



WITH NOTES

ANATOMY OF PELVIC WALL, VESSELS & NERVES

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M N U



Intended Learning Outcomes (ILOs)

At the end of the lecture, the students should be able to:

1. Describe the anatomy of pelvic wall ← MCQ
2. Knew the anatomy of pelvic vessels ← مهمة جدا والأساس
3. Knew the anatomy of pelvic nerves

المحاضرة معظمها أسئلة OSPE

Agenda

At the end of the lecture, the students should be able to:

1. Anatomy of pelvic wall
2. Anatomy of pelvic vessels
3. Anatomy of pelvic nerves





Bony Pelvis

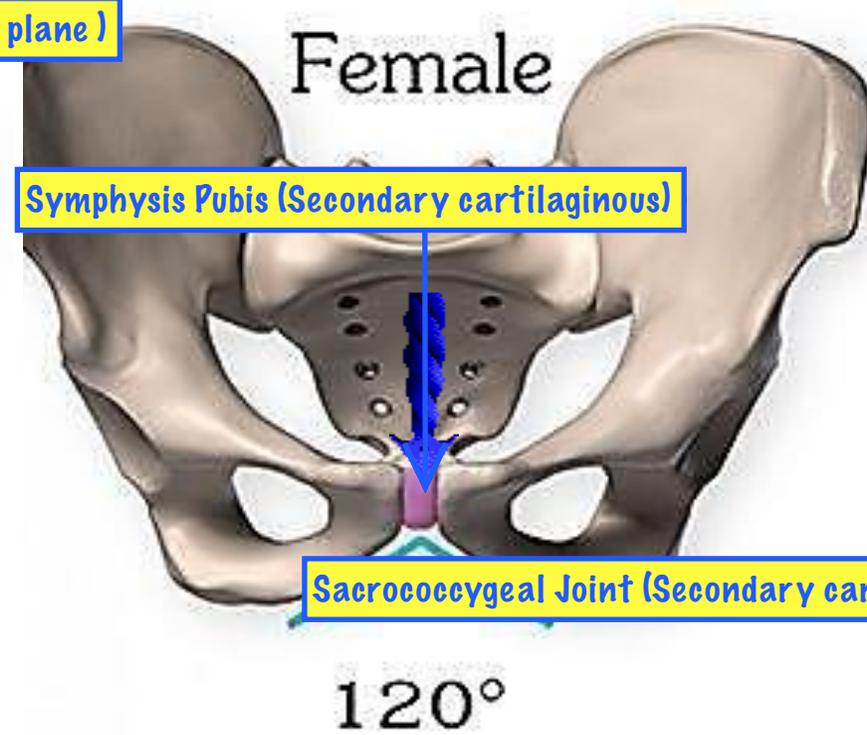
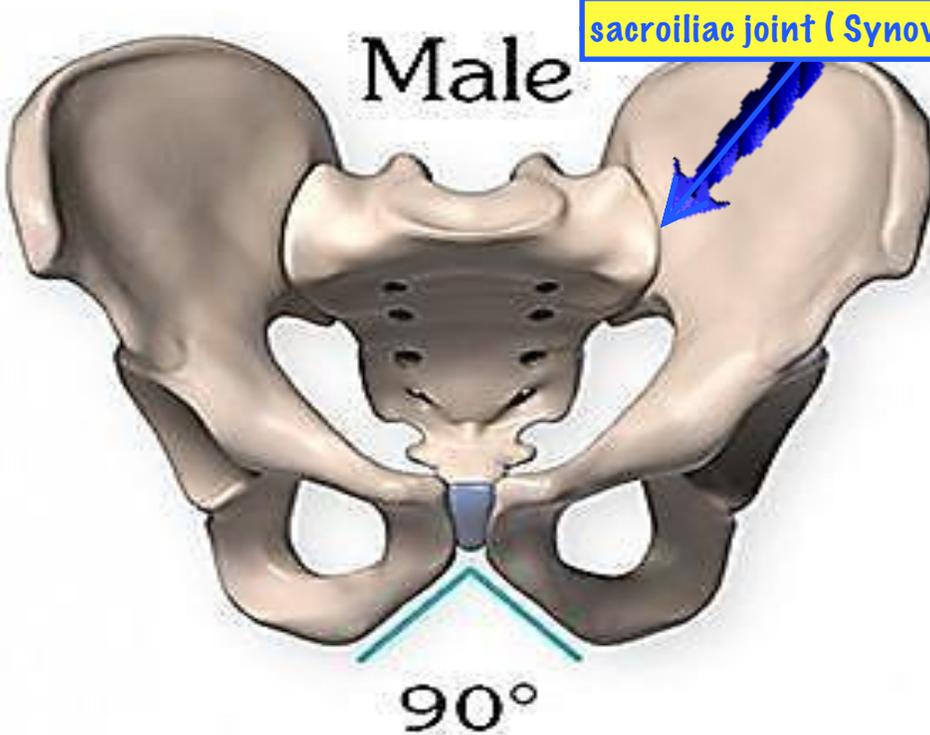


Bony Pelvis

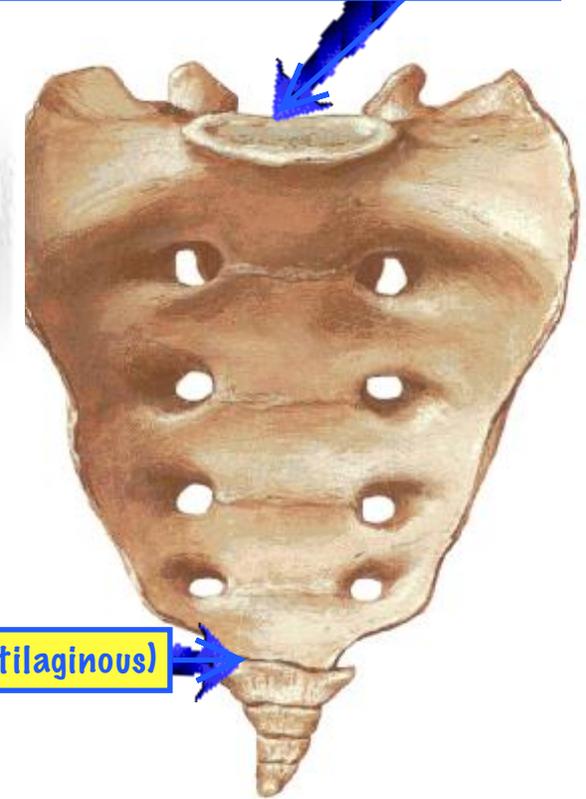
The four bones: include two **hip** bones in **front** and in the **sides**, and the **sacrum** and **coccyx** posteriorly.

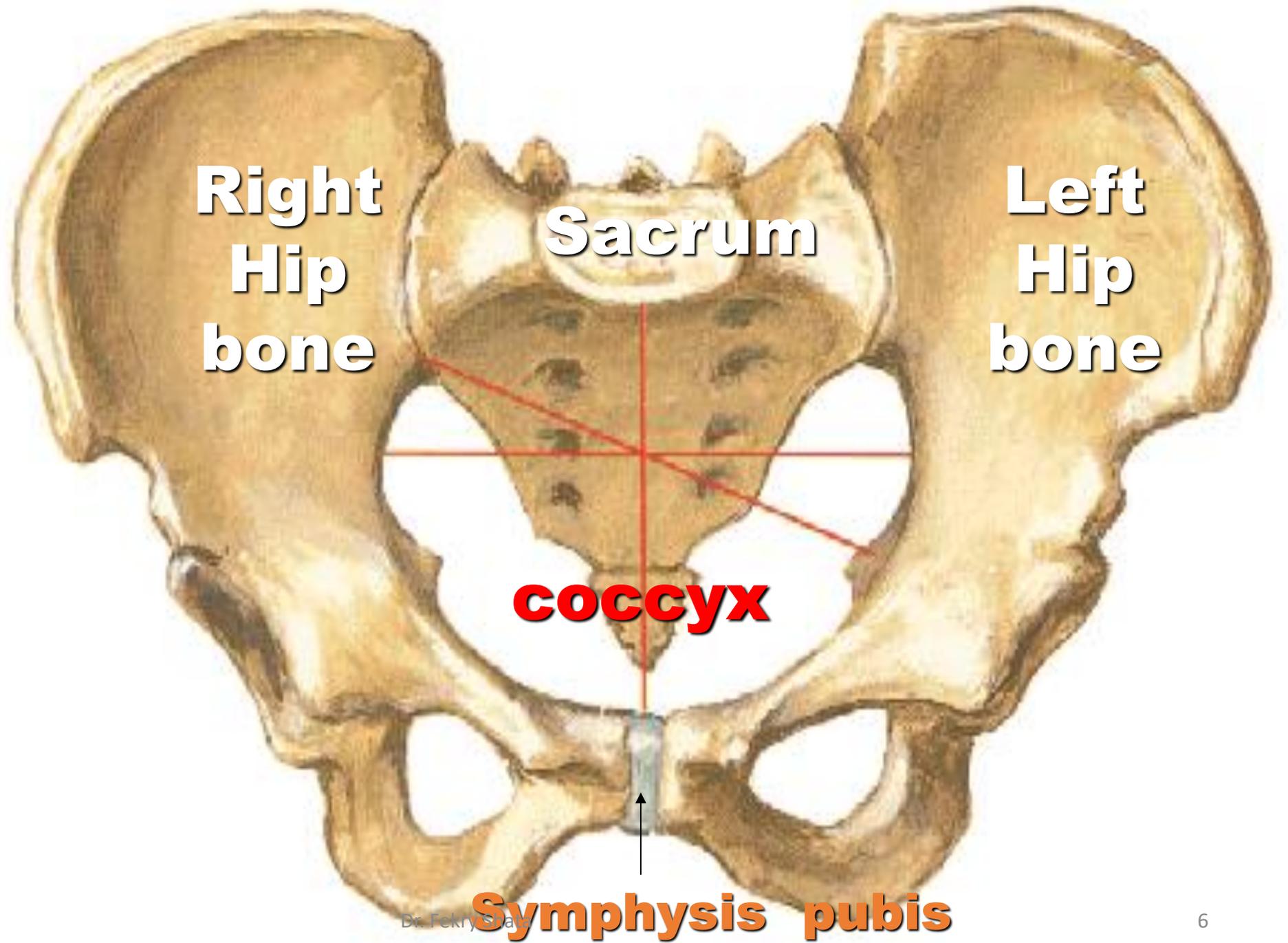
The four joints: **sacroiliac**, **symphysis pubis**, **sacrococcygeal** & **lumbosacral joint**.

* سؤال identify في ال OSPE
* مهم نعرف اسم ونوع كل joint

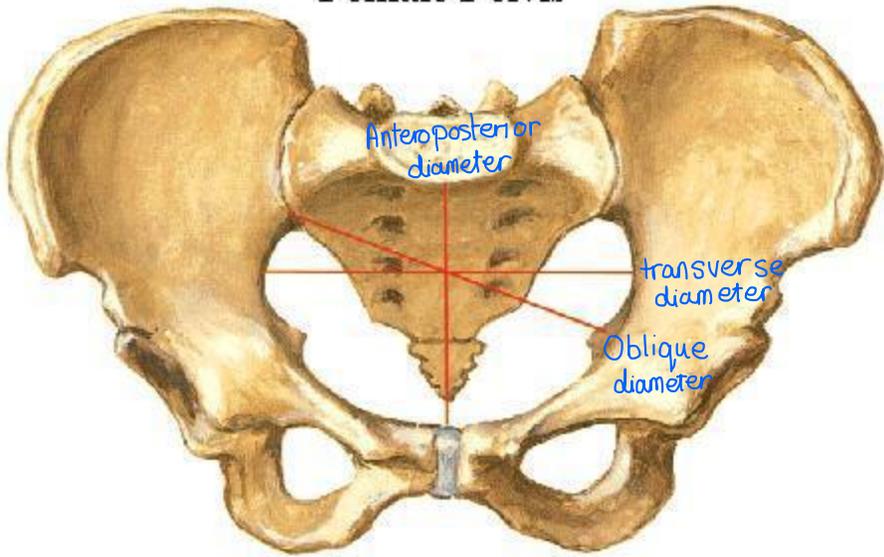


Lumbosacral Joint (Secondary cartilaginous)
Site : () L5 & S1

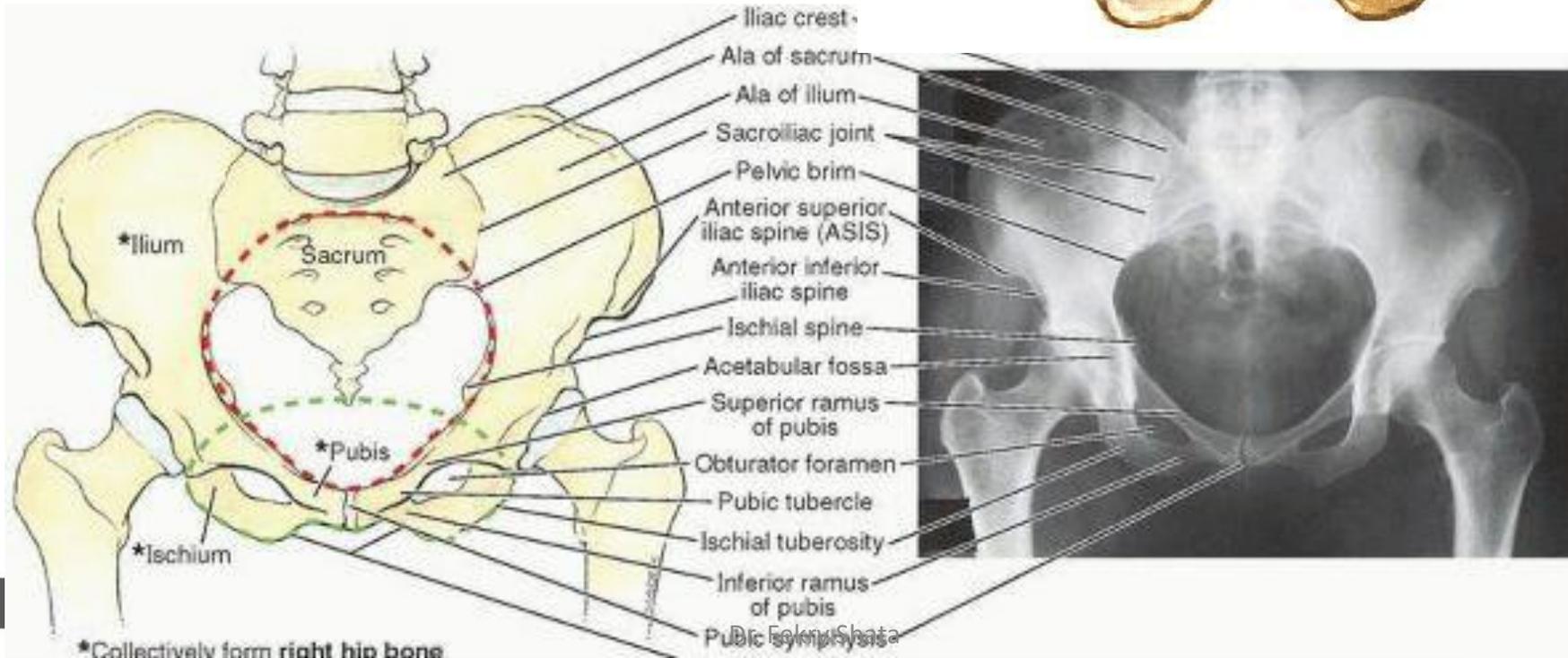
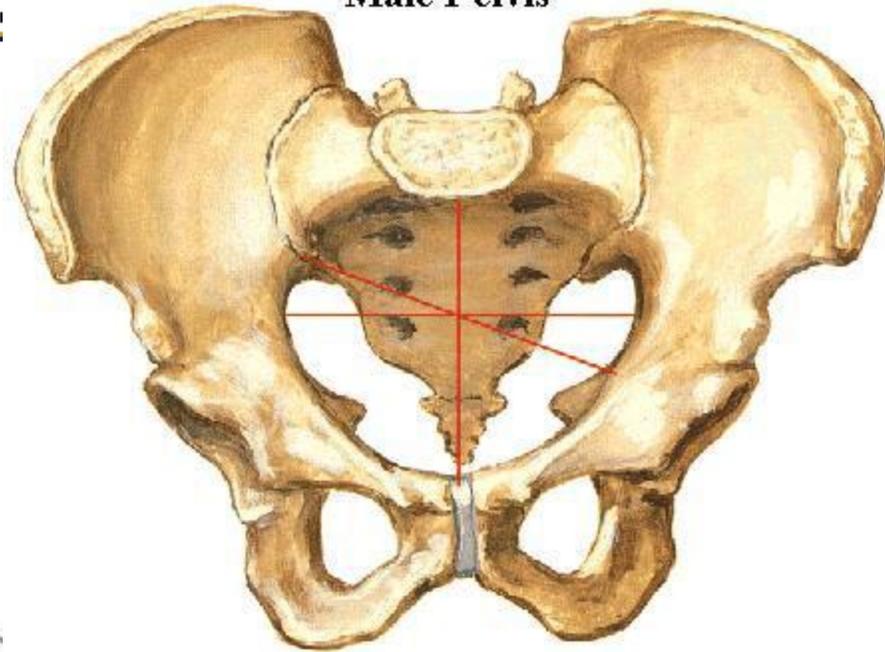




Female Pelvis



Male Pelvis



Parts of Pelvis

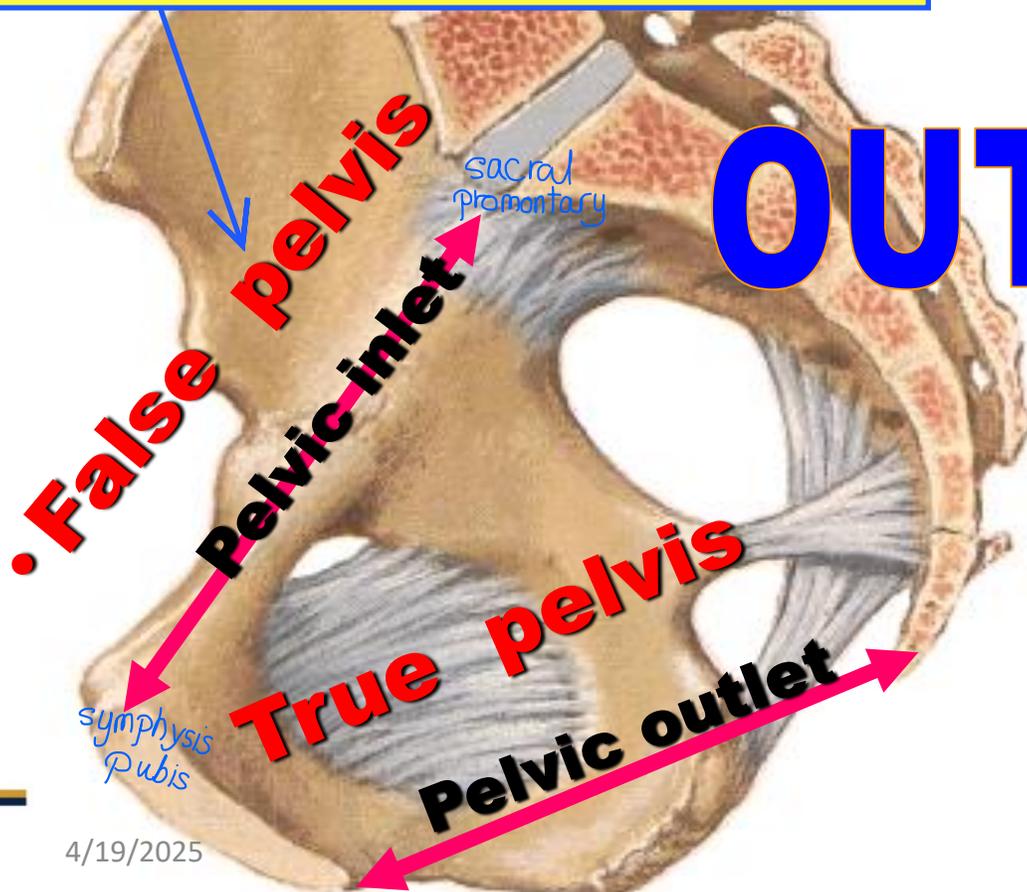
Sagittal Section

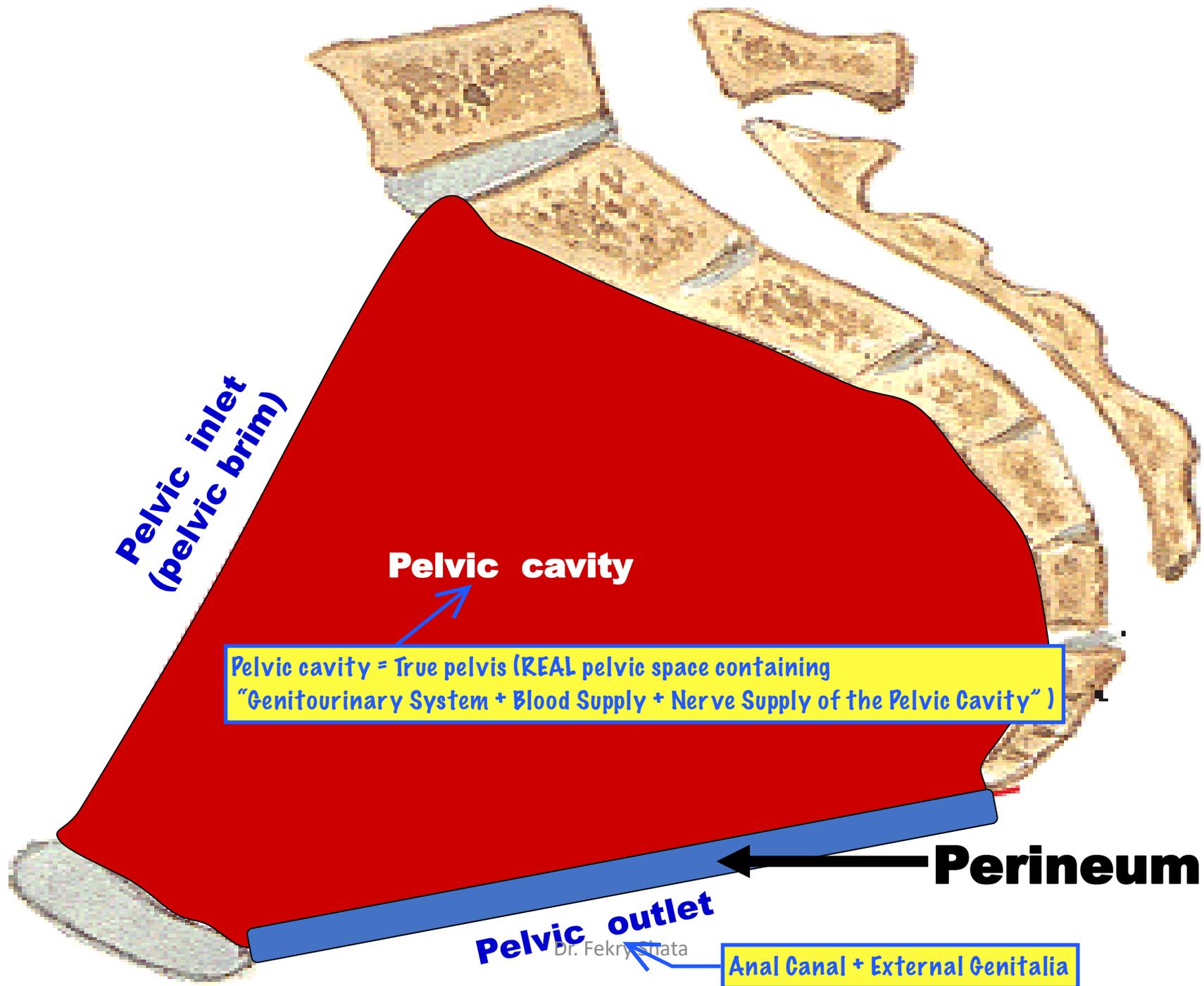
INLET &

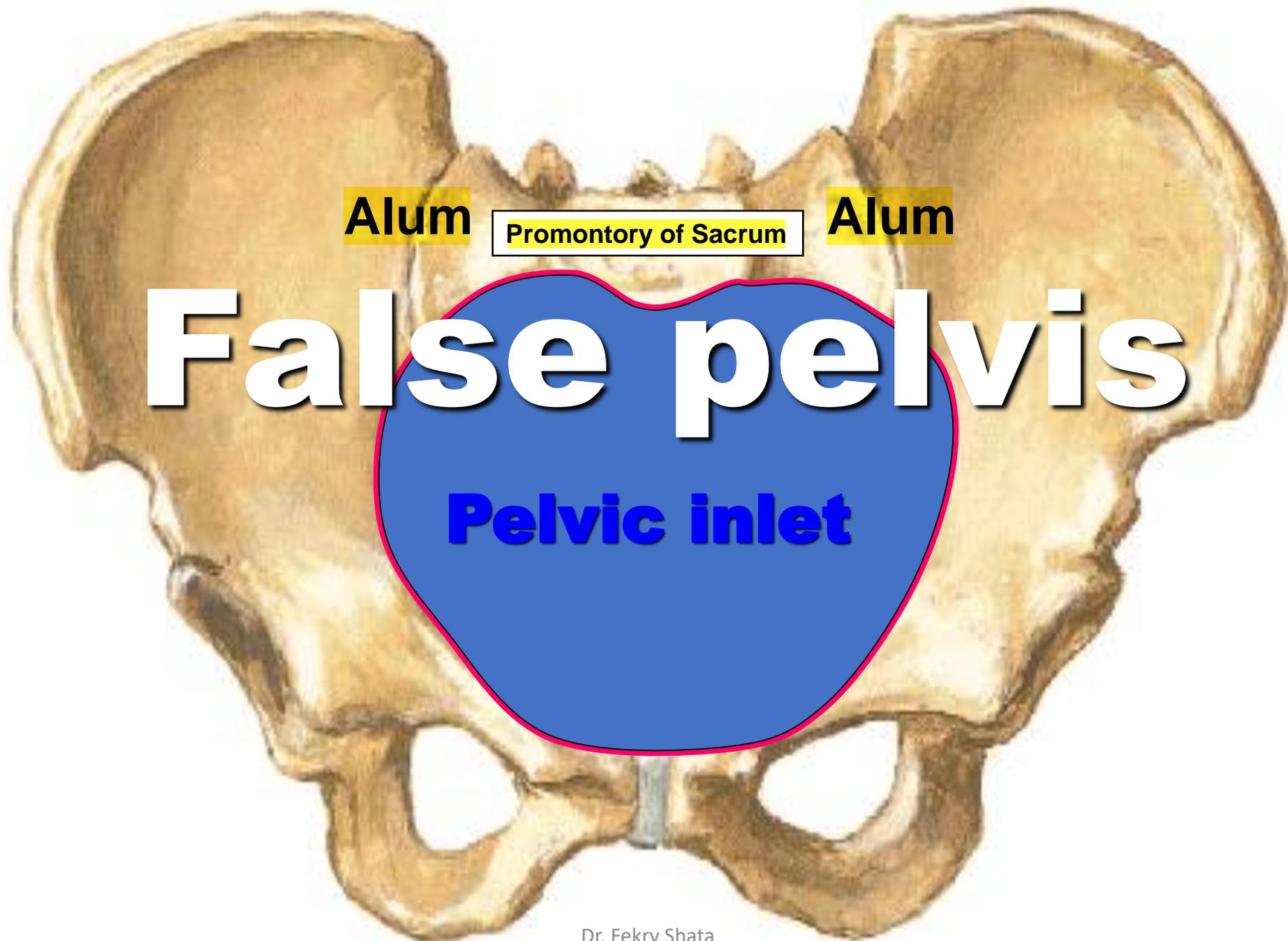
OUTLET OF PELVIS

خلي بالكوا ان :

The false pelvis is continuous with the abdominal cavity







Alum

Promontory of Sacrum

Alum

False pelvis

Pelvic inlet



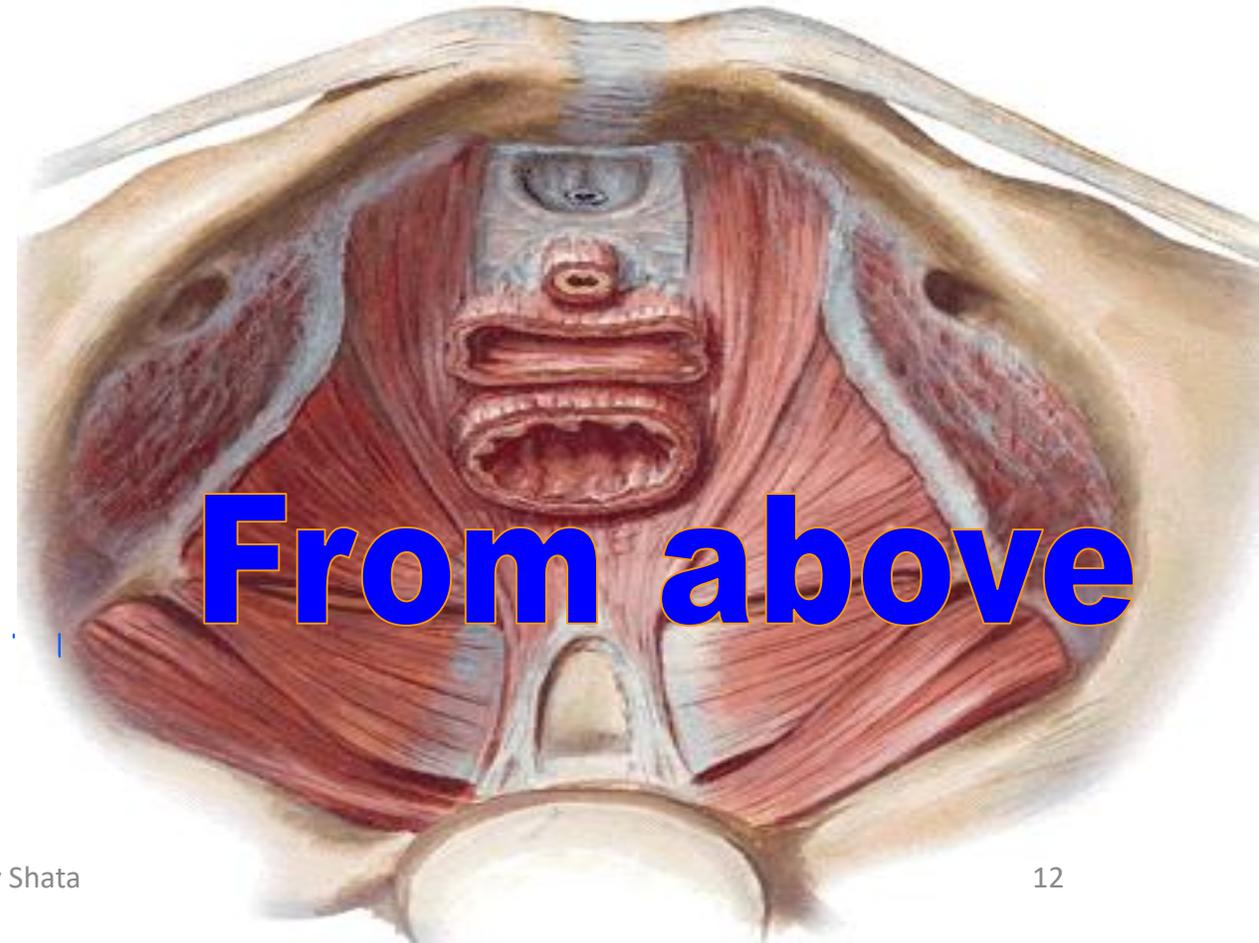
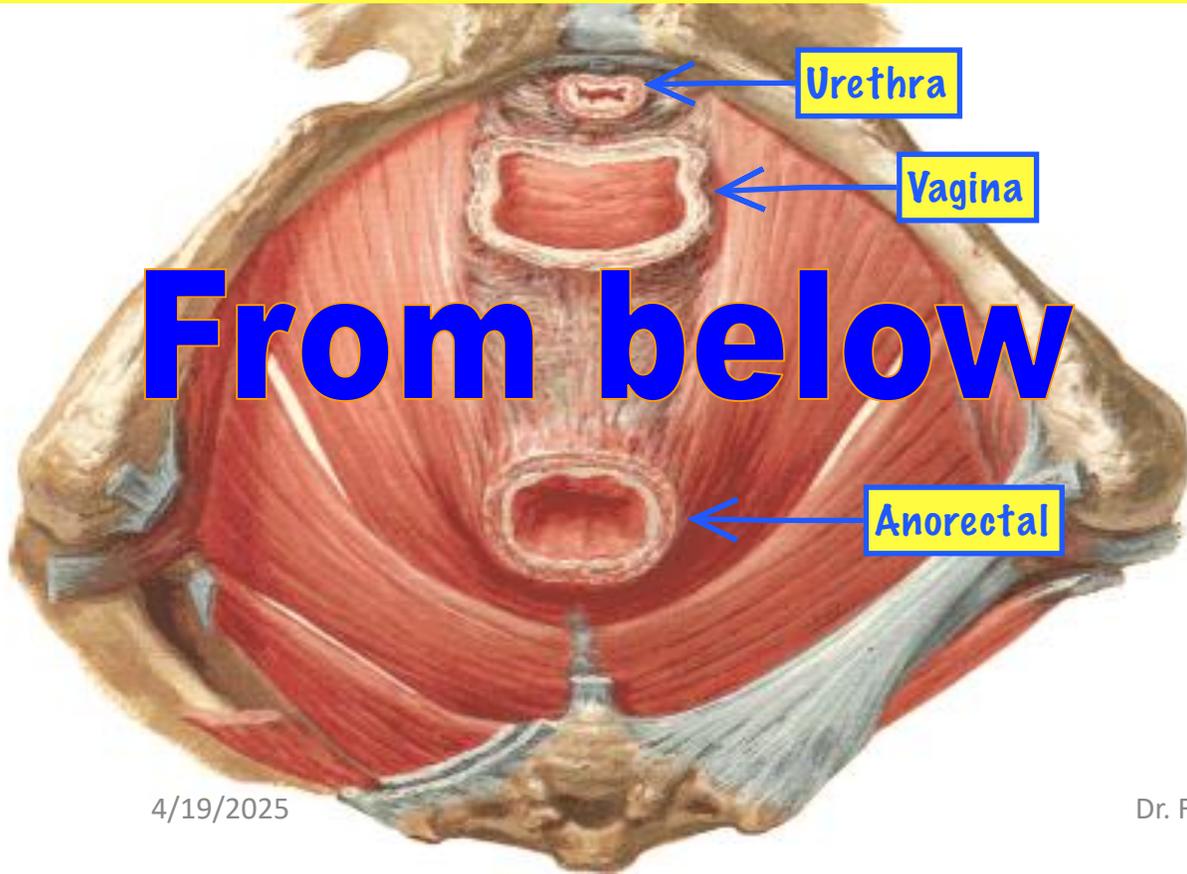
Muscles of the Pelvis



PELVIC FLOOR

OSPE ?

- * Identify (male or female pelvis) ?
- * Identify (parts of pelvic floor from below) ?



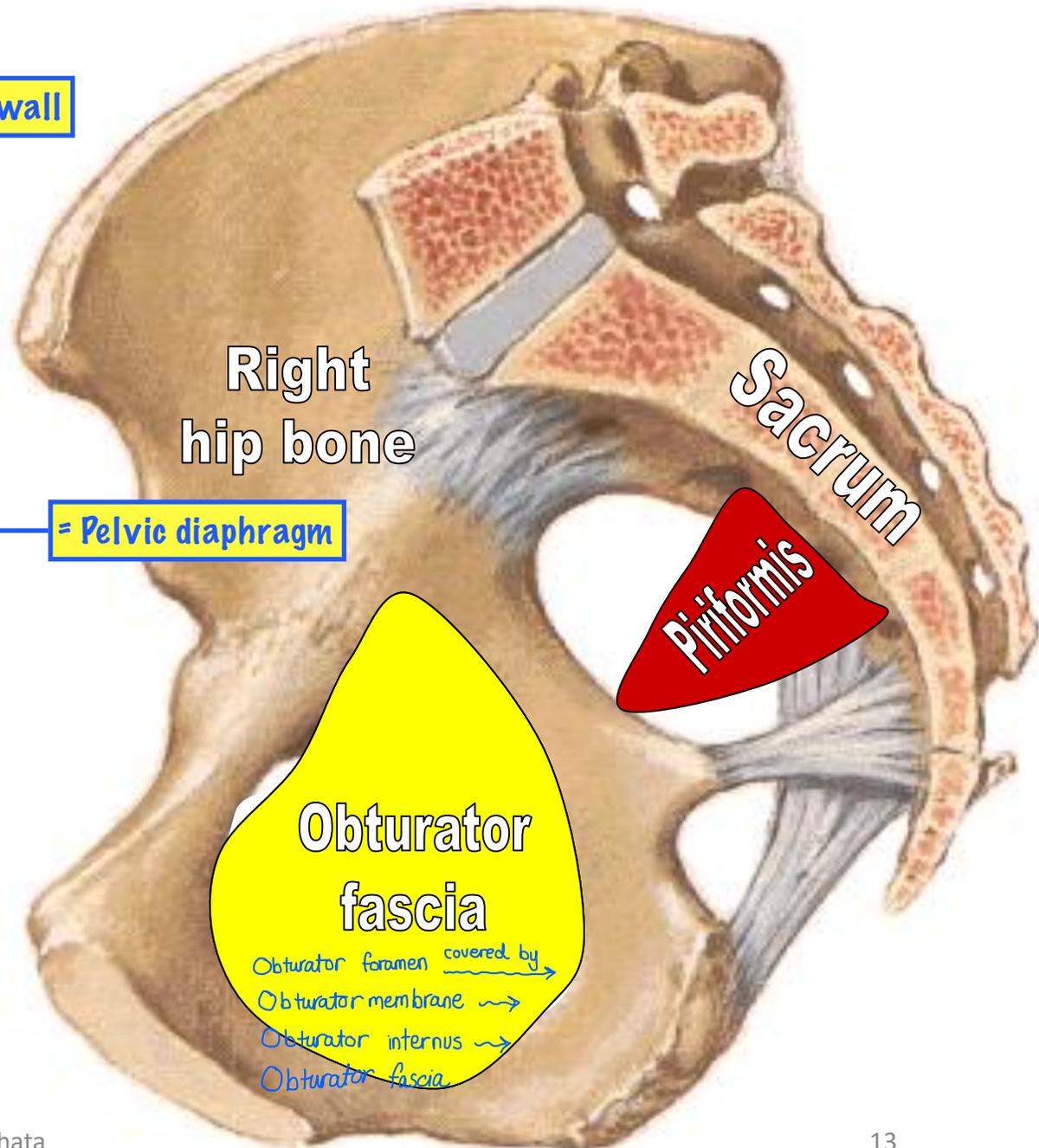
= Lateral wall

1)-Muscles of the pelvic wall:

1. **Obturator internus.**
2. **Piriforms.**

2)-Muscles of the pelvic floor:

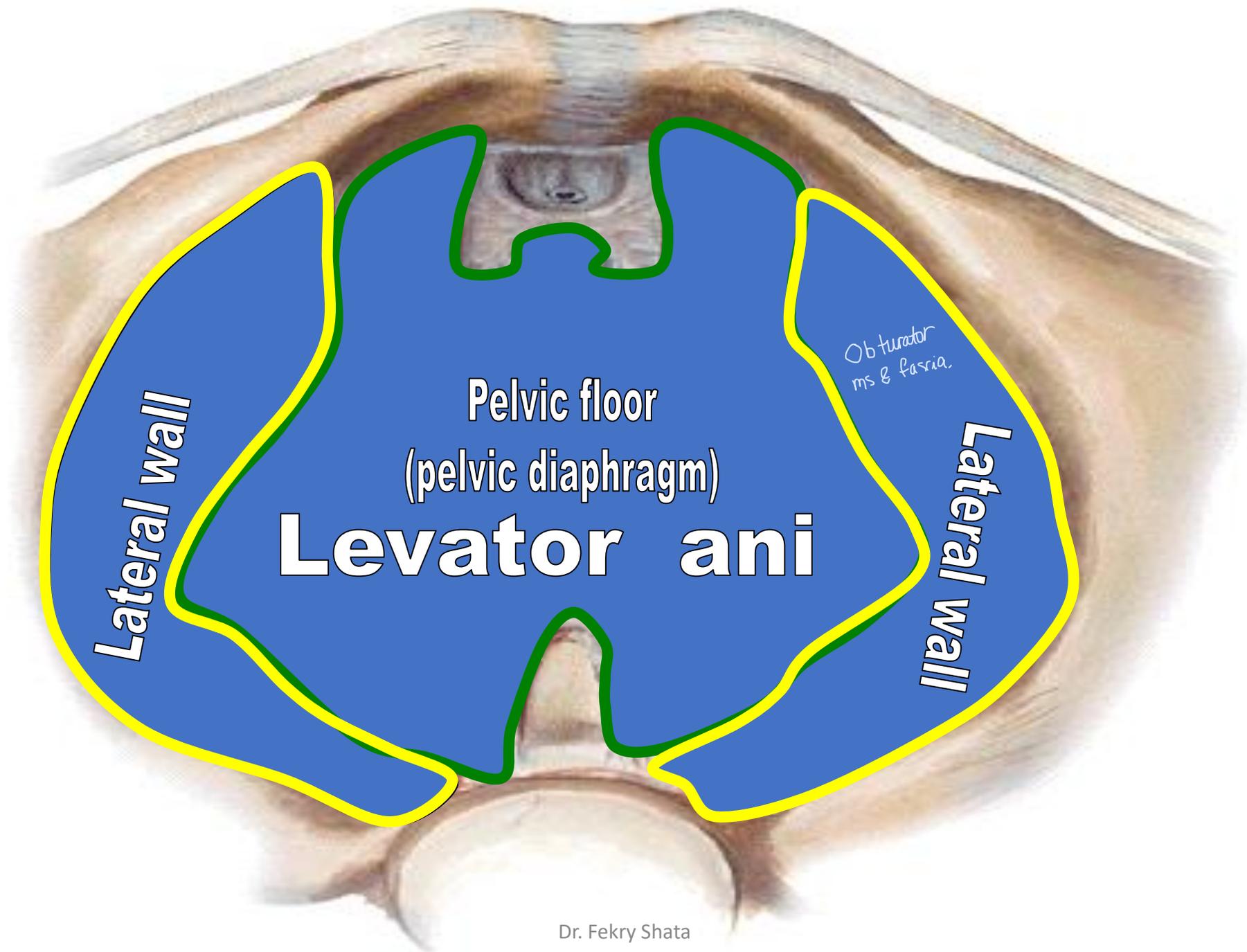
1. **Levator ani.**
2. **Coccygeus.**

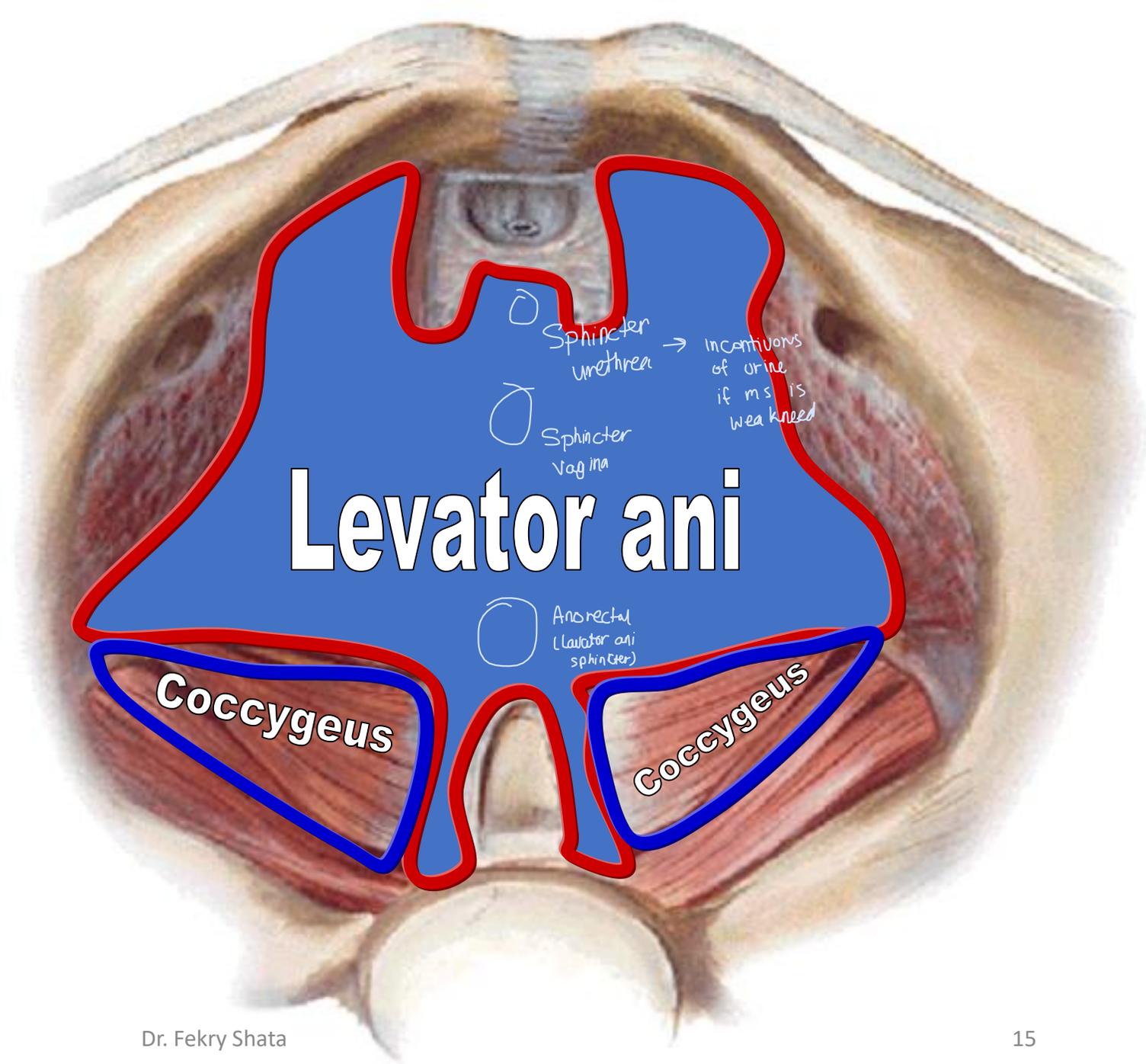
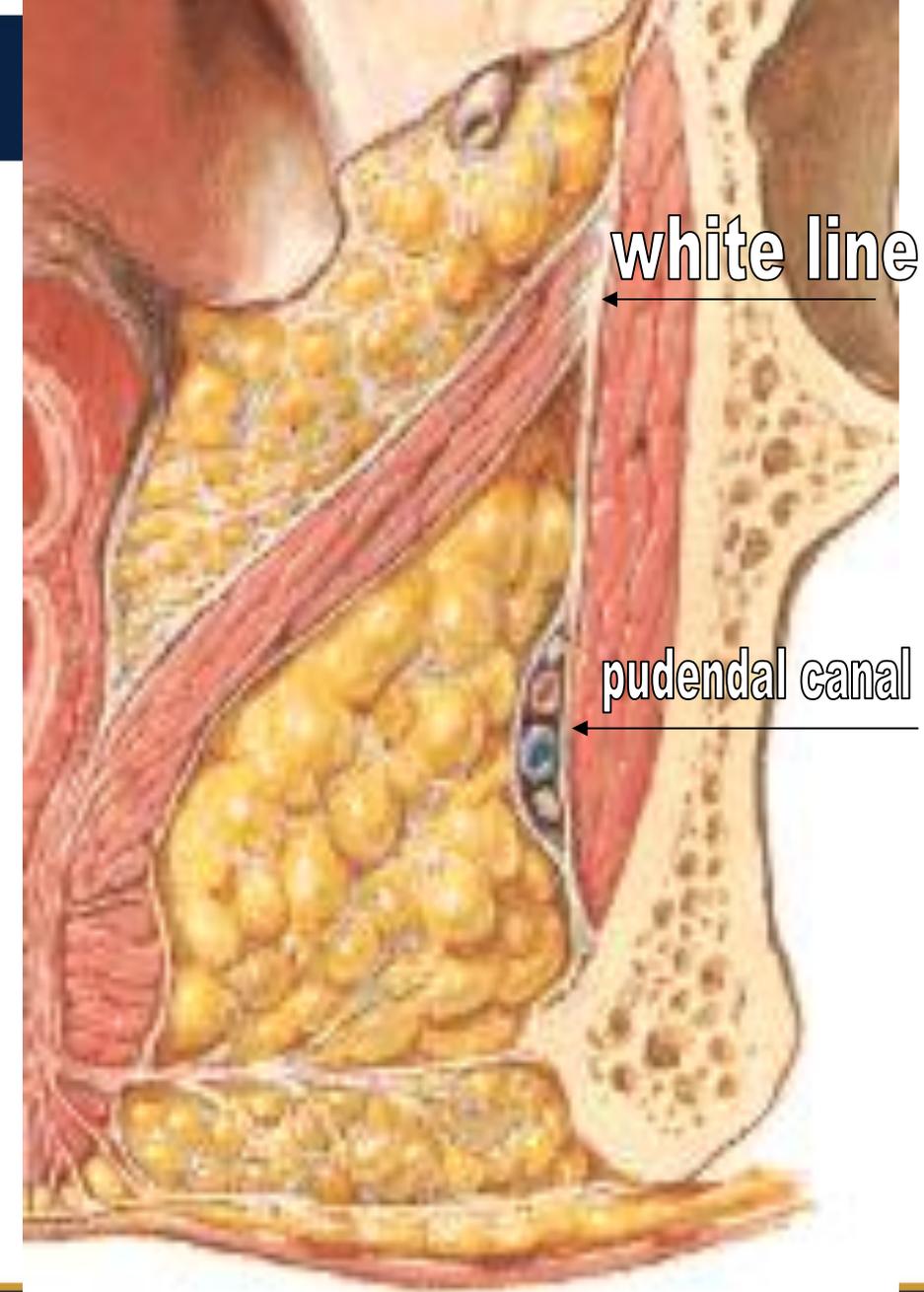


= Pelvic diaphragm

Obturator
fascia

Obturator foramen covered by
Obturator membrane
Obturator internus
Obturator fascia





The Levator ani muscle SAQ & MCQ

Origin & insertion: ANATOMICAL PARTS

1. The ischiococcygeus part:

- Origin from the **ischial spine**
- Inserted into the **front of the coccyx.**

2. The iliococcygeus: = Obturator internus = Obturator fascia مهم نعرفهم

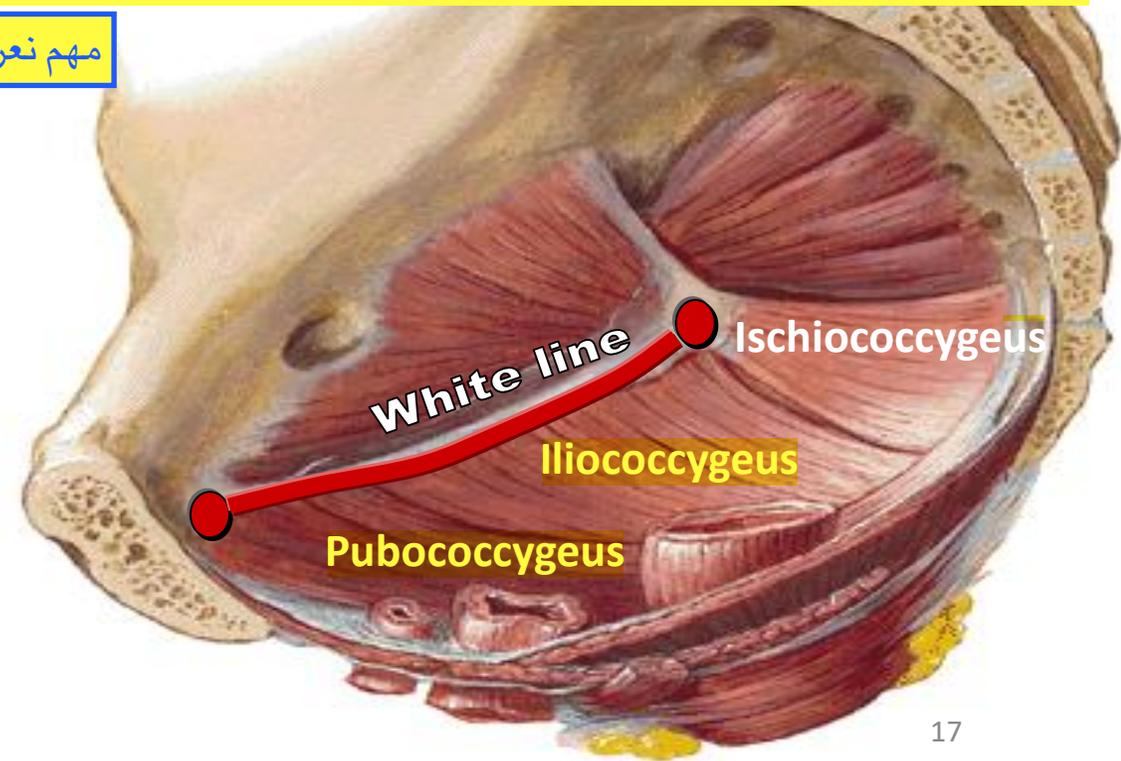
- Origin from the **"white line"** on the **MCQ** lateral Wall of the pelvis,
- inserted into **tip of the coccyx and raphe**

3. The pubococcygeus

- Origin from the **back of the pubic ramus**
- Inserted into **tip of the coccyx and raphe**

SAQ : Enumerate the anatomical parts of the Levator ani muscle ?

MCQ : Iliococcygeus part of the Levator ani muscle originate (arises from) ? white line (Obturator internus = Obturator fascia)



FUNCTIONAL PARTS

Anterior fibers:

Weakness leads to prolapse of the prostate or vagina.

- Fibers that are inserted in the

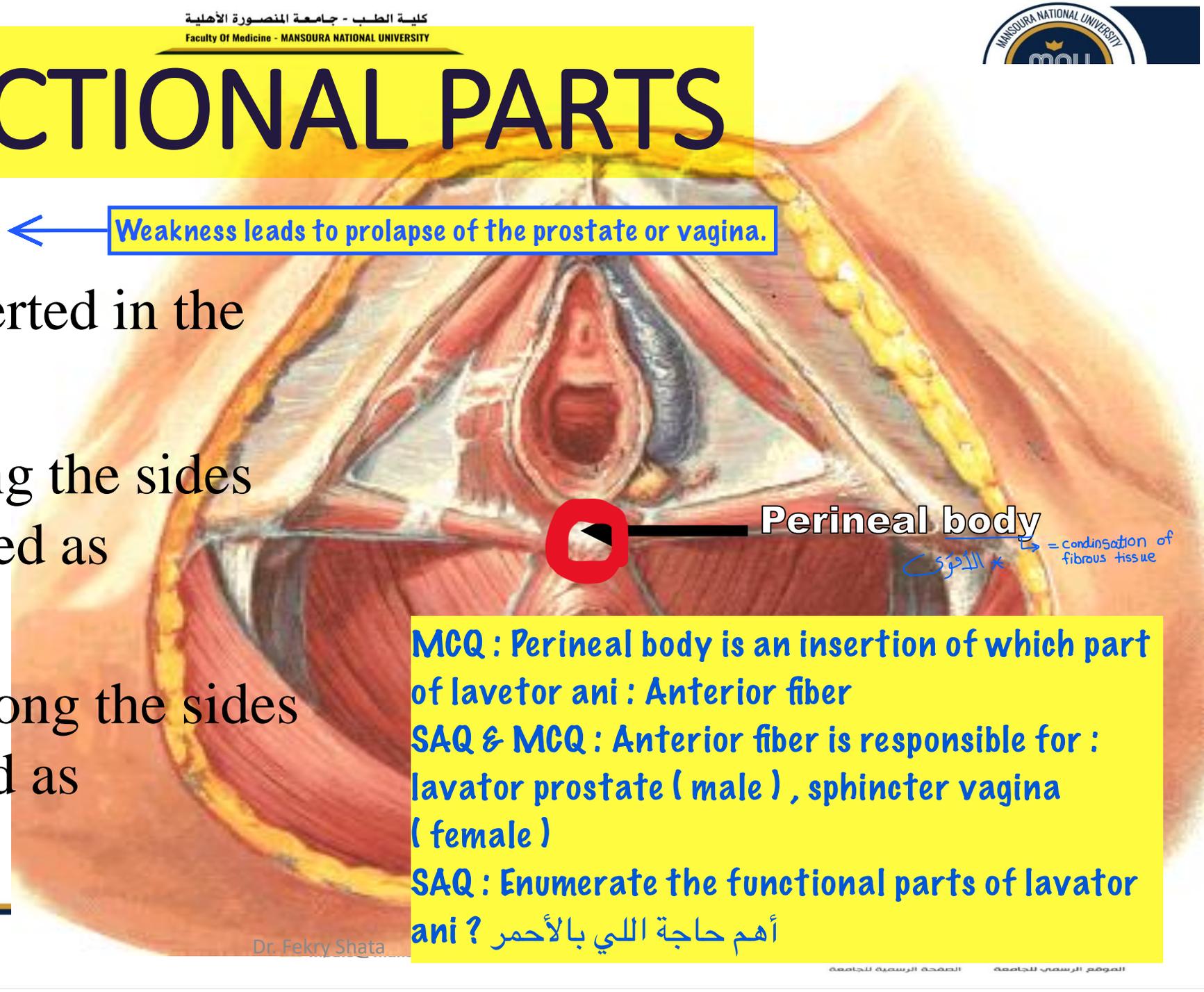
perineal body

in male it passes along the sides of prostate, it is termed as

levator prostate

in female it passes along the sides of vagina, it is termed as

sphincter vaginae



Perineal body

= condensation of fibrous tissue

MCQ : Perineal body is an insertion of which part of levator ani : Anterior fiber

SAQ & MCQ : Anterior fiber is responsible for : levator prostate (male) , sphincter vagina (female)

SAQ : Enumerate the functional parts of levator ani ? أهم حاجة اللي بالأحمر

Intermediate fibers (puborectalis)

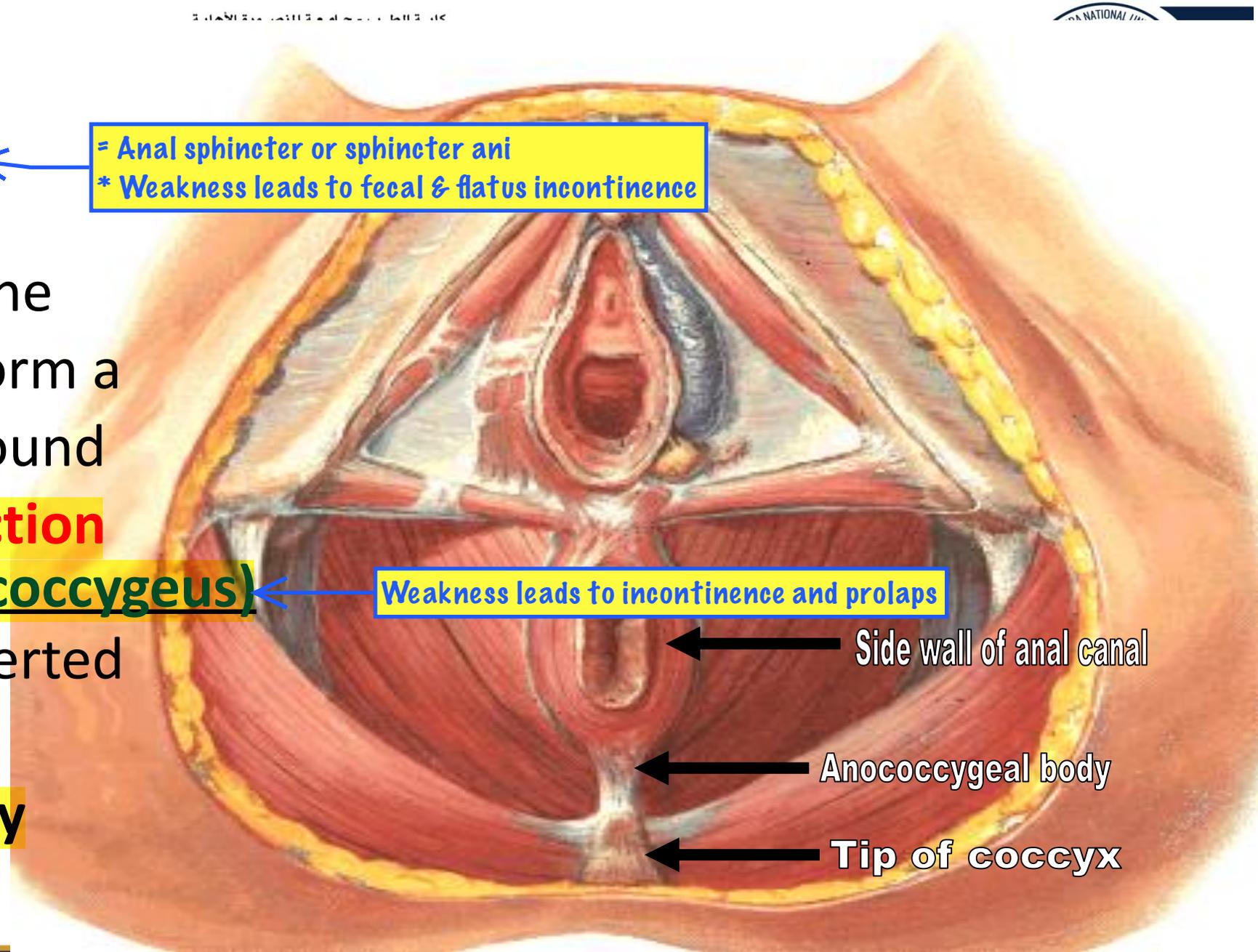
= Anal sphincter or sphincter ani
* Weakness leads to fecal & flatus incontinence

- Join the fibers of the opposite side to form a **U-shaped loop** around the **anorectal junction**

Posterior fibers (iliococcygeus)

Weakness leads to incontinence and prolaps

- Fibers that are inserted into the **anococcygeal body** and the **coccyx**



Side wall of anal canal

Anococcygeal body

Tip of coccyx

Actions of Levator Ani

1. **Supports the pelvic viscera** in its position, levator prostatae
2. **Raising intra-abdominal pressure** in forced expiration and during defecation, cough, vomiting etc.
- 3- Have an **important sphincter action**: pubourethralis, sphincter vaginae, and puborectalis

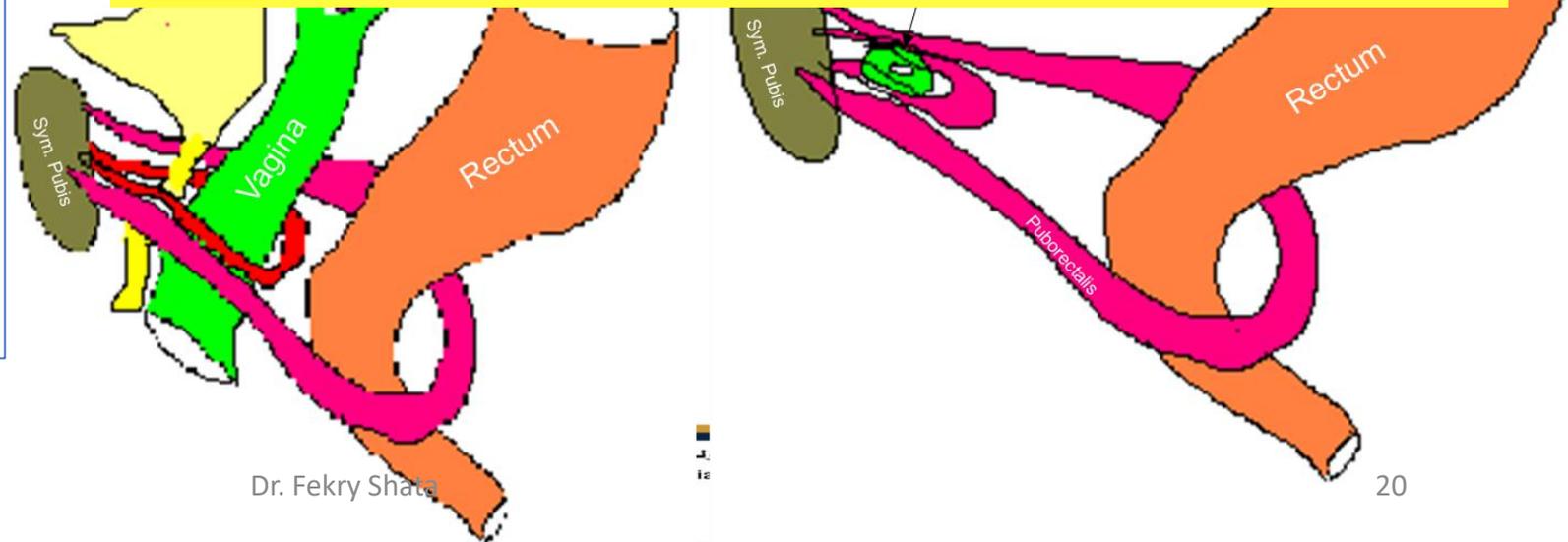
مهمة وتتخط أول بويونت

Nerve supply

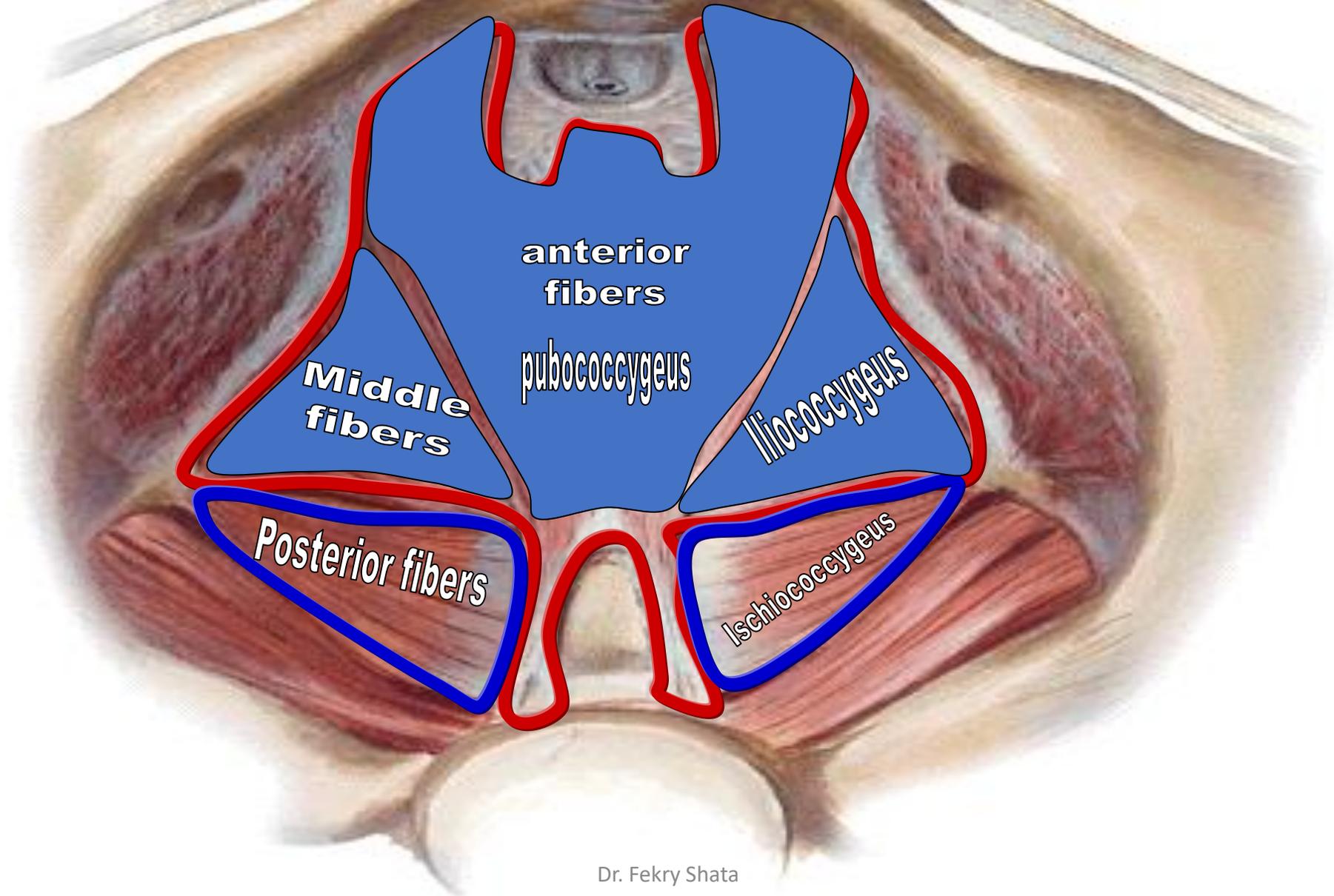
1. **Pelvic surface**: by a branch from **S4**.
2. **Perineal surface**:
Pudendal nerve

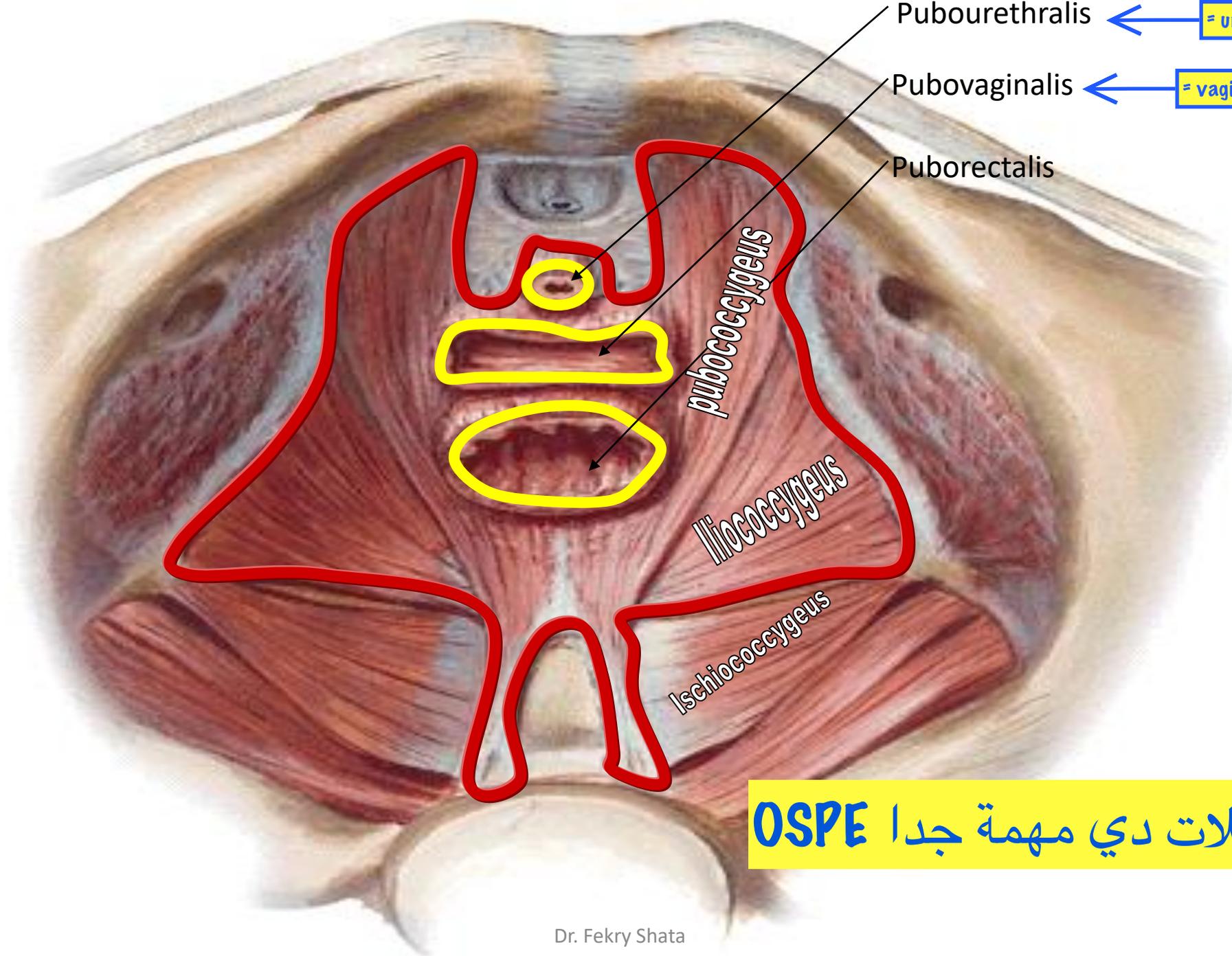
الاسلايد دي مهمة جداااا

SAQ : Enumerate action - nerve supply ?



Division





Pubourethralis ← = urethral sphincter

Pubovaginalis ← = vaginal sphincter

Puborectalis

pubococcygeus

Iliococcygeus

Ischiococcygeus

أسماء العضلات دي مهمة جدا OSPE

Relations

* أهم حاجة ال upper & lower relation

* ال Anterior & posterior relation ما بتجيش كثير

Relations

* Lower (Perineal) Surface Related to:
Ischiorectal fossa.
Anal canal

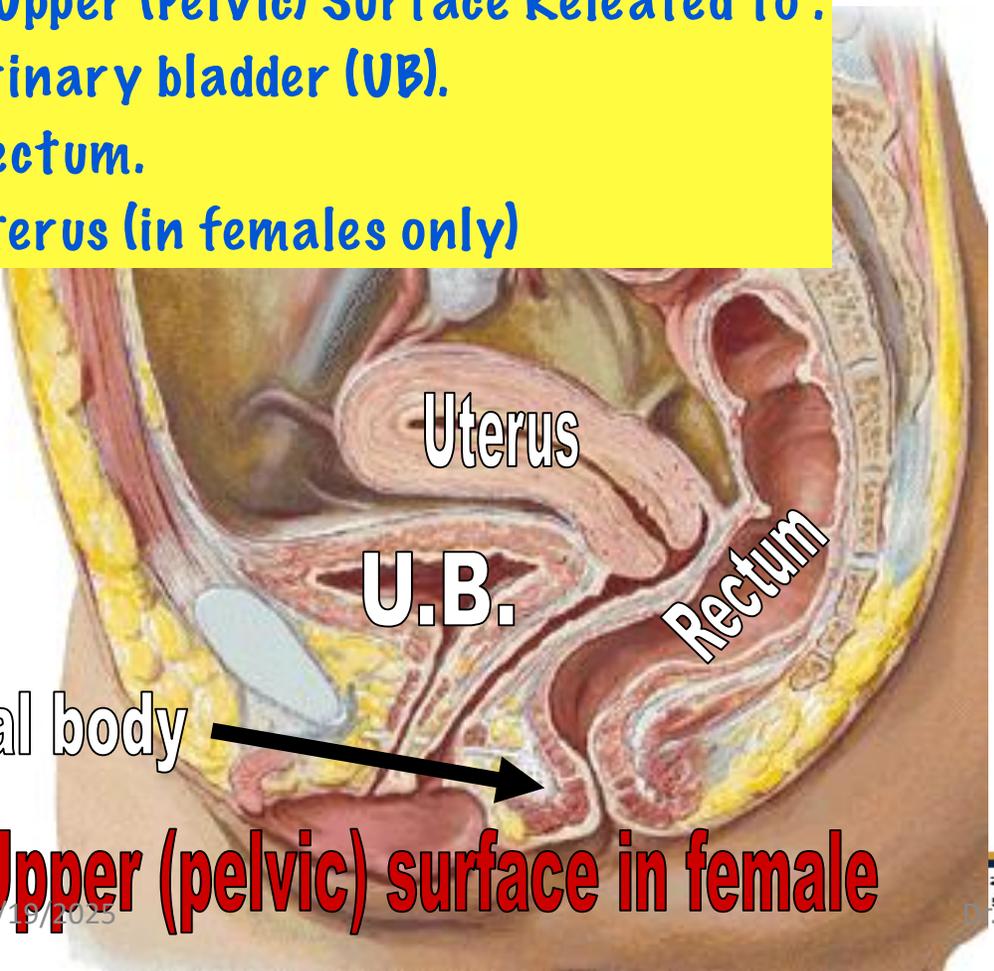
MCQ : inferior relation of lavetor ani ? Ischiorectal fossa



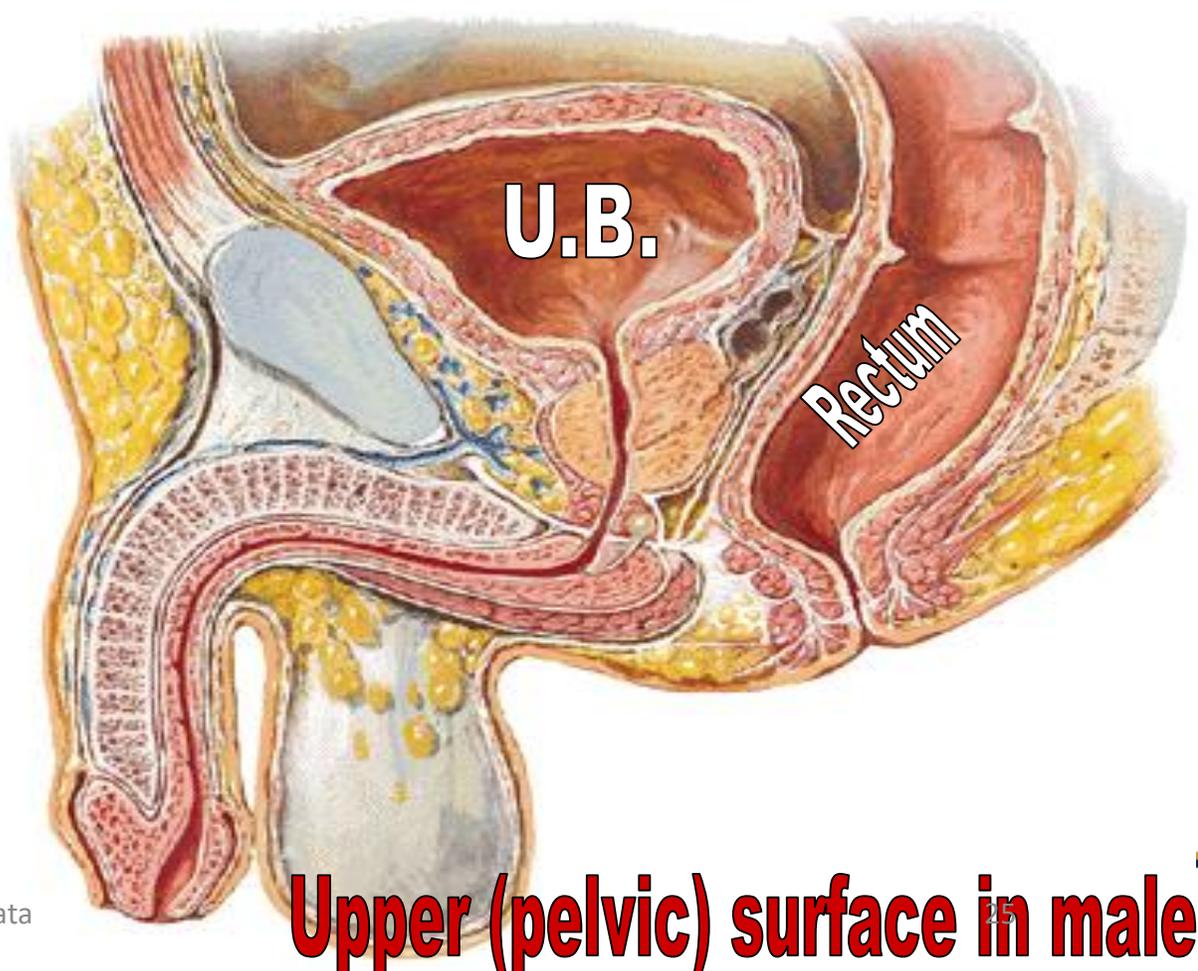
Lower (perineal) surface

Upper (pelvic) surface

* Upper (Pelvic) Surface Related to :
Urinary bladder (UB).
Rectum.
Uterus (in females only)

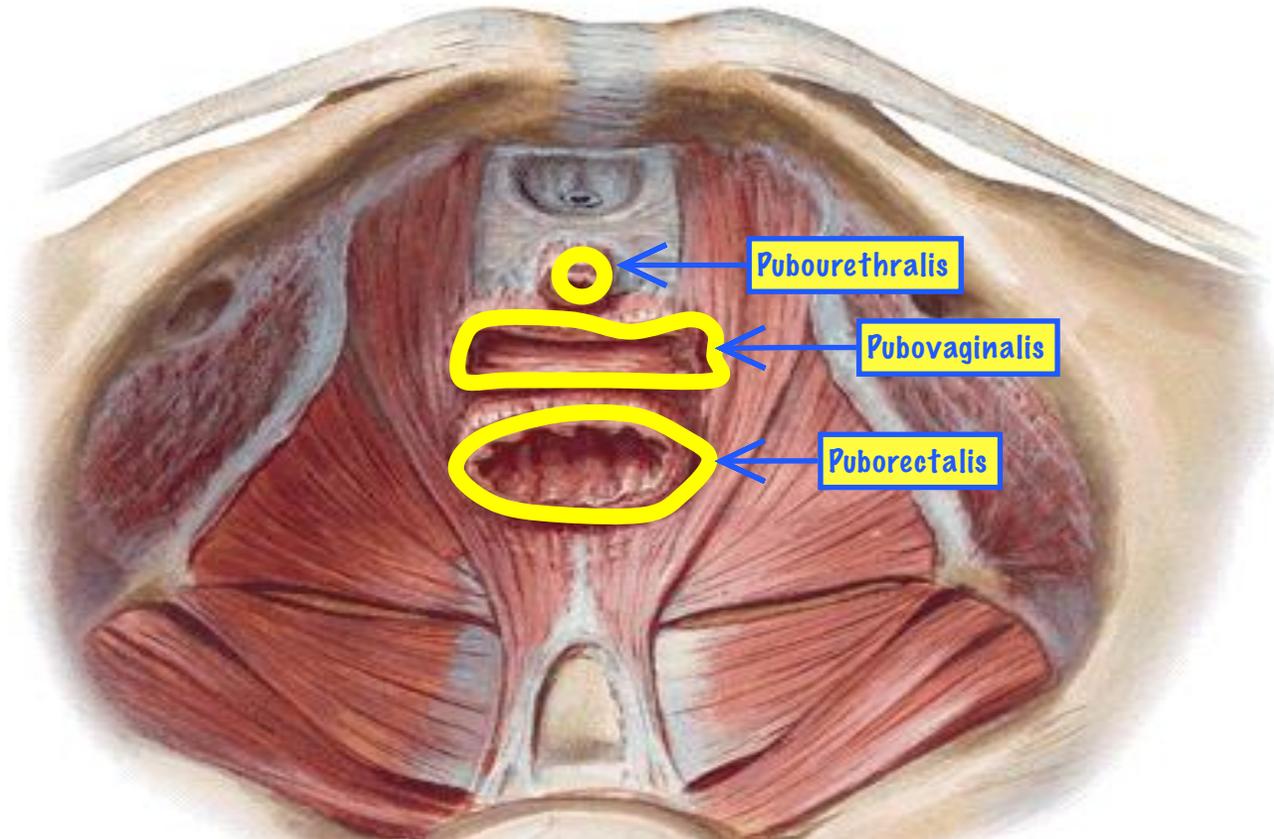


Upper (pelvic) surface in female

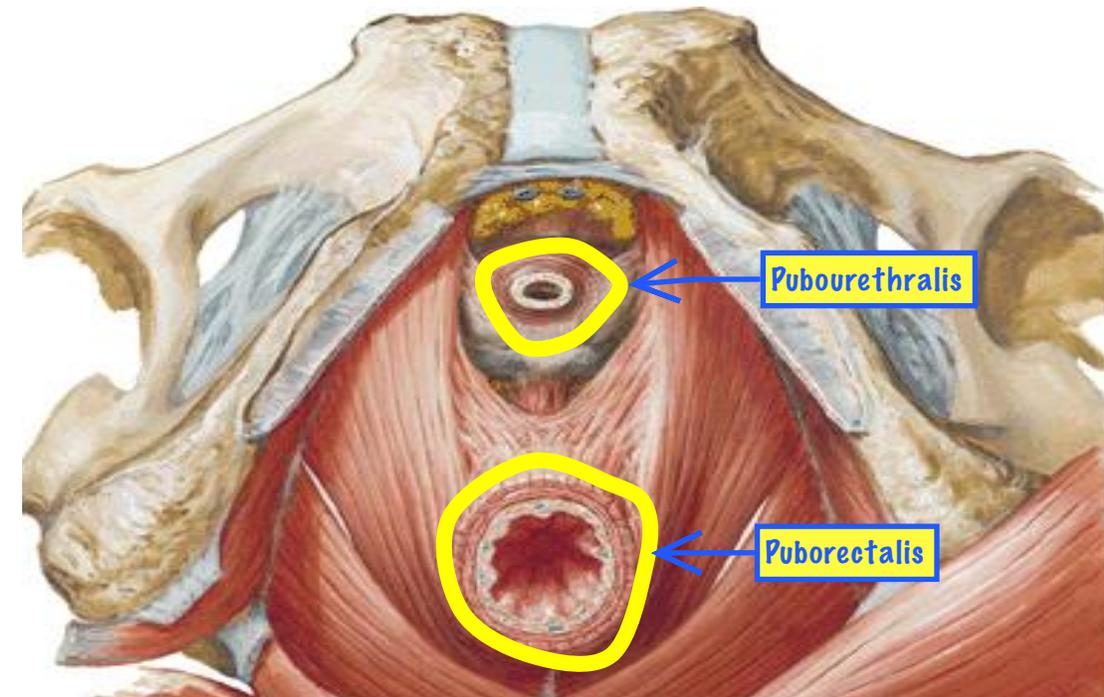


Upper (pelvic) surface in male

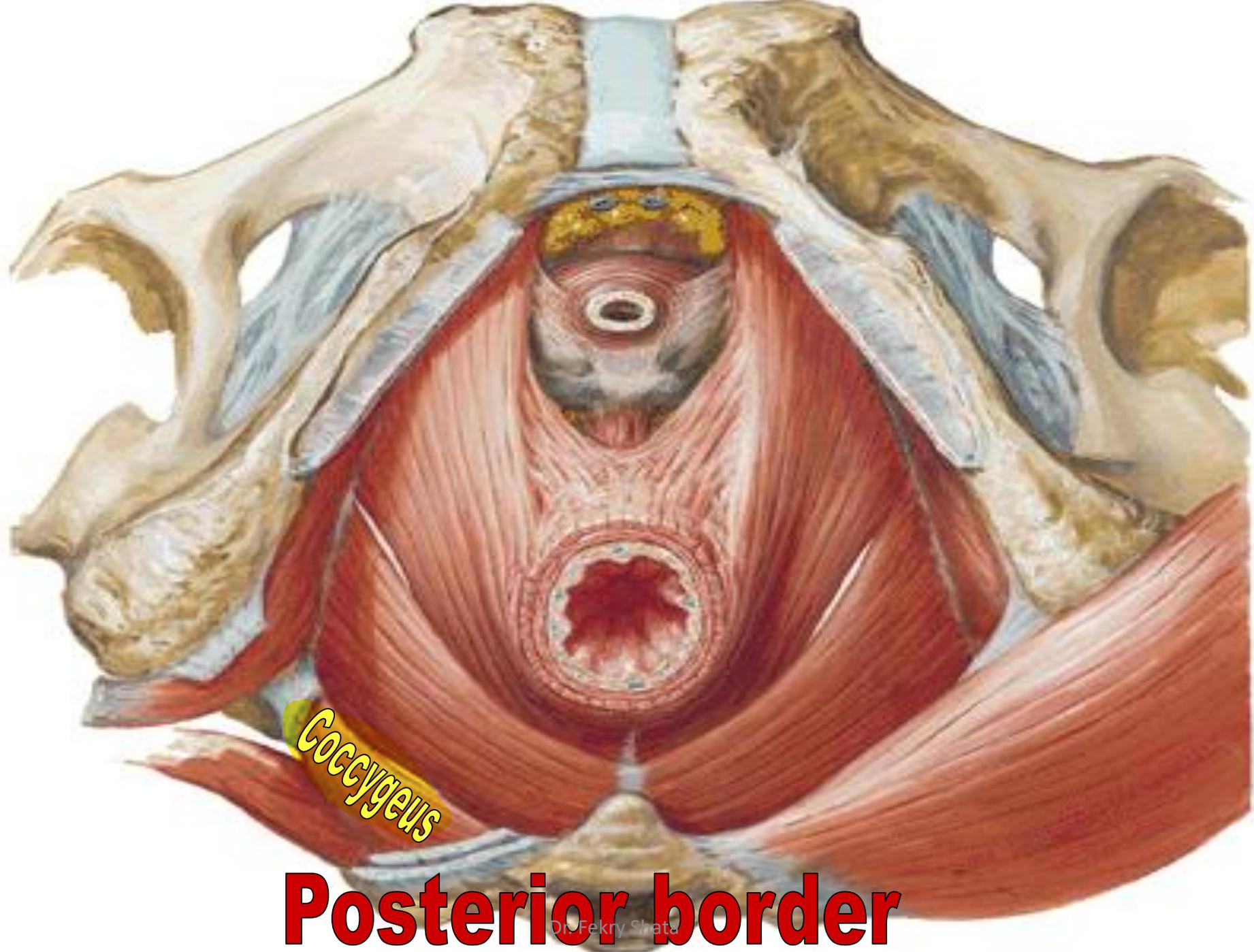
Anterior border



Anterior border in female



Anterior border in male





Arrangement of pelvic viscera & peritoneal covering



Pelvic fascia

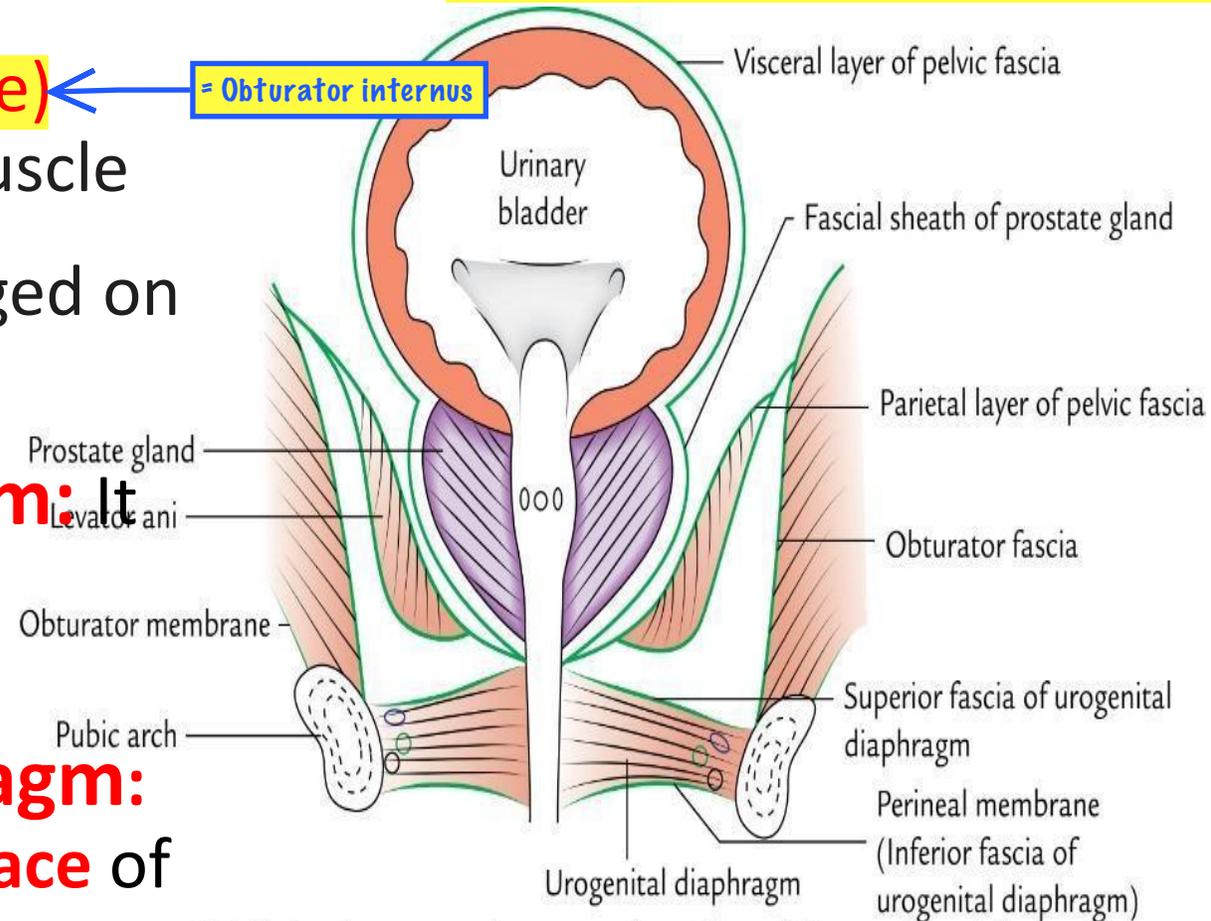
مطلوب منا ال
fascia بس في السلايد دي

1. Obturator fascia: presents a linear thickening called **tendinous arch (white line)** which provides origin to the levator ani muscle

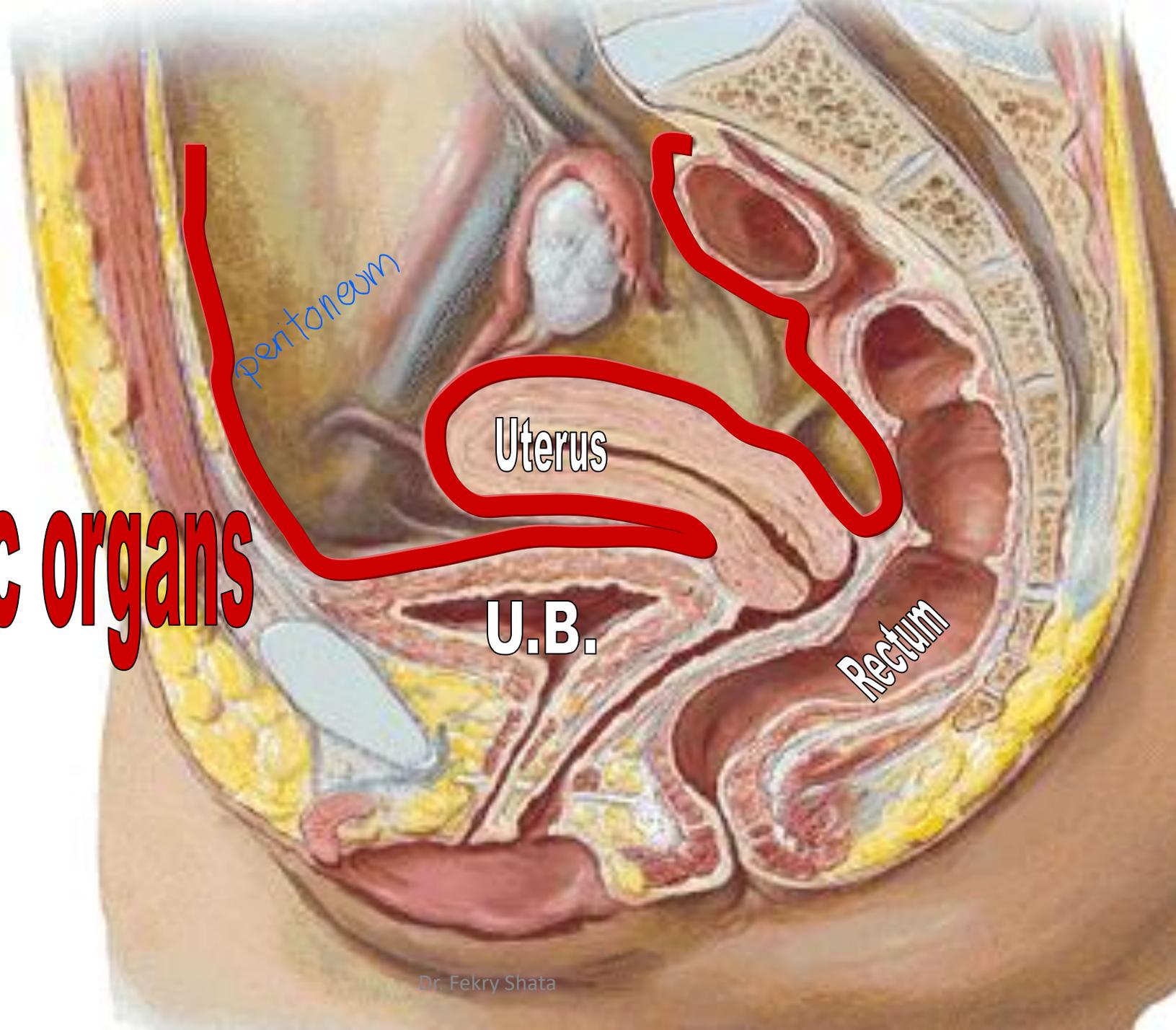
2. Piriformis fascia: very thin is prolonged on the muscle into the gluteal region

3. Superior fascia of pelvic diaphragm: It covers the **upper surface** of the pelvic diaphragm

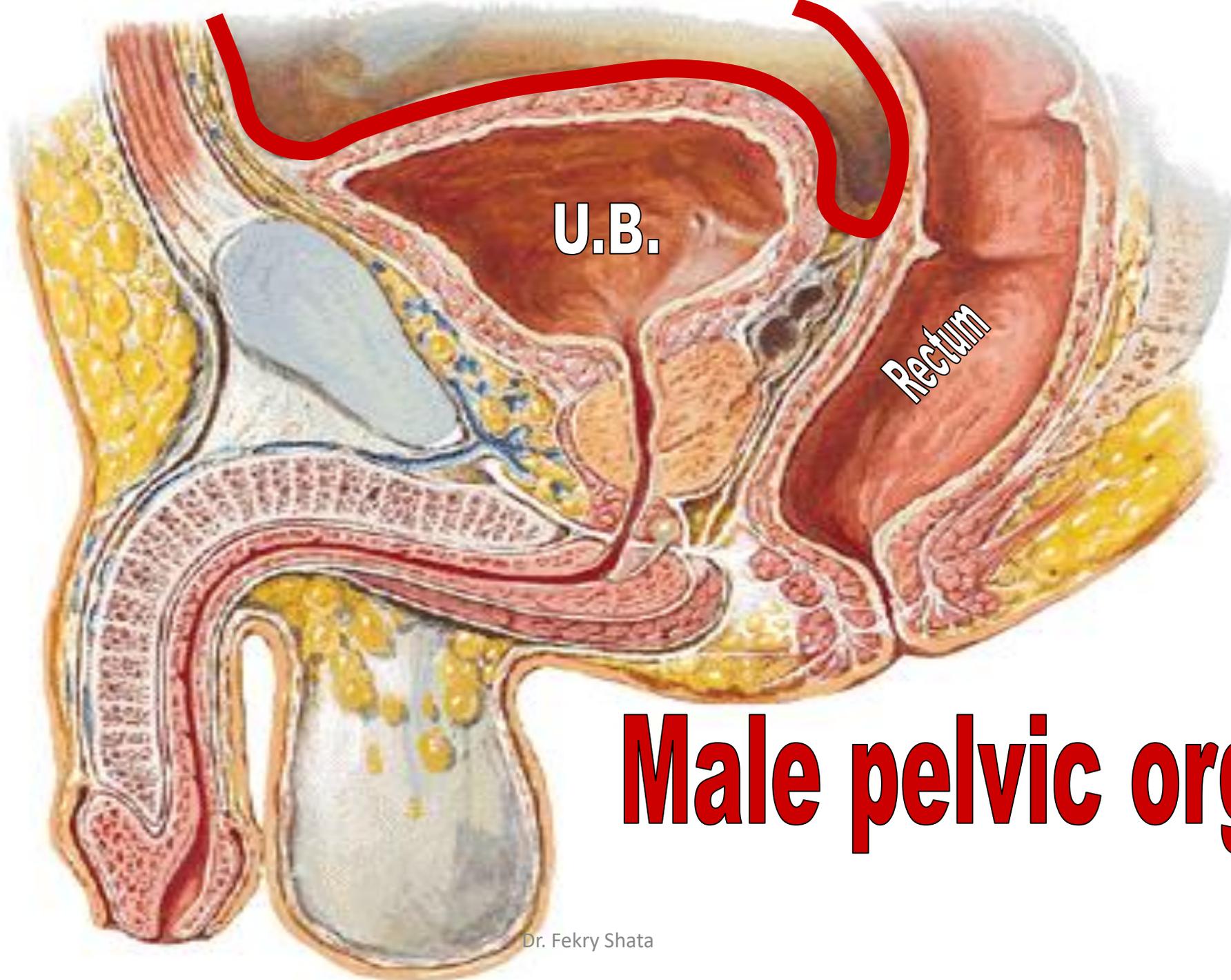
4. Inferior fascia of the pelvic diaphragm: is a thin fascia that covers the **inferior surface** of the levator ani.



Pelvic fascia as seen in coronal section of the male pelvis.



Female pelvic organs



Male pelvic organs



Vessels & Nerves of the Pelvis

مطلوب الاسم وجاي منين بس



Arteries of the Pelvis





1. Internal Iliac Artery



ORIGIN:-

=One of two terminal branches of **common iliac artery**.

=At level of **sacra-iliac joint**. **MCQ**

TERMINATION:- at upper margin of **greater sciatic foramen** by dividing into:- **MCQ**

1-**Anterior division**.

2-**Posterior division**.

COURSE:- descend on the posterior wall of pelvis.

Sacro-iliac Joint

**Upper margin
of
Greater Sciatic Foramen**

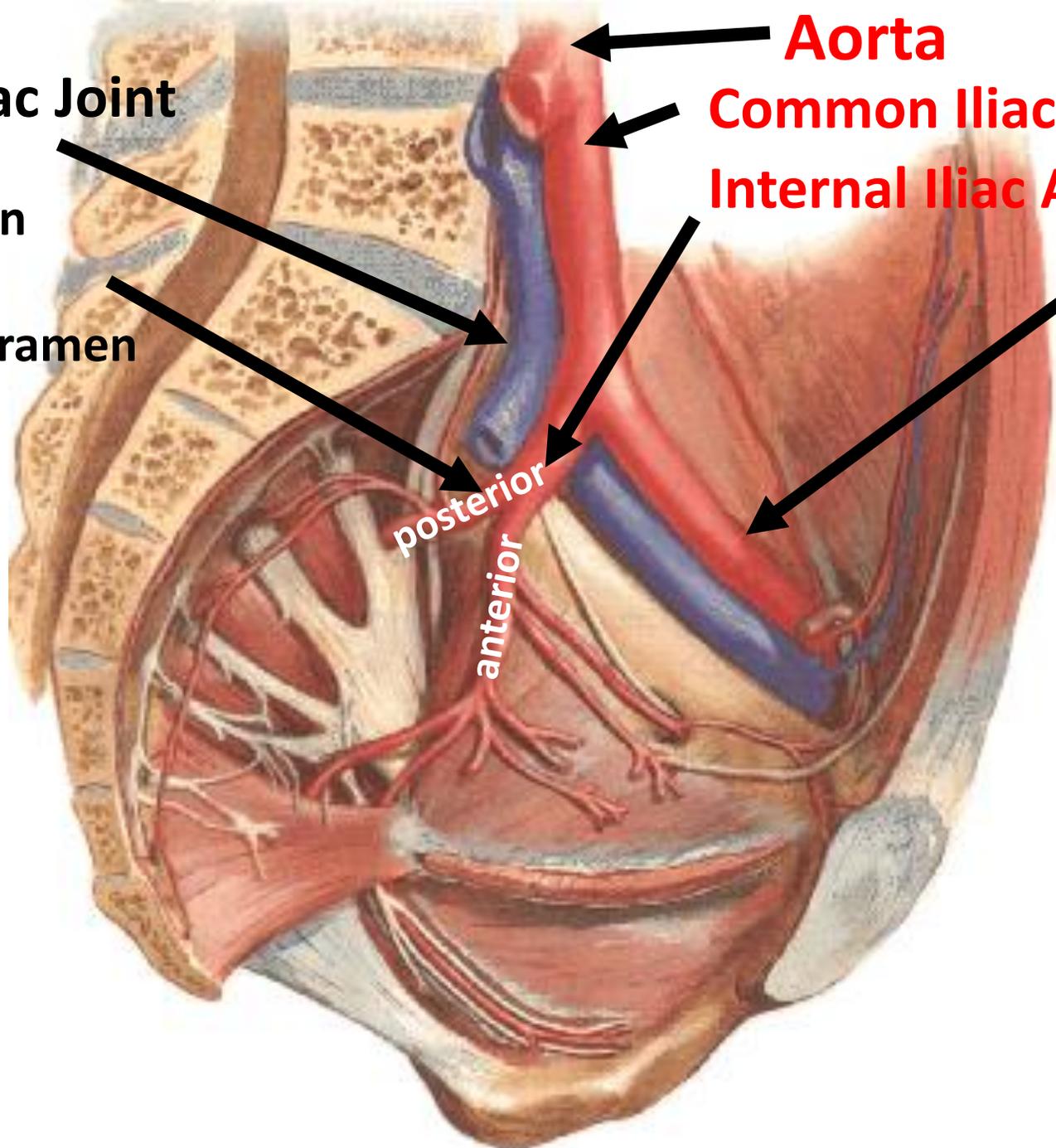
Aorta

Common Iliac Artery

Internal Iliac Artery

External Iliac Artery

femoral *كامل





كلية الطب - جامعة المنصورة - كلية الطب
Faculty Of Medicine - MANSOURA NATIONAL UNIVERSITY

BRANCHES

السلامة دي مهمة جداااا وجاية
في الامتحان SAQ & MCQ

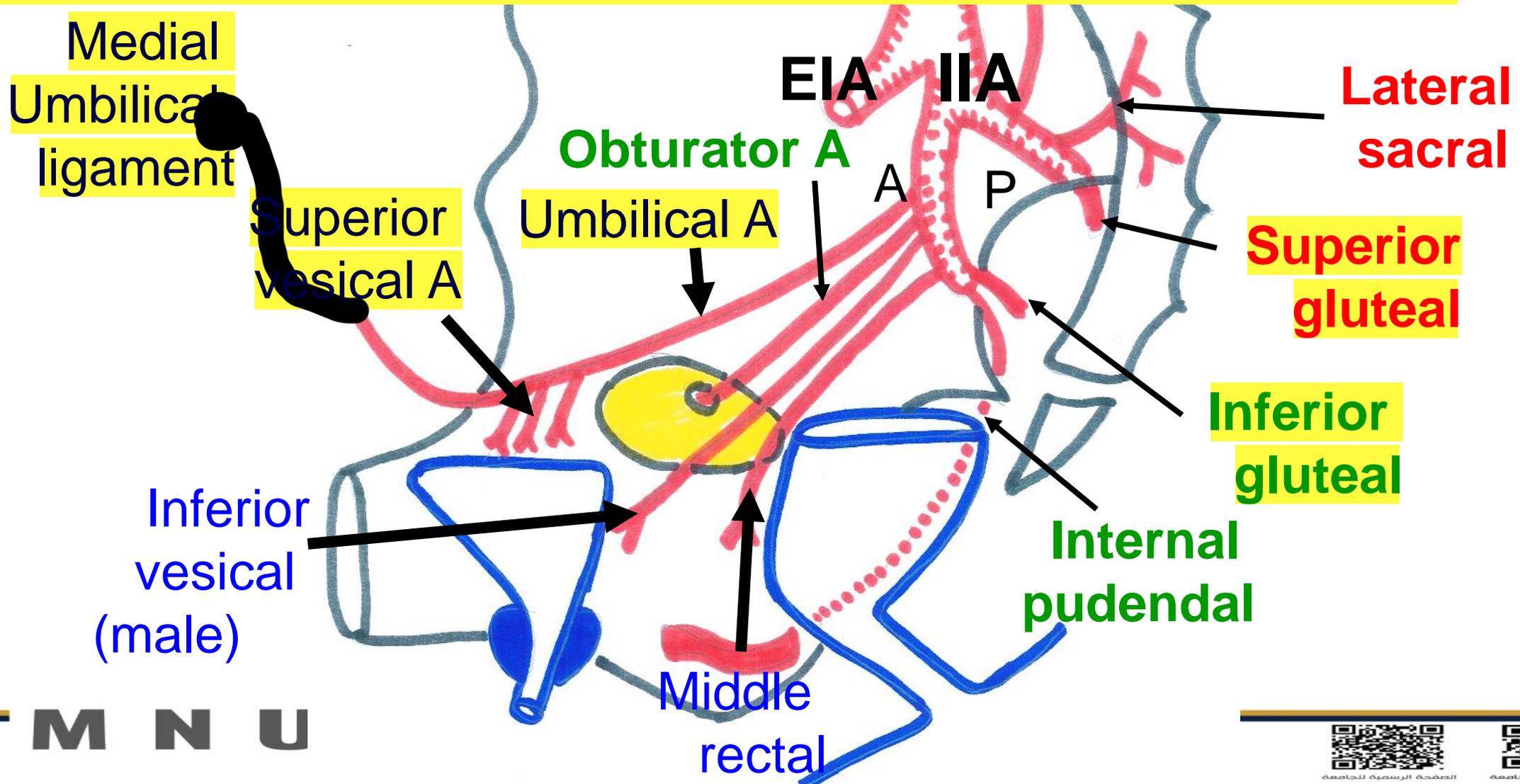
Anterior division		Posterior division
Parietal branches [supply the wall of pelvis]	Visceral branches [supply the viscera of pelvis]	All are Parietal branches <i>↓ pelvic wall</i>
<ol style="list-style-type: none"> Internal pudendal artery. Obturator artery. Inferior gluteal artery. (continuation) 	<ol style="list-style-type: none"> Umbilical (superior vesical) Middle rectal artery. Inferior vesical artery. (only male) Uterine artery. (only female) Vaginal artery. (only female) 	<ol style="list-style-type: none"> Lateral sacral artery. Iliolumbar artery. Superior gluteal artery. (continuation)

SAQ : Enumerate Branches of (Anterior - posterior - partial) divisions of internal Iliac Artery ?

MCQ مهم جدا : Continuation of posterior division of internal iliac artery ? Superior gluteal artery

MCQ مهم جدا : Continuation of anterior division of internal iliac artery ? Inferior gluteal artery

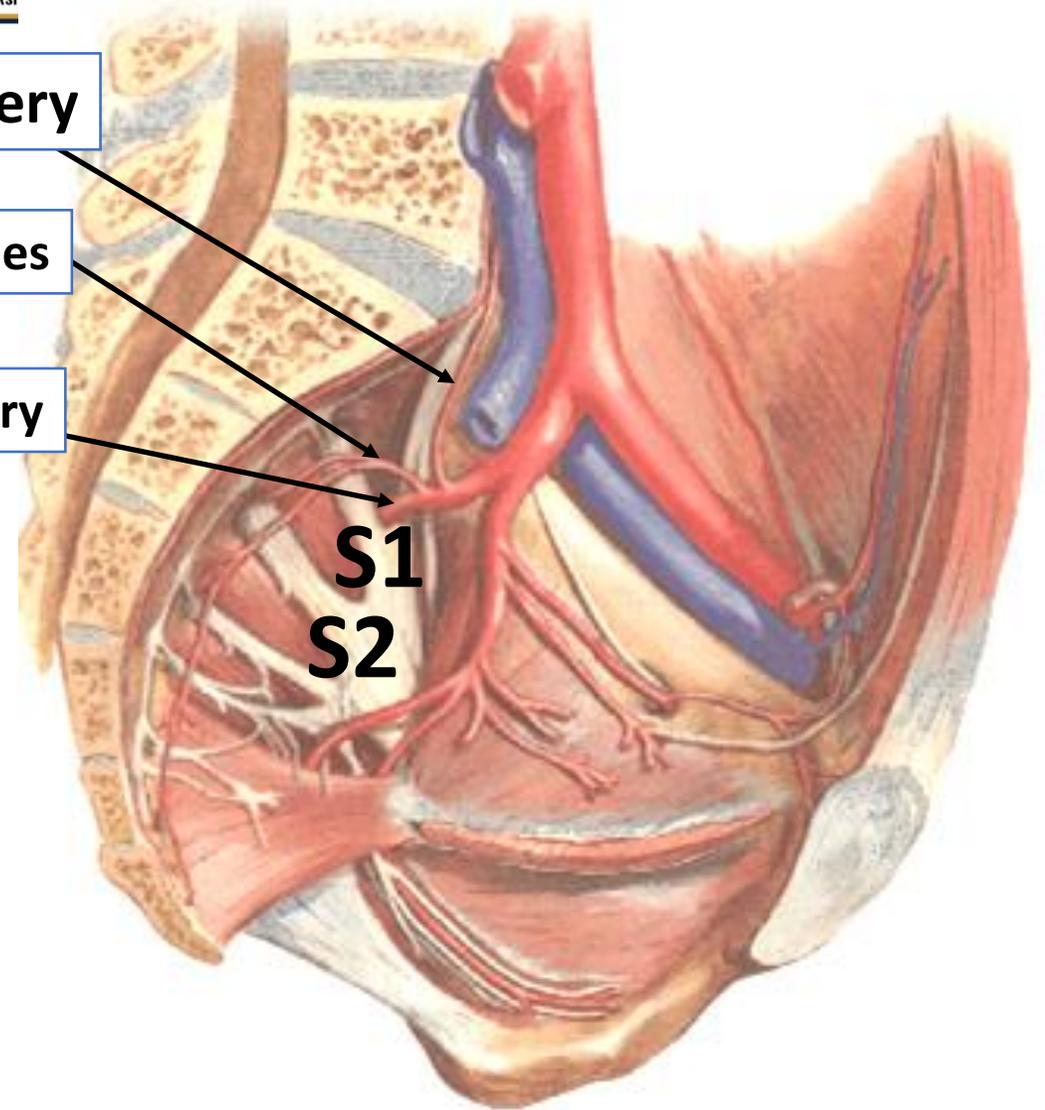
MCQ : Which artery is present only in males ? Inferior vesical artery



1- Iliolumbar Artery

2- Lateral Sacral Arteries

3- Superior Gluteal Artery



Branches from the posterior division of internal iliac artery (all are parietal branches).

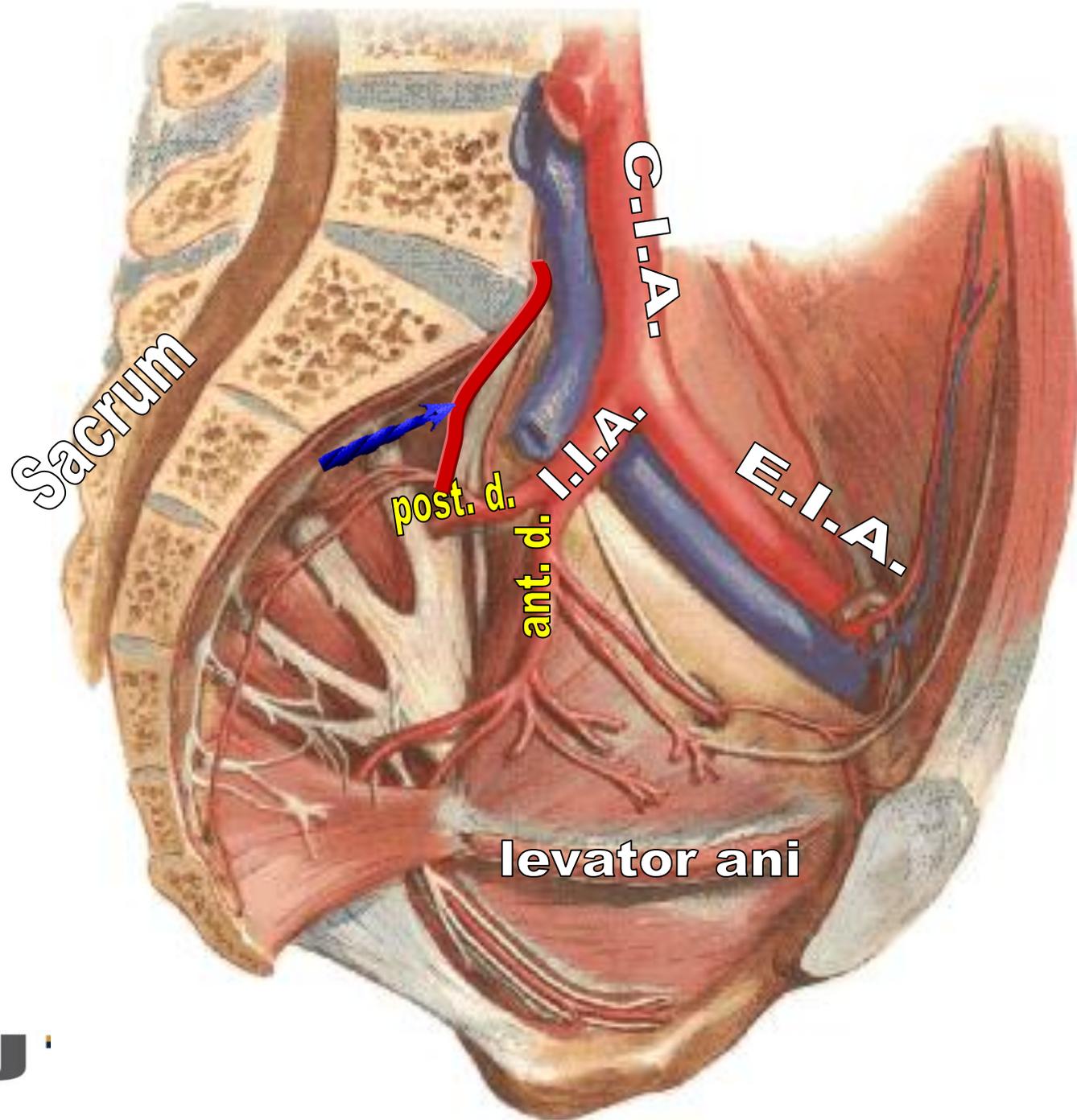
1. Iliolumbar artery

Course: ascends in front of sacroiliac joint and end deep to psoas major mus.

Termination: by dividing into two terminal branches:

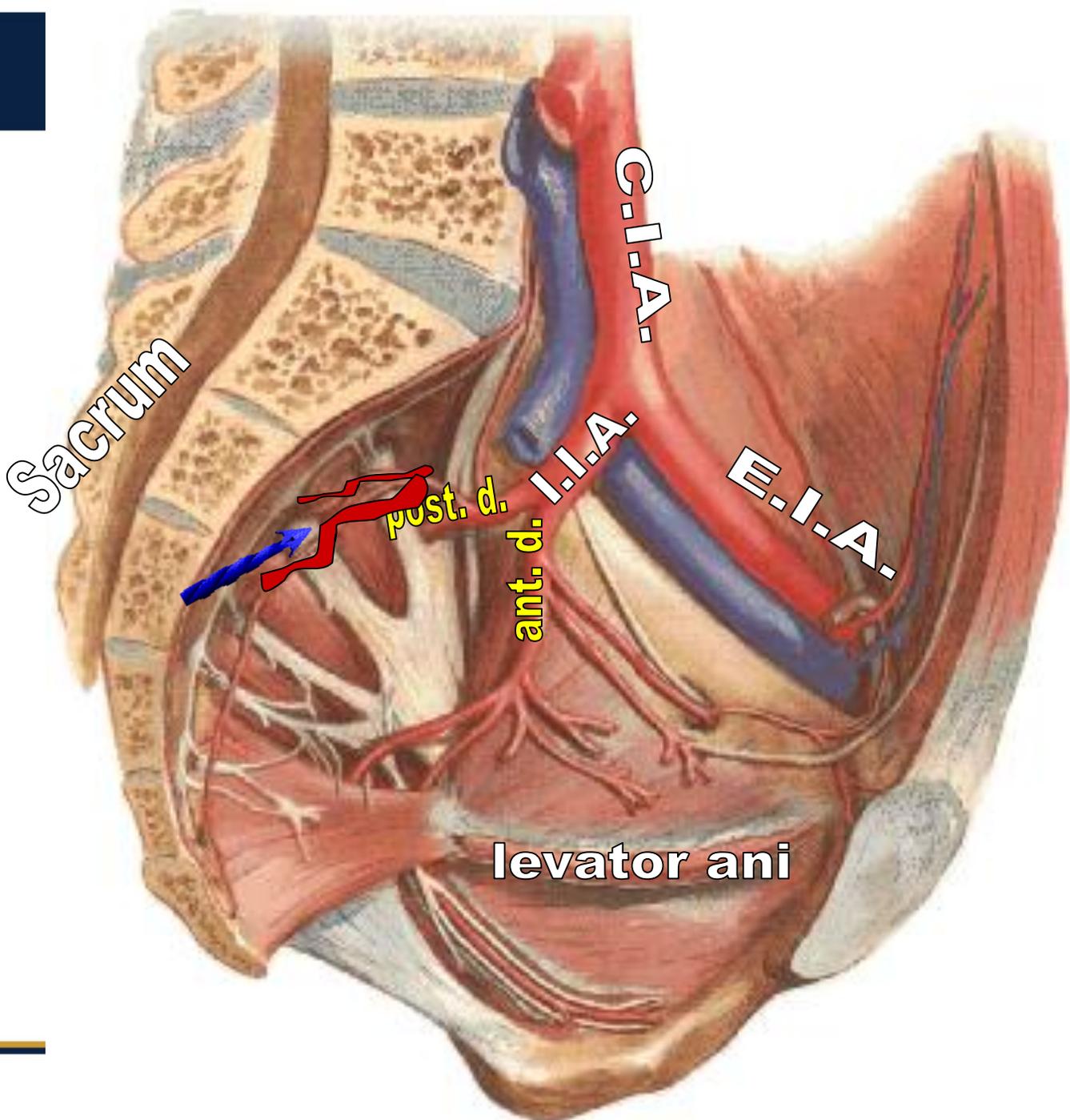
1.Iliac branch: to the iliacus muscle and supplying it.

2.Lumbar branch: to psoas major and quadratus lumborum.

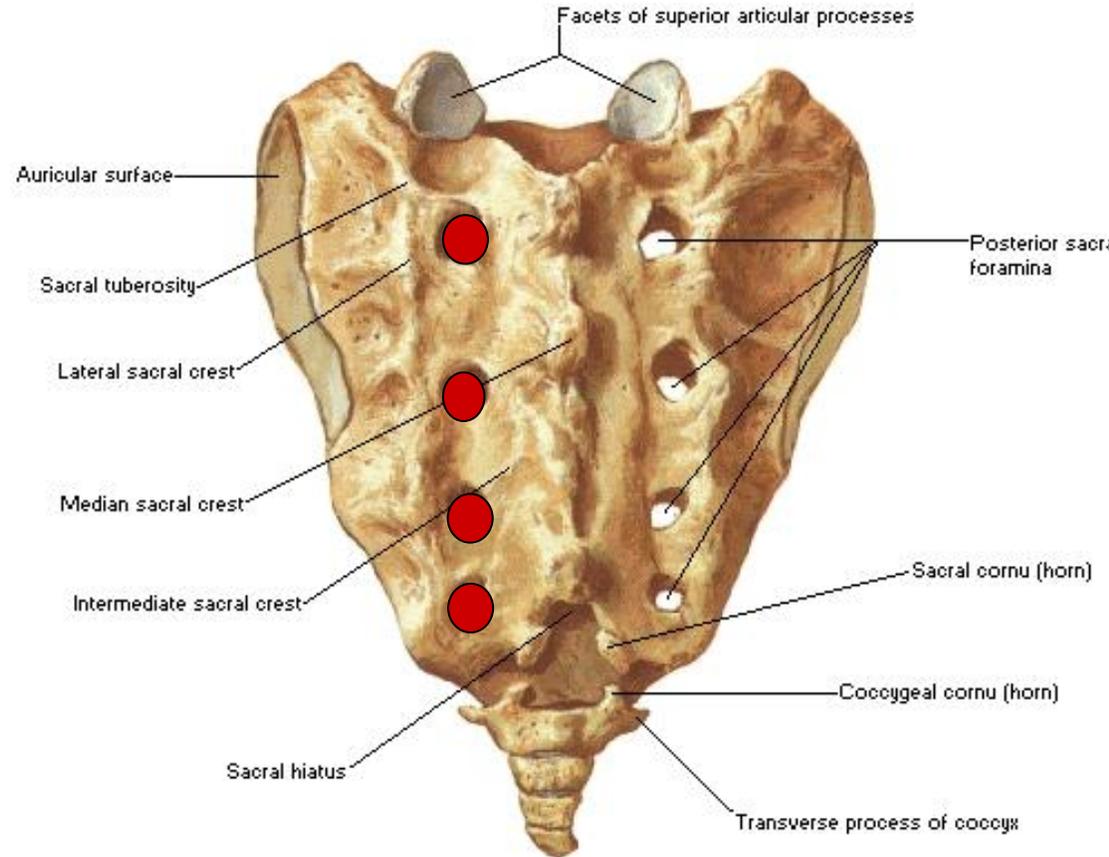


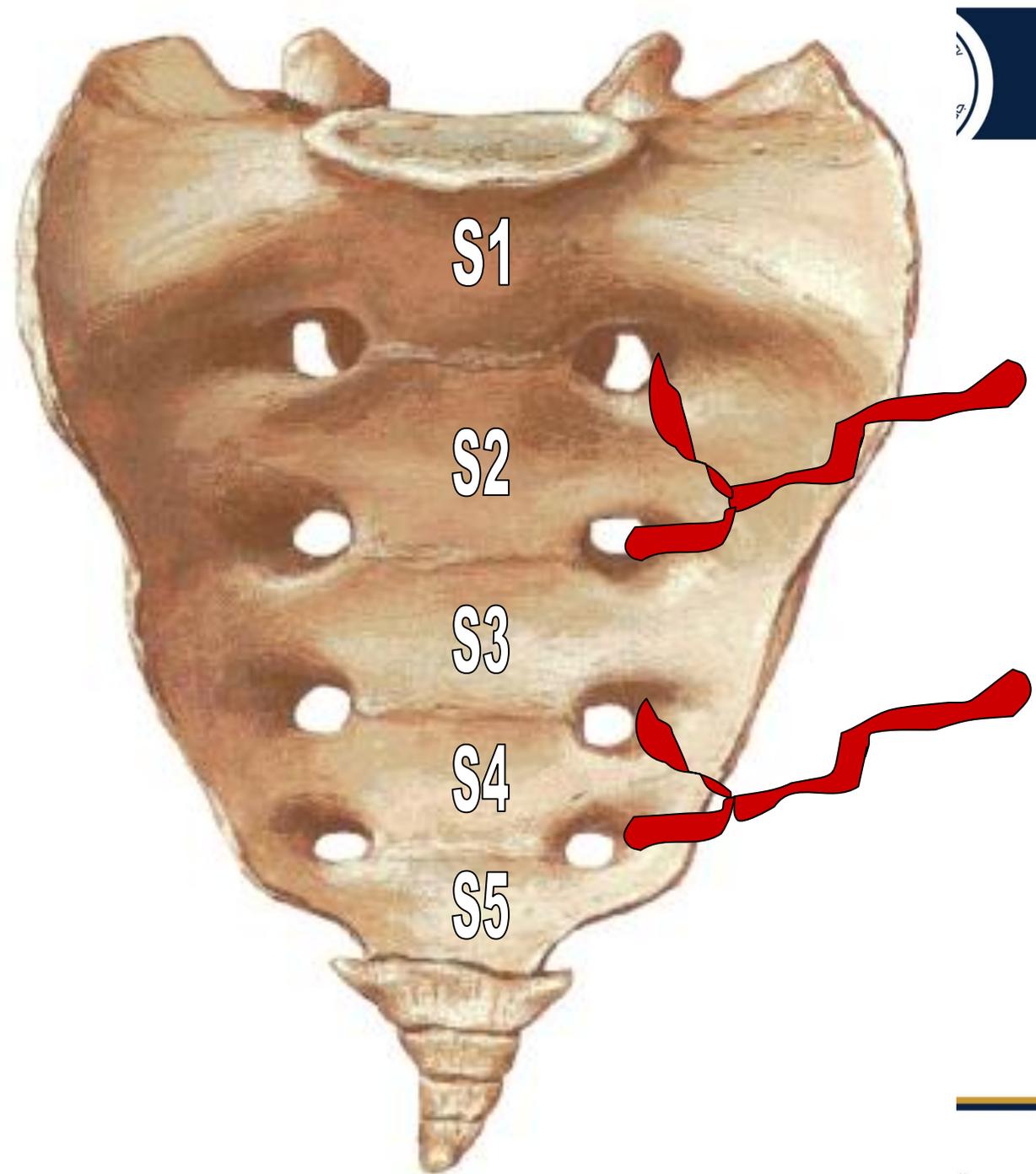
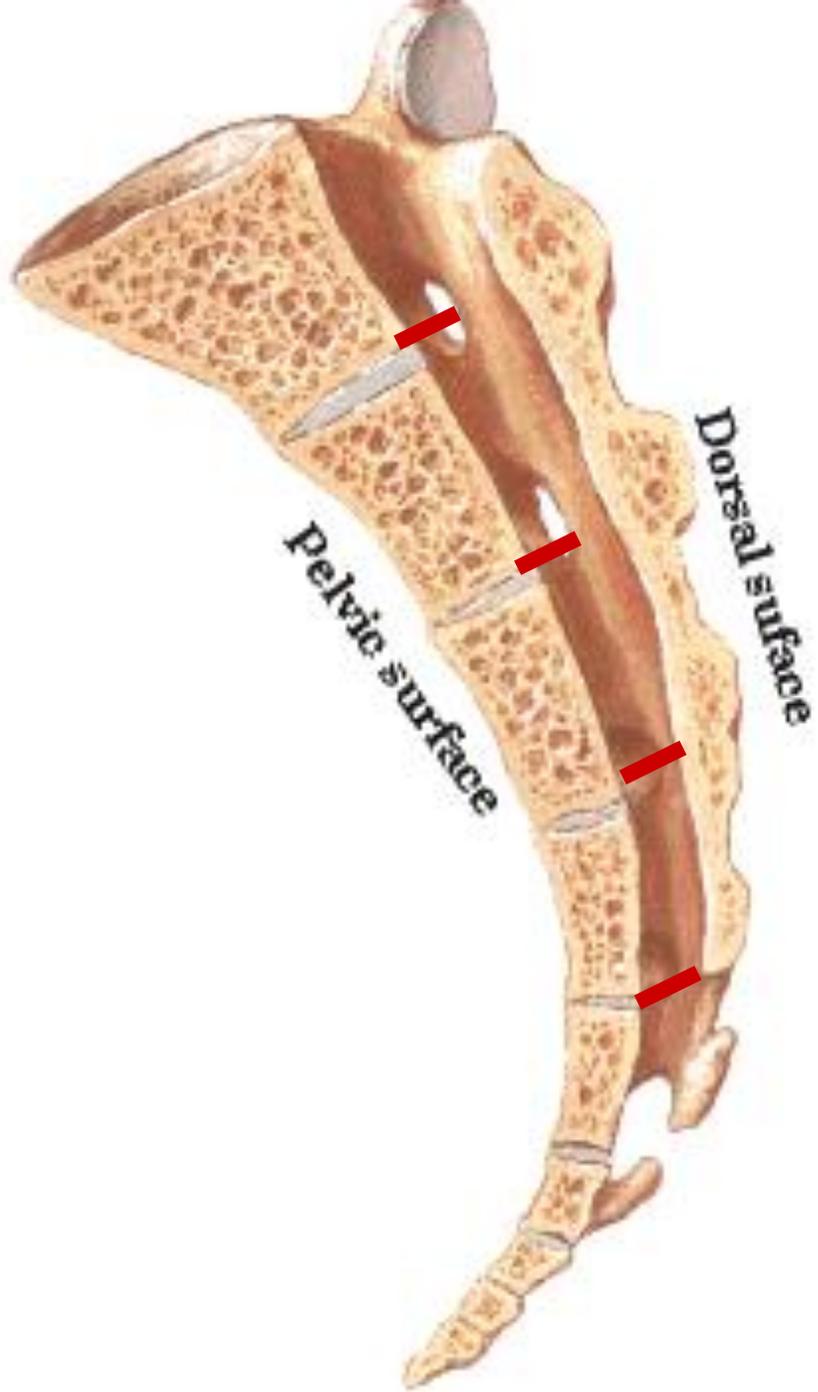
2. Lateral sacral artery

- Two arteries each one divides into two branches.
- The **four branches** pass through the **anterior sacral foramina.**
- supply the contents of the sacral canal then through the posterior sacral foramina to supply the muscles of the back.



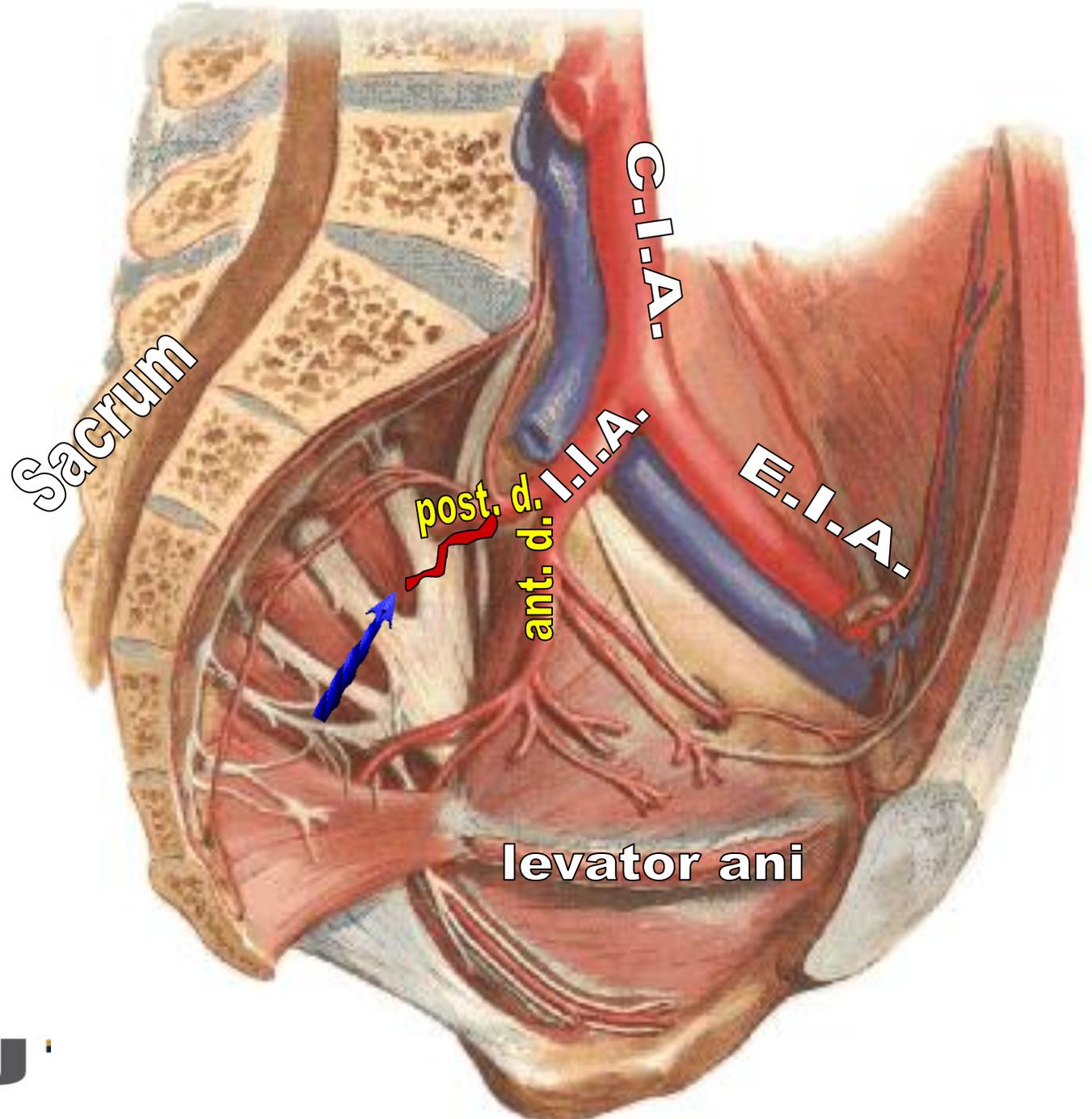
Dorsal Surface





3. Superior gluteal artery

- Is the **continuation of the posterior division.**
- Passes between the lumbosacral trunk and the first sacral nerve.
- Leaves the pelvis by **passing through the greater sciatic foramen** above the piriformis muscle to reach the gluteal muscles.
- Supplies the **gluteal muscles** .

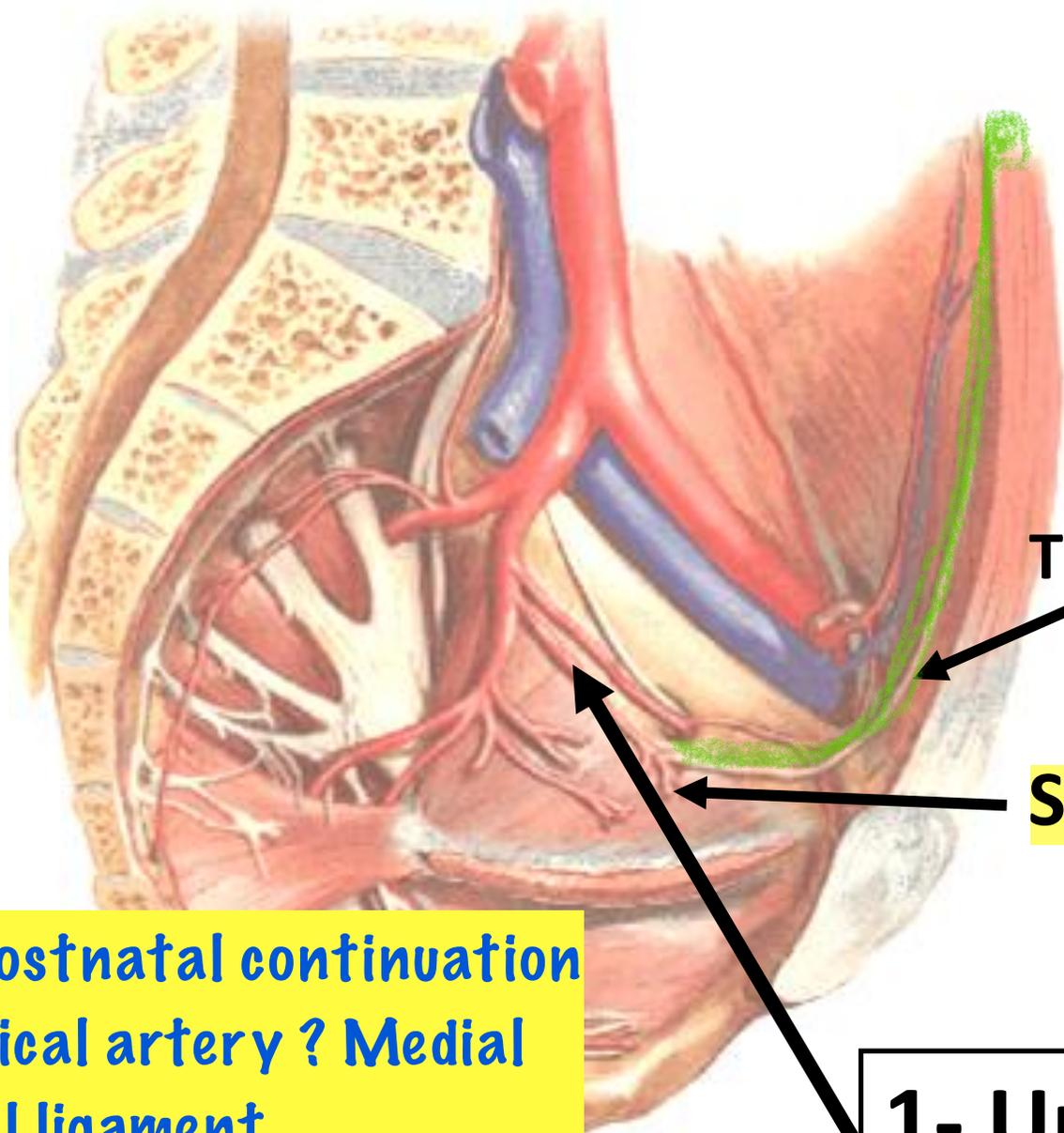




Branches of anterior division of internal iliac artery

الجزء دا OSPE





The Umbilicus

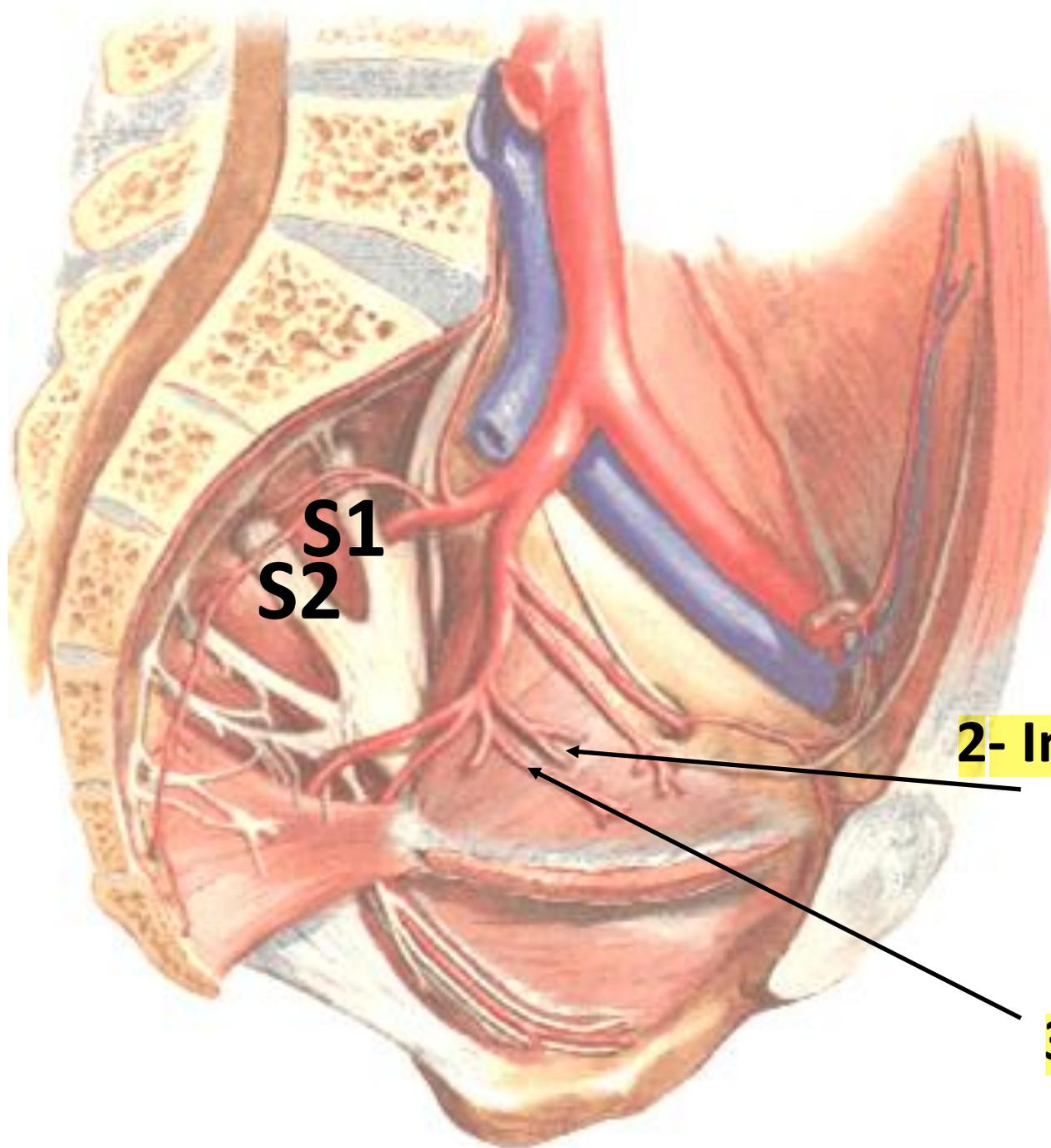


The medial Umbilical Lig.

Superior Vesical Artery

1- Umbilical Artery

MCQ : postnatal continuation of umbilical artery ? Medial umbilical ligament



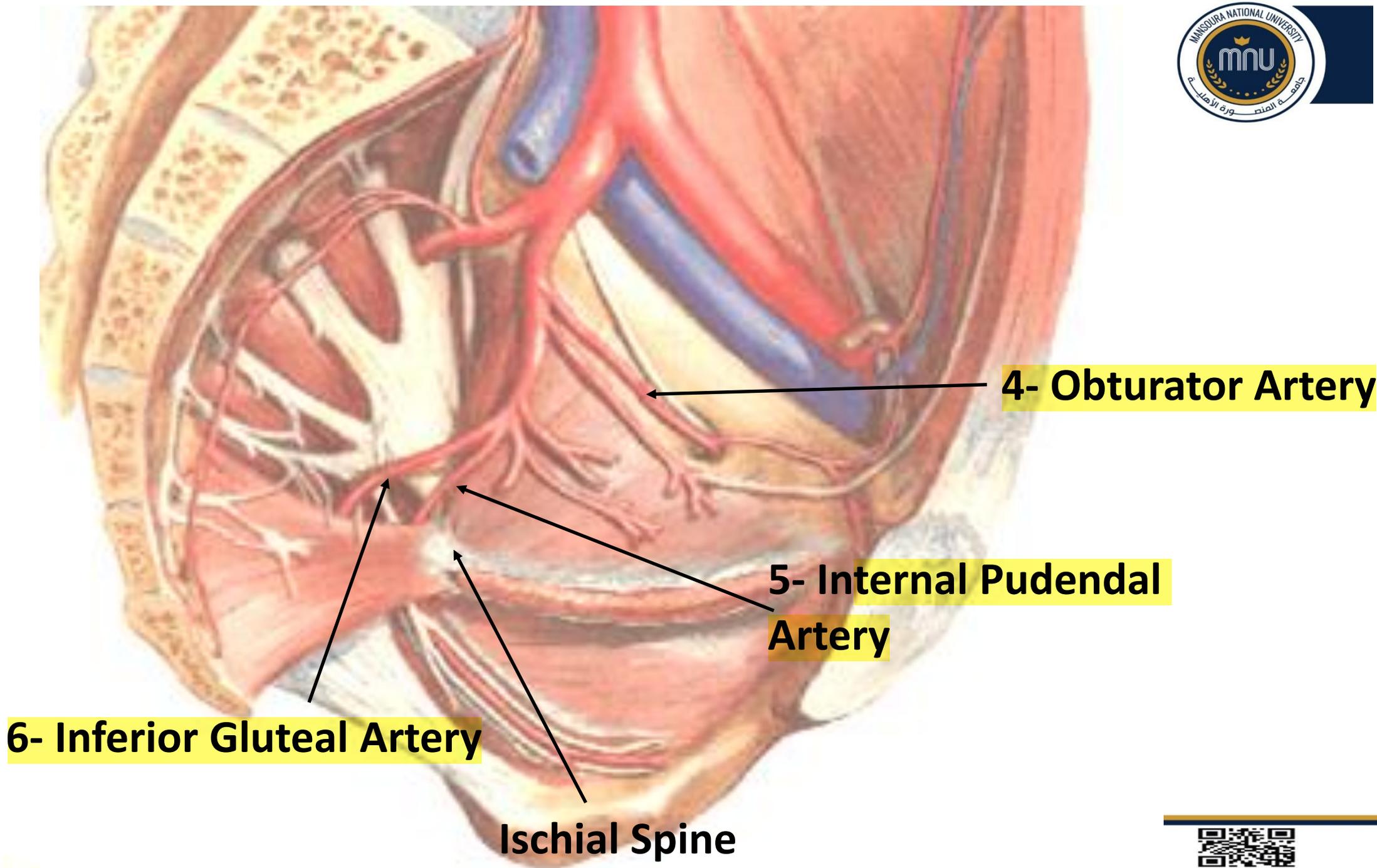
S1
S2

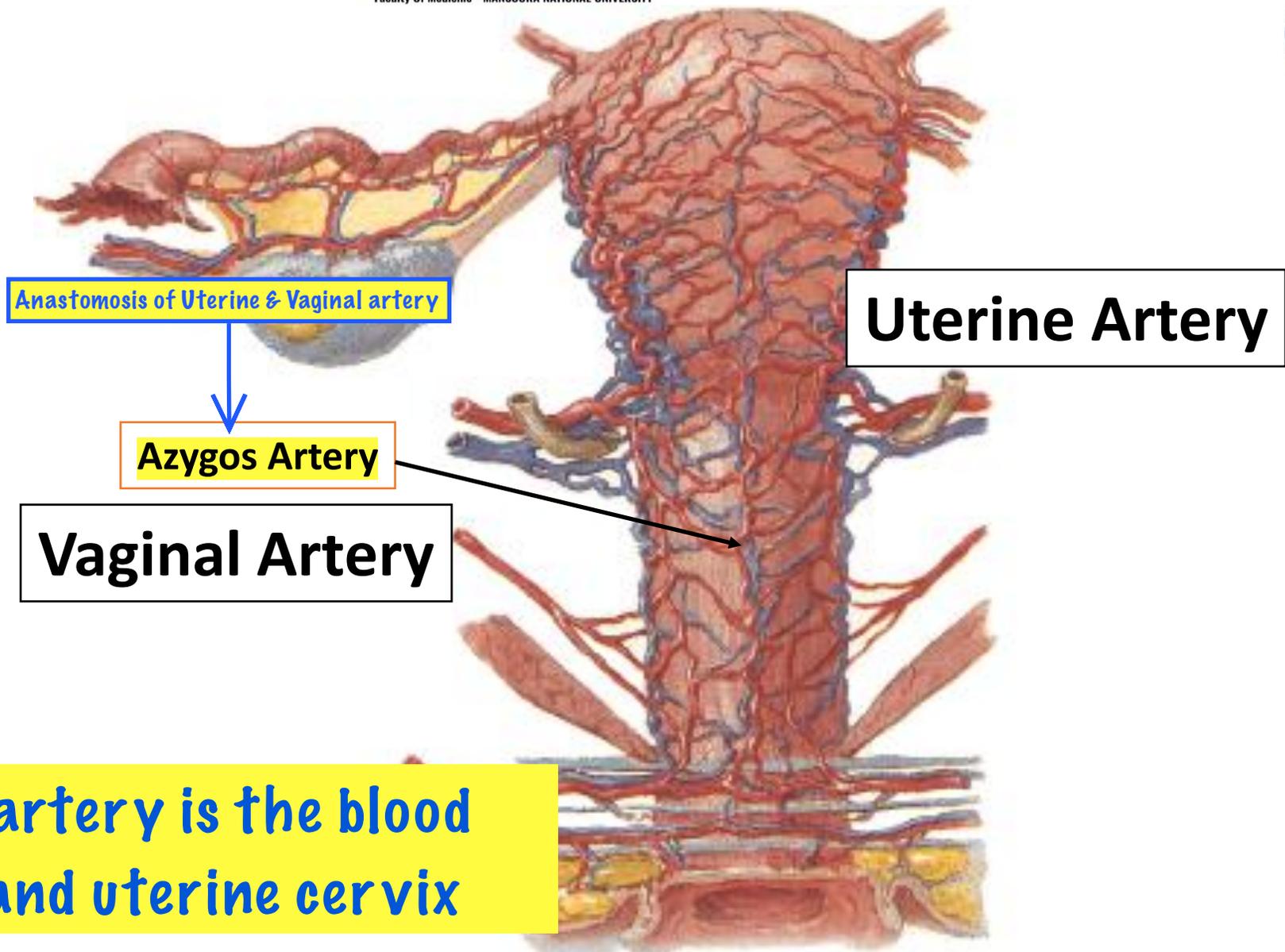
2- Vaginal Artery
(females only)

OR

2- Inferior Vesical Artery
(males only)

3- Middle Rectal





MCQ : The azygos artery is the blood supply of : Vagina and uterine cervix

Internal pudendal artery

Origin: It is a one of the two, terminal branches of anterior division of the internal iliac artery **MCQ**

Course: accompany the pudendal nerve

Branches

In female	In male
1. Inferior rectal artery	1. Inferior rectal artery
2. Two labial arteries	2. Two scrotal arteries.
3. Artery of the bulb of clitoris	3. Artery of the bulb of penis
4. Deep and dorsal arteries of clitoris	4. Deep and dorsal arteries of penis



2. Median Sacral Artery



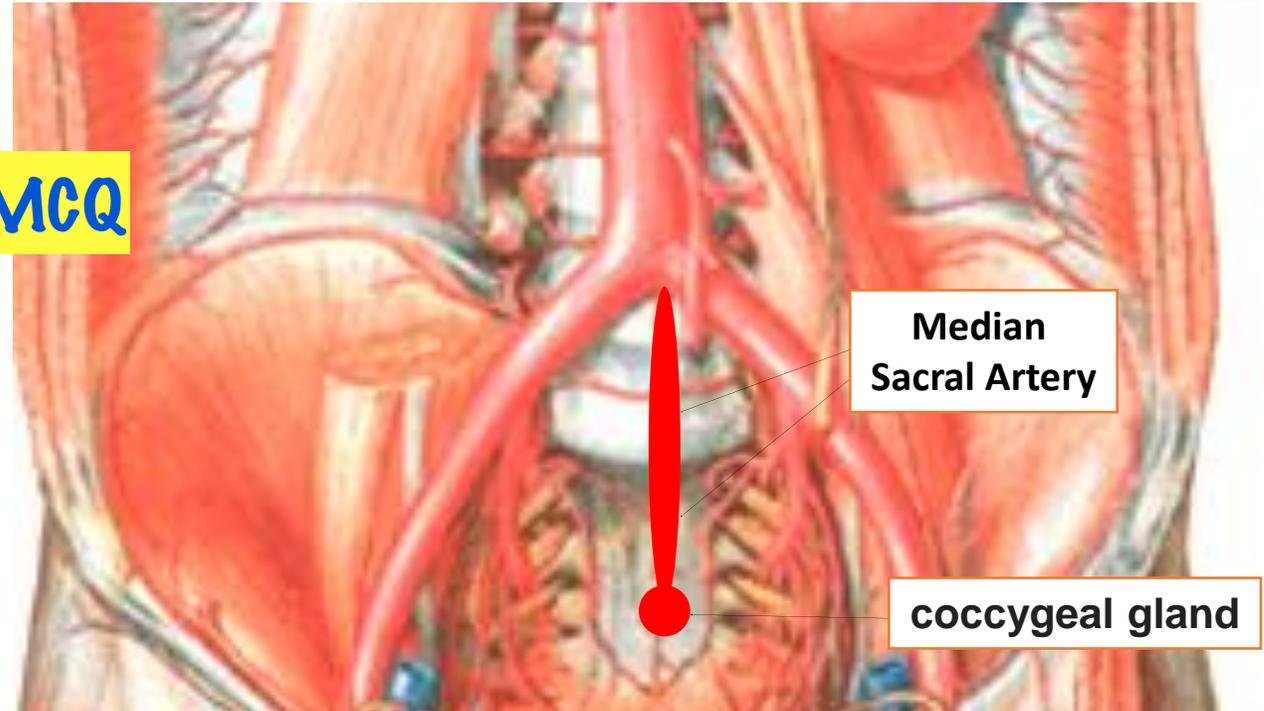
2. Median Sacral Artery

Origin: arises from the abdominal aorta at the level of the **third or fourth lumbar vertebra**. It descends in the middle line in front of the fourth and fifth lumbar vertebrae, the sacrum and coccyx,

Ending: in the **glomus coccygeum (coccygeal gland)**.

Supplies: coccyx, lumbar vertebrae, sacrum

MCQ



MCQ : Which of the following artery terminate as gland ? Median sacral artery

MCQ : Glomus coccygeum is the terminate of ? Median sacral artery

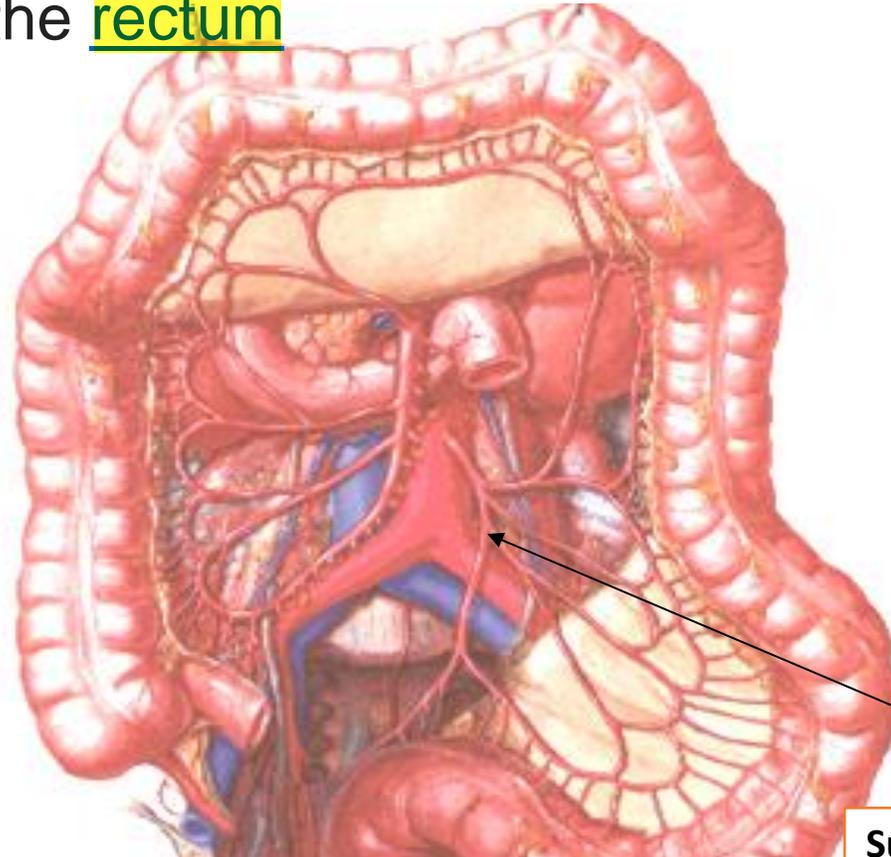


3. Superior Rectal Artery



3. Superior rectal artery

- **Origin:** is the continuation of the inferior mesenteric artery **MCQ**
- **supply:** blood to the rectum

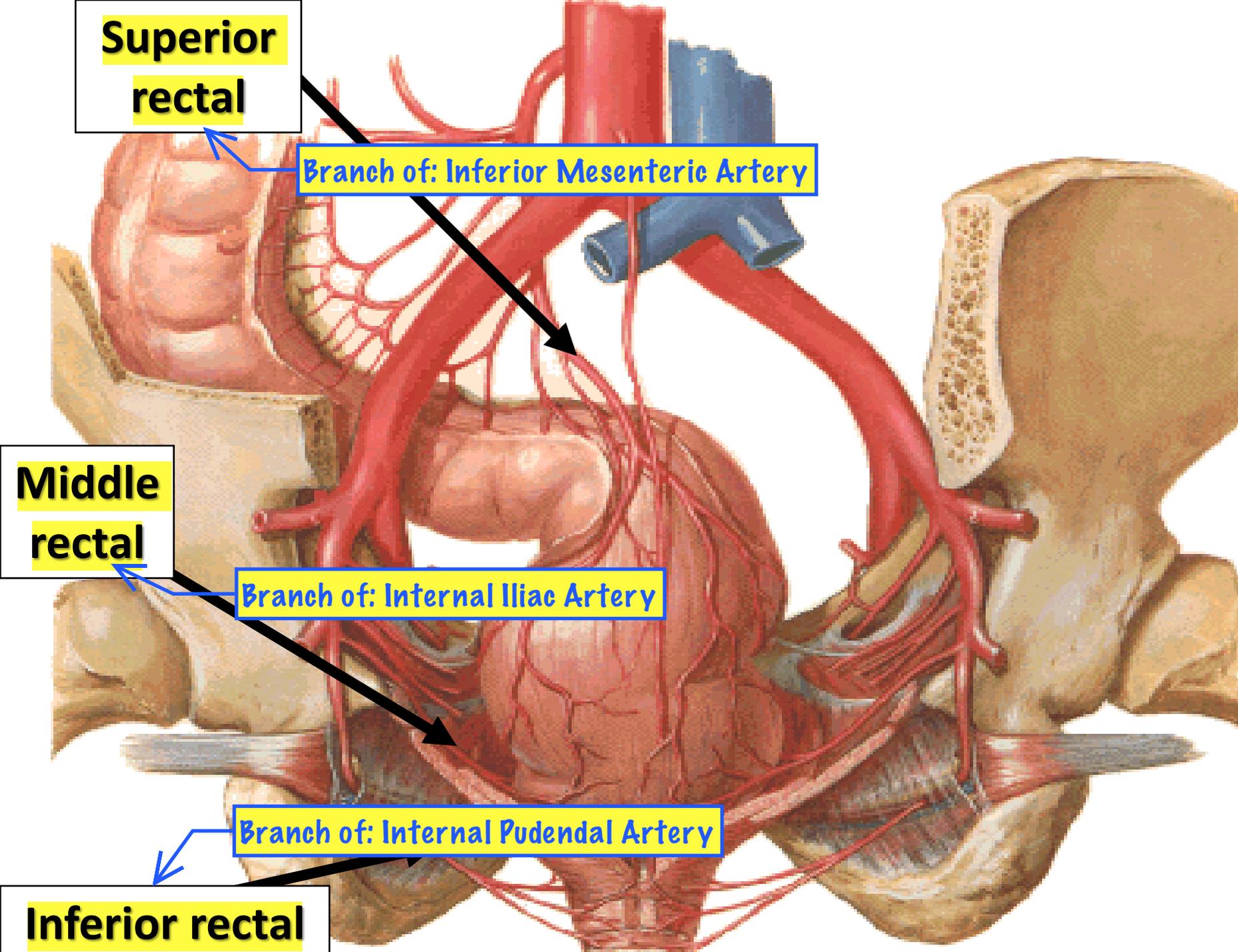


Superior Rectal Artery

SAQ : Enumerate blood supply of rectum ?

A) Superior rectal, middle rectal, inferior rectal







4. Ovarian Artery

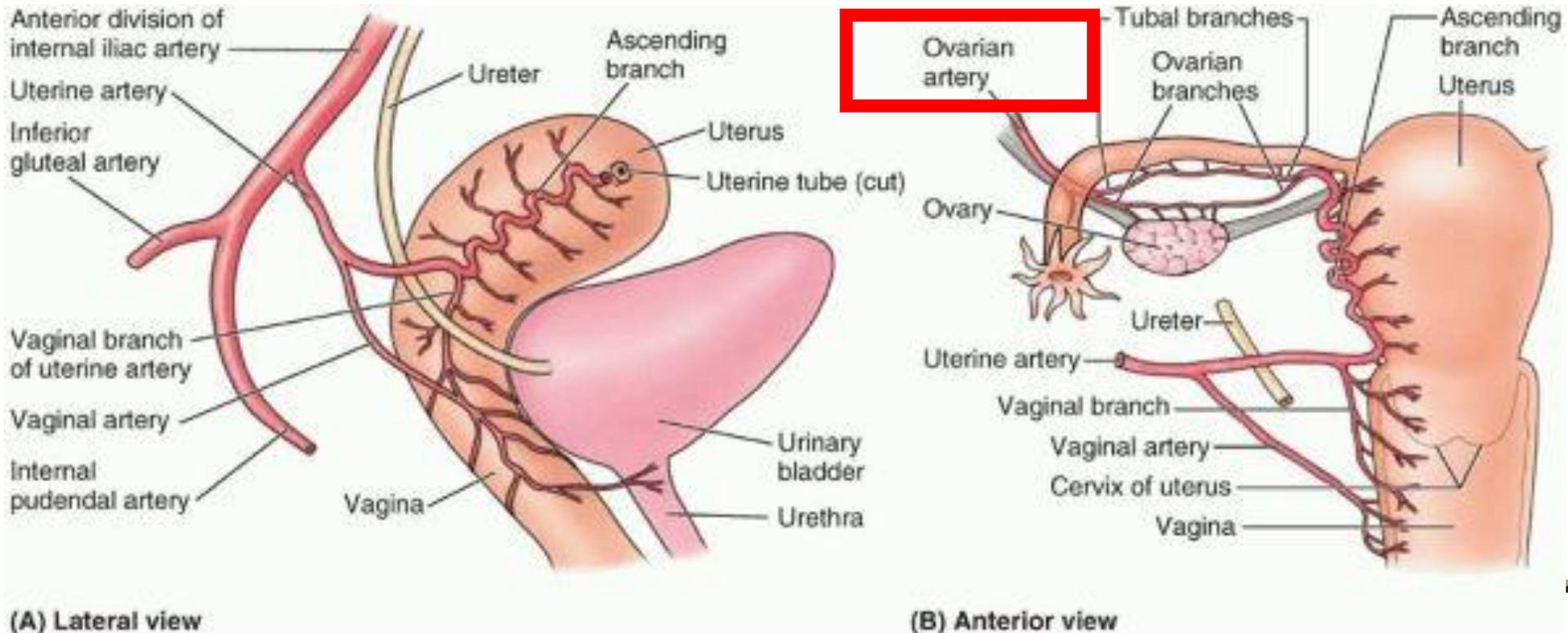


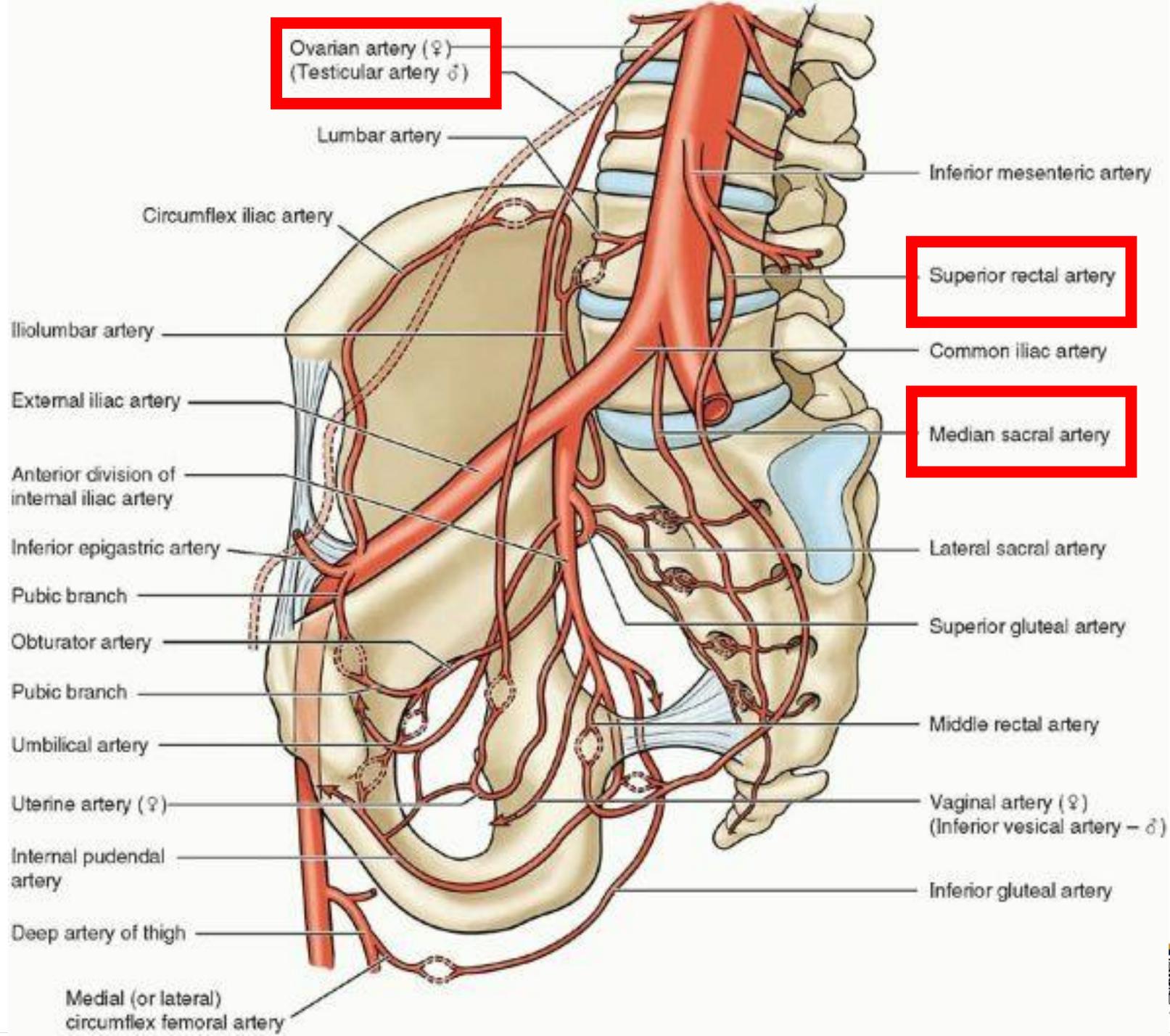
4. Ovarian artery

Origin: from the **abdominal aorta** below the renal artery. It can be found in the **suspensory ligament** of the ovary. **At the level of L2**

Branches: tubal branches of ovarian artery

Supplies: ovaries, uterus

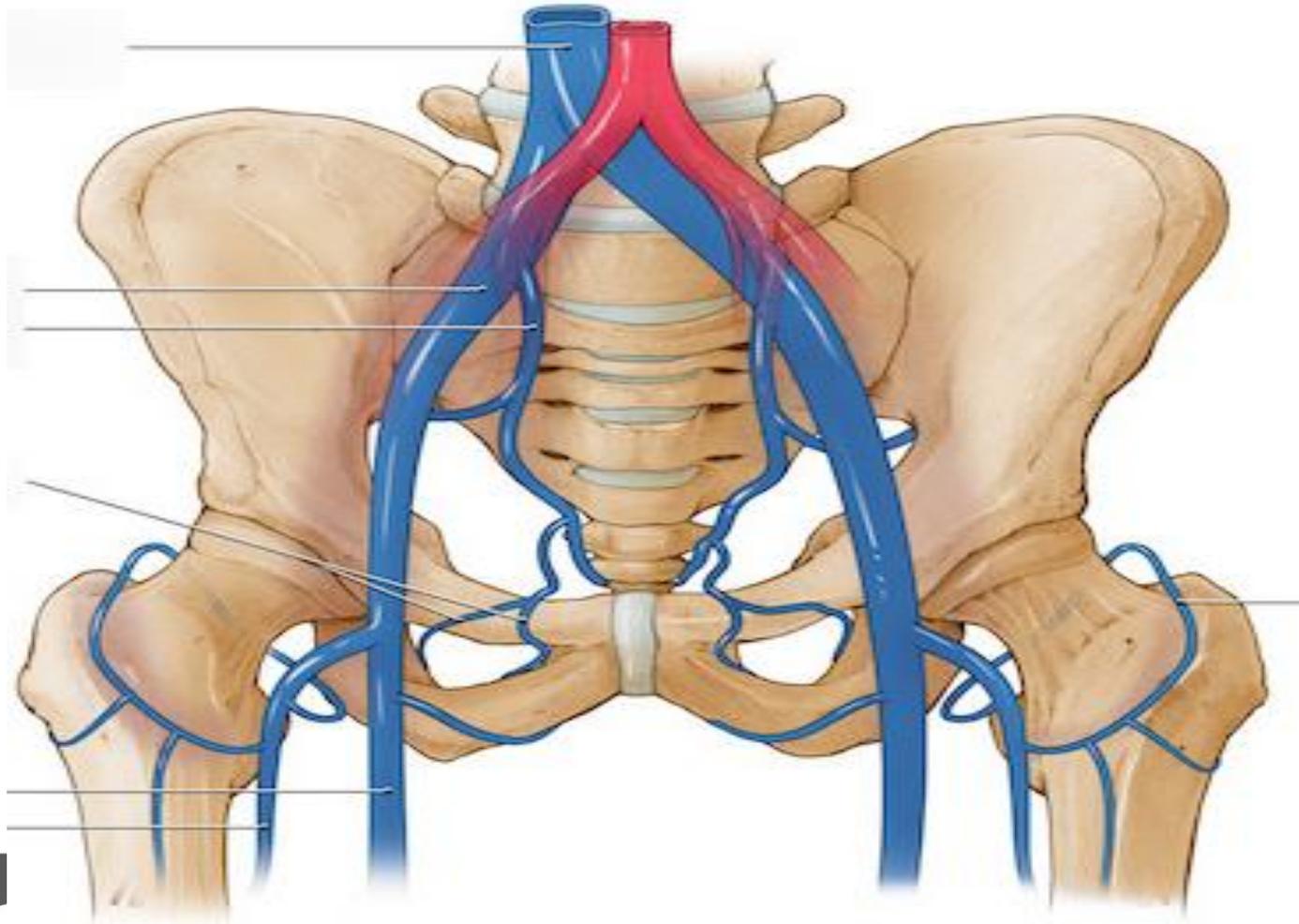






Veins of the Pelvis

Veins of the Pelvis



Veins of the Pelvis

اتأخذ قبل كذا .. ما يجيش منه إلا
MCQ واحد في السلايد الجاية

External iliac vein

Beginning: femoral veins

Main tributaries: inferior epigastric, deep circumflex iliac, pubic veins

Drains to: common iliac vein

Internal iliac vein

Beginning: deep veins of the pelvis and thigh

Tributaries: middle rectal, obturator, lateral sacral, inferior gluteal, superior gluteal veins

Drains to: common iliac vein

Common iliac vein

Beginning: internal and external iliac veins

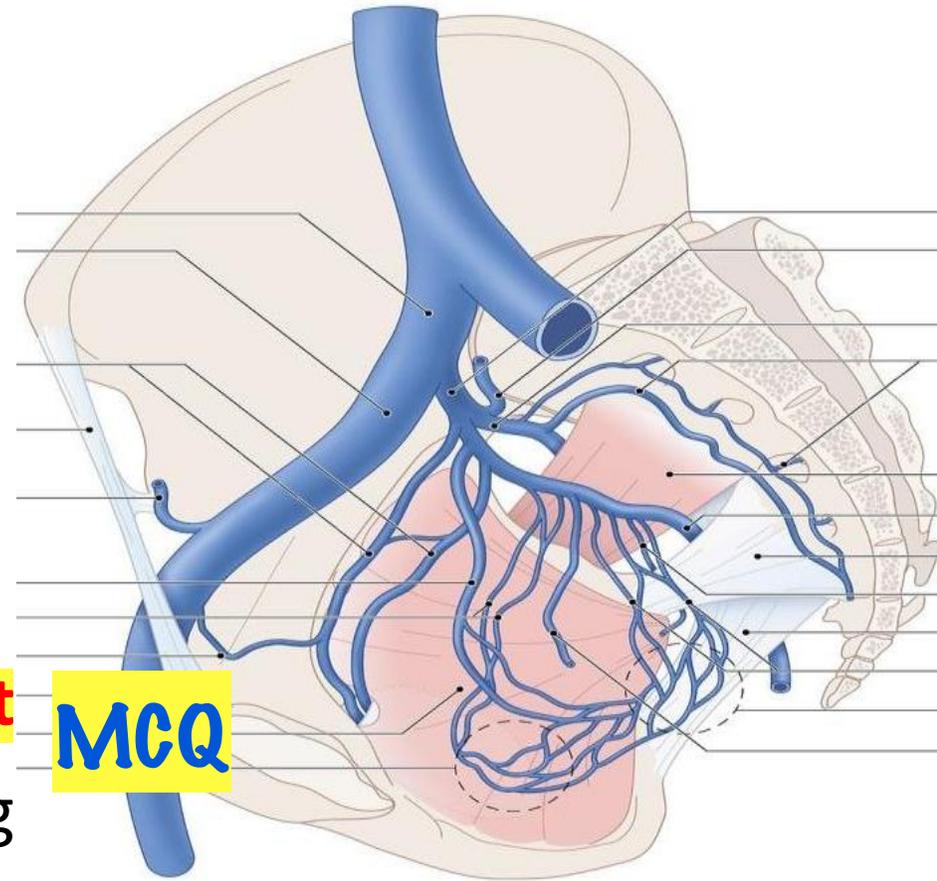
Tributaries: internal pudendal, median sacral veins

Drains to: inferior vena cava

The internal iliac vein

- runs upward lateral to the internal iliac artery and **joins the external iliac vein to form the common iliac vein.**
- Its **tributaries correspond to the branches of the internal iliac artery** except umbilical and lumbar veins which drain, respectively, into the portal and common iliac veins.

N.B The **superior gluteal vein** is the **largest tributary** of the internal iliac vein except during pregnancy when the uterine veins exceed its size greatly.



MCQ

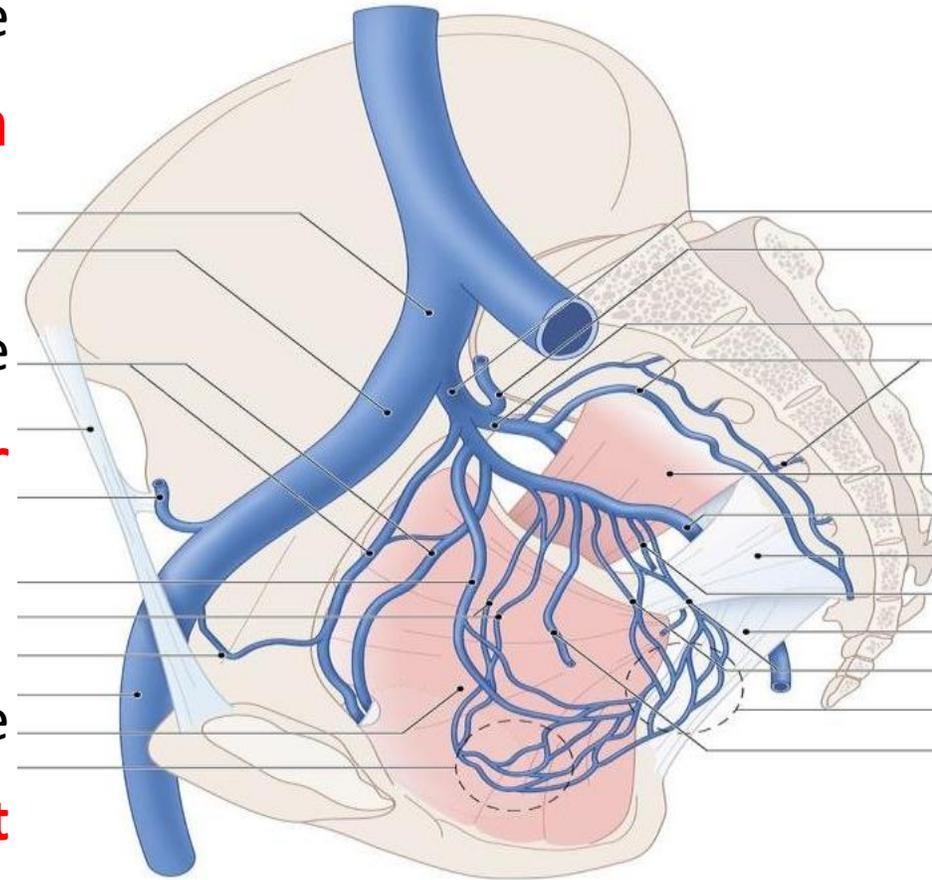
**MCQ : Which vessel is normally the largest tributary of the internal iliac vein ?
Superior gluteal vein**

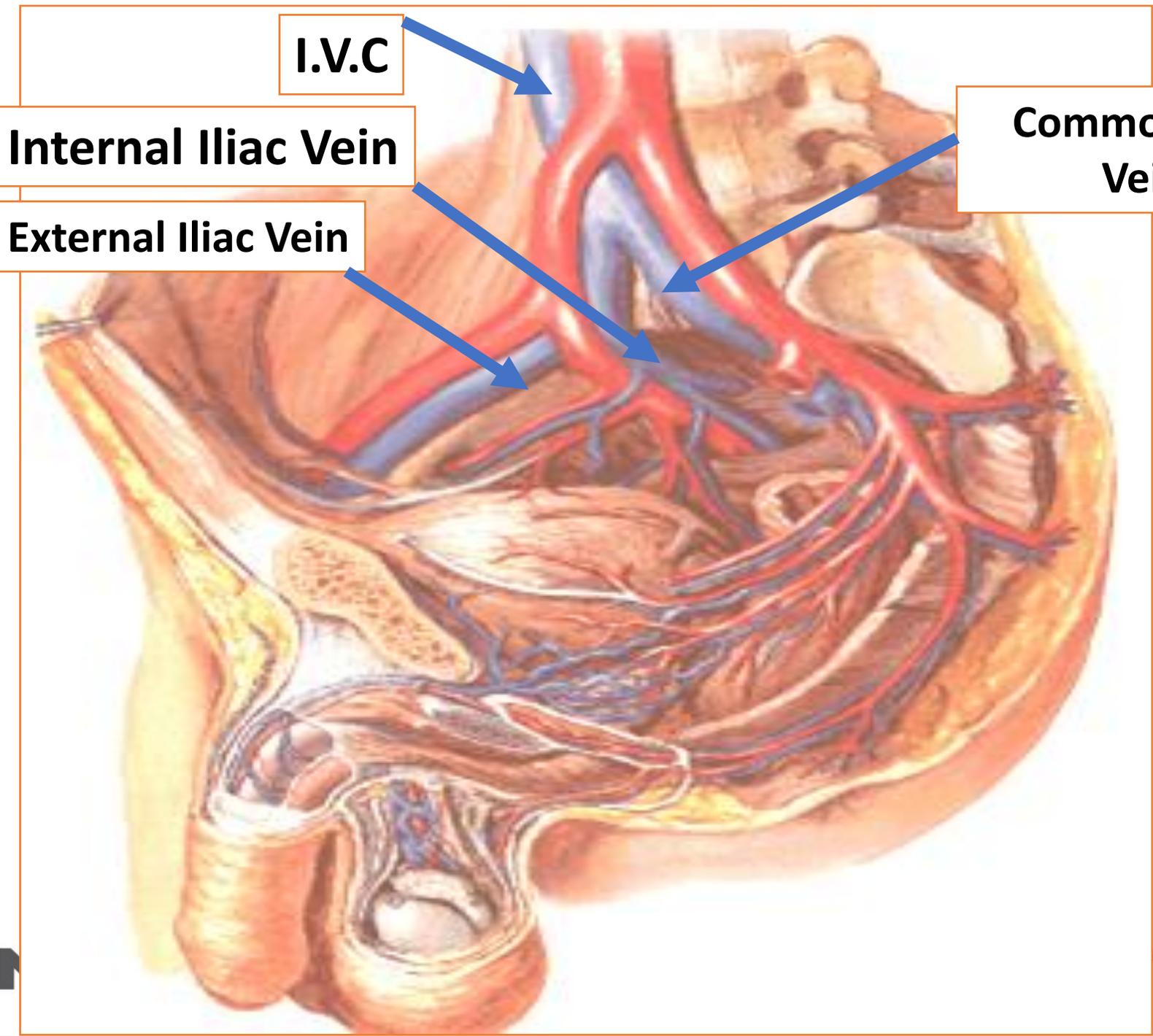
Other veins

A. The median sacral veins: accompany the median sacral artery and **terminate in the left common iliac vein.**

B. The superior rectal vein: accompanies the superior rectal artery to **become the inferior mesenteric vein**

C. The ovarian vein: condensation of the pampiniform plexus around the ovarian artery. On the **right side it drains into the inferior vena cava and on the left side into the left renal vein**



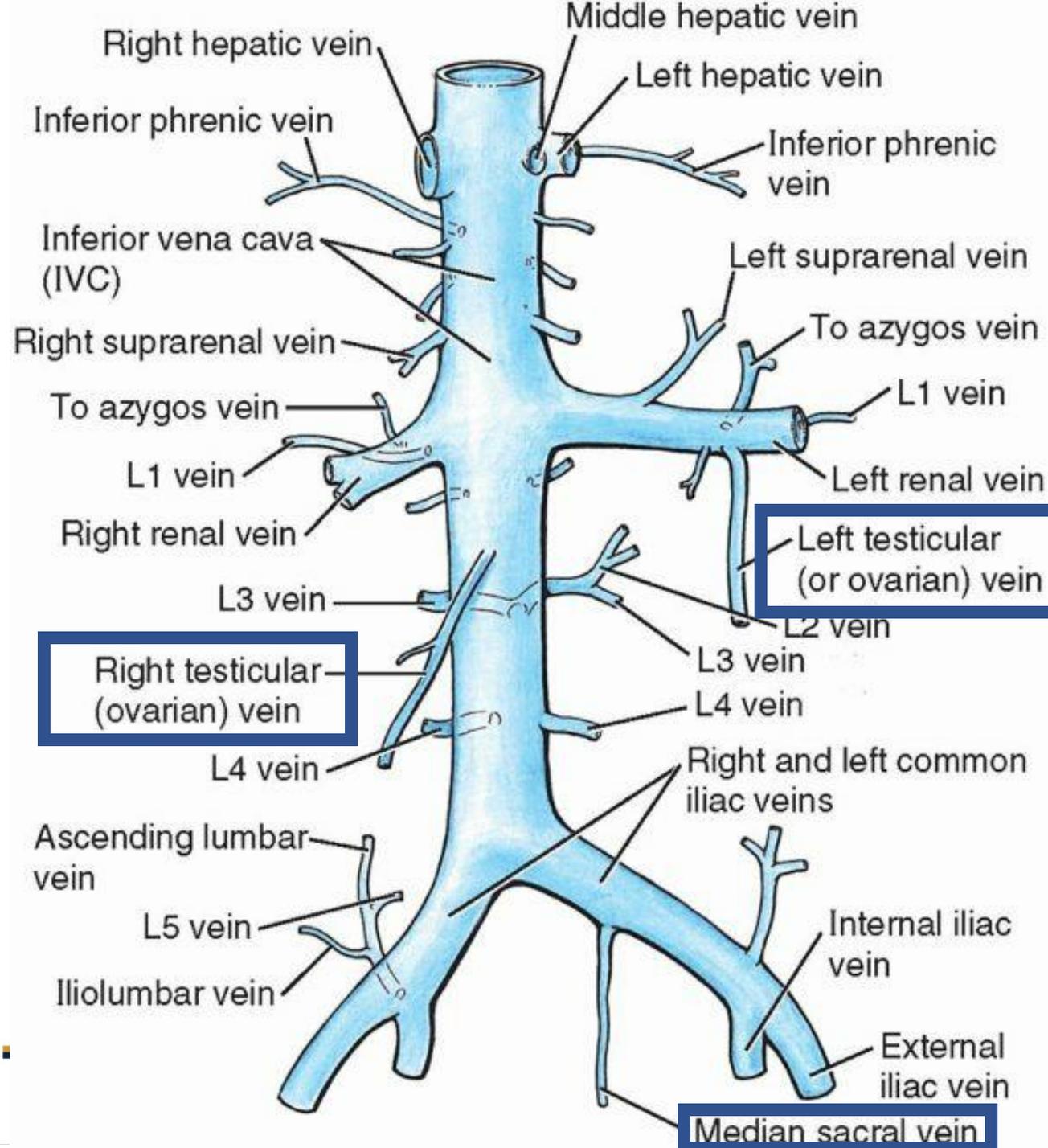


I.V.C

Internal Iliac Vein

External Iliac Vein

Common Iliac Vein



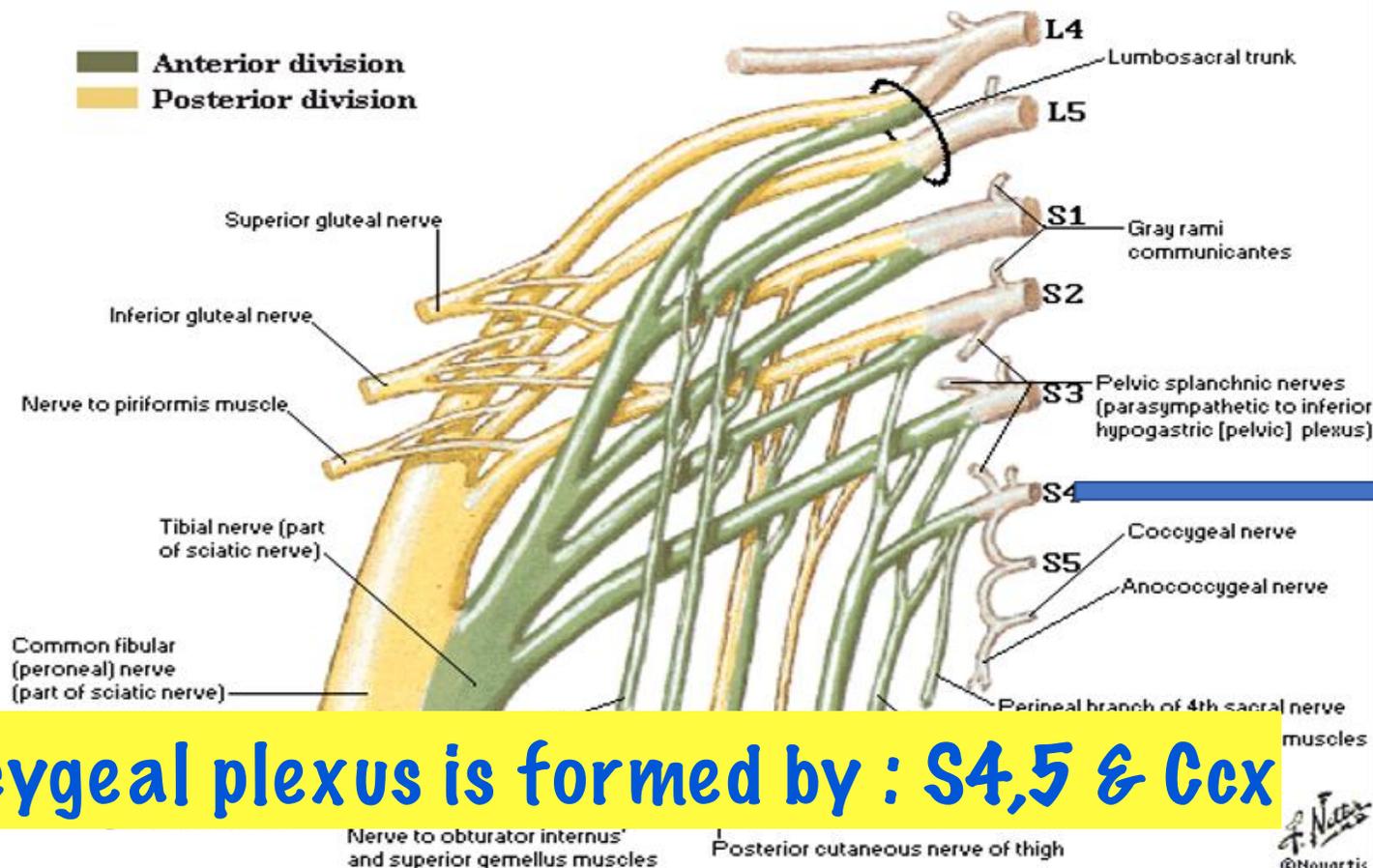


Nerves of the Pelvis



Somatic Nerves of the Pelvis

Sacral and Coccygeal Plexuses Schema



SACRAL

L4,5

MCQ

S1,2,3,4

Coccygeal

MCQ

S4,5

Ccx

MCQ : Coccygeal plexus is formed by : S4,5 & Ccx



Sacral Plexus

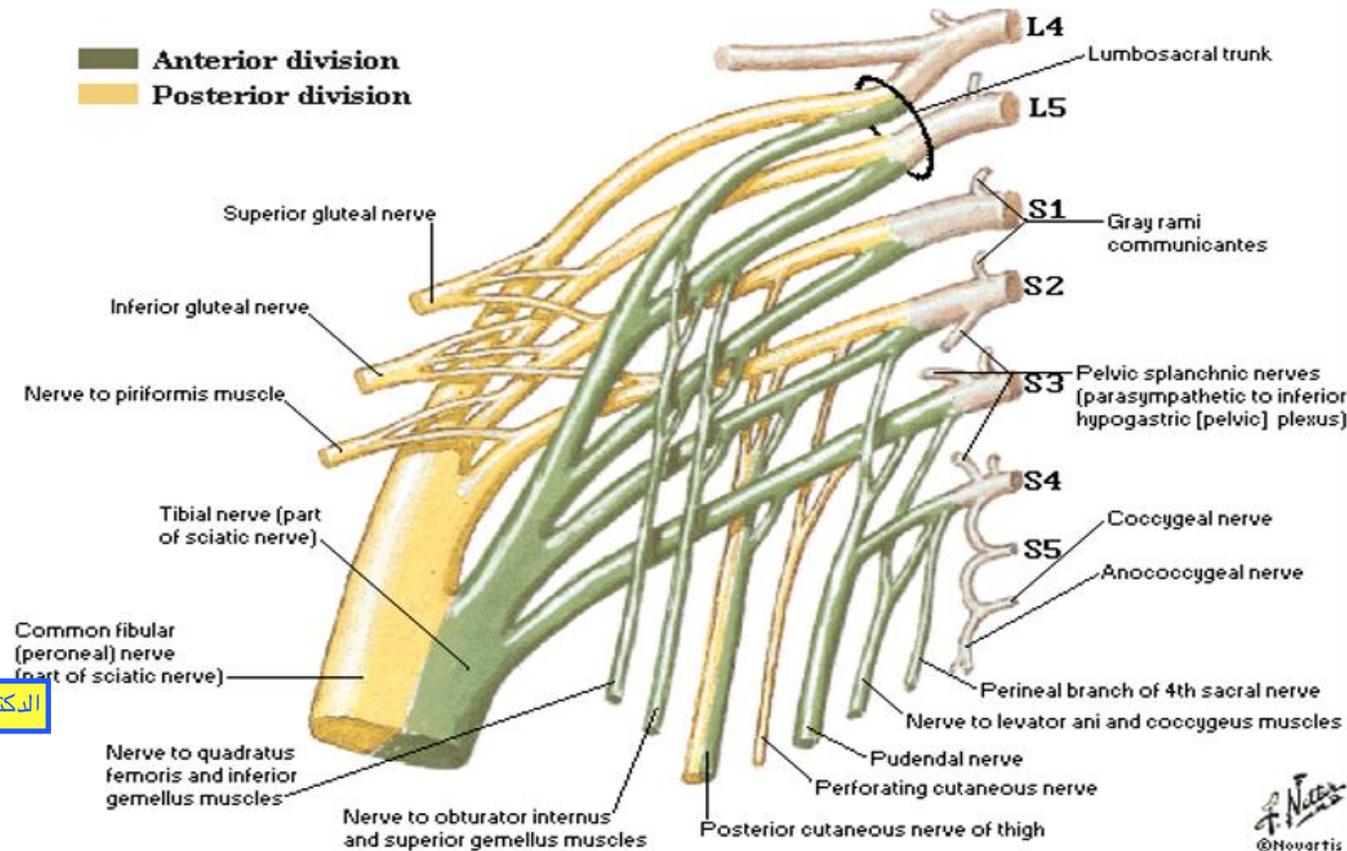
Sacral and Coccygeal Plexuses Schema

Formation

formed by the lumbosacral trunk (L 4, 5) and the ventral rami of S1-S4 sacral nerves

Termination: By dividing into two terminal branches (sciatic and internal pudendal nerves)

الدكتور قال ممكن نكتفي بـ pudendal nerve بدون internal



Branches of Sacral Plexus

Branches to the lower limb that leaves the pelvis through the greater sciatic foramen:

1. **The sciatic nerve:** the **largest nerve in the body** **MCQ**
2. **The superior gluteal nerve:** for gluteus medius , minimus & tensor fascia lata muscles.
3. **The inferior gluteal nerve:** for the gluteus maximus muscle.
4. **The nerve to the quadratus femoris muscle &** inferior gemellus muscle.
5. **The nerve to the obturator internus muscle &** superior gemellus muscle
6. **The posterior cutaneous nerve of the thigh:** for the skin of the buttock and the back of the thigh
7. **The perforating cutaneous nerve:** for the skin of the lower medial part of the buttock

يدوب نعرف ال sciatic nerve



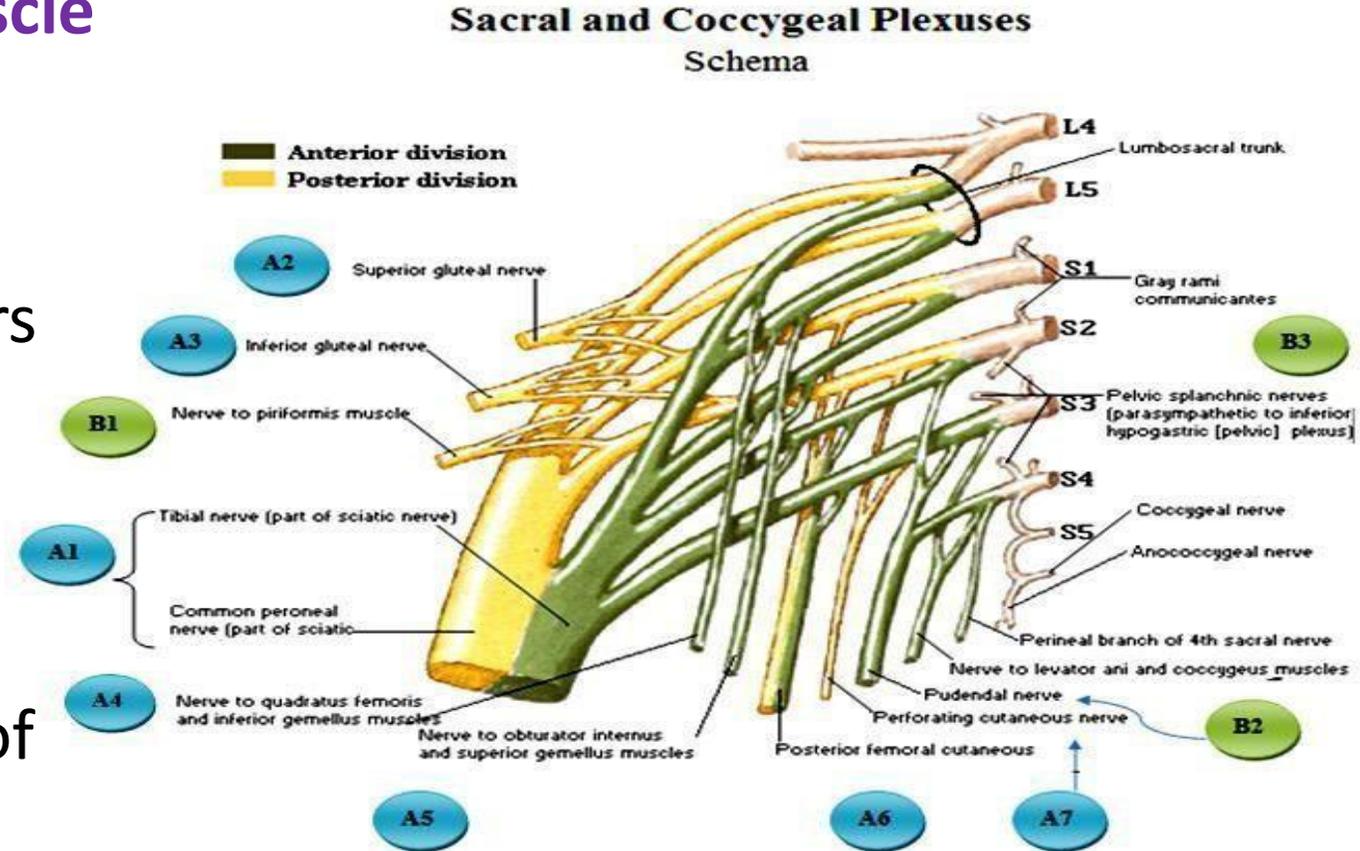
Nice to know وبقاقي السلايد

Branches to the pelvic muscles, pelvic viscera and perineum:

1. The nerves to the piriformis muscle

2. The **pudendal nerve**: which leaves the pelvis through the greater sciatic foramen and enters the perineum through the lesser sciatic foramen

3. The **pelvic splanchnic nerves**: which constitute the sacral part of the parasympathetic system



Pudendal nerve

Origin: It is a **one of the two terminal branches of the sacral plexus**

Course: it crosses the back of sacrospinous ligament to lesser sciatic foramen to enters the **pudendal canal** to end at the deep perineal pouch

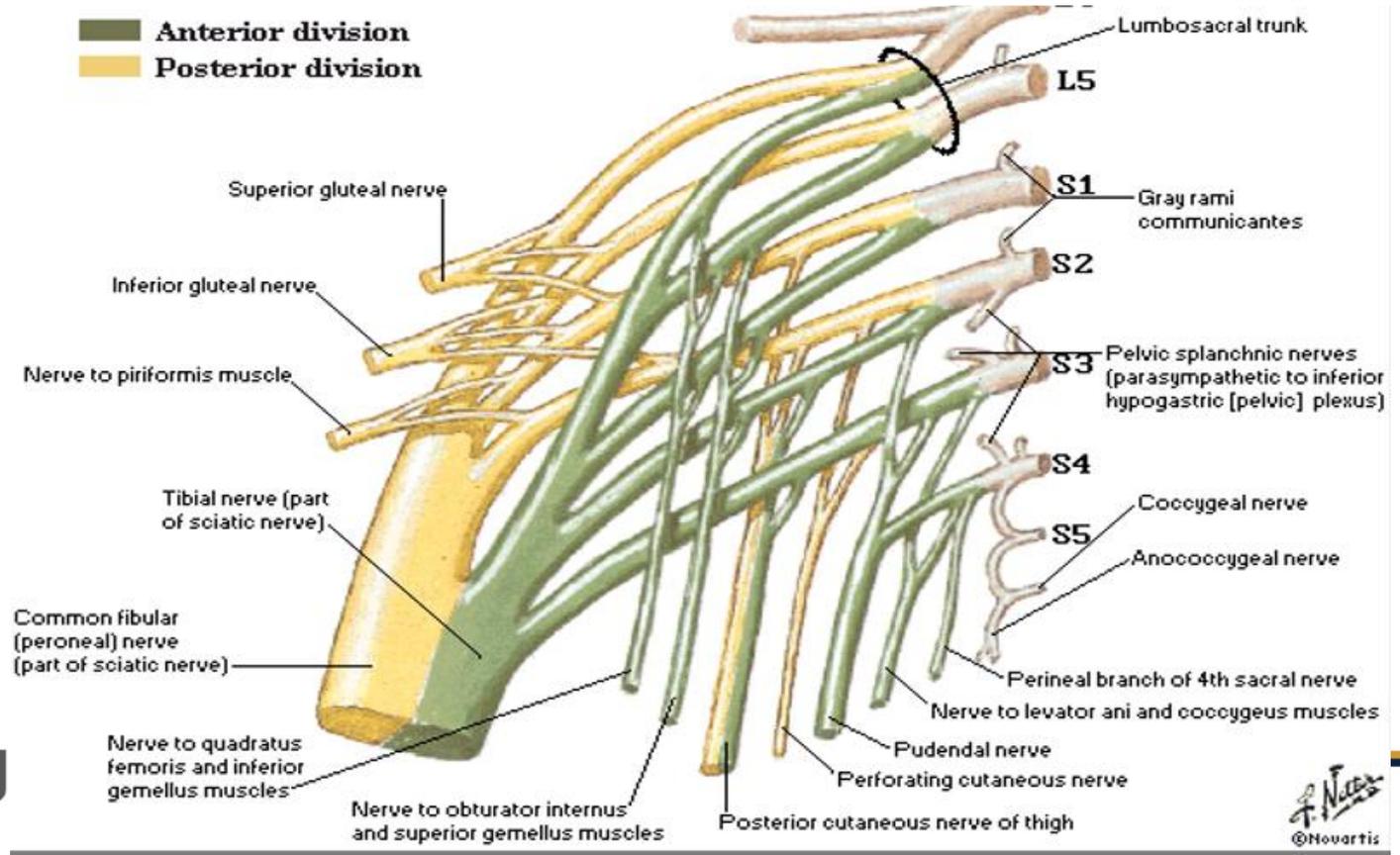
Branches:

1. Inferior rectal nerve: to levator ani and external anal sphincter.
2. Perineal nerve: to the skin of scrotum or labia majora.
3. Dorsal nerve of penis.

Coccygeal Plexus

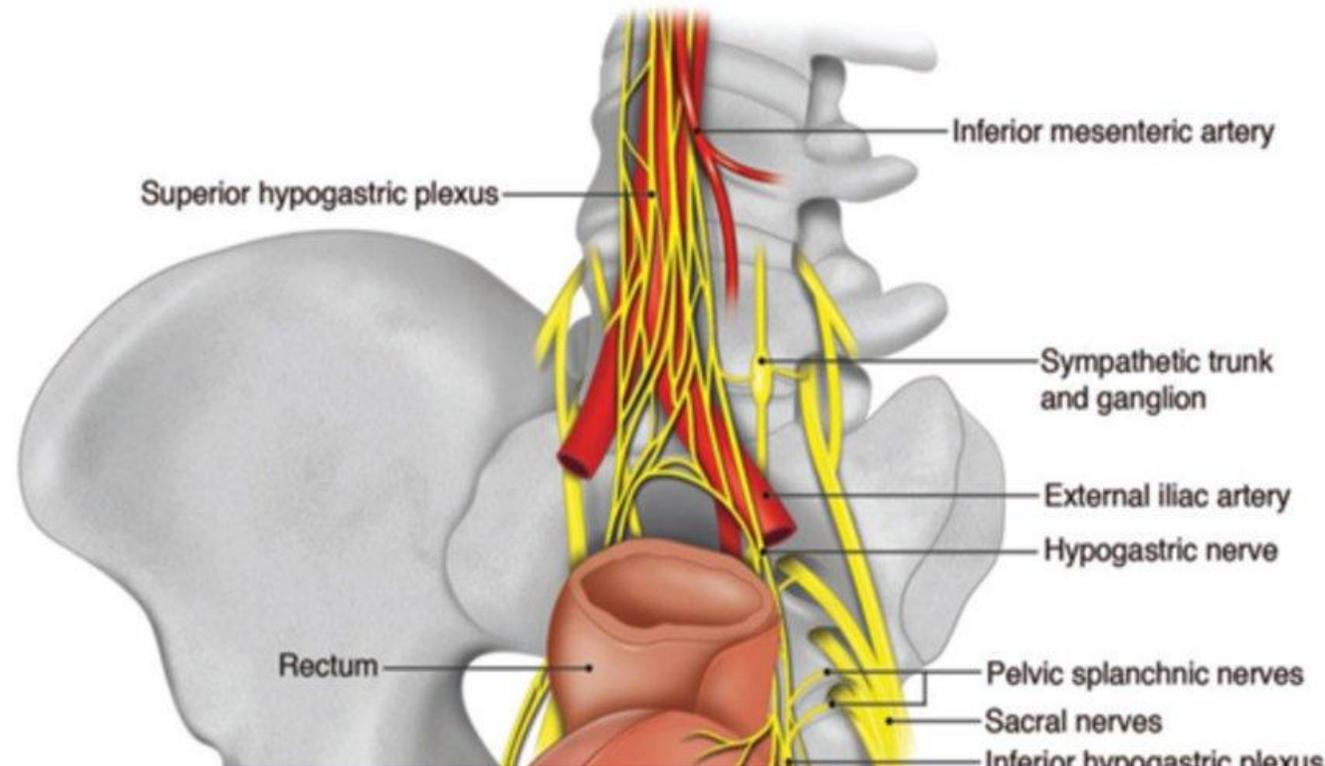
plexus, coccygeal	ventral primary rami of spinal nerves S4, S5, C1	anococcygeal n.	None	skin of the region overlying the coccyx
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الدكتور قال نعدلها ونكتب بدلها (zero) أو C0 أو Cox



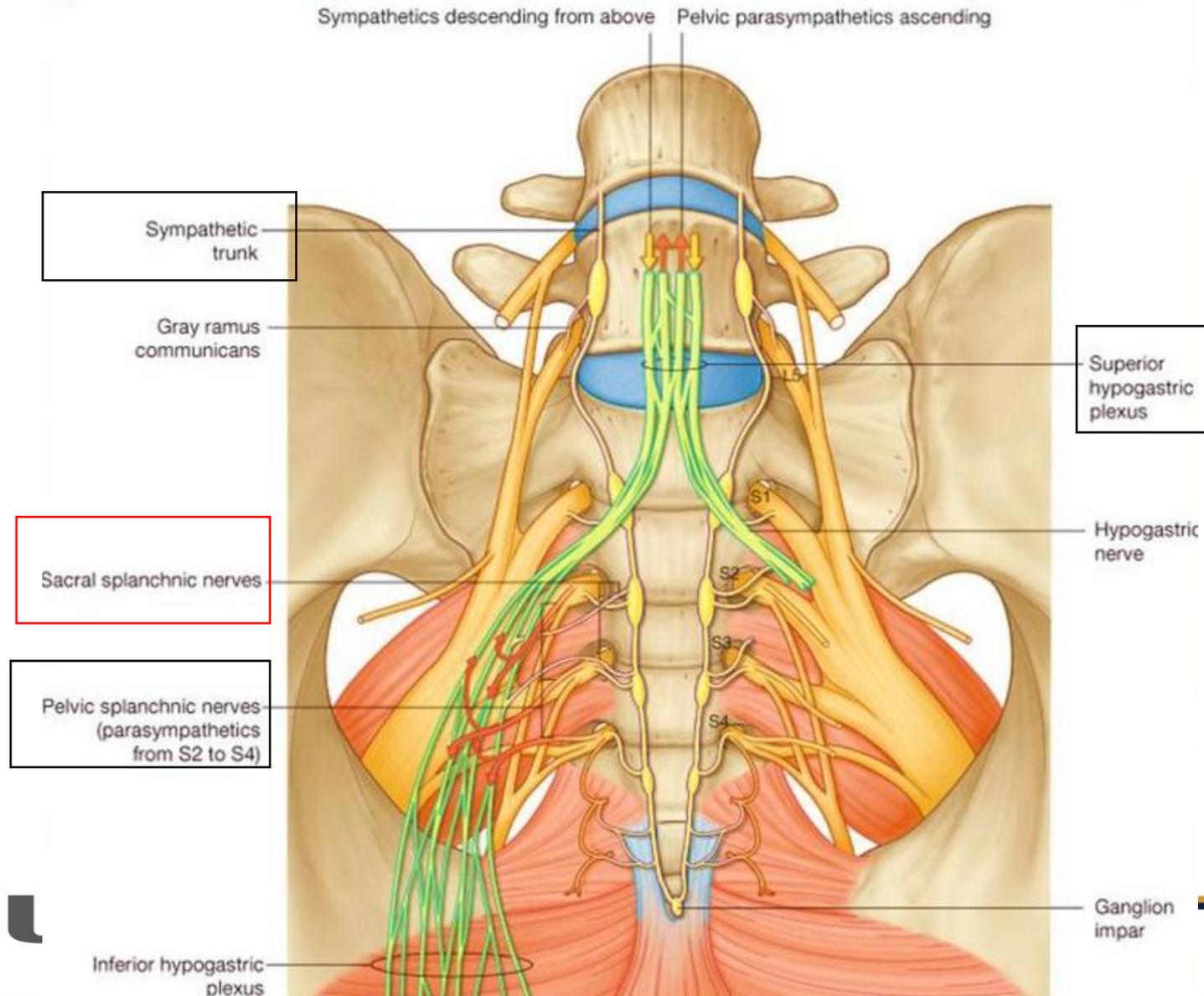
Autonomic Nerves of the Pelvis

- Represents the **sacral flow** of the **parasympathetic system** which **arises from S2, 3, 4.**
- Carry preganglionic parasympathetic fibers to the pelvic organs and the derivatives of the of the **hindgut** (left 1/3 of transverse colon, left colic flexure, descending colon, sigmoid colon, rectum and the upper part of the anal canal).
- Supply **vasodilator fibers to the erectile tissue** of the penis so known as **nervi erigentes.** **MCQ**



MCQ : The vasodilator fibers supplying the erectile tissue of the penis are known as: nervi erigentes

Autonomic Nerves of the abdomen & pelvis



2- Pelvic Part
of
Sympathetic
chain



Ganglion impar **MCQ**

3- Superior
Hypogastric Plexus
(sympatetic)

4- Inferior Hypogastric
Plexus
(sympatetic)

* Hypogastric = pelvic

1- Pelvic Splanchnic
Nerve
S 2, 3, 4
(Parasympathetic)

MCQ مهم : Ganglion impar belongs to which nervous system ? Sympathetic nervous system



Quiz 1

1. Roots of Sacral plexus

- A. L1,2,3
- B. L2,3,4
- C. L4,5 & S1-S4
- D. L5 & S1,2

The answer: C

Quiz 2

2. Inferior vesical artery

- A. Is a branch of external iliac artery
- B. Supply the urinary bladder of male & female
- C. Gives superior vesical arteries
- D. Is a branch of internal iliac artery

The answer: D



References

- 1. Independent learning from the Internet**
2. Sadler,T.W.:Langman's,MedicalEmbryologyWilliamsandWilkinsCo.,Baltimore,12thedition.Chapter2,P.21–24&P.29-30.
3. Sadler,T.W.:Langman's,MedicalEmbryologyWilliamsandWilkinsCo.,Baltimore,12thedition.Chapter2,P.24–27.



