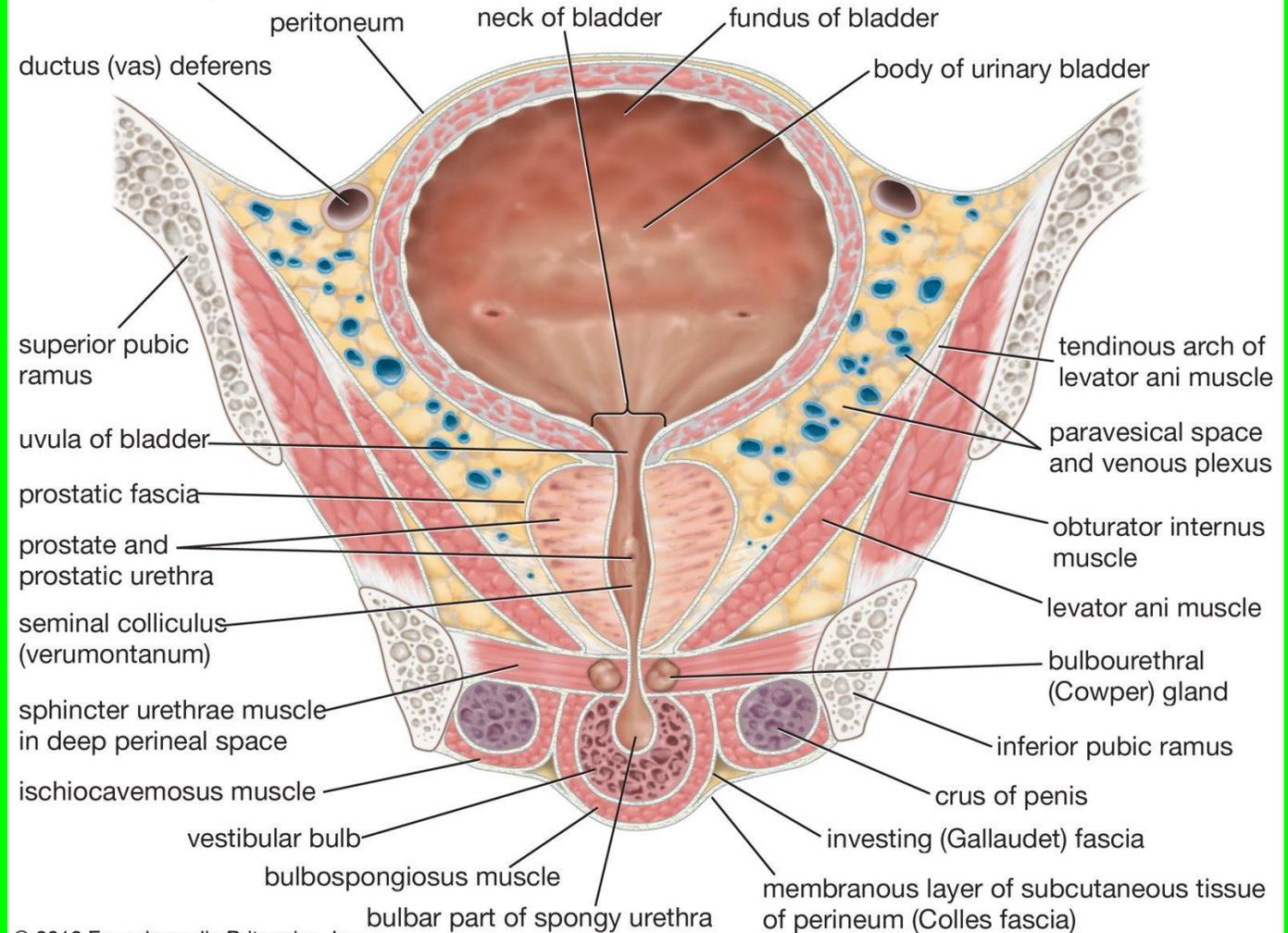


Urinary Bladder

3- Two Inferolateral surfaces: have no peritoneal covering and related to;

- 1- Retropubic pad of fat.
- 2- Obturator internus muscle.
- 3- Levator ani muscle.

Male urinary bladder and urethra



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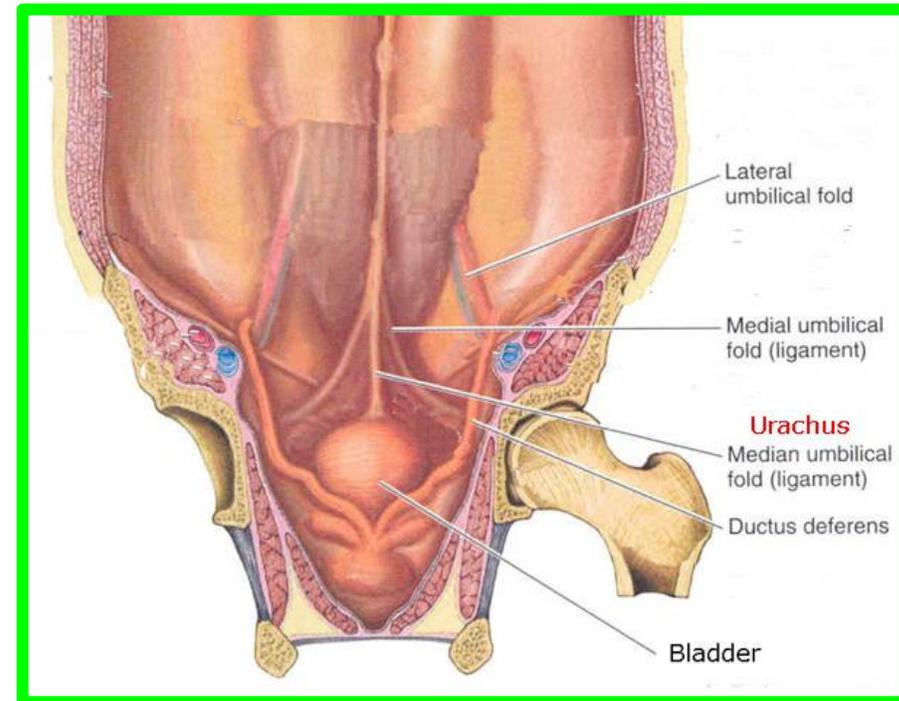
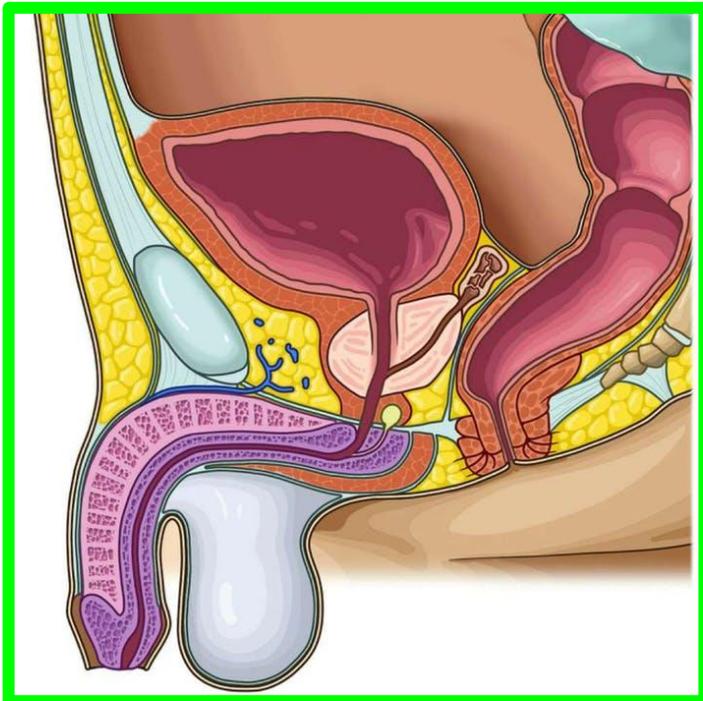
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Urinary Bladder

B- Relations of the angles:

1- Apex:

- ✓ It is directed anteriorly and lies behind **the upper border of the symphysis pubis**. It is separated from these bones by the potential **Retropubic space (of Retzius)**
- ✓ It is continuous with the umbilicus by a **median umbilical ligament**.



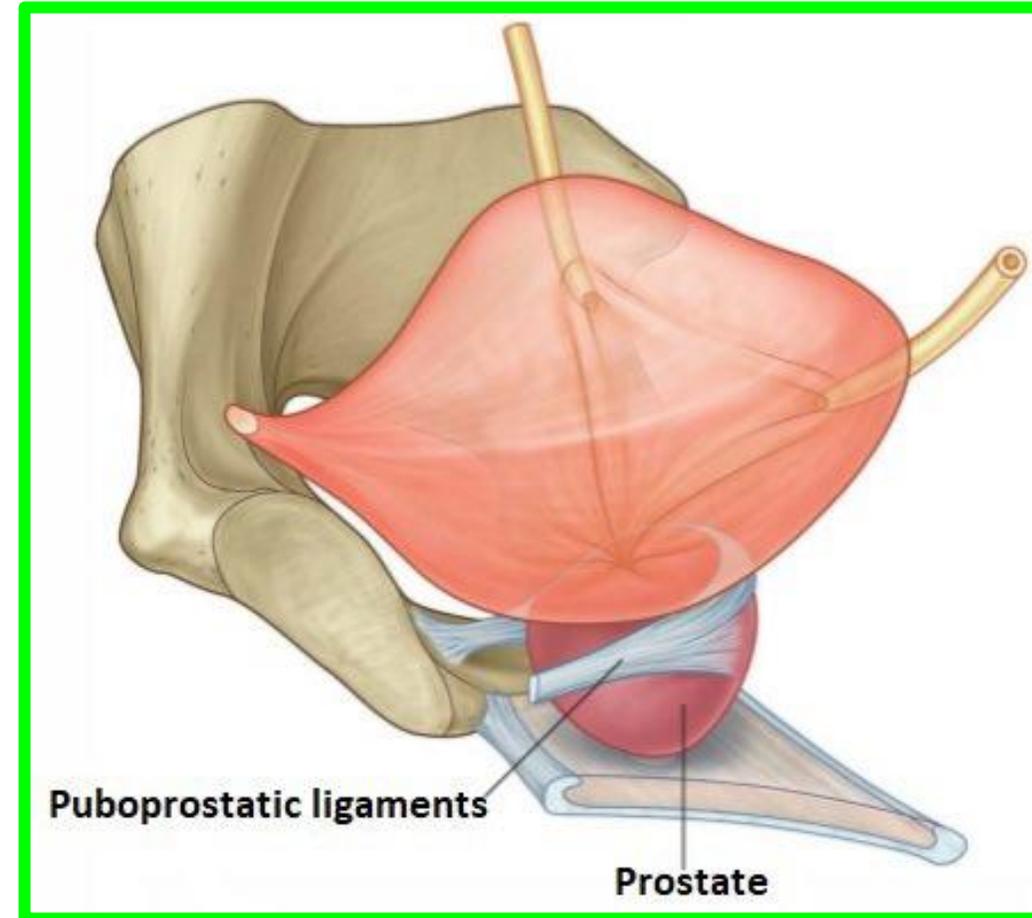
Urinary Bladder

2- Neck (inferior angle):

- ✓ It lies **1.5 inches** behind the lower part of the symphysis pubis.
- ✓ It is pierced by internal urethral orifice.

a- In male:

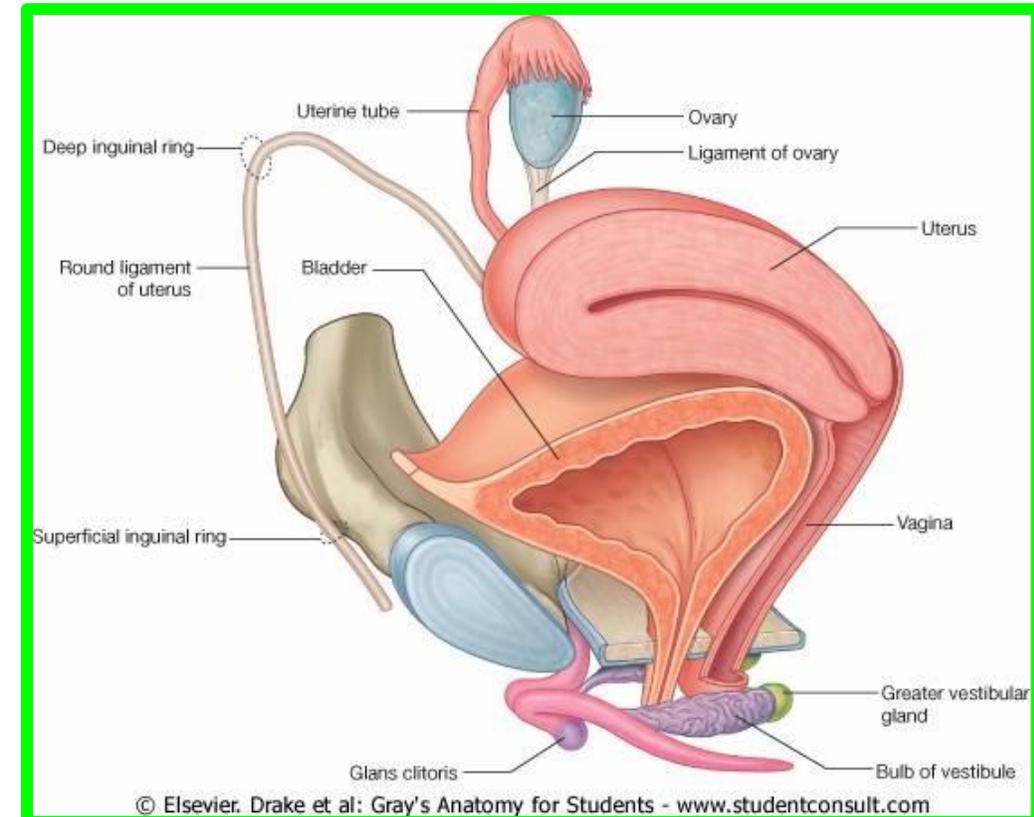
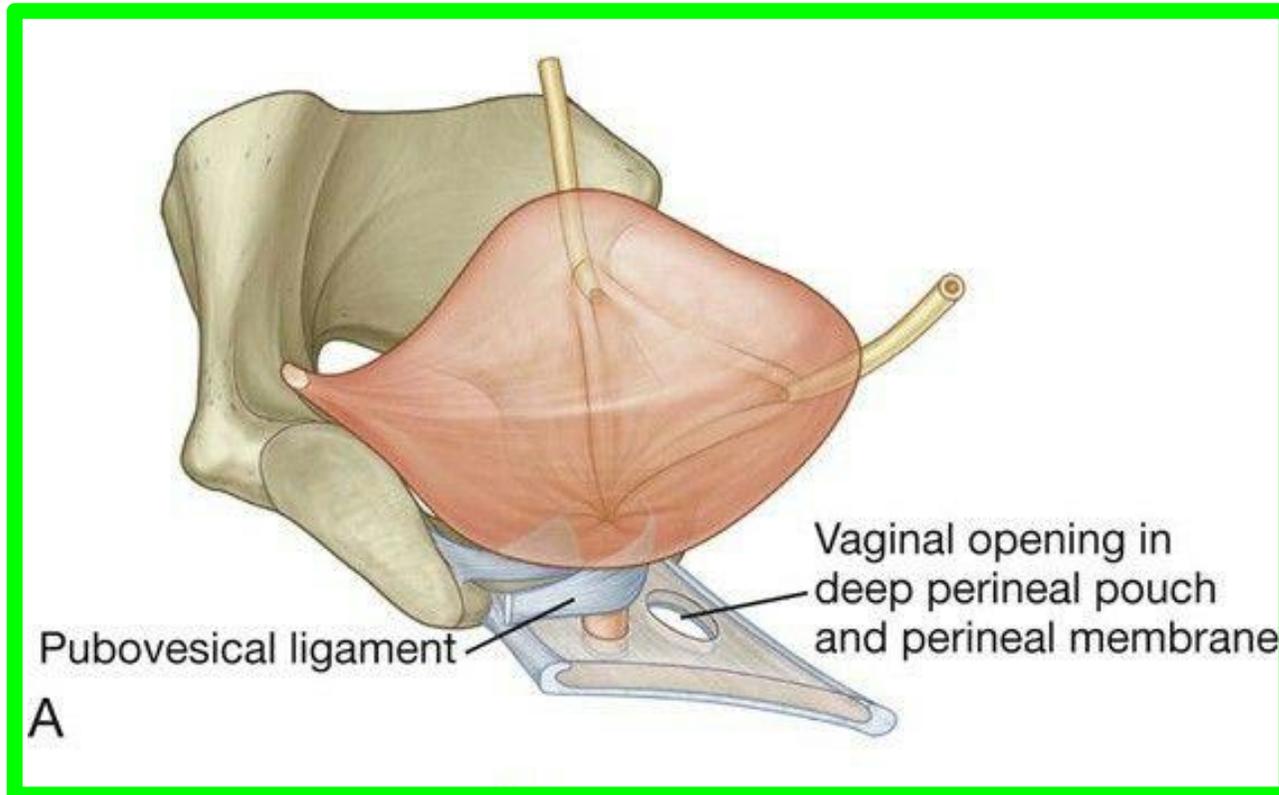
- ✓ Inferiorly; it rests on **the base of the prostate gland.**
- ✓ Anteriorly; attached to **the pubo-prostatic ligament.**
- ✓ Posteriorly, related to **the ejaculatory duct.**



b- In female:

- ❖ Inferiorly; it rests on **the pelvic fascia.**
- ❖ Anteriorly, attached to **the pubo-vesical ligament.**
- ❖ Posteriorly, related to **the anterior wall of the vagina.**

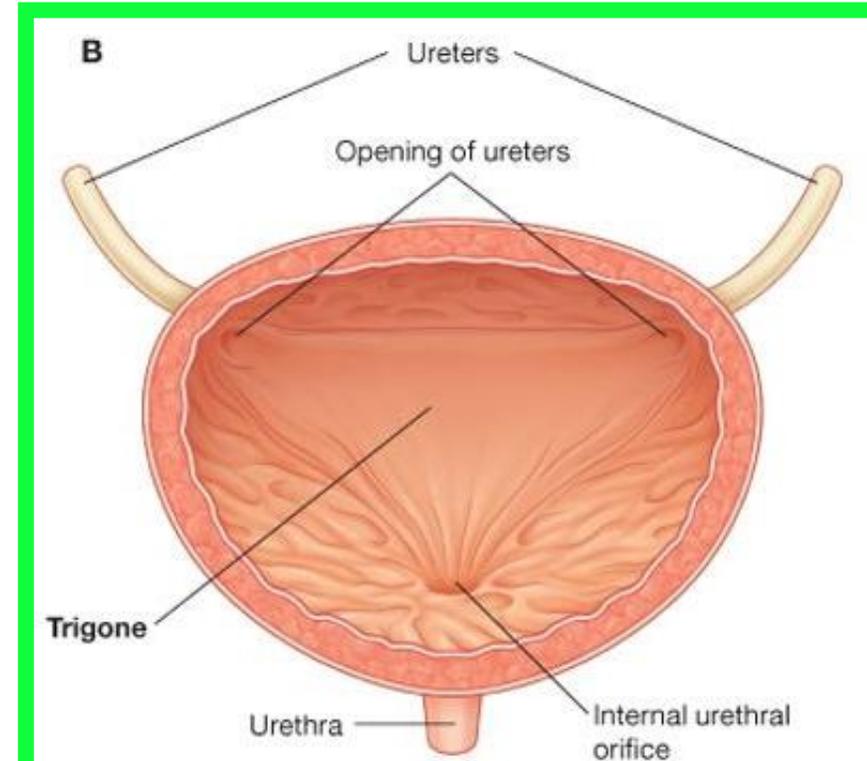
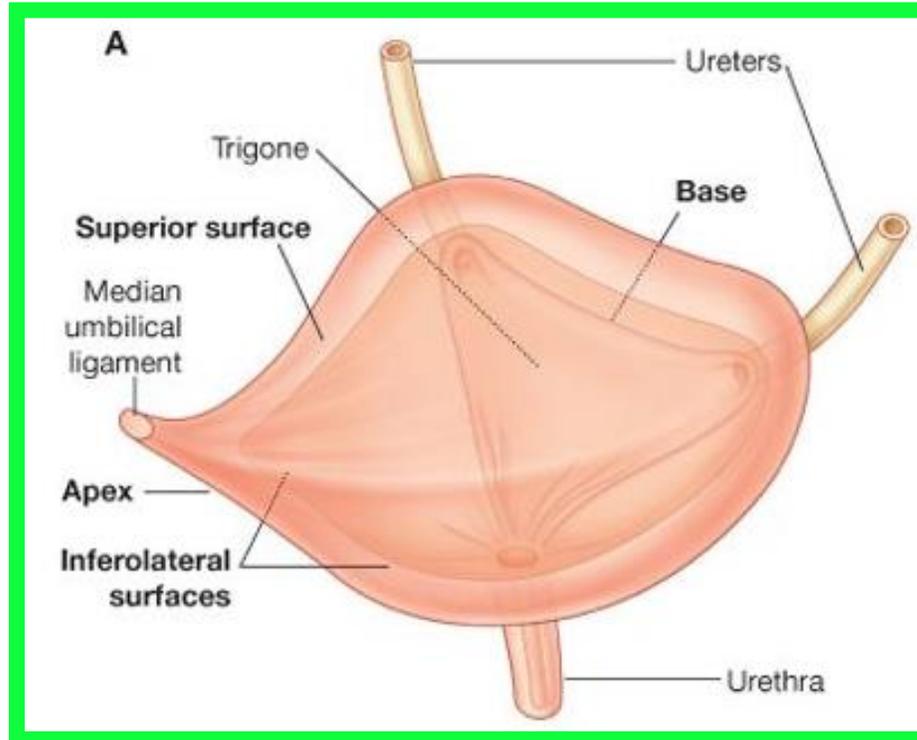
3- Postero-superior angles receive the ureters.



Urinary Bladder

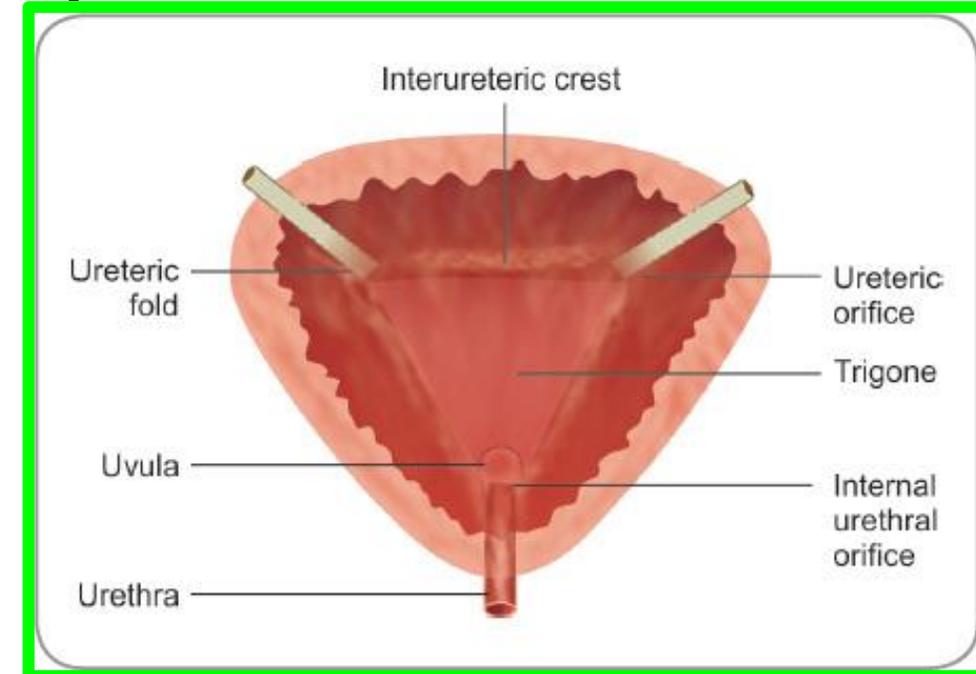
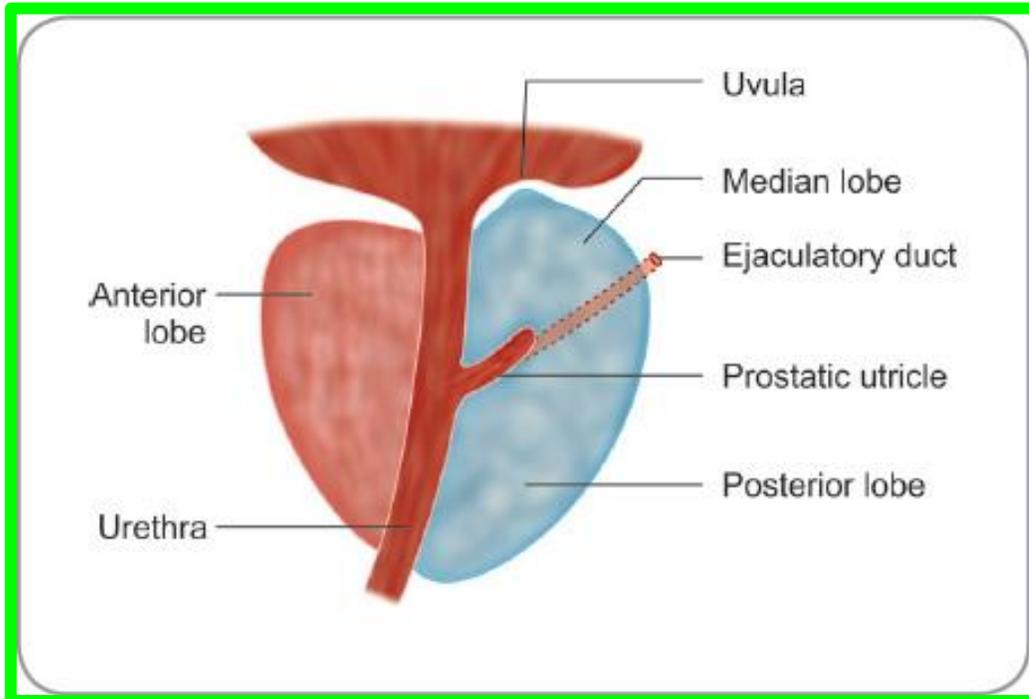
** Interior (mucosa) of the bladder:

- It is lined by **transitional epithelium** and **shows folds** except the trigone.
- **Trigone** (mesodermal in origin)
 - ❖ This is a **triangular area** on the posterior wall of the bladder wall.
 - ❖ It is bound by **3 lines** connecting the **2 ureteric orifices** and the **internal urethral orifice**



Urinary Bladder

- **Interureteric ridge** between the **2 ureteric orifices**, forms the base of the trigone.
- **Internal urethral meatus** is situated **at the apex** of the trigone.
- In male, **Uvula** of the bladder is a slight elevation behind the internal urethral meatus. It is produced by the median lobe of the prostate.



- The mucosa of trigone is **smooth, vascular, elastic, and sensitive.**

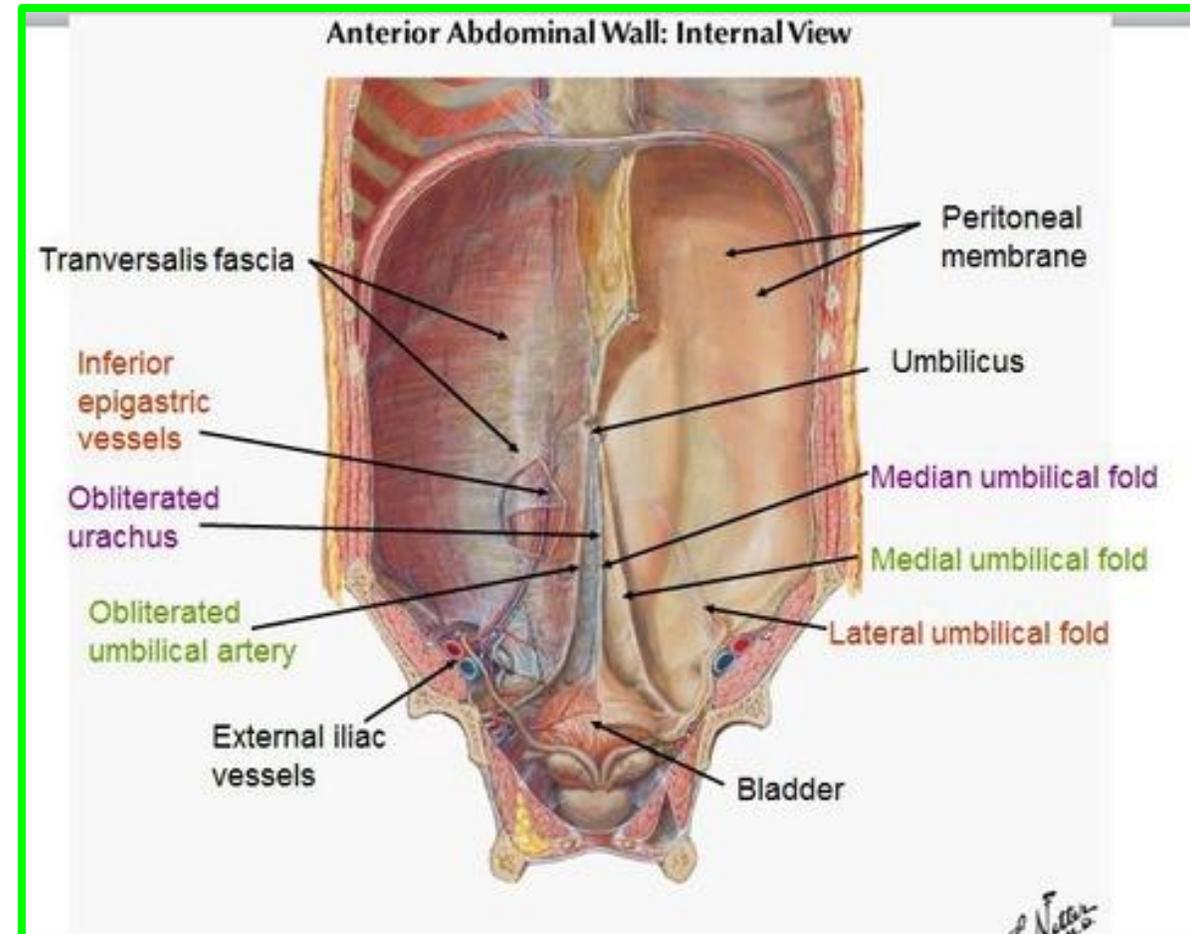
Urinary Bladder

**** Ligaments of the urinary bladder:**

A- True ligaments;

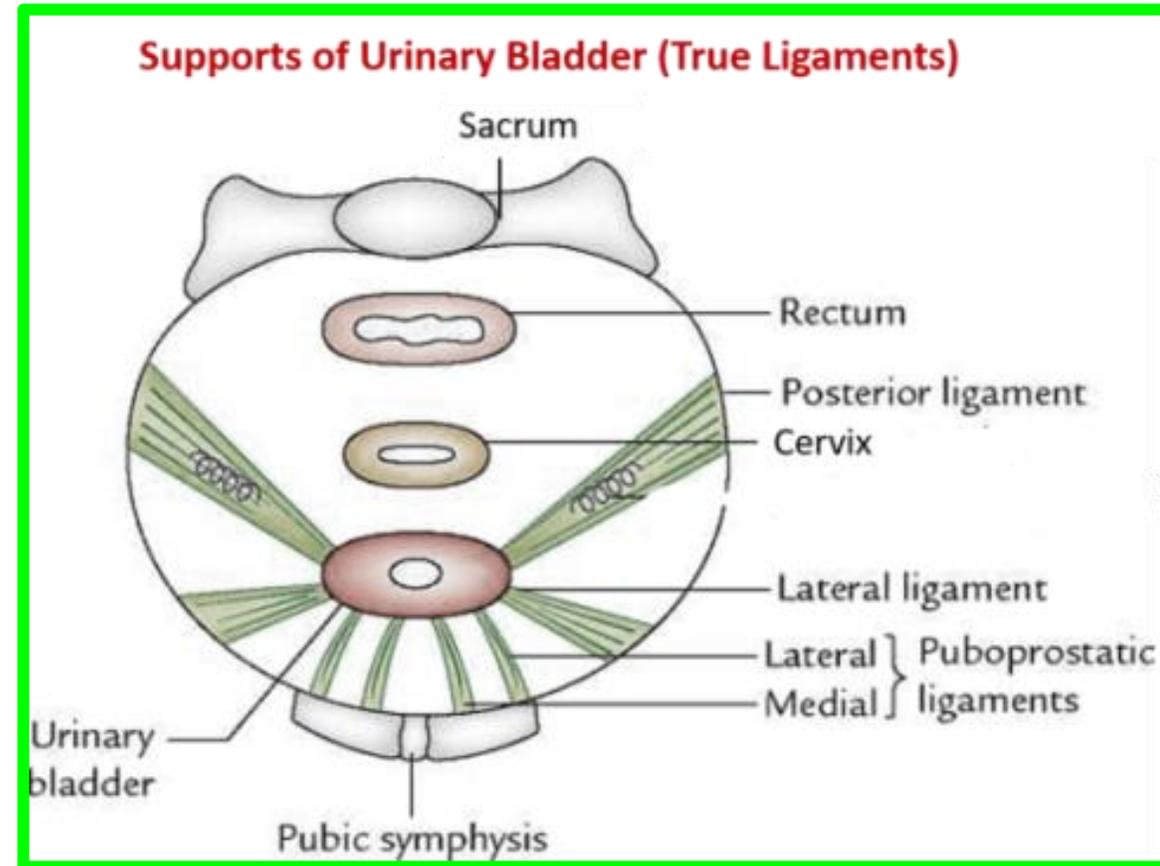
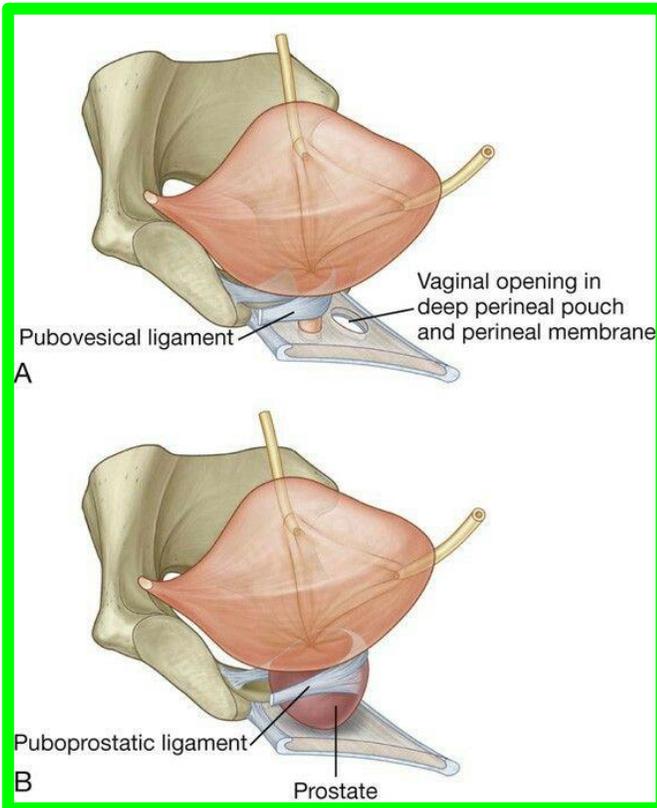
1- Median umbilical ligament (obliterated urachus) extending from the apex to the umbilicus.

2- Two medial umbilical ligaments, obliterated umbilical arteries.



Urinary Bladder

- 3- Two Lateral true ligaments extend from the side of the bladder to **the side of the pelvis**.
- 4- Posterior true ligament extends from the bladder **to the sacrum**.
- 5- Pubo-postatic (male) **Pubo-vesical** (female) **ligament**; from the **back of the pubis** to the neck of the bladder.

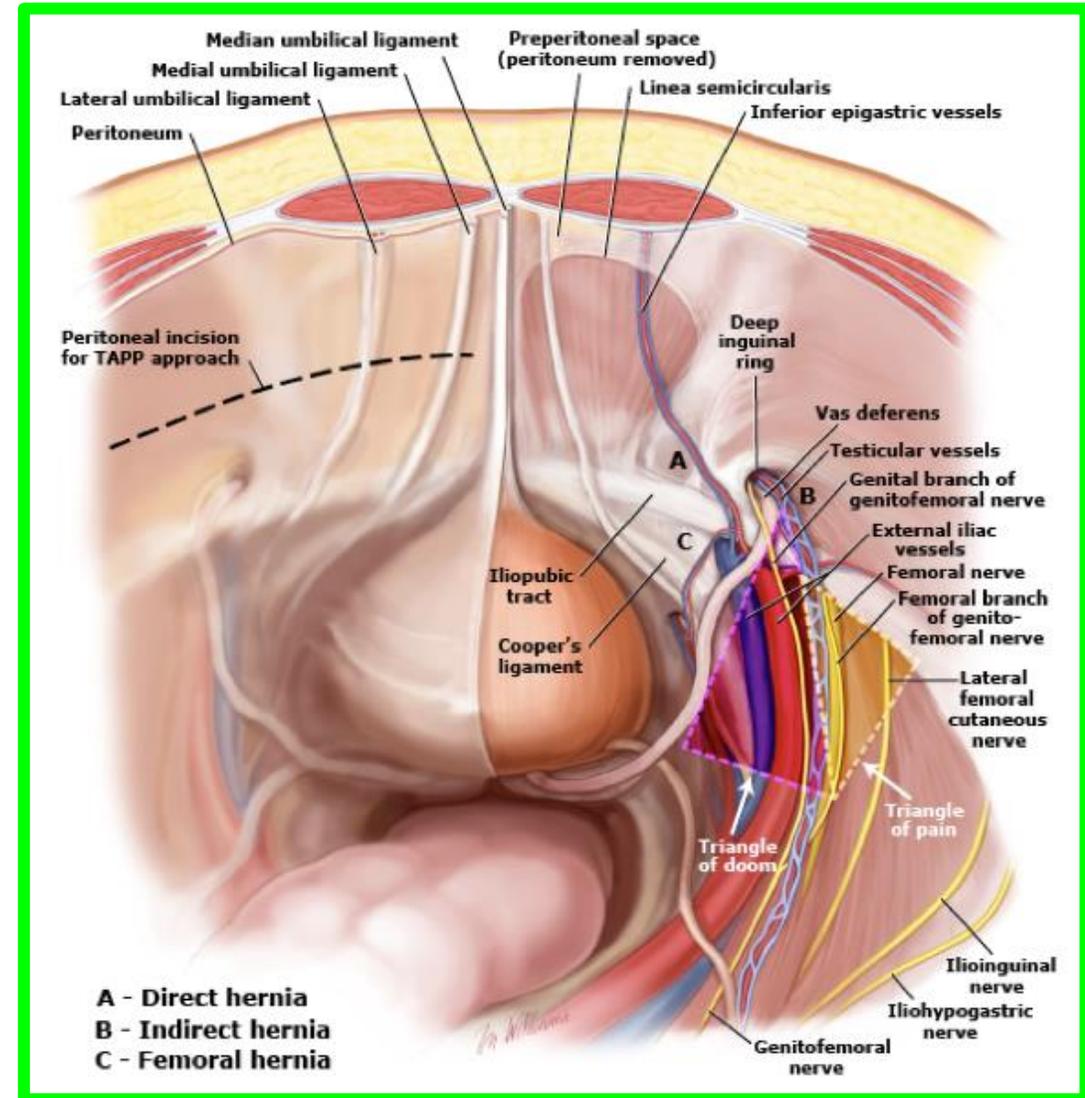


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Urinary Bladder

B- False ligaments; made of the peritoneal folds covering the true ligaments.

- 1- Median umbilical fold.
- 2- Two medial umbilical folds.
- 3- Two lateral false ligaments.
- 4- Posterior false ligament.



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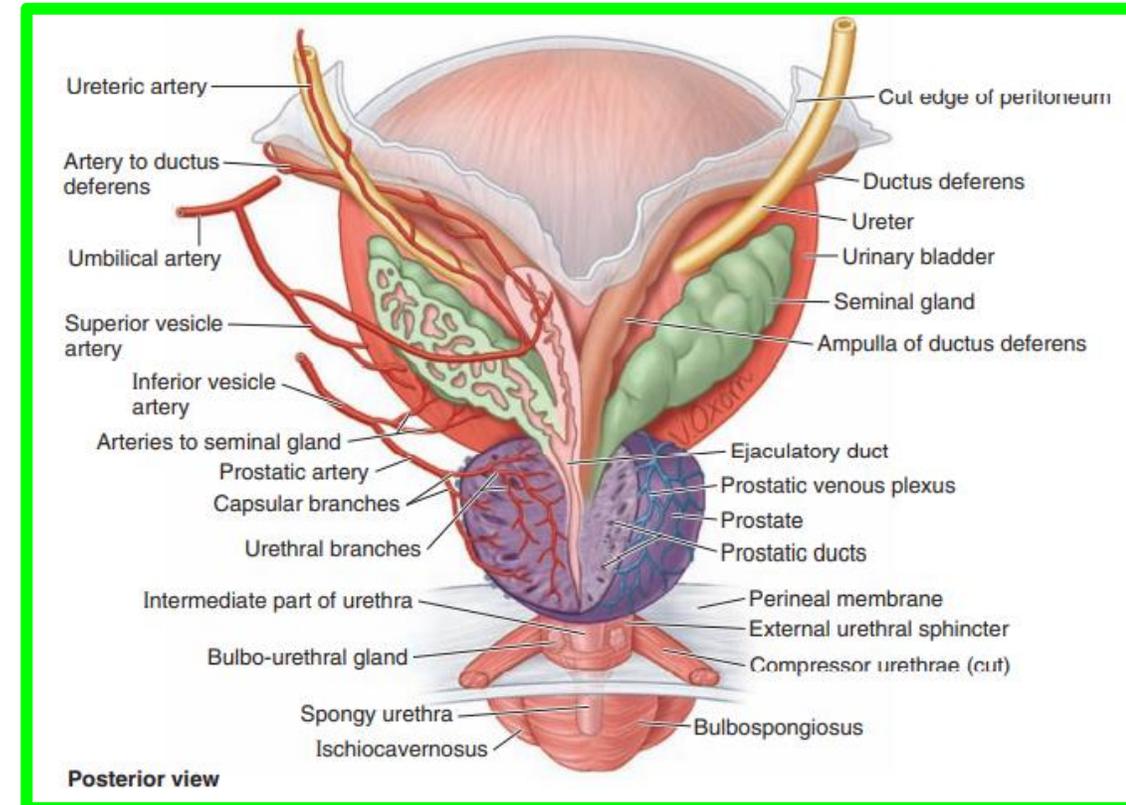
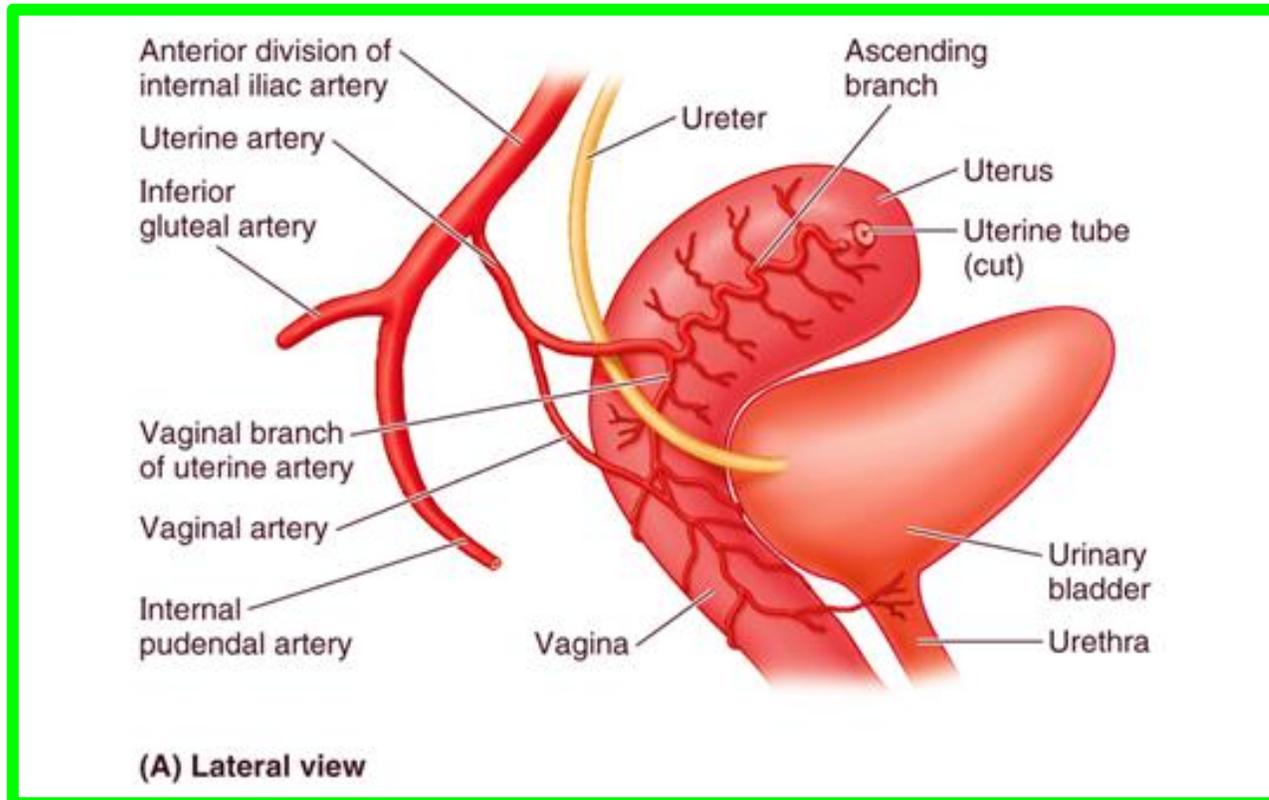
Urinary Bladder

**** Blood supply:**

*** Arterial supply:**

1- Superior vesical artery (patent part of the umbilical artery).

2- Inferior vesical artery (in male) or **vaginal and uterine arteries** (in female) from the anterior division of the internal iliac artery.

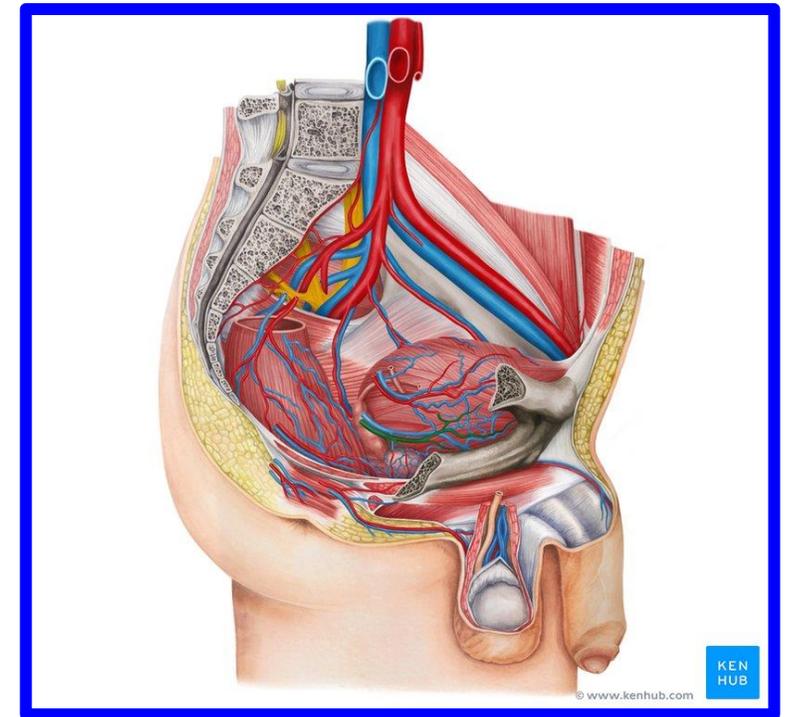
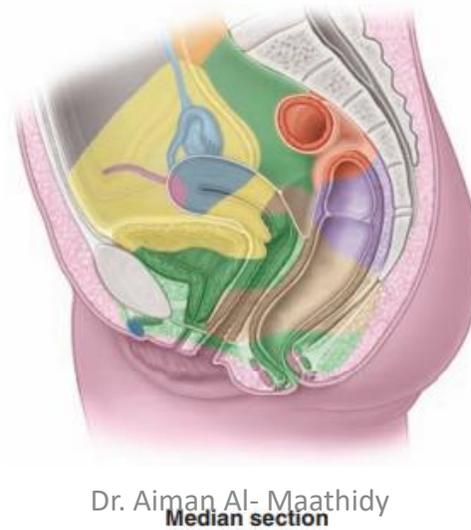
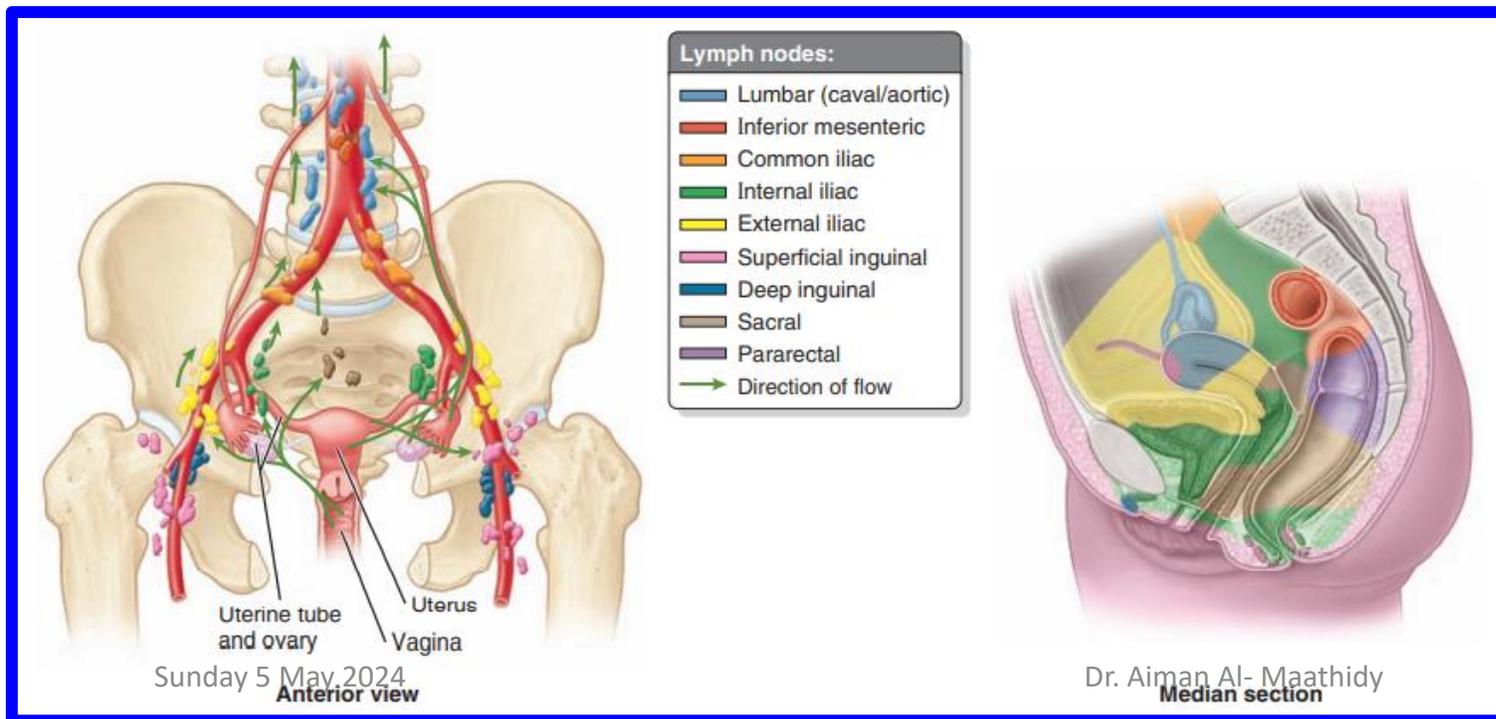


* **Venous drainage:** The veins form a **venous plexus**; then drain into **the internal iliac vein**.

** **Lymphatic drainage:**

1- Mostly into **the external iliac lymph nodes**.

2- Partly Into **the internal iliac, and common iliac lymph nodes**.



Urinary Bladder

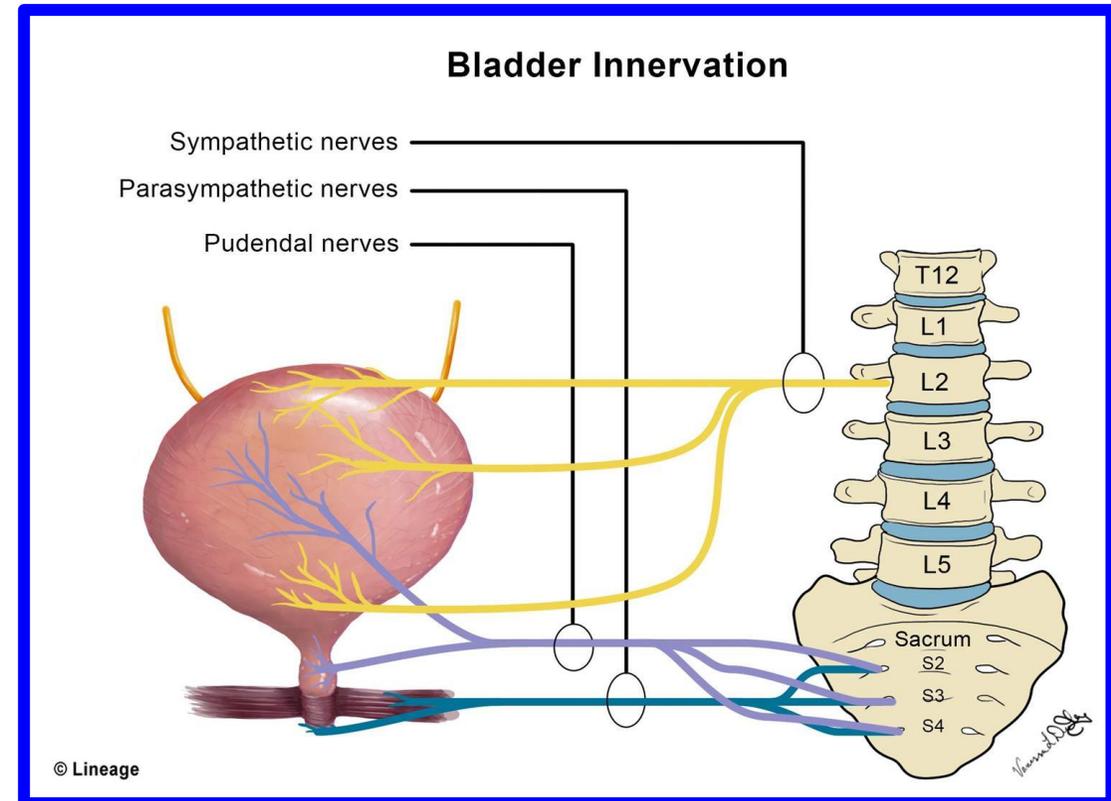
** Nerve supply:

a- Sympathetic from T11, 12 and L 1, 2 segments of the spinal cord.

- It is inhibitory to the muscle wall and motor to the sphincter.

b- Parasympathetic from S 2, 3, 4.

- It is motor to the muscle wall and inhibitory to the sphincter (micturation)



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