
بسم الله الرحمن الرحيم

GROSS ANATOMY OF URINARY BLADDER

BY

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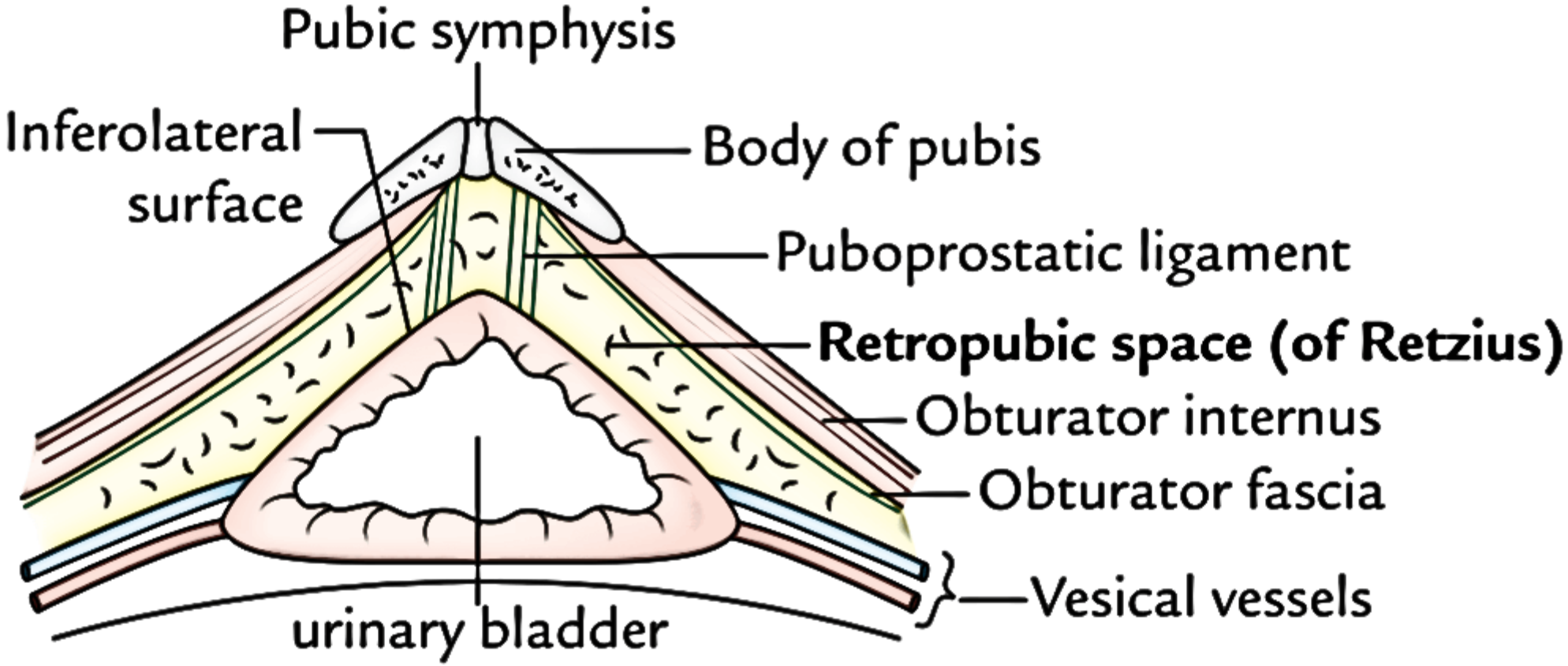
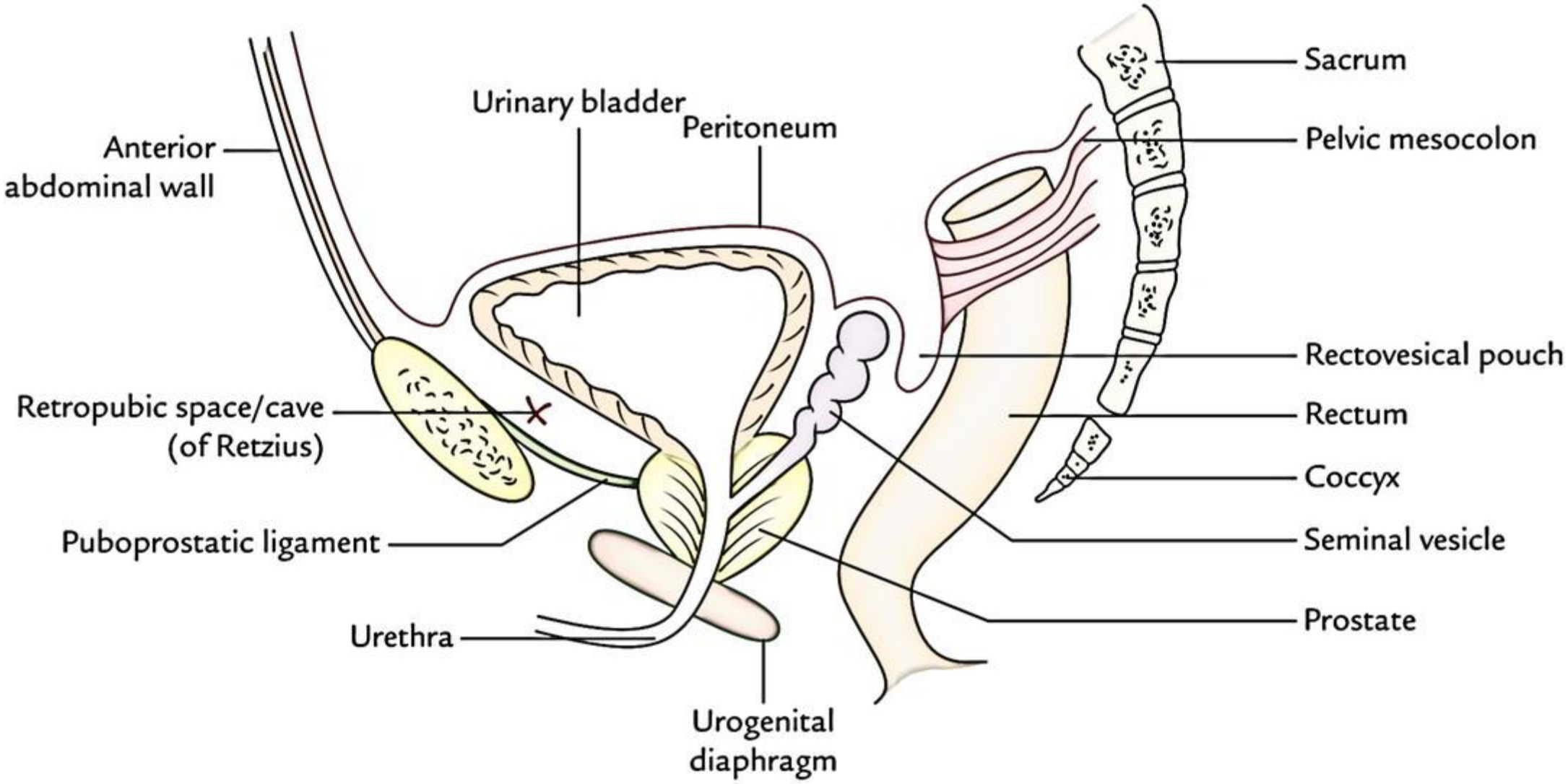
Urinary System

- Two Kidneys
  - Perform all functions except actual excretion.
- Two Ureters
  - Convey urine from Kidneys to Urinary Bladder
- Urinary Bladder
  - Holds Urine until excretion
- Urethra
  - Conveys urine from bladder to outside of body

Gross Anatomy

- The adult bladder is located in the anterior pelvis and is enveloped by extraperitoneal fat and connective tissue. It is separated from the pubic symphysis by an anterior prevesical space known as the space of Retzius or retropubic space. The dome of the bladder is covered by peritoneum, and the bladder neck is fixed to neighboring structures by reflections of the pelvic fascia and by true ligaments of the pelvis.


Pubic symphysis
Inferolateral surface
Body of pubis
Puboprostatic ligament
Retropubic space (of Retzius)
Obturator internus
Obturator fascia
Vesical vessels
urinary bladder


Anterior abdominal wall
Urinary bladder
Peritoneum
Sacrum
Pelvic mesocolon
Rectovesical pouch
Retropubic space/cave (of Retzius)
Rectum
Coccyx
Puboprostatic ligament
Seminal vesicle
Prostate
Urethra
Urogenital diaphragm

Gross Anatomy Contd

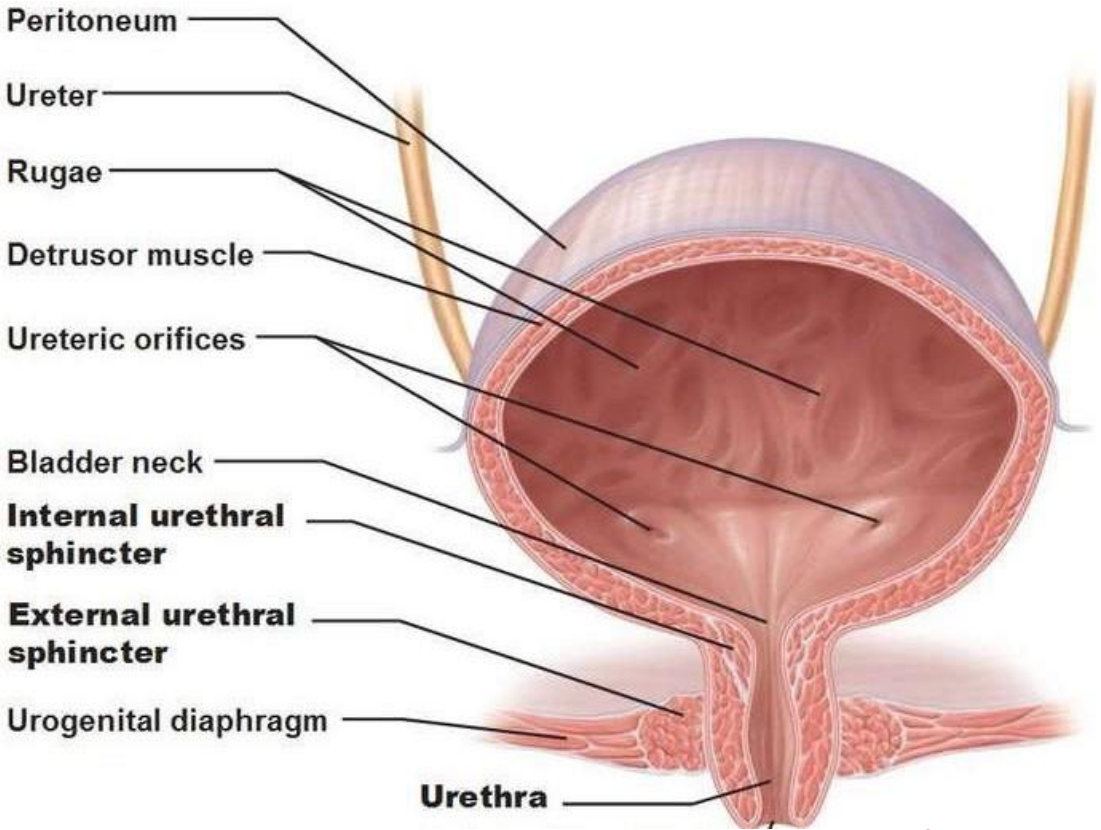
- The body of the bladder receives inferior support from the pelvic diaphragm in females or prostate in males and lateral support from the obturator internus and levator ani muscles. At its apex, the medial umbilical ligament, or the urachal remnant, courses along the anterior abdominal wall to the umbilicus.

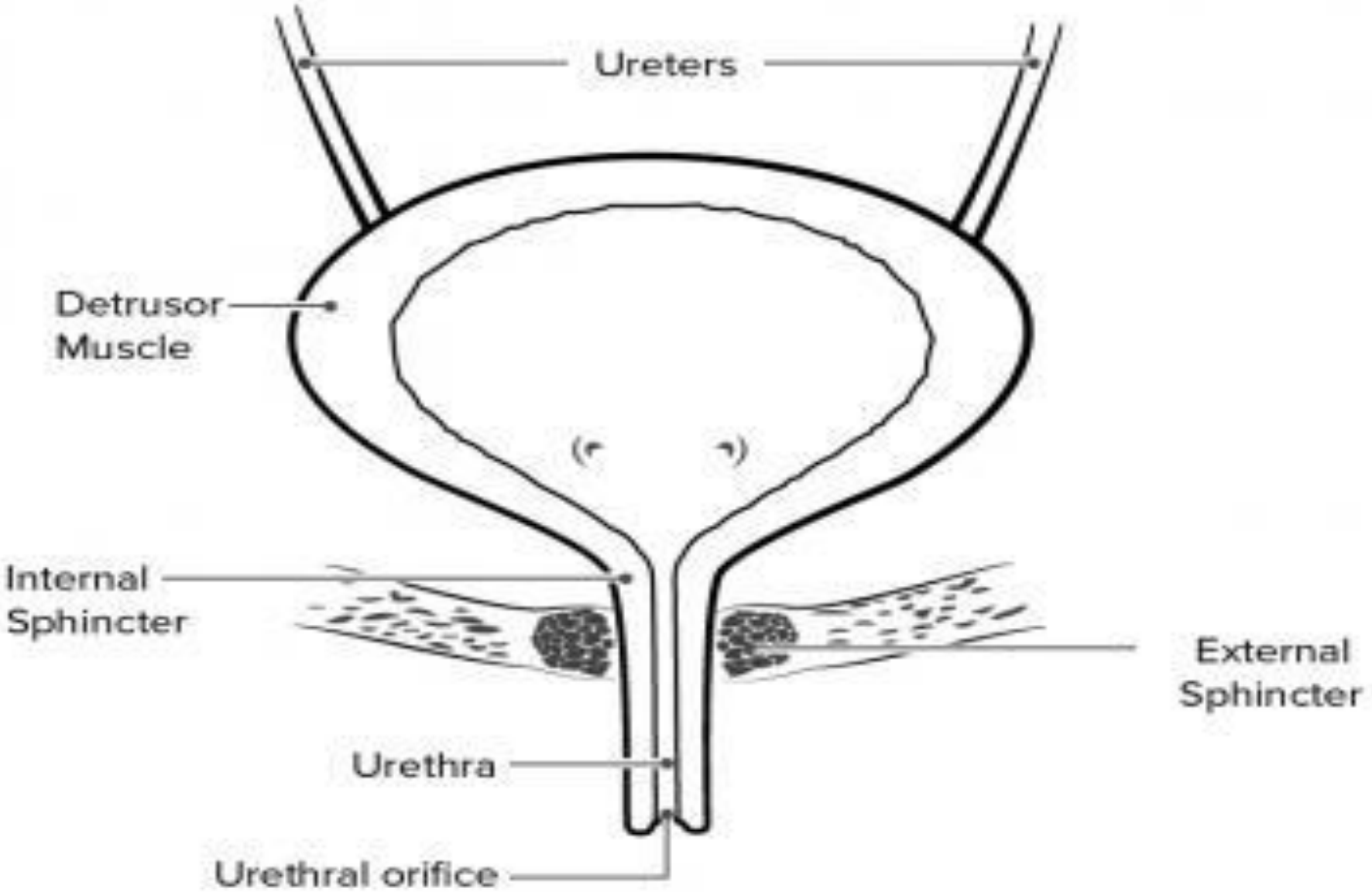
BODY OF URINARY BLADDER

- It is lined by Transitional epithelium,
- It holds the urine, before it is voided.
- It can hold 400ml to 1000ml of the urine.
- It is located between the apex and the fundus.

URINARY BLADDER

- IT IS A HOLLOW MUSCULOMEMBRANOUS SAC WHICH ACTS AS A RESORVOIR FOR THE URINE.
- IT IS THE MOST ANTERIOR ELEMENT OF THE PELVIC VISCERA.
- IT IS A SUBPERITONEAL ORGAN AND HAS PARIETAL PERITONEUM ONLY ON ITS SUPERIOR SURFACE.
- URINE ENTERS THE BLADDER VIA URETERS AND EXITS VIA THE URETHRA.




Ureters
Detrusor Muscle
Internal Sphincter
External Sphincter
Urethra
Urethral orifice

ANATOMICAL LOCATION

- When "Empty" , the adult urinary bladder is located in the "Lesser pelvis" lying partially superior to and partially posterior to the pubic Bones.
- As the bladder fills it enters the "Greater Pelvis".
- In some individuals, a full bladder may ascend to the level of the "Umbilicus".
- .

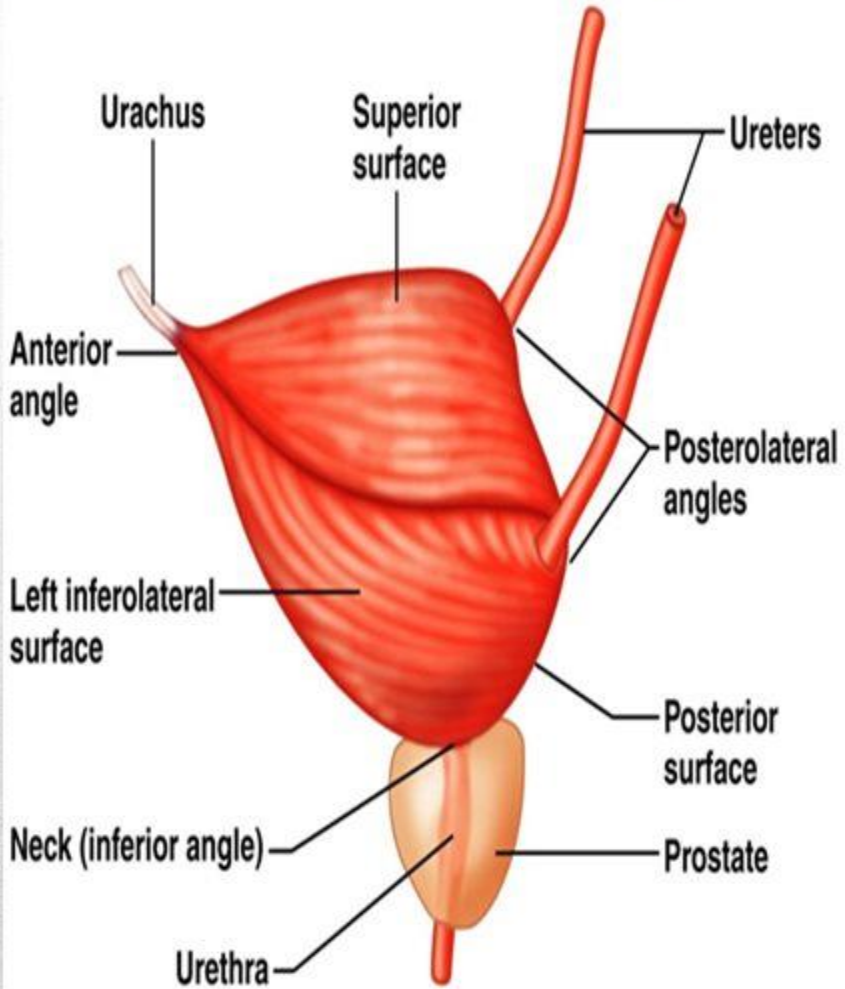
Parts:

1. Apex: Directed anteriorly (Median umbilical ligament) to the umbilicus

2. Base: Directed posteriorly.- Trigone

3. Three surfaces:
   a. Superior surface.
   b. Two infero-lateral surfaces (one on each side).

4. Three angles:
   a. Two postero-superior angles (one on each side).
   b. Inferior angle (neck of the bladder).



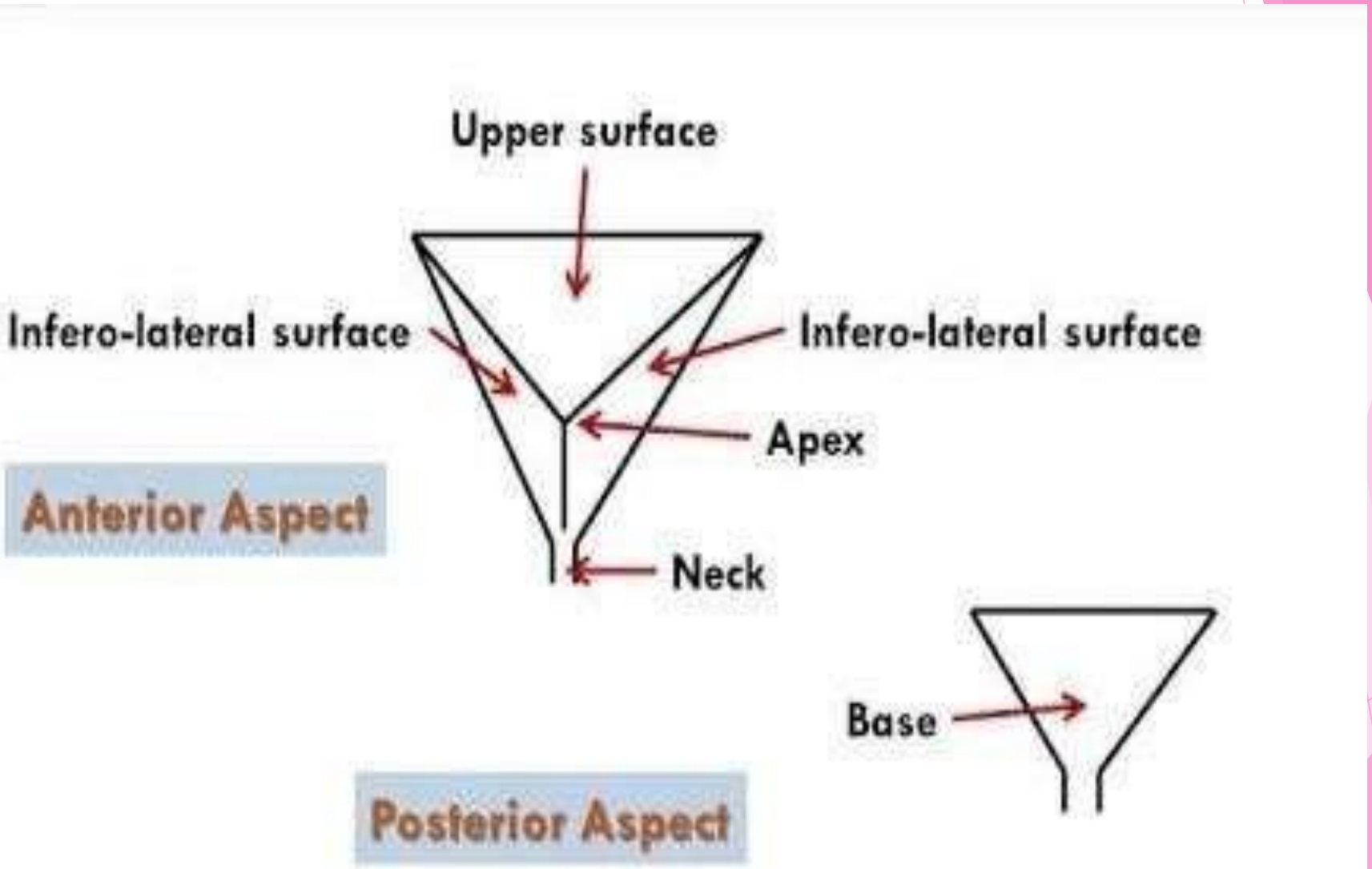
SURFACES OF THE URINARY BLADDER

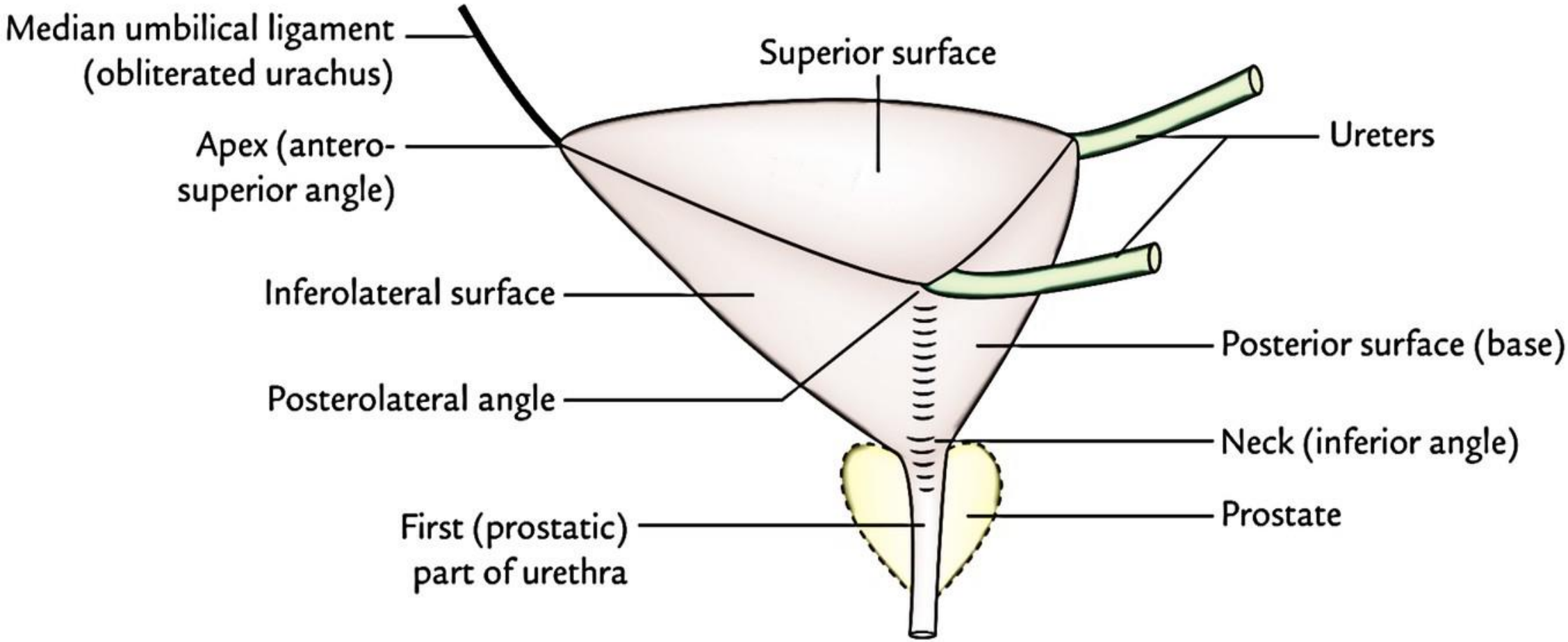
- Superior surface.
- Right inferolateral surface.
- Left inferateral surface
- Posterior surface.(BASE)

  Apex (ANTERIOR)

THREE SIDED PYRAMID

- APEX BASE OR FUNDUS NECK


Upper surface
Infero-lateral surface
Infero-lateral surface
Apex
Anterior Aspect
Neck
Base
Posterior Aspect


Median umbilical ligament
(obliterated urachus)
Apex (antero-
superior angle)
Inferolateral surface
Posterolateral angle
First (prostatic)
part of urethra
Superior surface
Ureters
Posterior surface (base)
Neck (inferior angle)
Prostate

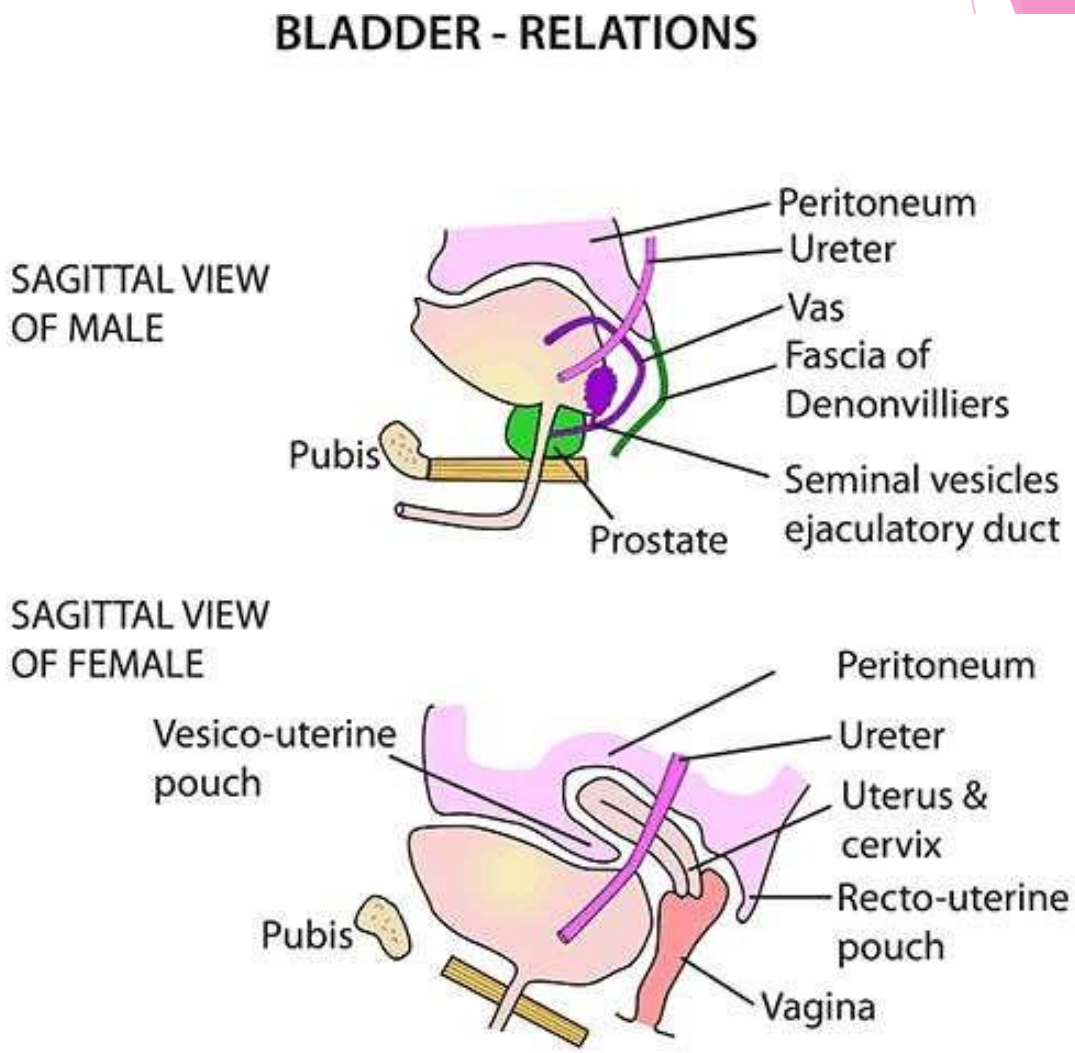
POSTERIOR RELATIONS OF URINARY BLADDER

In males :-

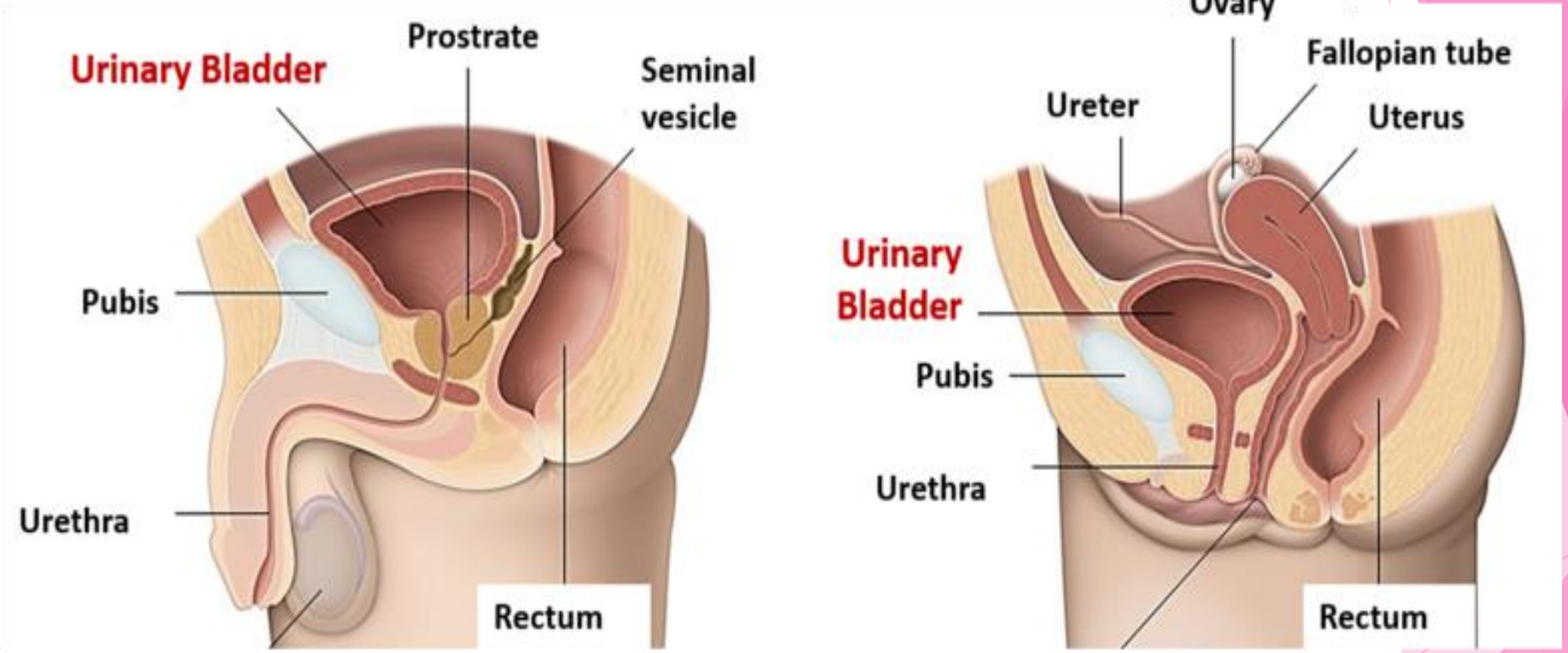
- Vas deferan
- Seminal Vesicle
- Rectum
- rectovasical Fascia
- Peritoneum parietal

In famales :-

- Vagina
- Part of Uterus



Location of Urinary Bladder



BLADDER IN RELATION TO NEARBY STRUCTURES

- In males, the seminal vesicles, ductus deferens, ureters, and rectum border the inferoposterior aspect of the bladder and prostate. Anterior to the bladder is the space of Retzius or retropubic space, which is composed of fibroadipose tissue and the prevesical fascia. The dome and posterior surface of the bladder are covered by parietal peritoneum, which reflects superiorly to the seminal vesicles and is continuous with the anterior rectal peritoneum.

BLADDER IN RELATION TO NEARBY STRUCTURES

- In females, the posterior peritoneal reflection is continuous with the uterus and vagina and is referred to as the anterior cul-de-sac or vesicouterine pouch. The inferoposterior aspect of the bladder thus rests on the anterior vaginal wall, through which the urethra courses. As a result of positioning adjacent to the reproductive organs and behind the bony pubis, the bladder neck and urethra are at risk for both direct and hypoxic injury during childbirth.

RELATIONS CONTINUED

Superior Relations in male:-

- Peritoneum
- Coils of ileum
- Sigmoid colon

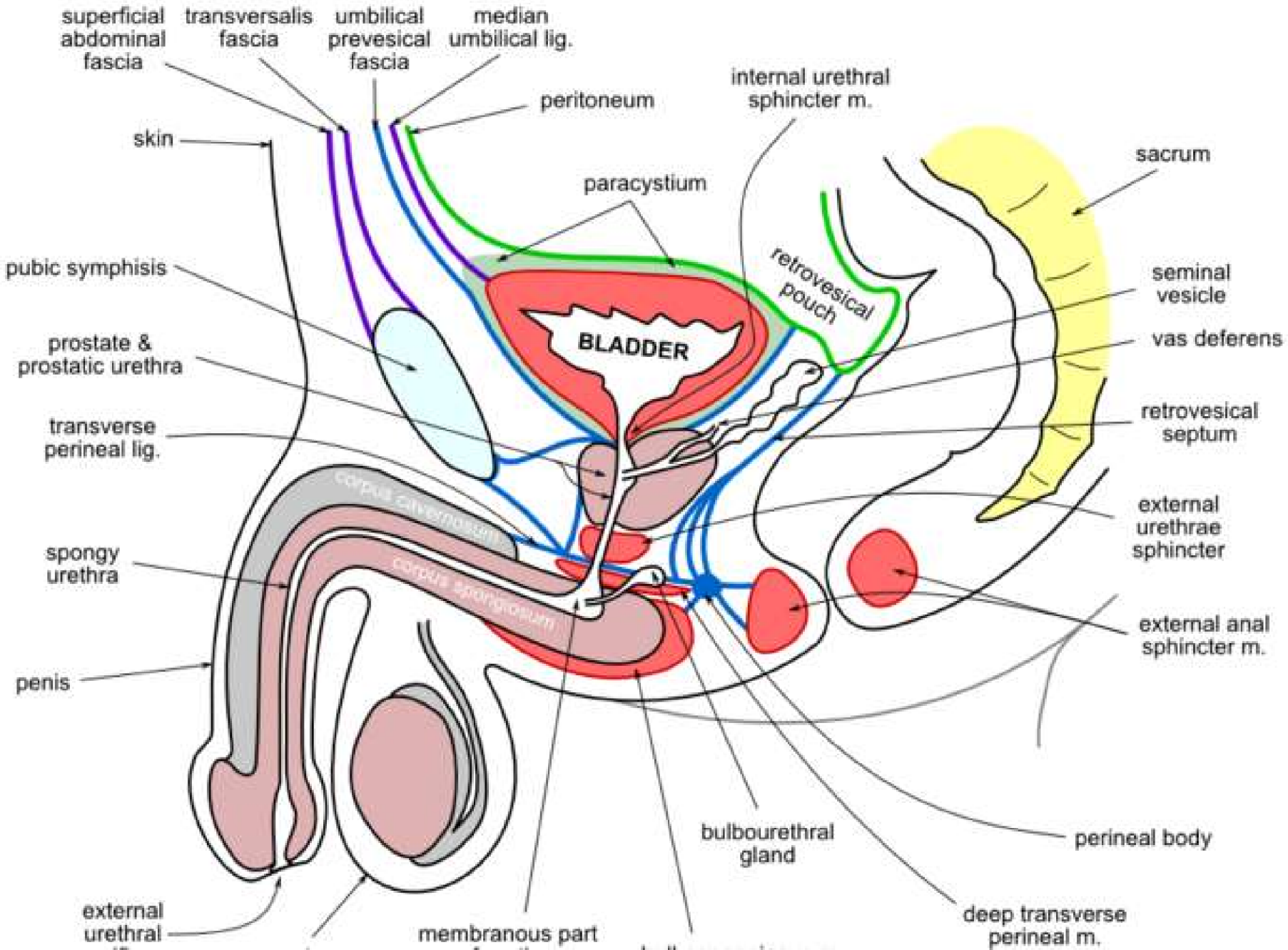
Superior Relations in female:-

- Uterus

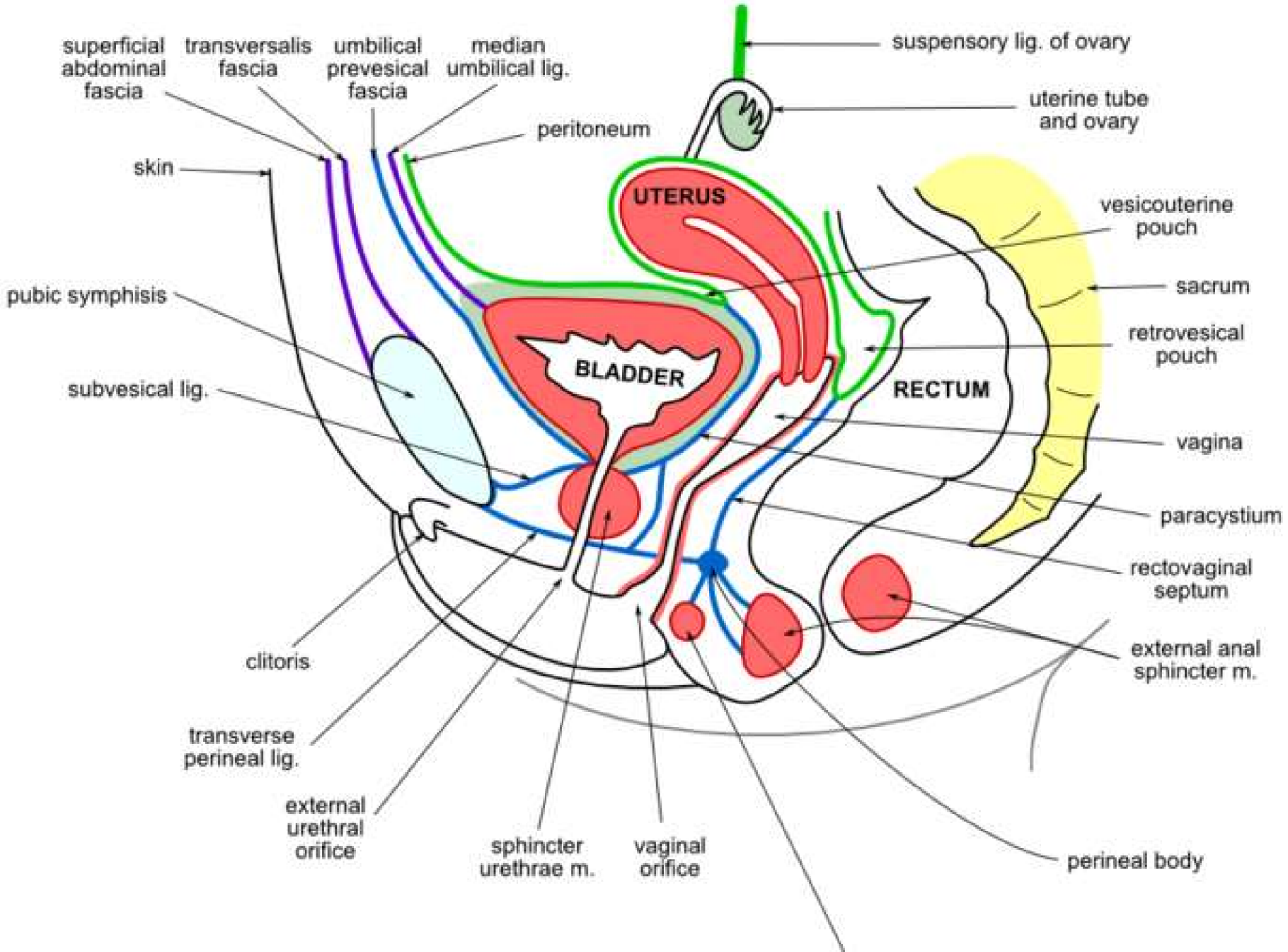
Lateral Relations :-

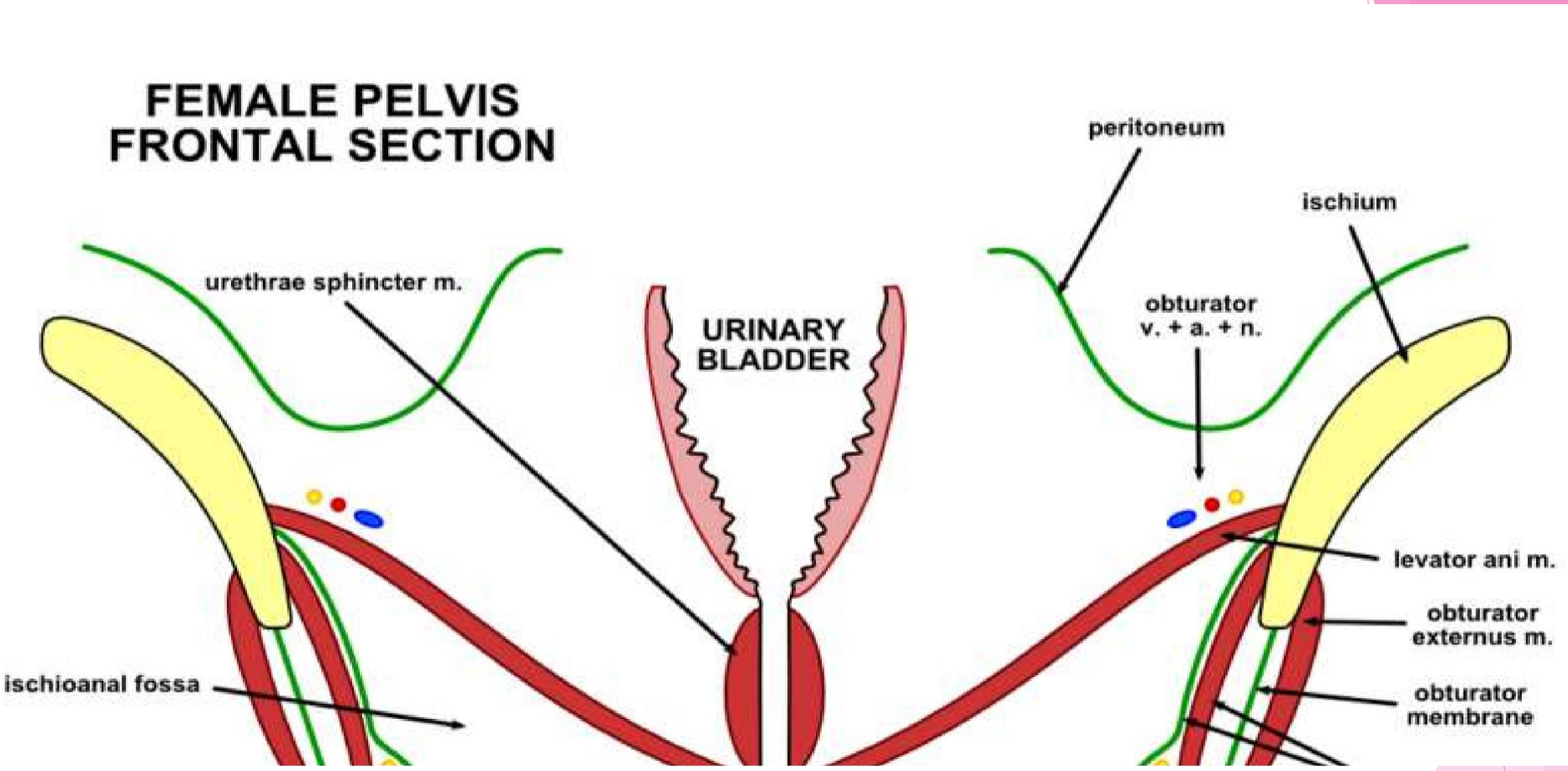
- Obturator internus
- Levator ani

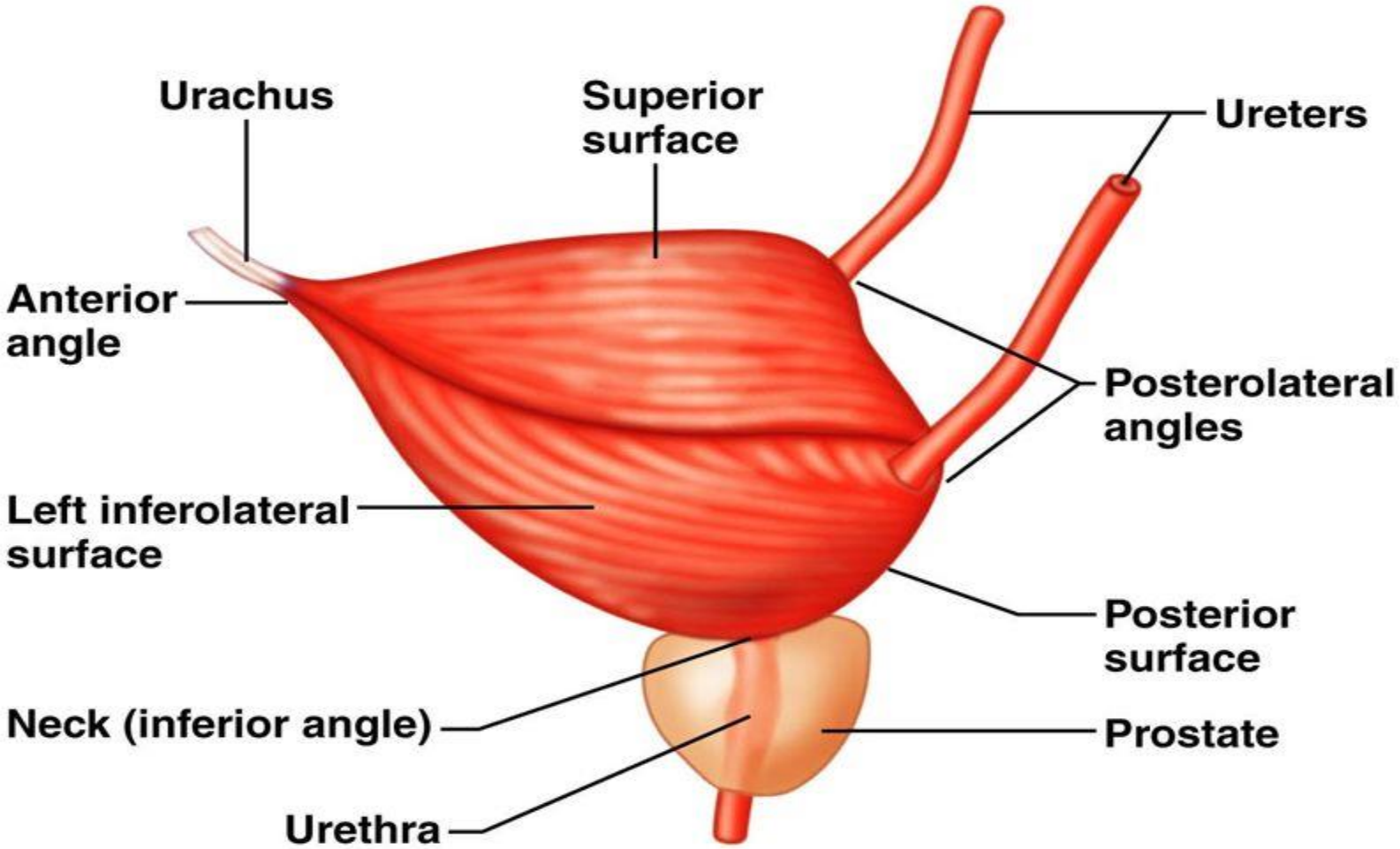
MALE PELVIS - SAGITTAL SECTION

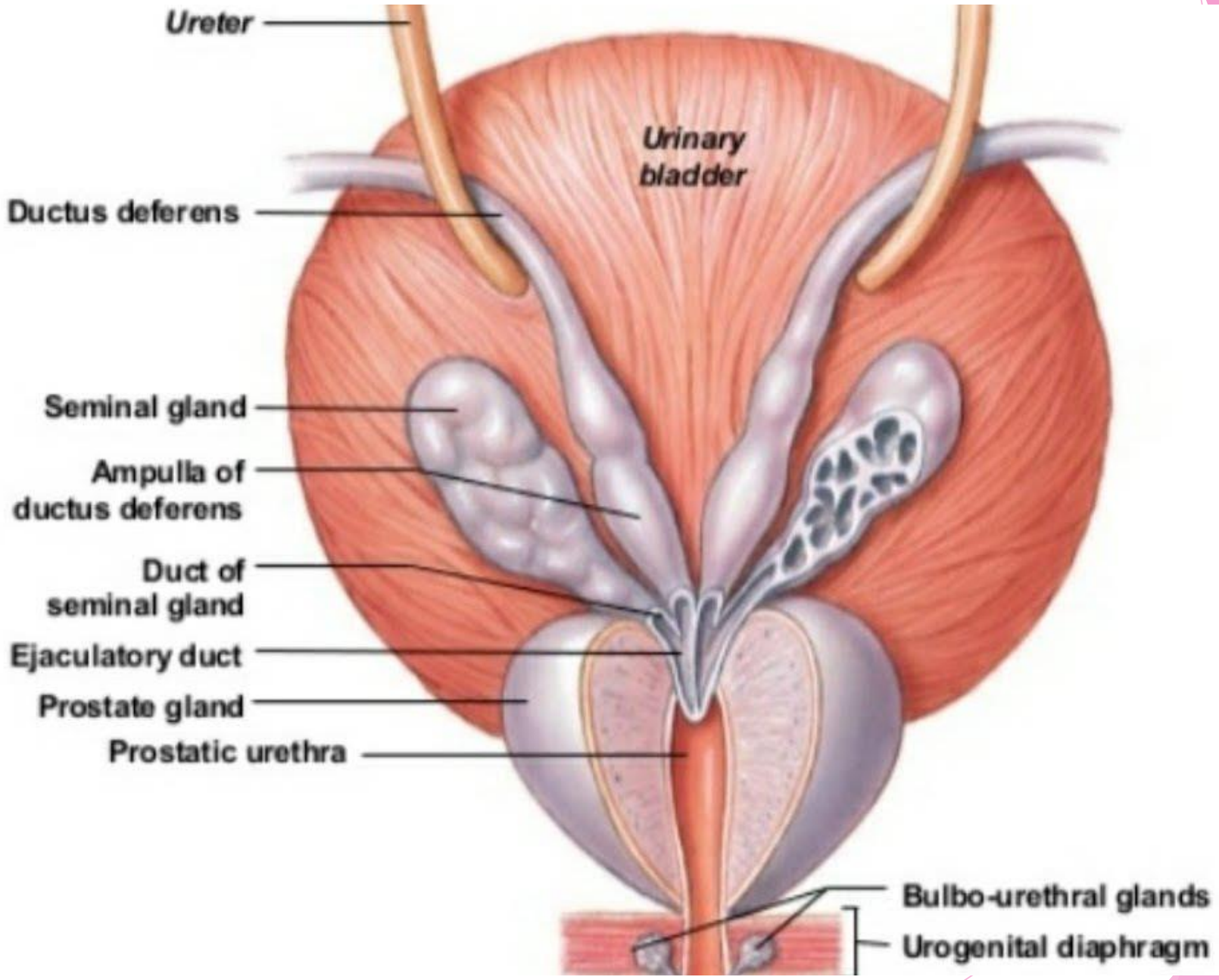


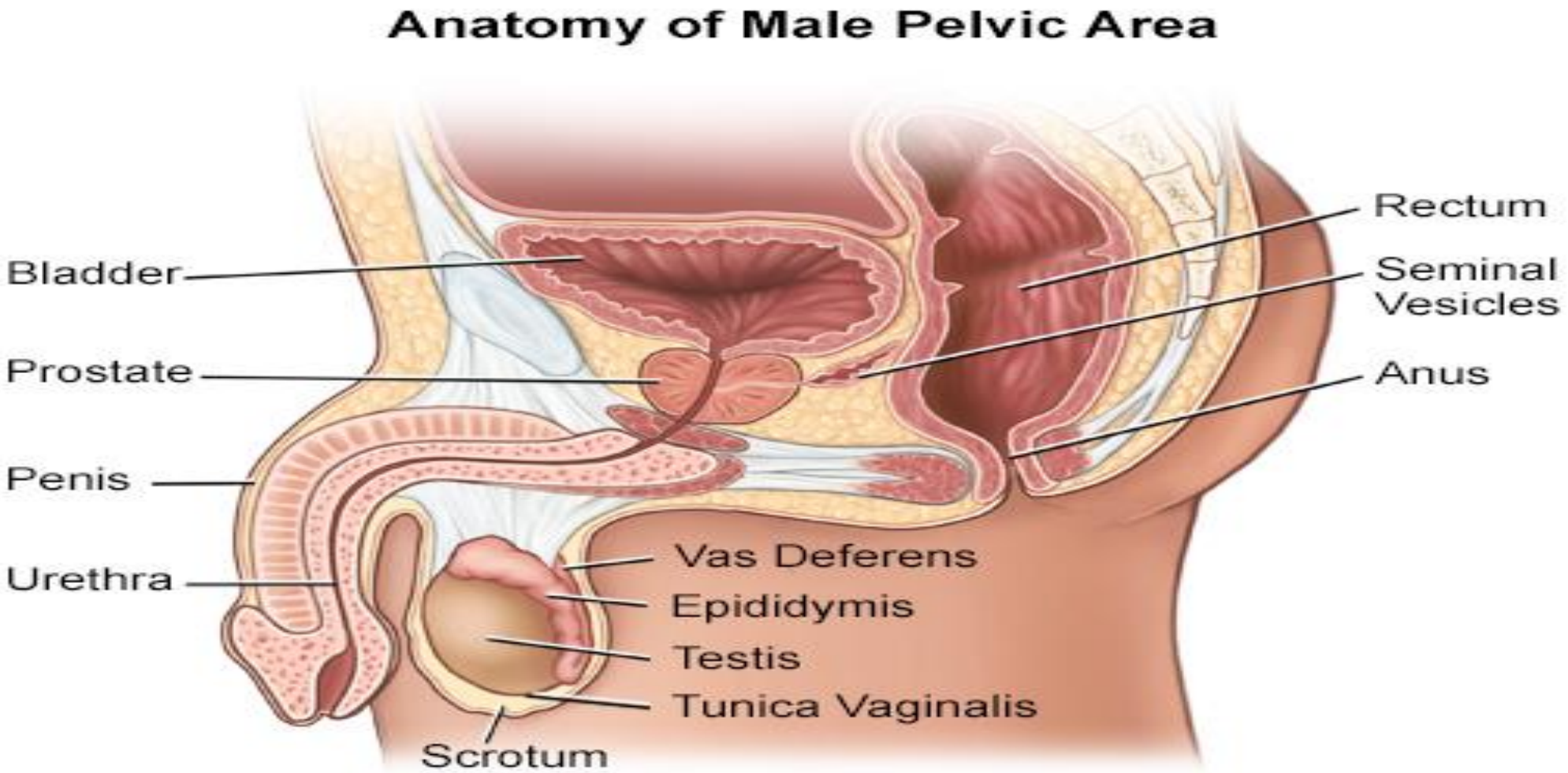
FEMALE PELVIS - SAGITTAL SECTION



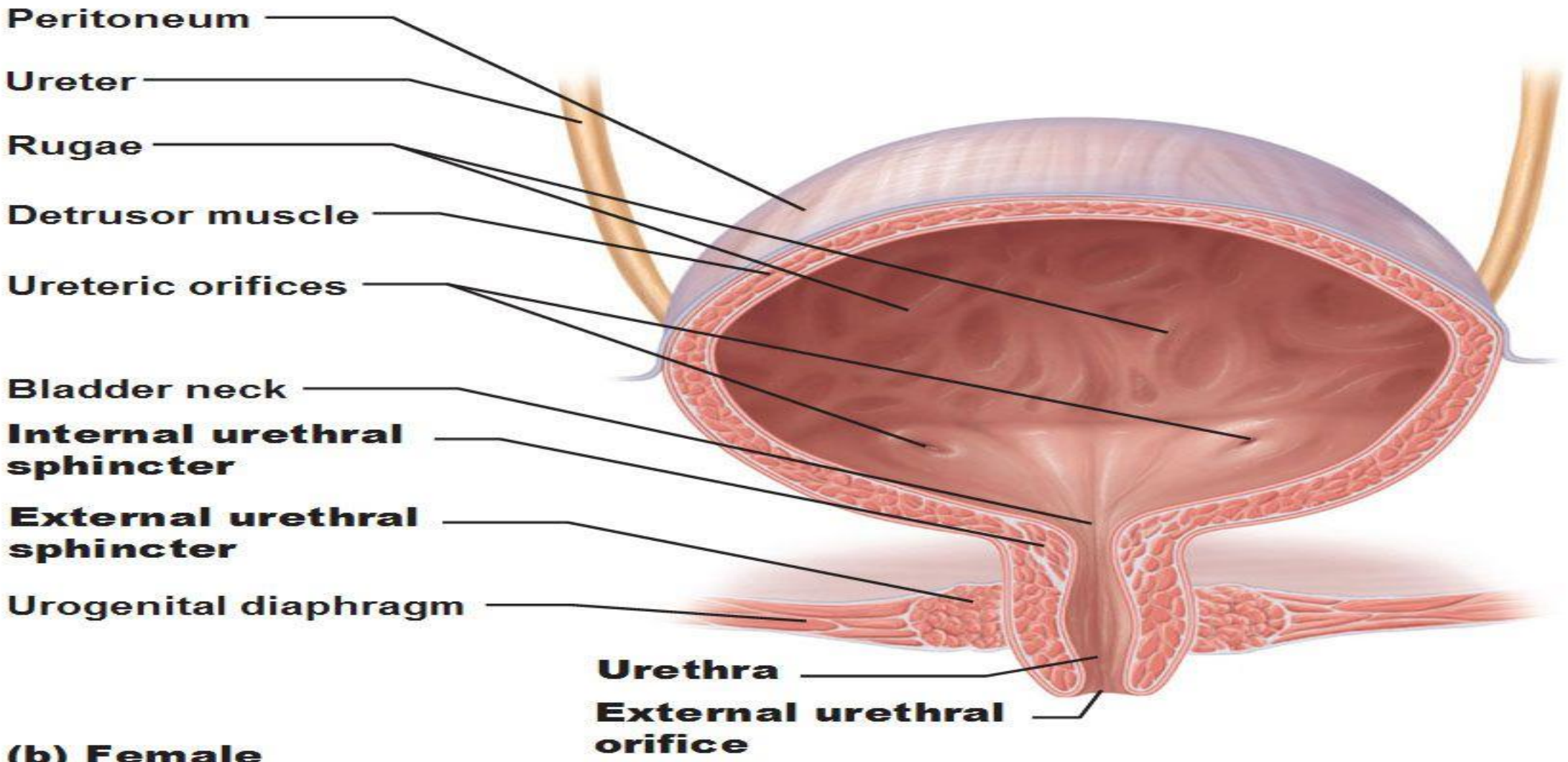

FEMALE PELVIS
FRONTAL SECTION
peritoneum
ischium
urethrae sphincter m.
URINARY
BLADDER
obturator
v. + a. + n.
levator ani m.
obturator
externus m.
ischioanal fossa
obturator
membrane


Urachus
Superior surface
Ureters
Anterior angle
Posterolateral angles
Left inferolateral surface
Posterior surface
Neck (inferior angle)
Prostate
Urethra


Ureter
Urinary bladder
Ductus deferens
Seminal gland
Ampulla of ductus deferens
Duct of seminal gland
Ejaculatory duct
Prostate gland
Prostatic urethra
Bulbo-urethral glands
Urogenital diaphragm

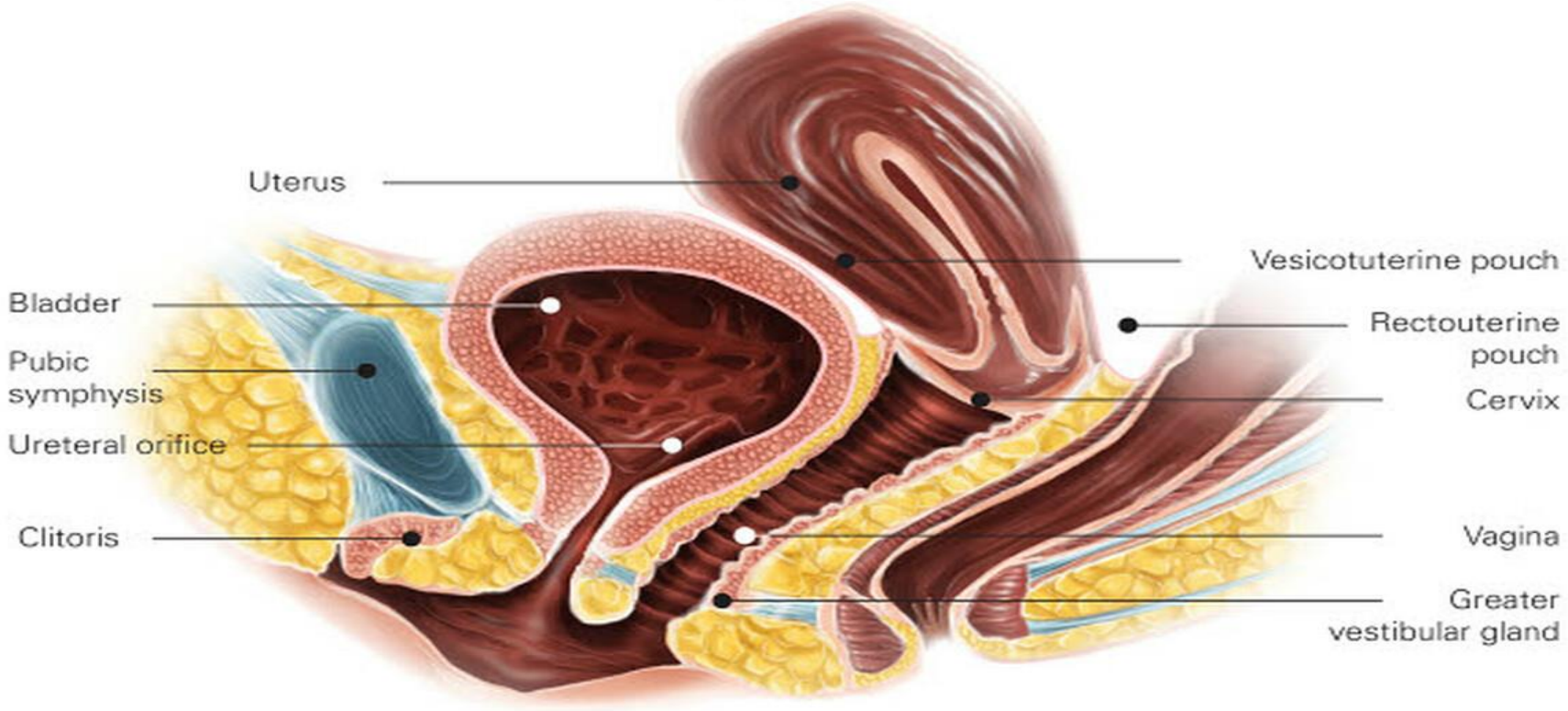

Anatomy of Male Pelvic Area
Bladder
Prostate
Penis
Urethra
Rectum
Seminal Vesicles
Anus
Vas Deferens
Epididymis
Testis
Tunica Vaginalis
Scrotum

Urinary Bladder and Urethra – Female



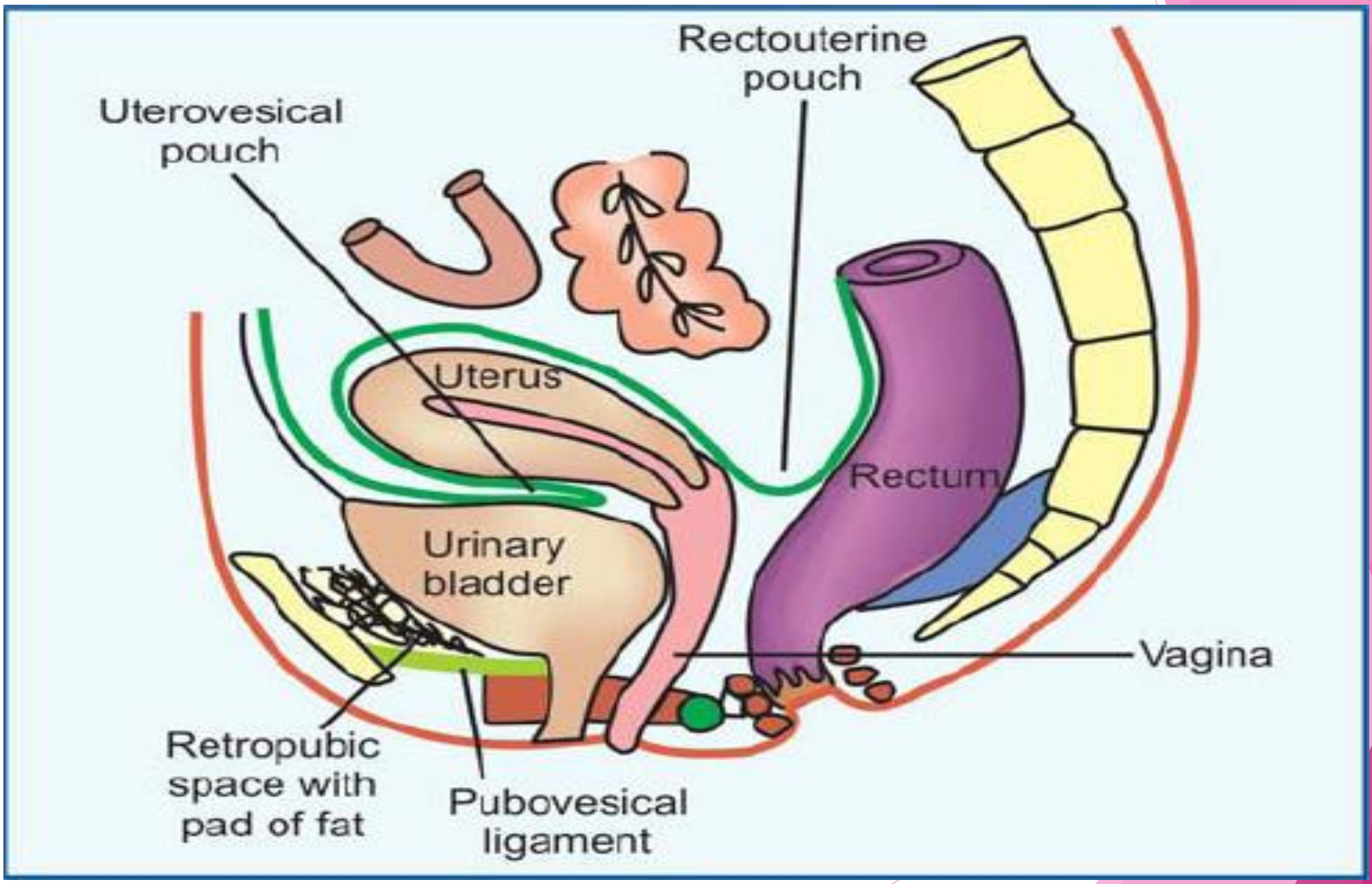
Female Urinary Bladder Anatomy

Sagittal View



LIGAMENTS SUPPORTING NECK

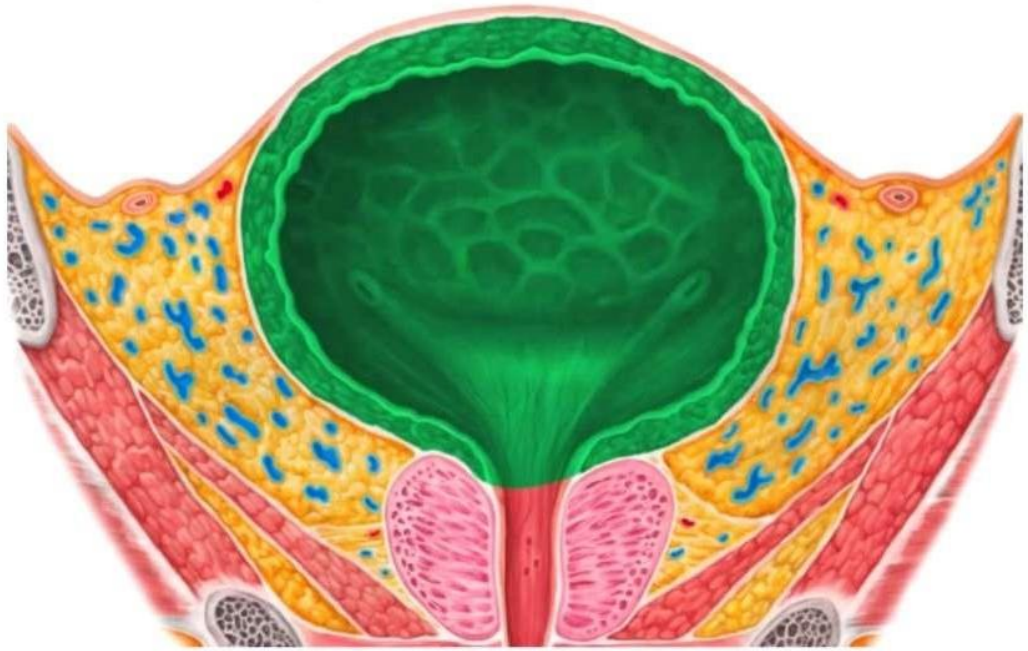
- PUBO PROSTATIC LIGAMENT AND PUBOVESICAL LIGAMENT


Rectouterine pouch
Uterovesical pouch
Uterus
Rectum
Urinary bladder
Vagina
Retropubic space with pad of fat
Pubovesical ligament

Body of urinary bladder

LATIN

Corpus vesicae urinariae



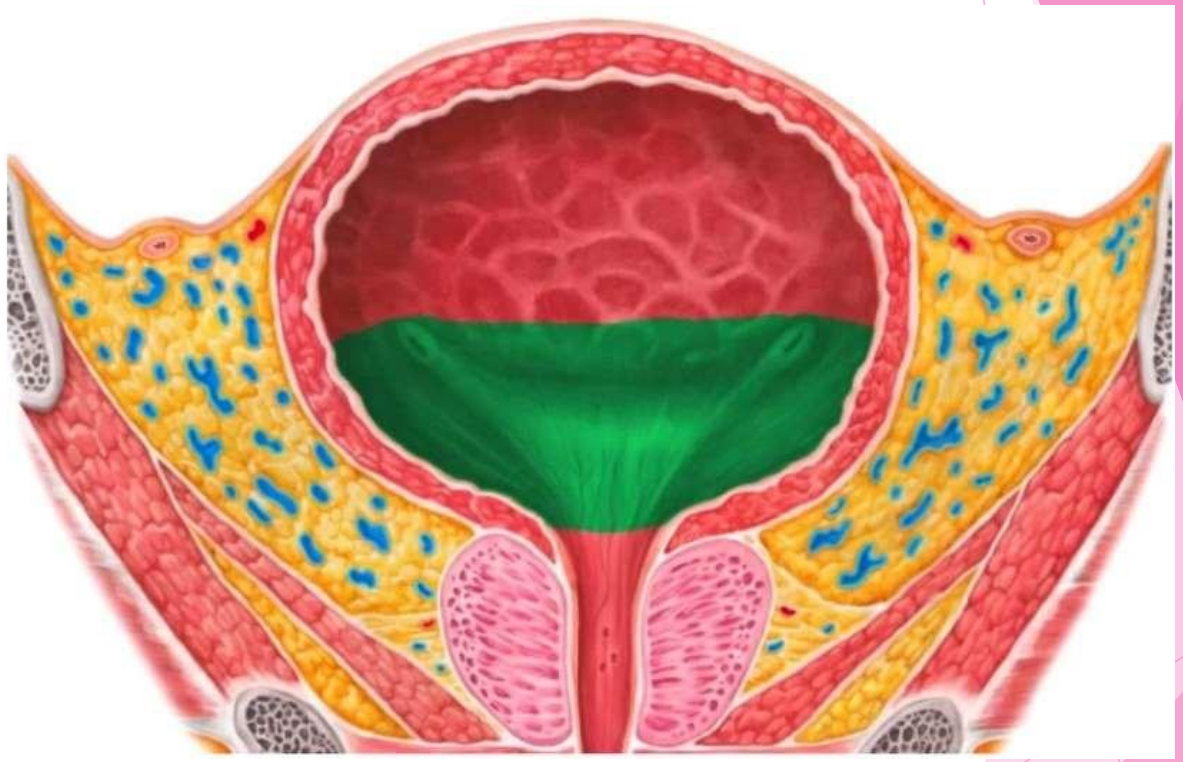
FUNDUS OF THE URINARY BLADDER

- It is base of the bladder.
- It has the shape of inverted triangle.
- It faces postero-inferiorly and , is formed by the posterior wall of bladder.
- Trigone of the urinary bladder is found on the fundus.

Fundus of urinary bladder

LATIN

Fundus vesicae urinariae



TRIGONE OF URINARY BLADDER

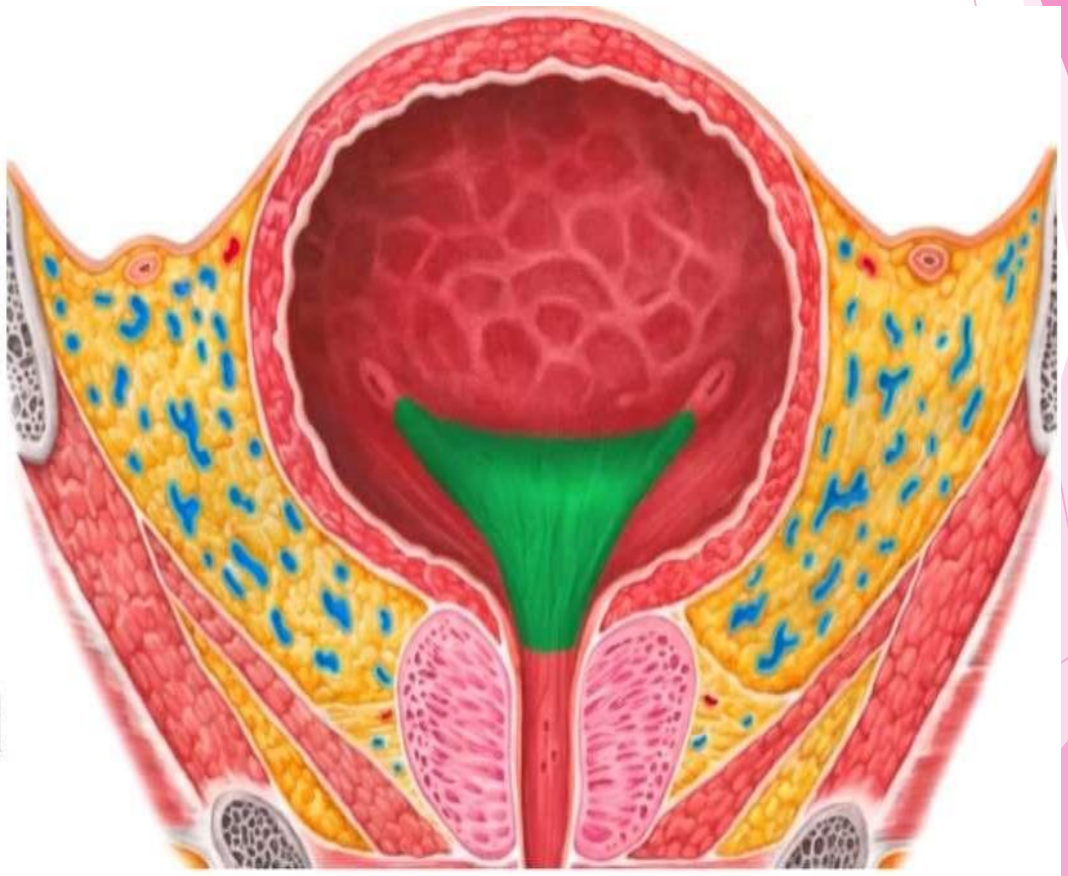
- It is smooth triangular part of urinary bladder.
- Mucosal lining of trigone is smooth and firmly attached to the underlying wall of the bladder.
- Formed by Right and left ureteral orifices.
- Once the trigone of urinary bladder is stretched to a certain degree, siganl is sent to the brain that bladder needs to be emptied.

Trigone of urinary bladder

LATIN
Trigonum vesicae urinariae

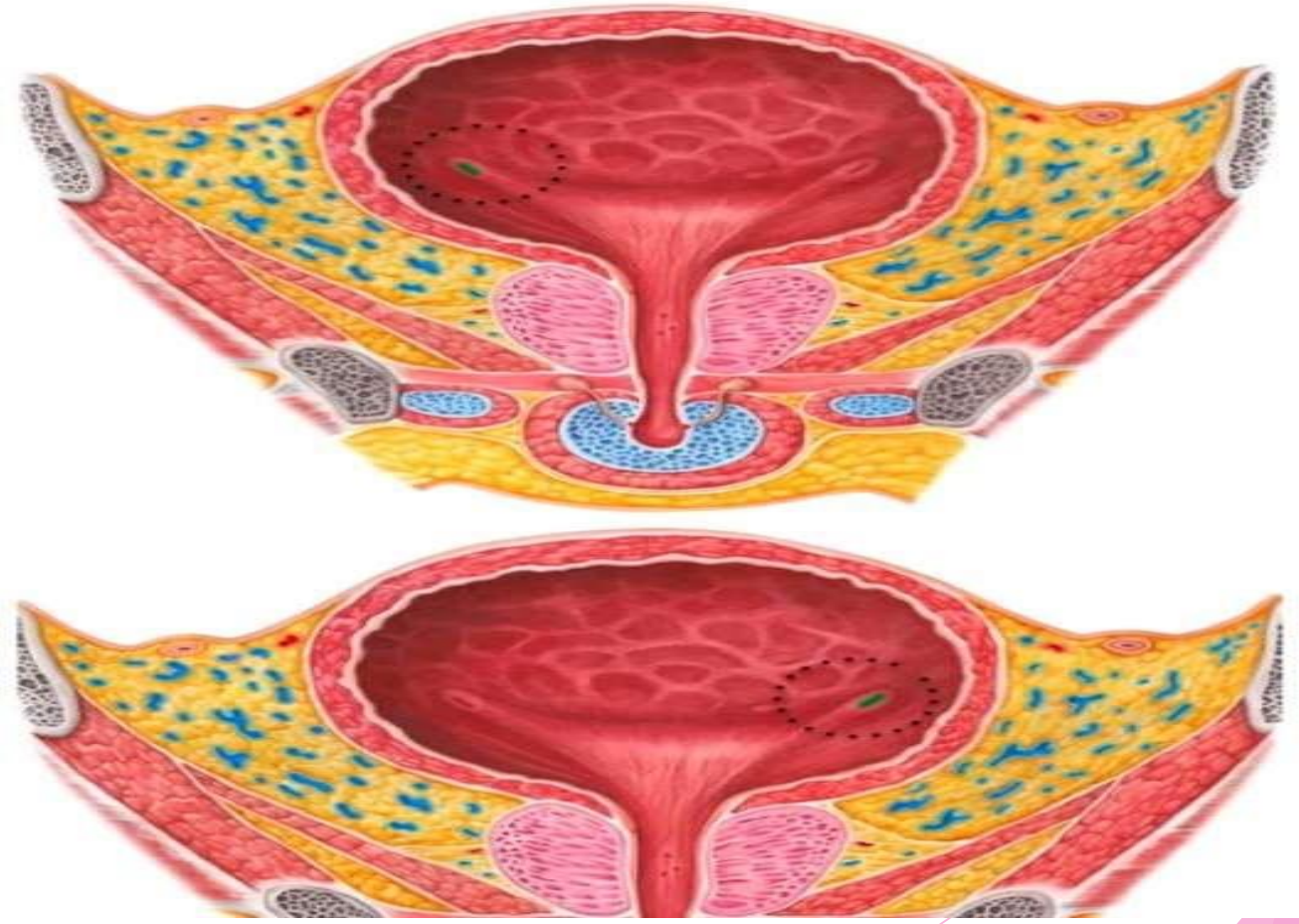
Triangular

Formed by the left and right ureteral orifices.



URETERAL ORIFICES

- These are Slit like openings through which ureters enter the bladder on the posterolateral angles of the trigone of urinary bladder.



MERCIER'S BAR

- It is a mucous membane present between the two ureteral orifices.
- It is also called "InterUreteral Fold"

Mercier's bar

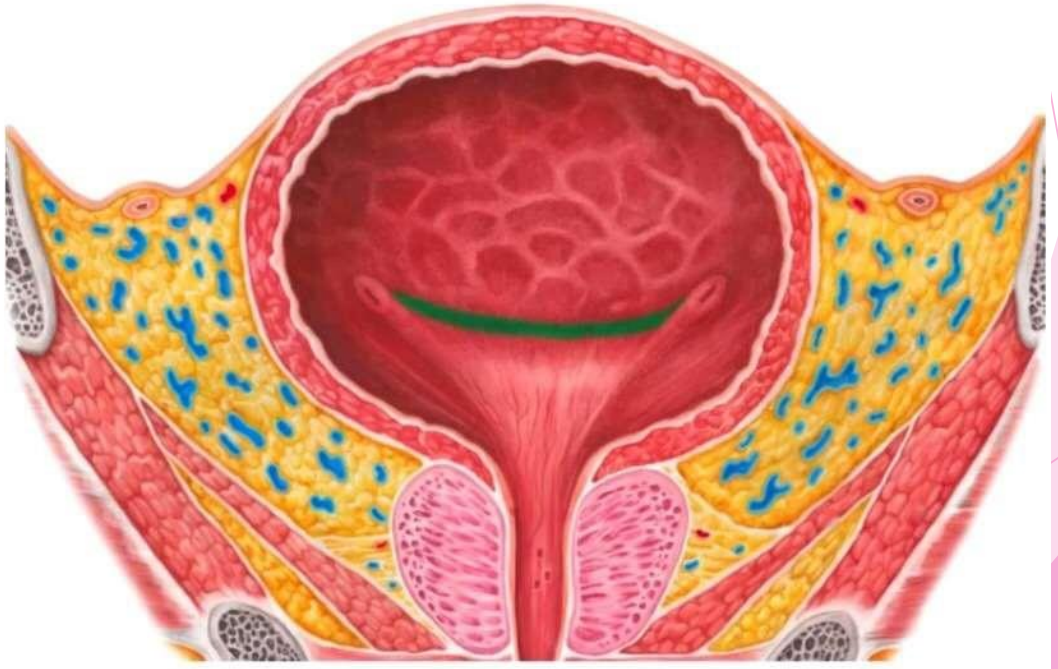
Interureteral fold

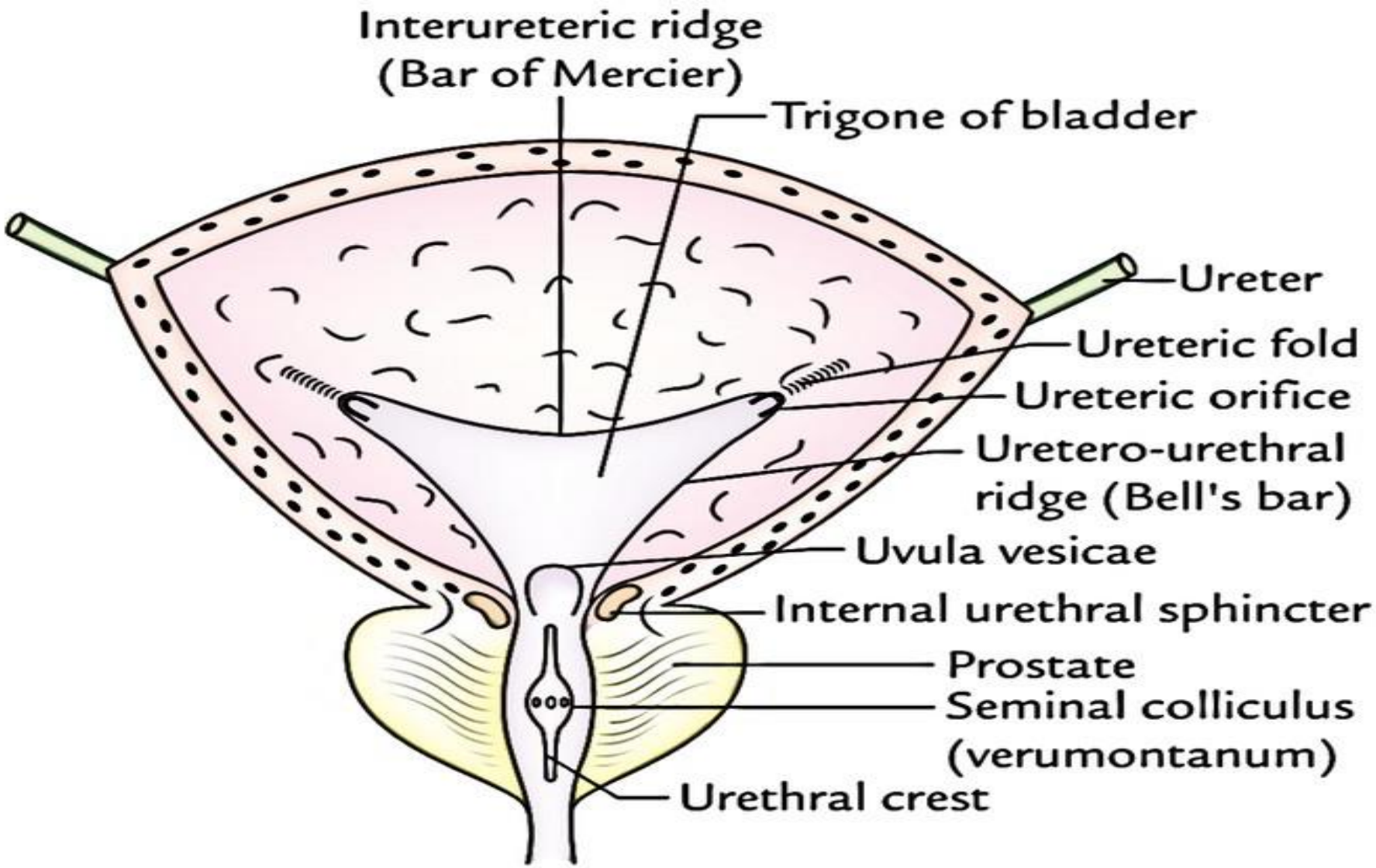
LATIN

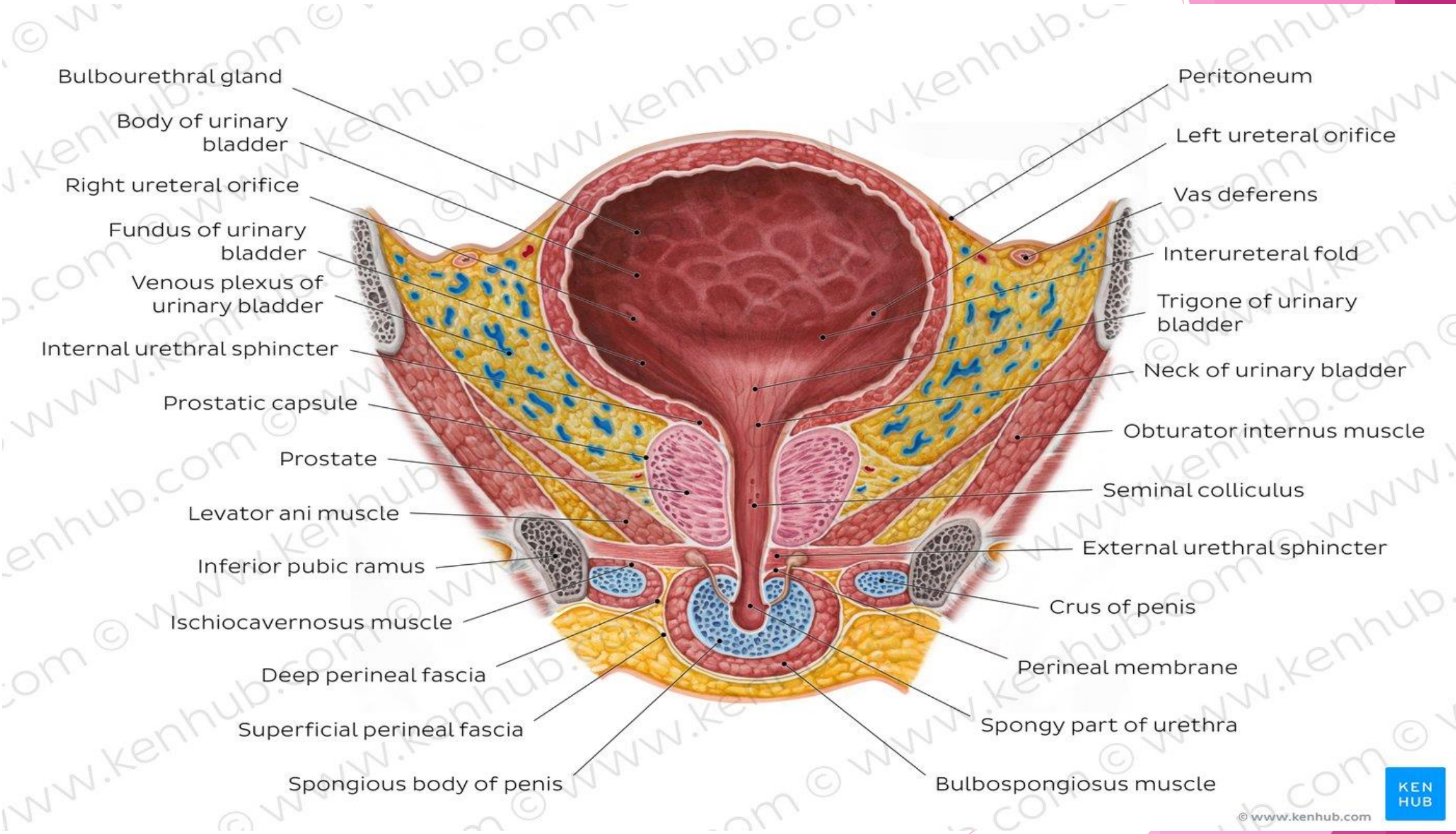
Plica interureterica

Mucous membrane

Between the two ureteral orifices




Interureteric ridge
(Bar of Mercier)
Trigone of bladder
Ureter
Ureteric fold
Ureteric orifice
Uretero-urethral
ridge (Bell's bar)
Uvula vesicae
Internal urethral sphincter
Prostate
Seminal colliculus
(verumontanum)
Urethral crest


Bulbourethral gland
Body of urinary bladder
Right ureteral orifice
Fundus of urinary bladder
Venous plexus of urinary bladder
Internal urethral sphincter
Prostatic capsule
Prostate
Levator ani muscle
Inferior pubic ramus
Ischiocavernosus muscle
Deep perineal fascia
Superficial perineal fascia
Spongious body of penis
Peritoneum
Left ureteral orifice
Vas deferens
Interureteral fold
Trigone of urinary bladder
Neck of urinary bladder
Obturator internus muscle
Seminal colliculus
External urethral sphincter
Crus of penis
Perineal membrane
Spongy part of urethra
Bulbospongiosus muscle
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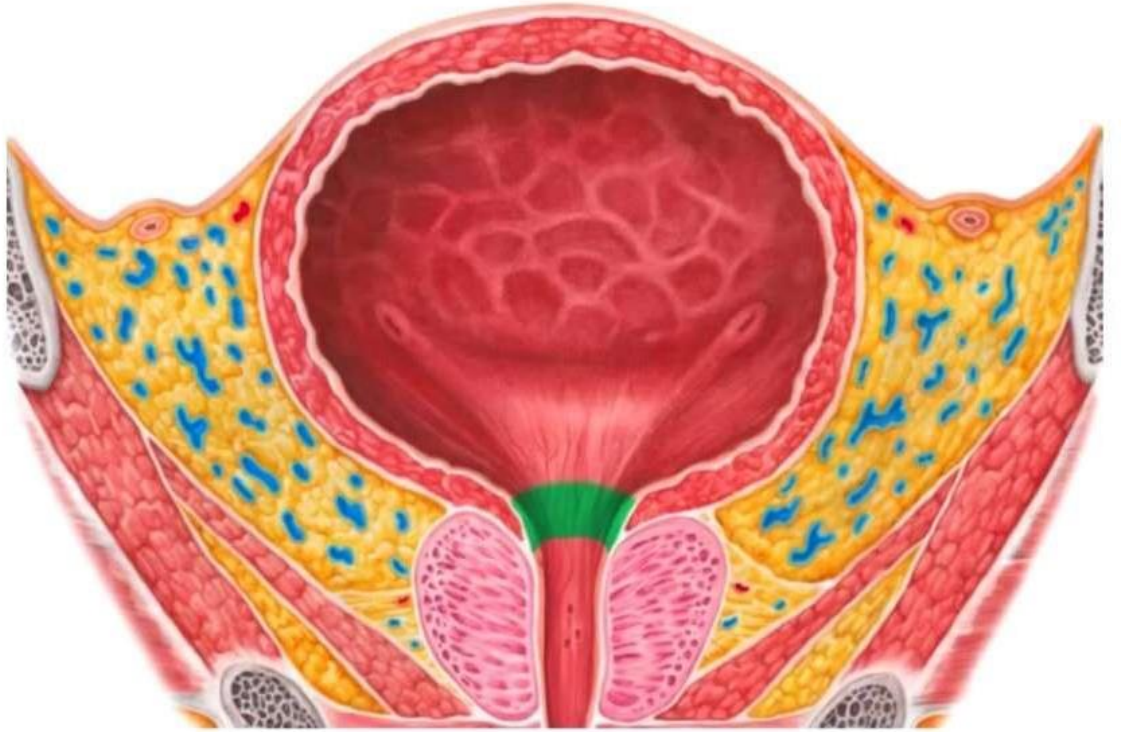
NECK OF URINARY BLADDER

- It is the lowest portion of the bladder through which the "Urethra" arrises.

Neck of urinary bladder

LATIN

Cervix vesicae urinariae



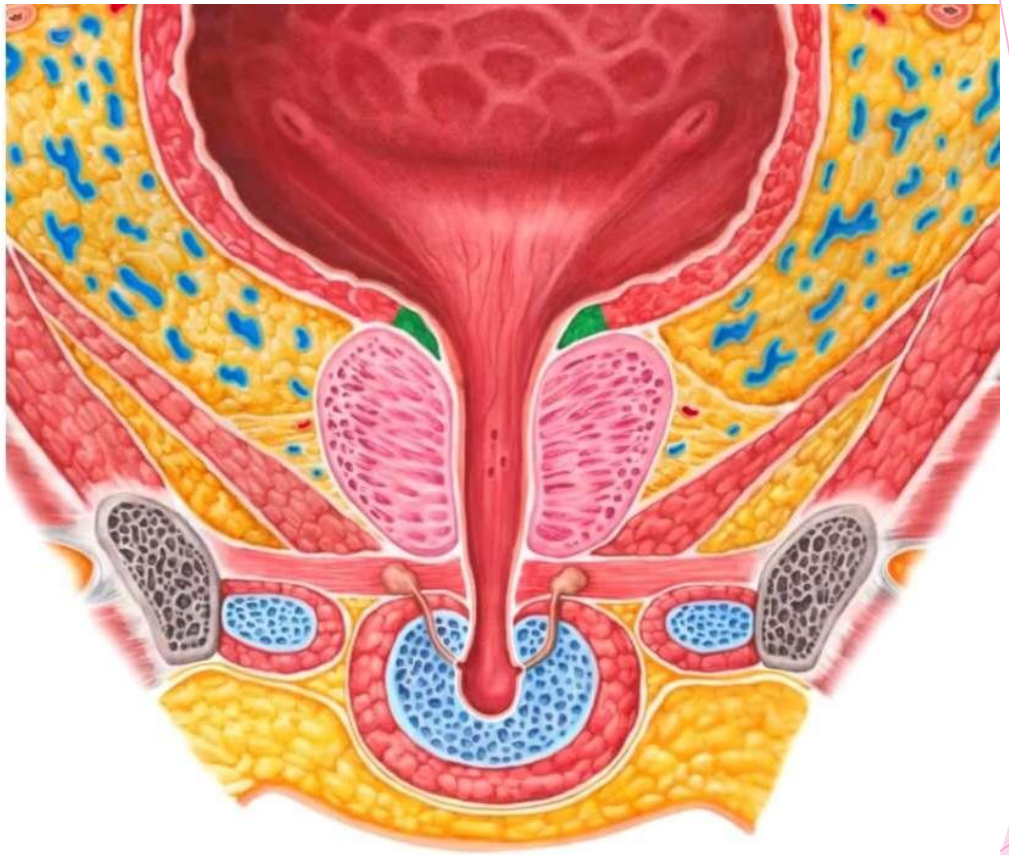
INTERNAL URETHRAL SPHINCTER

- It is comprised of smooth muscle that is located at the junction of urethra and the urinary bladder.
- It is innervated by S2-S4 nerves of the pelvic plexus.
- It's function is to constrict the internal urethra ,preventing the urine leakage and also prevents the Retrograde ejaculation (Ejaculatory Reflex) of semen into the bladder.

Internal urethral sphincter

LATIN

Musculus sphincter urethrae internus



Smooth muscle

Innervation:

S2-S4 nerves

Internal urethral sphincter

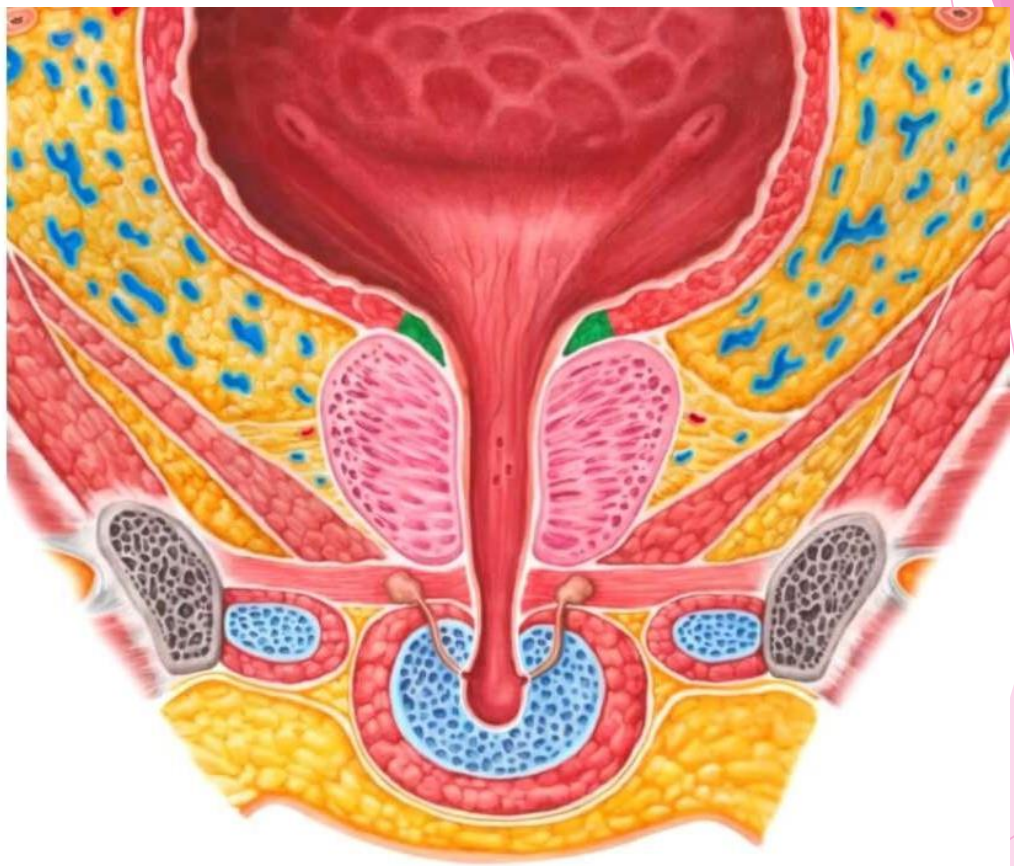
LATIN

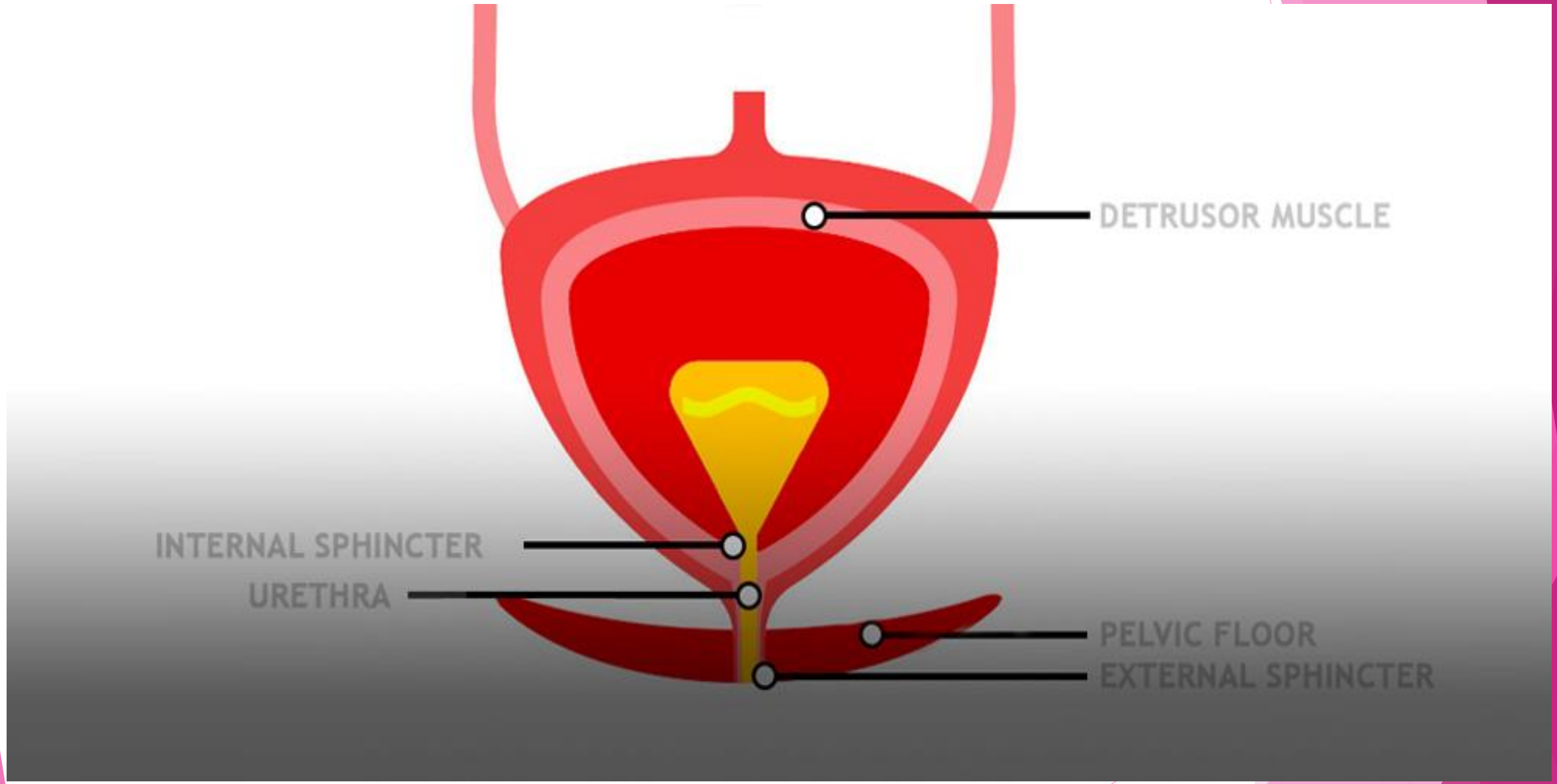
Musculus sphincter urethrae internus

Function:

Constrict the internal urethra

Prevents the reflux of semen




DETRUSOR MUSCLE
INTERNAL SPHINCTER
URETHRA
PELVIC FLOOR
EXTERNAL SPHINCTER

DETRUSOR MUSCLE

- It is also referred as " Muscularis Propria".
- It is smooth muscle , found around the wall of bladder.
- It is comprised of inner and outer longitudinal, and middle circular layer.
- This muscle is relaxing during accomulation of urine in the bladder, and contracts only during urination to void and empty the bladder.

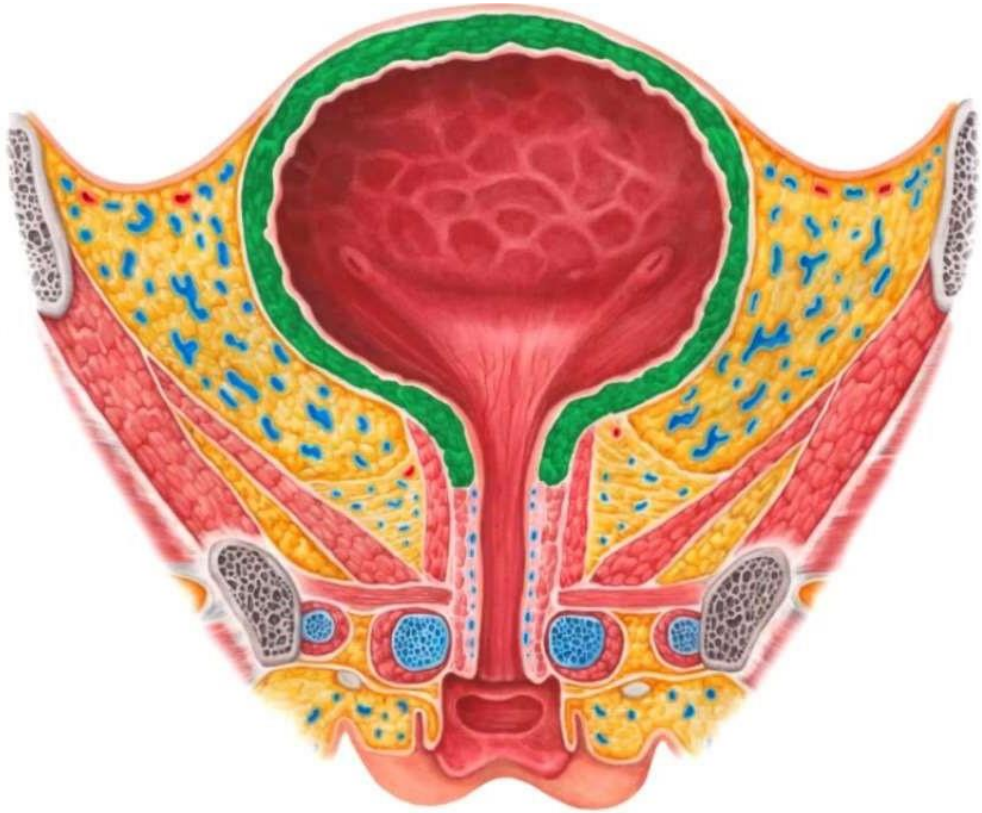
Detrusor urinae muscle

LATIN
Musculus detrusor vesicae

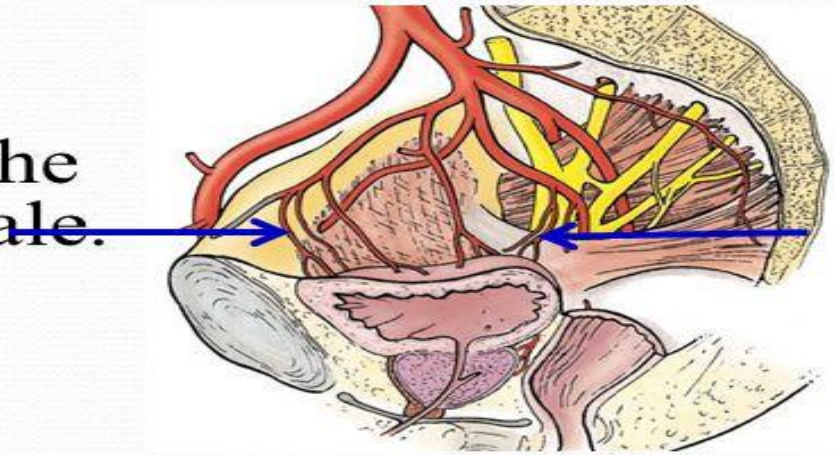
Muscularis propria

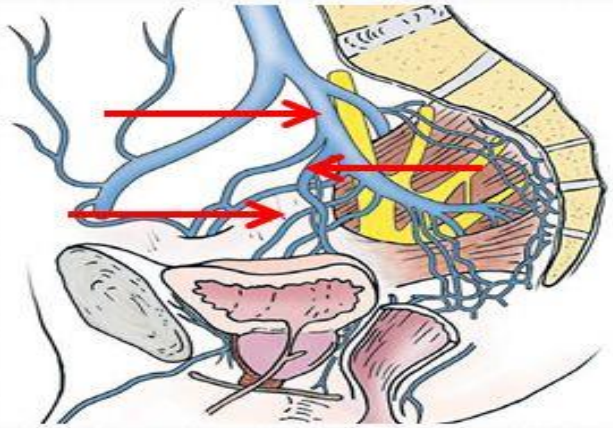
Inner and outer longitudinal layer

Middle circular layer



- Arterial supply:
- Superior vesical artery & Inferior vesical artery (branches of internal iliac arteries)
- Vaginal artery corresponds to the inferior vesical artery in the male.
- Venous drainage:
- In male, venous plexus around the bladder and prostate drain into inferior vesical vein
- Also, superior vesical vein drains the bladder
- Both veins drain into internal iliac vein





ARTERIAL SUPPLY

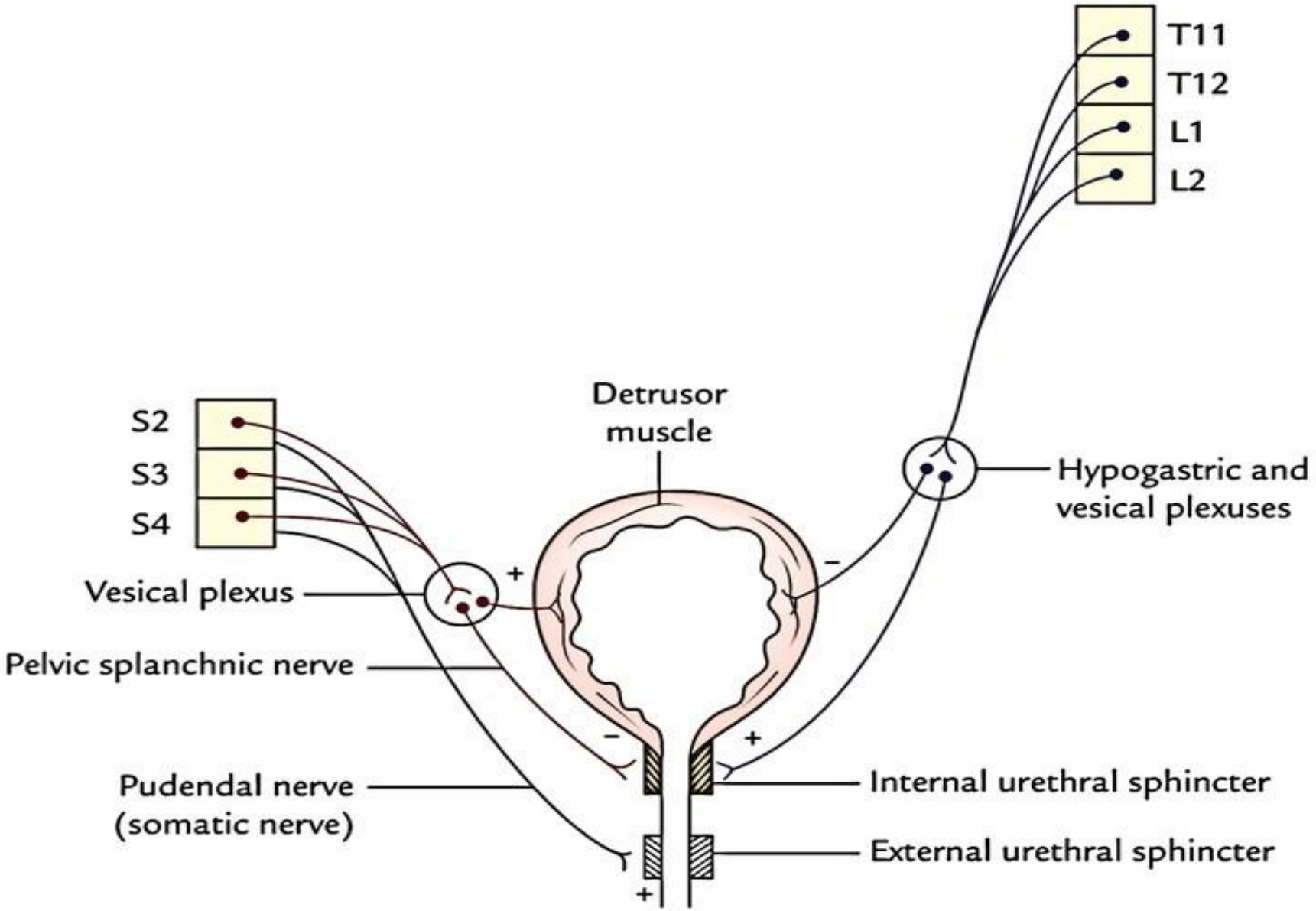
- Branches of internal iliac arteries.
- Superior vesical arteries supply anterosuperior parts of the bladder.
- In males, inferior vesical arteries supply the fundus and neck of the bladder.
- In females, vaginal arteries replace the inferior vesical arteries and send small branches to posteroinferior parts of the bladder.
- Obturator and inferior gluteal arteries also supply small branches to the bladder.

VENOUS DRAINAGE

- The veins draining from the bladder correspond to the arteries.
- Veins from the Vesical venous plexus drain into the internal iliac veins.

INNERVATION OF URINARY BLADDER

- Pelvic Nerve (Parasympathetic nerve) comes from the sacral region of spinal cord. It is not under our control. It causes contraction of the Detrusor muscle.
- Pudendal nerve (Somatic nerve) causes contraction of External Sphincter. We are firing pudendal nerve when we are trying to hold our urine.
- Hypogastric nerve (Sympathetic nerve) causes relaxation of Detrusor muscle and contraction of Internal sphincter.
- Afferent Pelvic nerve that is sensory and comes from the detrusor muscle. It is stimulated when the bladder is stretched.


T11
T12
L1
L2
S2
S3
S4
Detrusor muscle
Hypogastric and vesical plexuses
Vesical plexus
Pelvic splanchnic nerve
Pudendal nerve (somatic nerve)
Internal urethral sphincter
External urethral sphincter
+
−
−
+
+

LYMPHATIC DRAINAGE OF BLADDER

- In both sexes, lymphatic vessels leave the superior surface of the bladder and pass to the "External iliac lymph nodes".
- Those from fundus pass to the "Internal iliac lymph nodes".
- Some vessels from the neck of bladder drain into the "Sacral" to "Common iliac lymph nodes".