

وسهلا



أهلا

يُمنع أخذ السلايدات بدون  
إذن المحرر واي اجراء  
يخالف ذلك يقع تحت طائلة  
المسؤولية القانونية  
جميع المعلومات للاستخدام  
التعليمي فقط

الأستاذ الدكتور يوسف حسين

رئيس قسم التشريح والأنسجة والأجنة

كلية الطب - جامعة مؤتة - الأردن

دكتورة من جامعة كولونيا المانيا

Prof. Dr. Youssef Hussein Anatomy - YouTube

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# Anatomy of Kidney

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Upper pole

Lateral border

Anterior surface

Lower pole

**\*\* Size;** 12 cm long, 6 cm wide, 3 cm thick.

**\*\* Position:** kidneys lie behind the peritoneum of the posterior abdominal wall.

**\*\* Weight,** 150 gm in male and 135 gm in females.

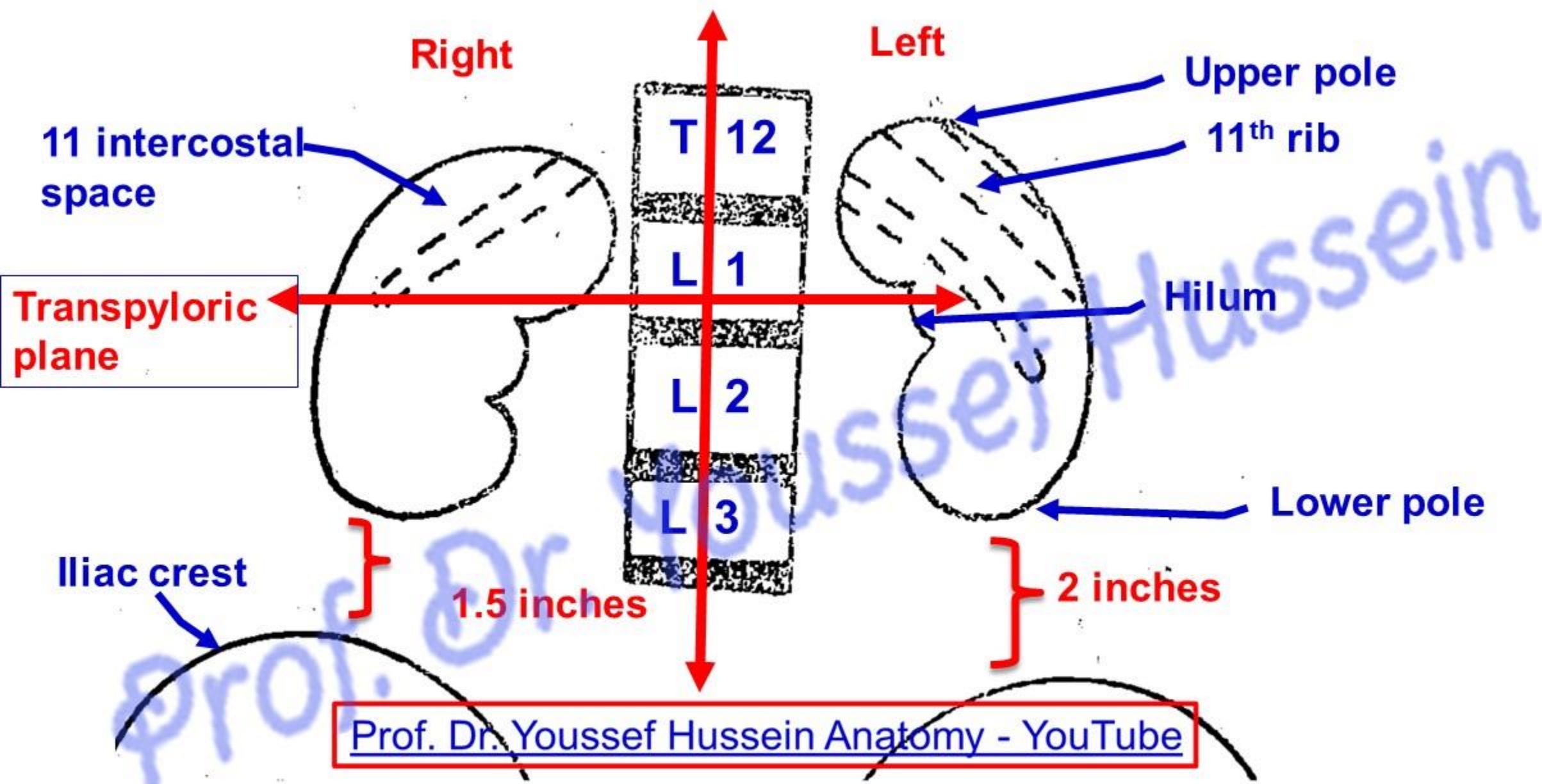
Renal artery

Renal vein

Pelvis of ureter

Medial border

**Hilum** in middle of medial border at level of **transpyloric plane (L1)**



**Surface anatomy of kidneys (anterior)**



## • Surface anatomy of Anterior surface of the kidney

- The left kidney is higher than the right kidney because the large size of right lobe of liver.

**1- The upper pole** is one inch from the median plane.

a- The left kidney reaches the 11<sup>th</sup> rib.

b- The right kidney reaches 11<sup>th</sup> intercostals space.

**2- The hilum;** is 2 Inches from the median plane.

a- The left kidney lies above the transpyloric plane.

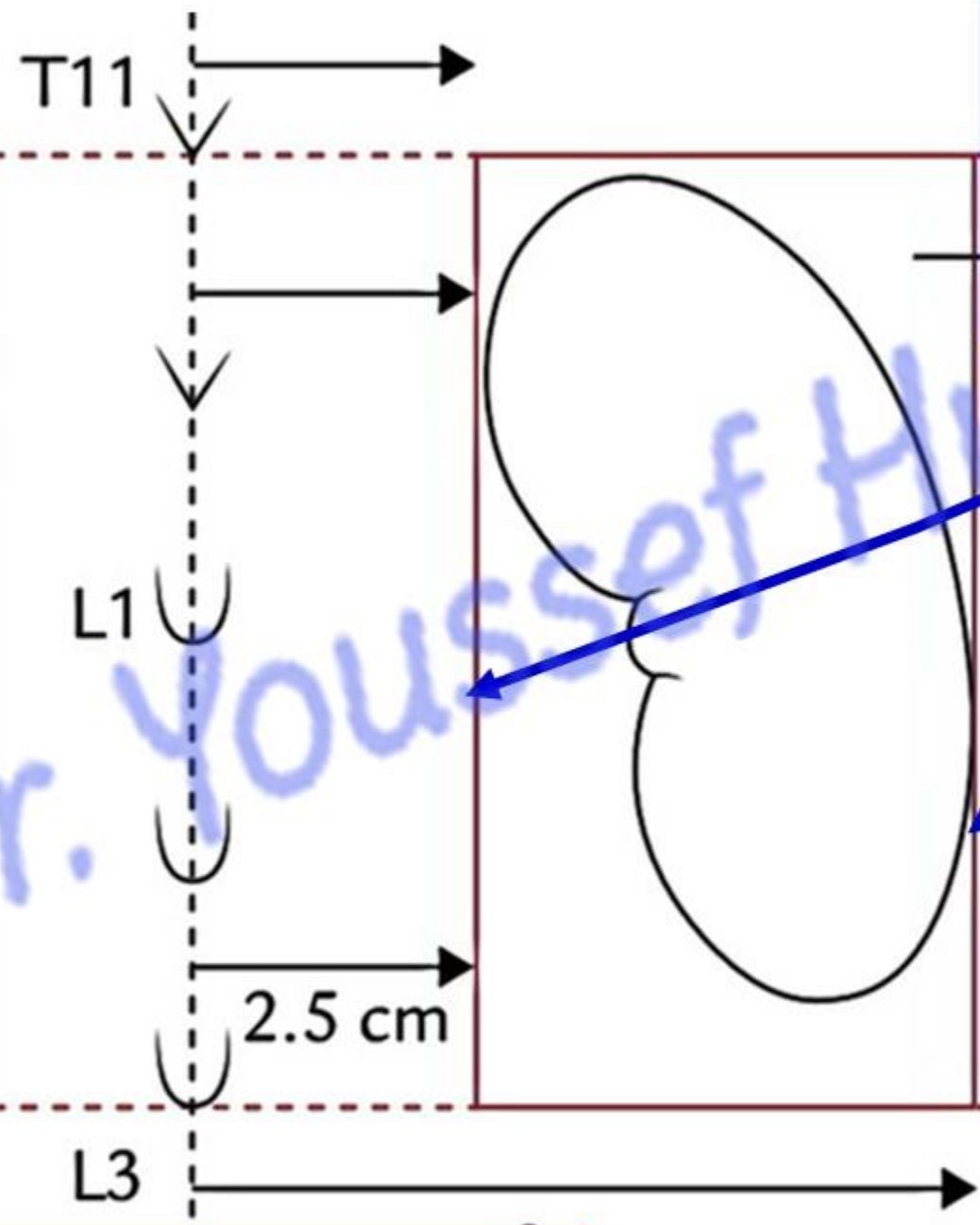
b- The right kidney lies below the transpyloric plane.

**3- The lower pole** is 3 inches from the median plane.

a- The left kidney lies 2 inches above the iliac crest.

b- The right kidney lies 1.5 inches above the iliac crest

Upper horizontal line at T 11



**Morris's parallelogram**  
**Surface anatomy of kidneys (posterior)**

Medial vertical line at 2.5 cm from median plane

Lateral vertical line at 9 cm from median plane

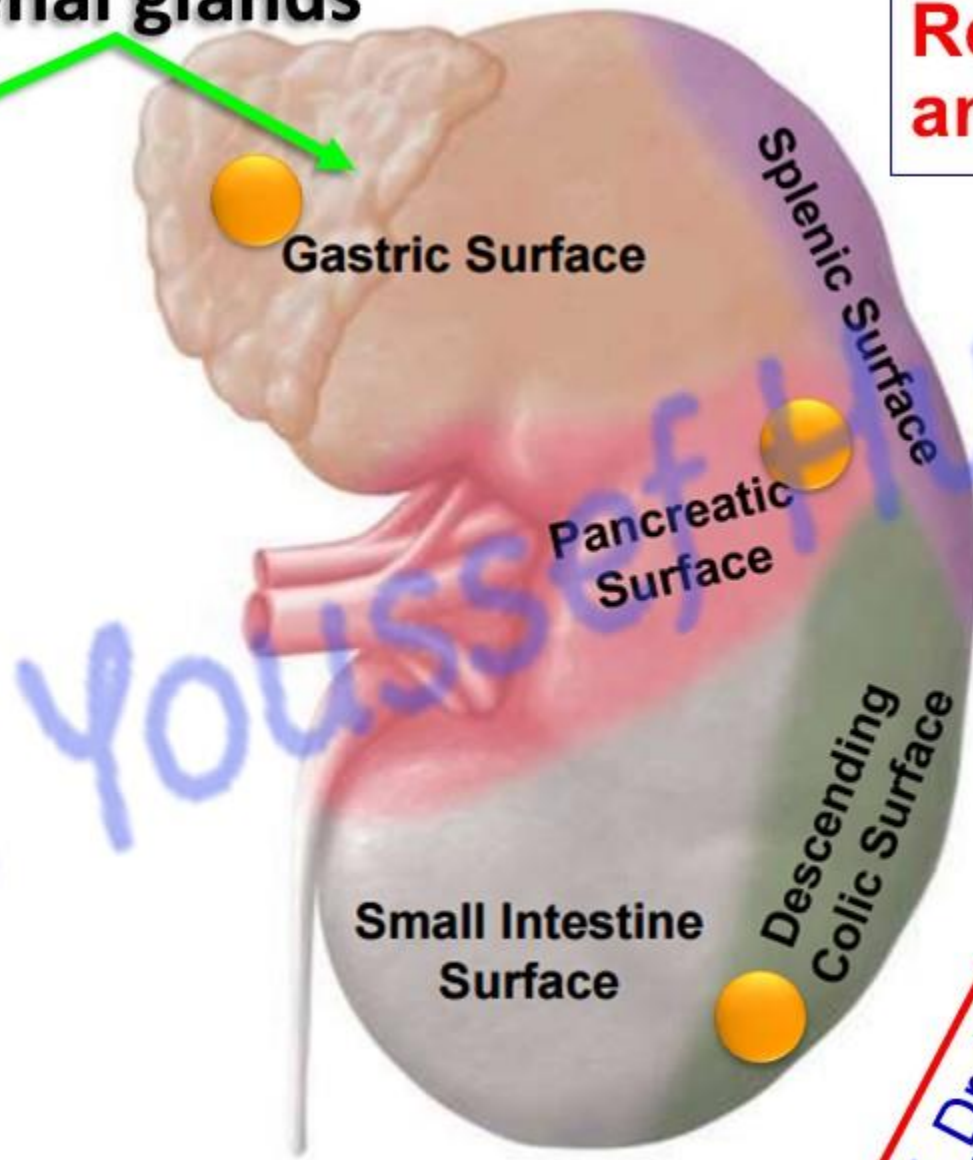
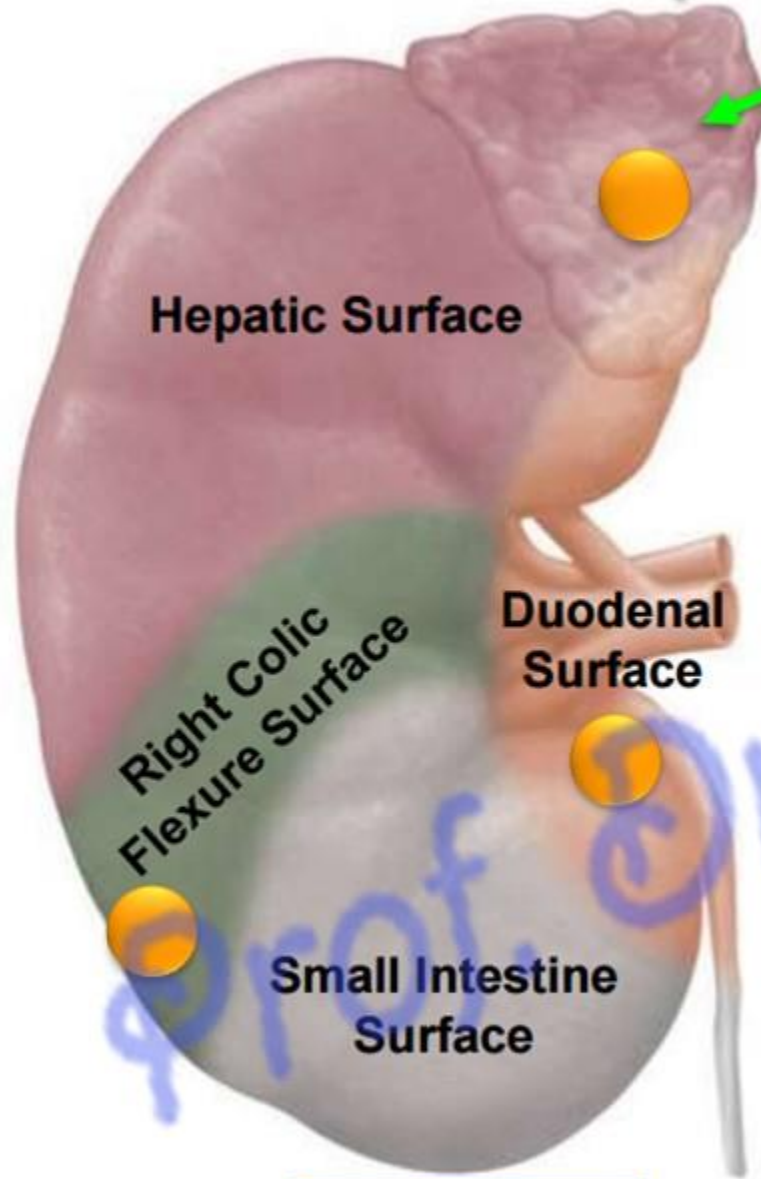
Lower horizontal line at L3



# Relations of Kidney

# Suprarenal glands

**Relations of the anterior surface**



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•\*\* **Relations of the Anterior surface of the right kidney**

**1- Right suprarenal gland:** related to the upper medial part.

**2- Right lobe of the liver:** related to the upper lateral part.

**3- Second part of the duodenum:** in front of the hilum.

**4- Coils of small Intestine:** related to the lower medial part.

**5- Right colic flexure:** related to the lower lateral part.

**\*\* Peritoneal covering;** anterior surface covered by peritoneum **except (bare areas):**

1) Right suprarenal gland.

2) 2nd part of the duodenum.

3) Right colic flexure.

## **\*\* Relations of the Anterior surface of the left kidney**

**1- Left suprarenal gland:** related to the upper medial part.

**2- Spleen:** related to the upper lateral part.

**3- Body of pancreas and splenic vessels:** related to the middle part.

**4- Stomach:** related to the triangular area between the left suprarenal gland, spleen and pancreas.

**5- Left colic flexure and descending colon:** related to the lower lateral part.

**6- Coils of small intestine:** related to the lower medial part.

• **\*\* Peritoneal covering;** anterior surface covered by peritoneum **except (bare areas):**

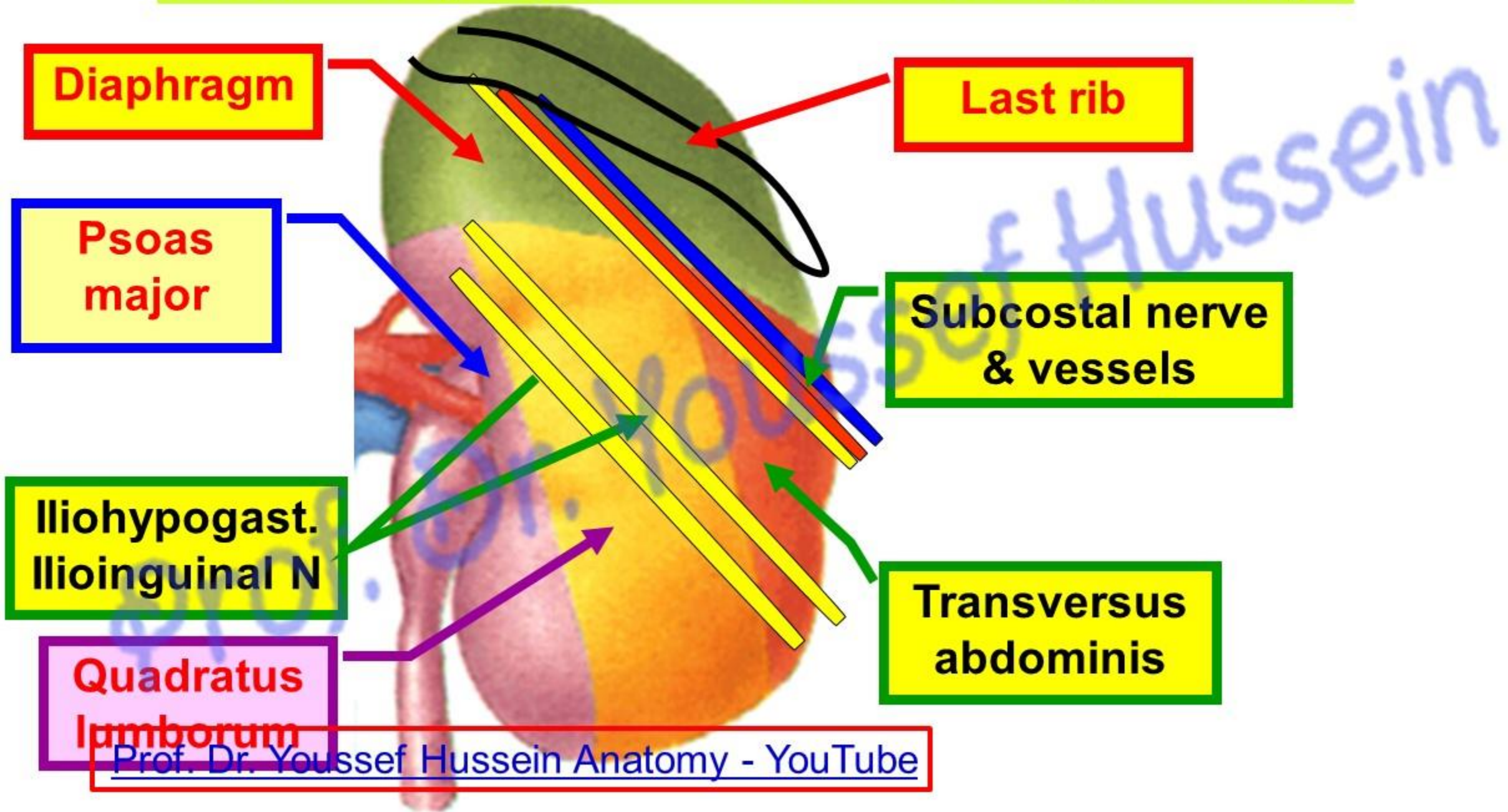
1) Left suprarenal gland.

2) Pancreas.

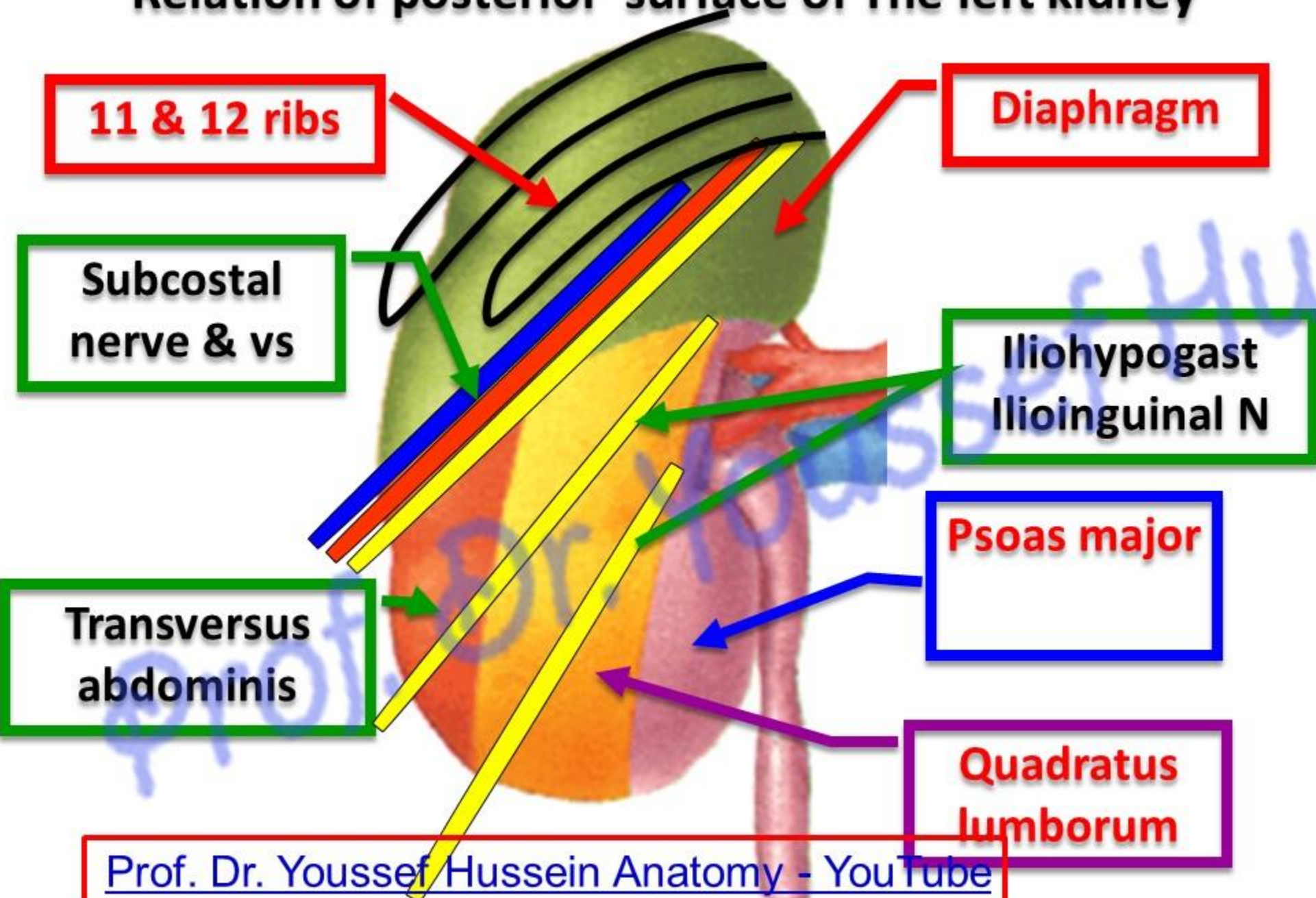
3) Colic flexure.



# Relation of posterior surface of The right kidney



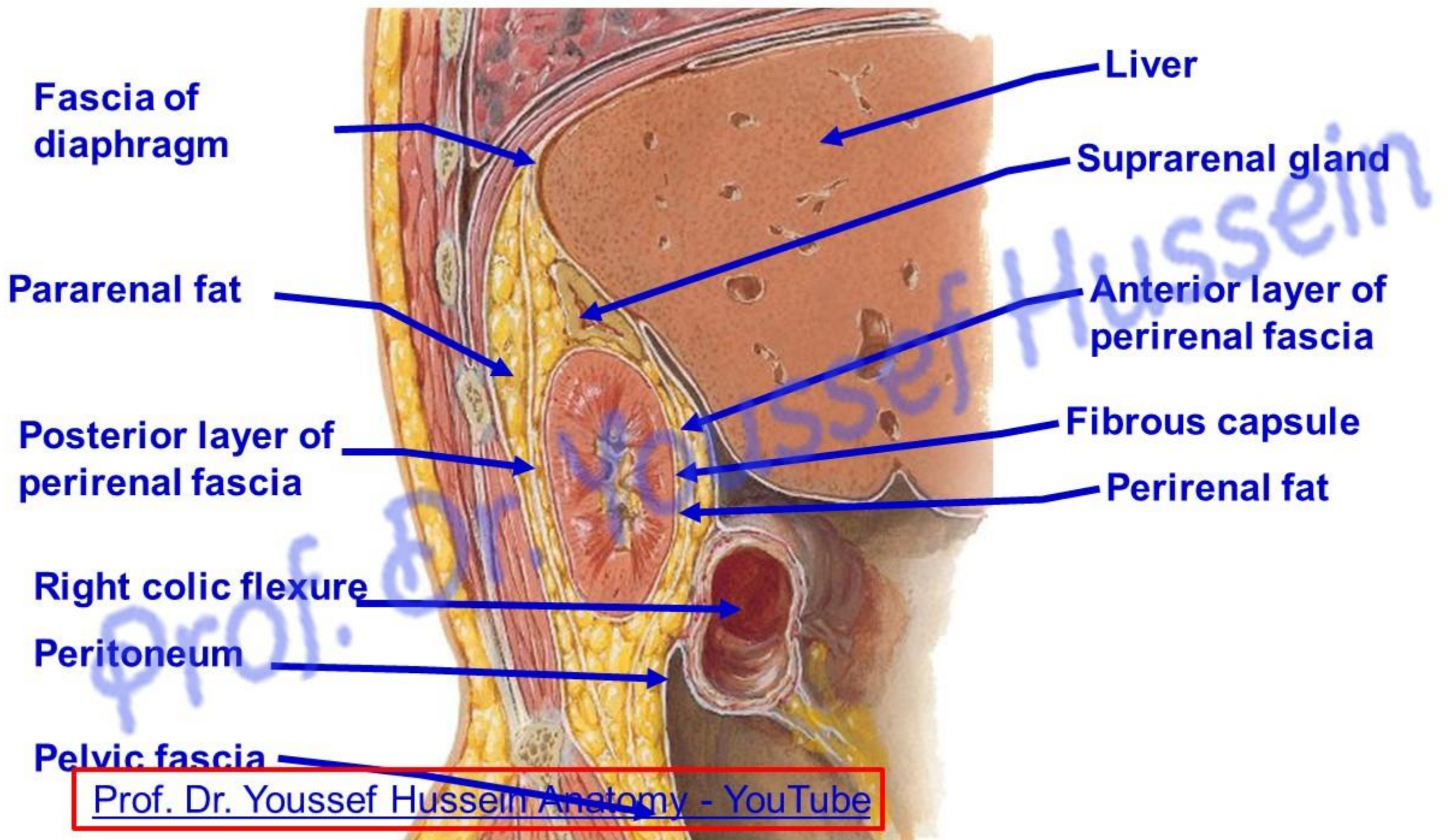
# Relation of posterior surface of The left kidney





# Coverings of Kidney

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Fascia of diaphragm

Liver

Pararenal fat

Suprarenal gland

Posterior layer of perirenal fascia

Anterior layer of perirenal fascia

Fibrous capsule

Perirenal fat

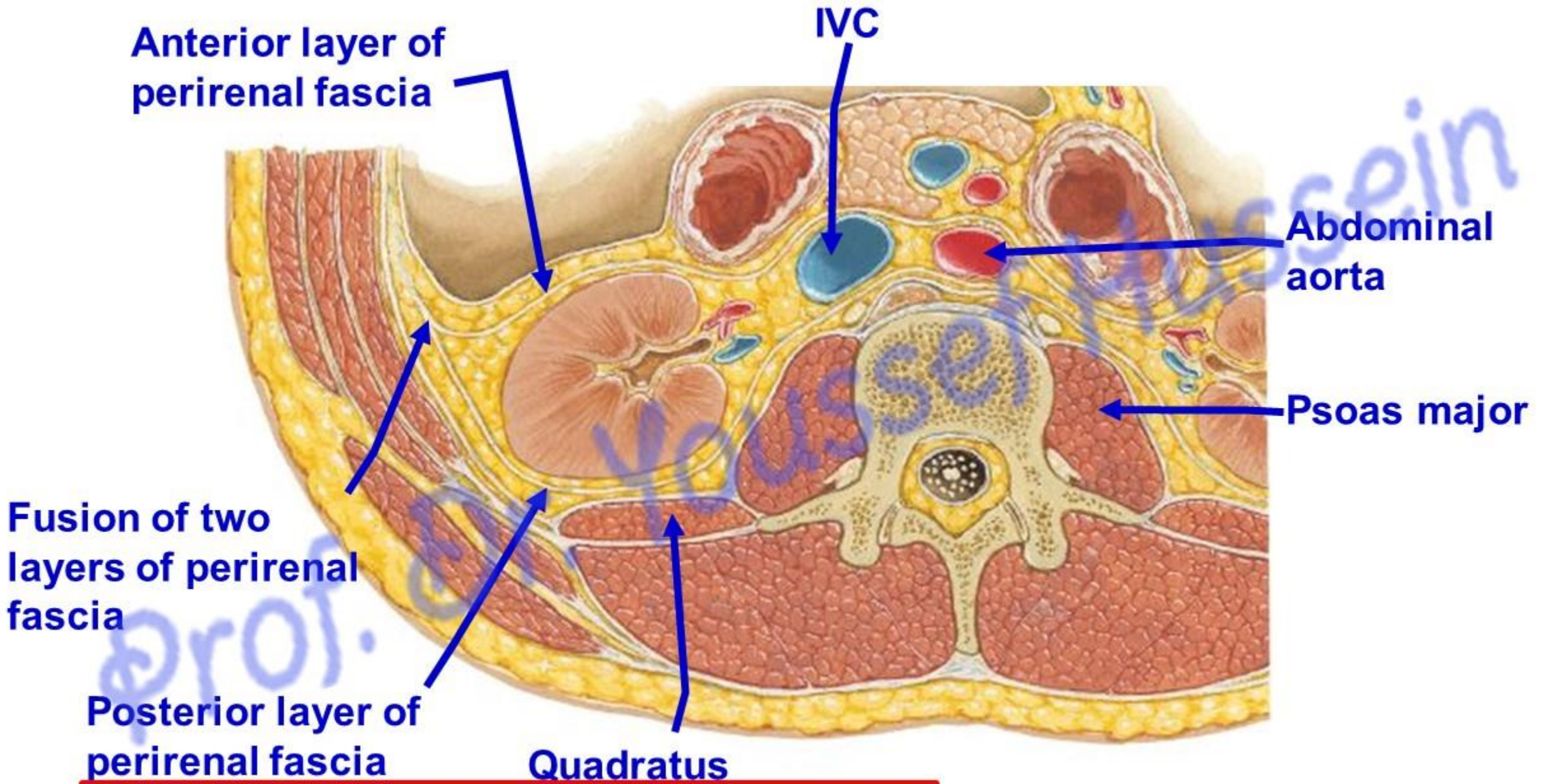
Right colic flexure

Peritoneum

Pelvic fascia

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## • Coverings of the kidney

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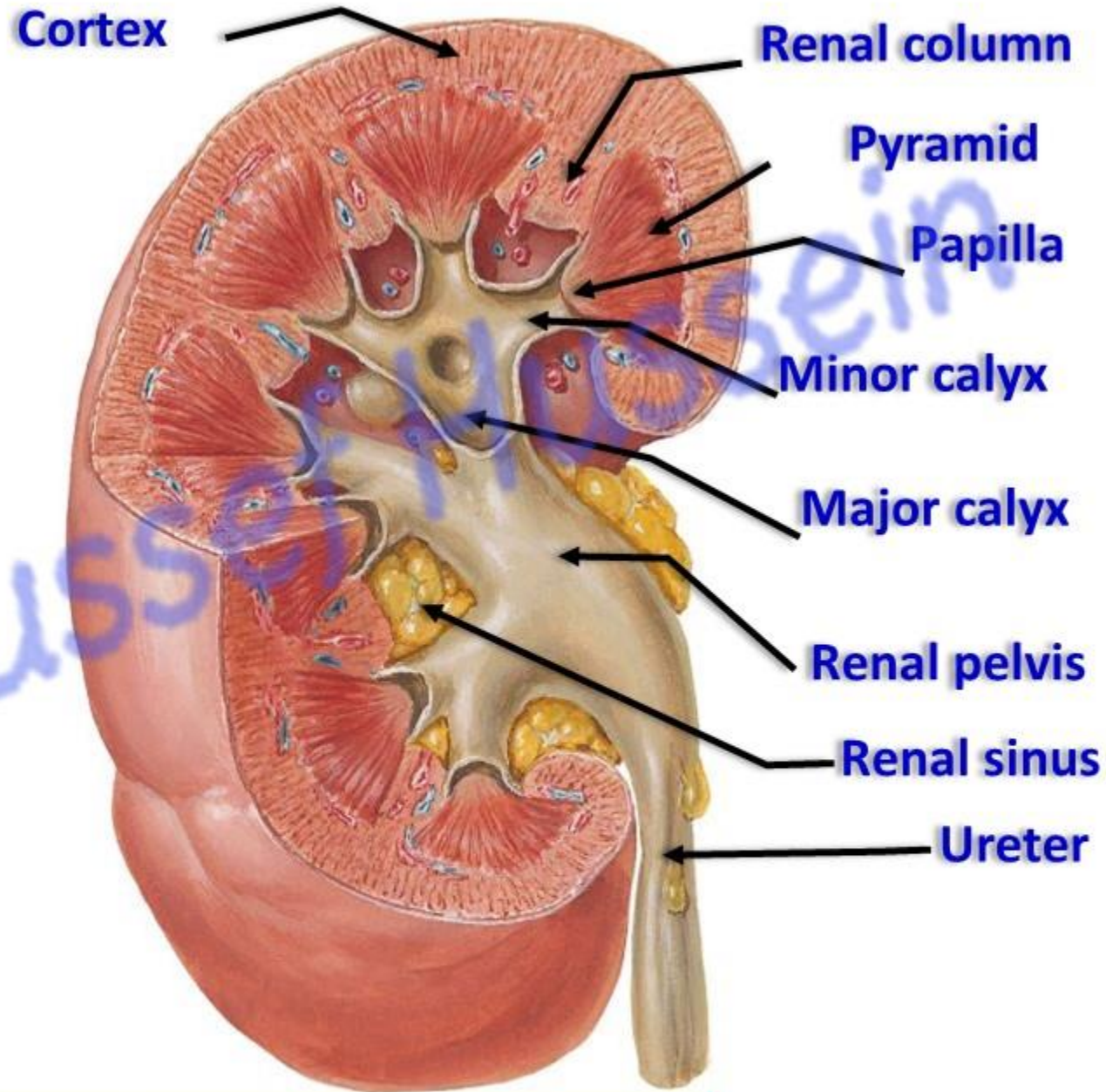
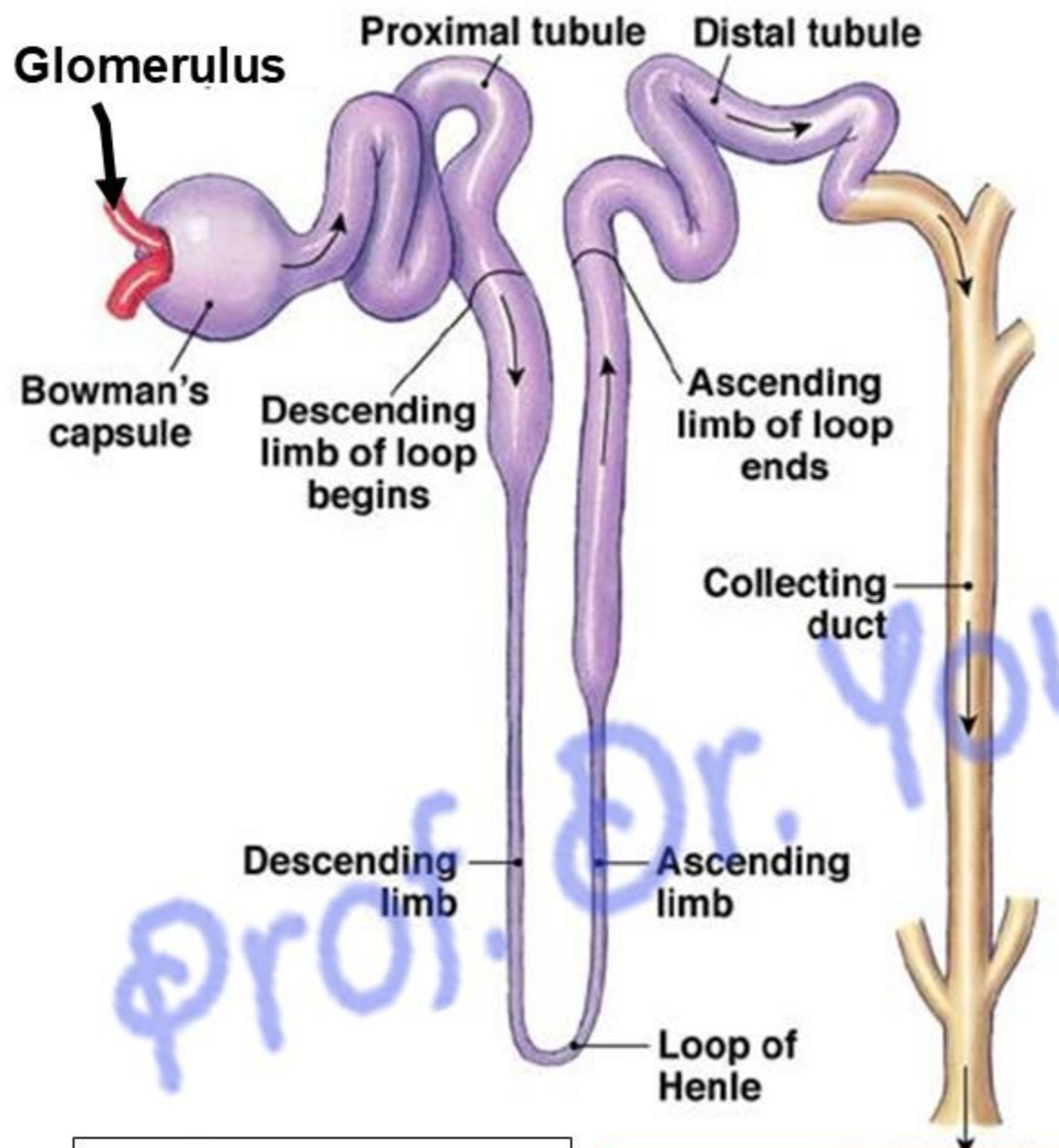
### • From inside outside

- **1- Fibrous capsule (inner)** Condensed connective tissue.
- **2- Perirenal fat (middle):** The fat surrounds the kidney and suprarenal gland.
- **3- Perirenal fascia (Zuckerkandl):** surrounds kidney and perirenal fat.
- **Medially;**
  - Anterior layer fuse with fascia in front of abdominal aorta and inferior vena cava.
  - Posterior layer fuse with fascia covering psoas major, quadratus lumborum
- **Superiorly**, the two layers fuse above the suprarenal gland and connected with fascia of the diaphragm.
- **Inferiorly**, the two layers remain separate, enclosing the ureter, and continues with the pelvic fascia.
- **Laterally** the 2 layers fuse together.



# Structure of Kidney

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**Nephron**

To bladder  
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## \*\* Longitudinal section (structure) of the kidney

### - The **nephron**

- It is the microscopic structural and functional unit of the kidney.
- A healthy adult has 0.8 to 1.5 million nephrons in each kidney.
- The renal tissue is differentiated into an outer **cortex** and an inner **medulla**.
- **1. Cortex** Contains renal corpuscles and proximal and distal convoluted tubules.
  - The renal corpuscle consists of glomerulus (a tuft of capillaries) surrounded by Bowman's capsule.
  - **Cortex** projects into the medullary region between the renal pyramids as renal columns.
- **2. Medulla** Forms the inner part of the kidney and consists of 8 to 12 renal pyramids (of Malpighian), which **contains Henle's loops** and **collecting tubules**.
- An apex of the renal pyramid, the renal papilla, fits into the cup-shaped **minor calyx** on which the collecting tubules open (10 to 25 openings).
- **Minor calyces** empty urine into two or three major calyces which in turn empty into renal pelvis.



**Blood supply  
Segments of  
Kidney**

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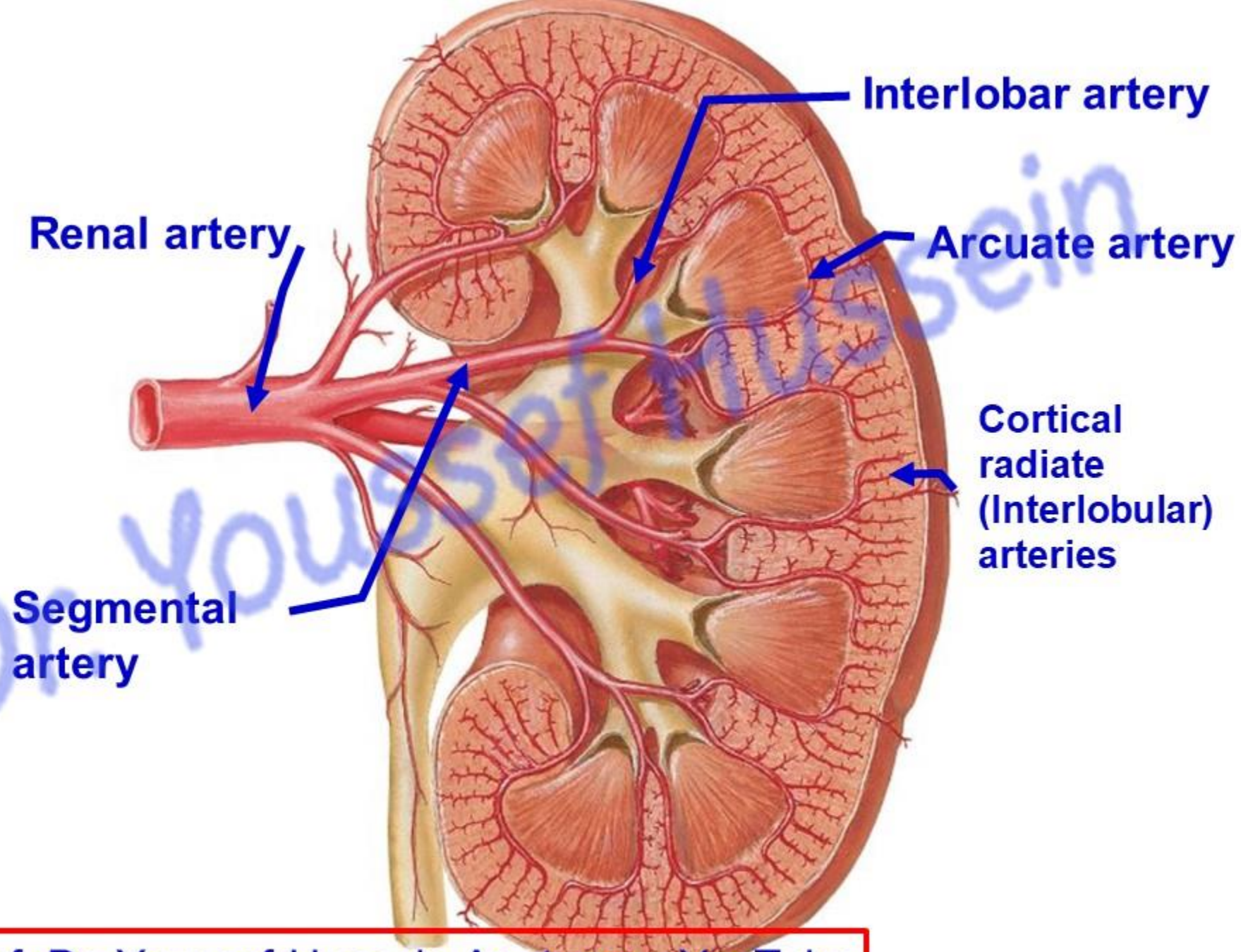


**\*\* Arterial supply, Renal artery** from abdominal aorta.

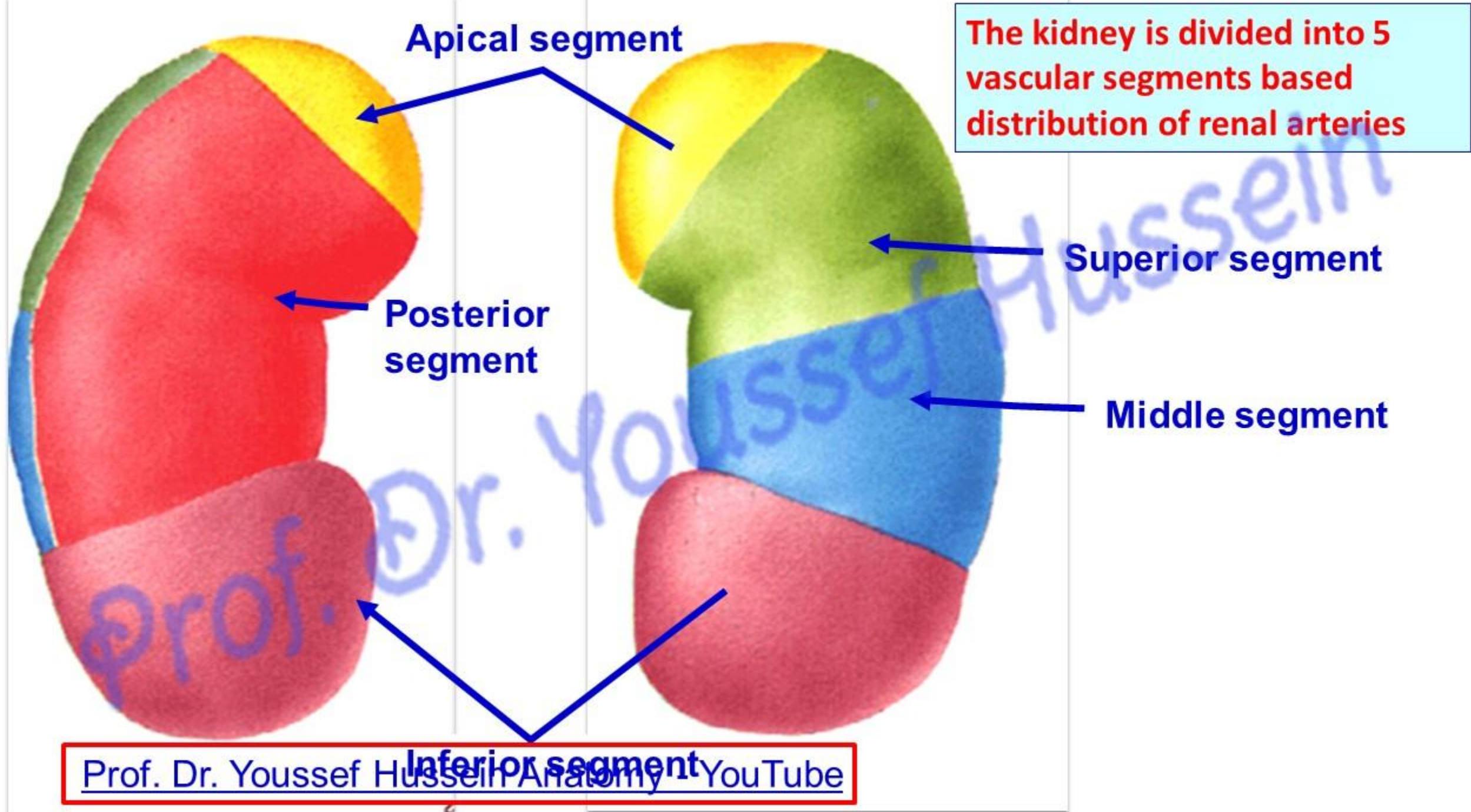
**\*\* Venous drainage, Renal veins** end into inferior vena cava.

**• Tributaries of left renal vein:**

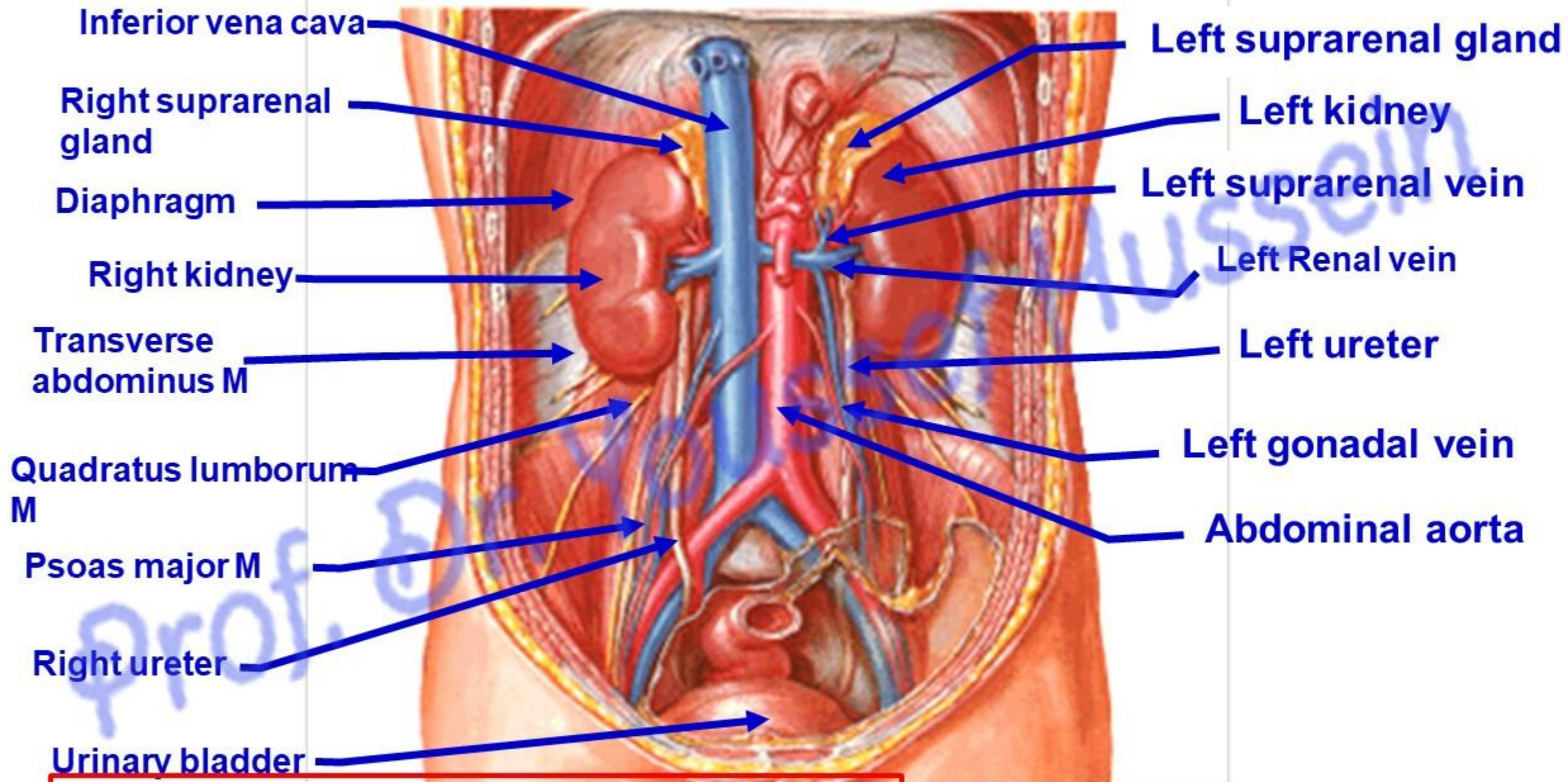
- 1) Kidney.
- 2) Suprarenal vein.
- 3) Gonadal (testicular or ovarian) vein **on the Left only**













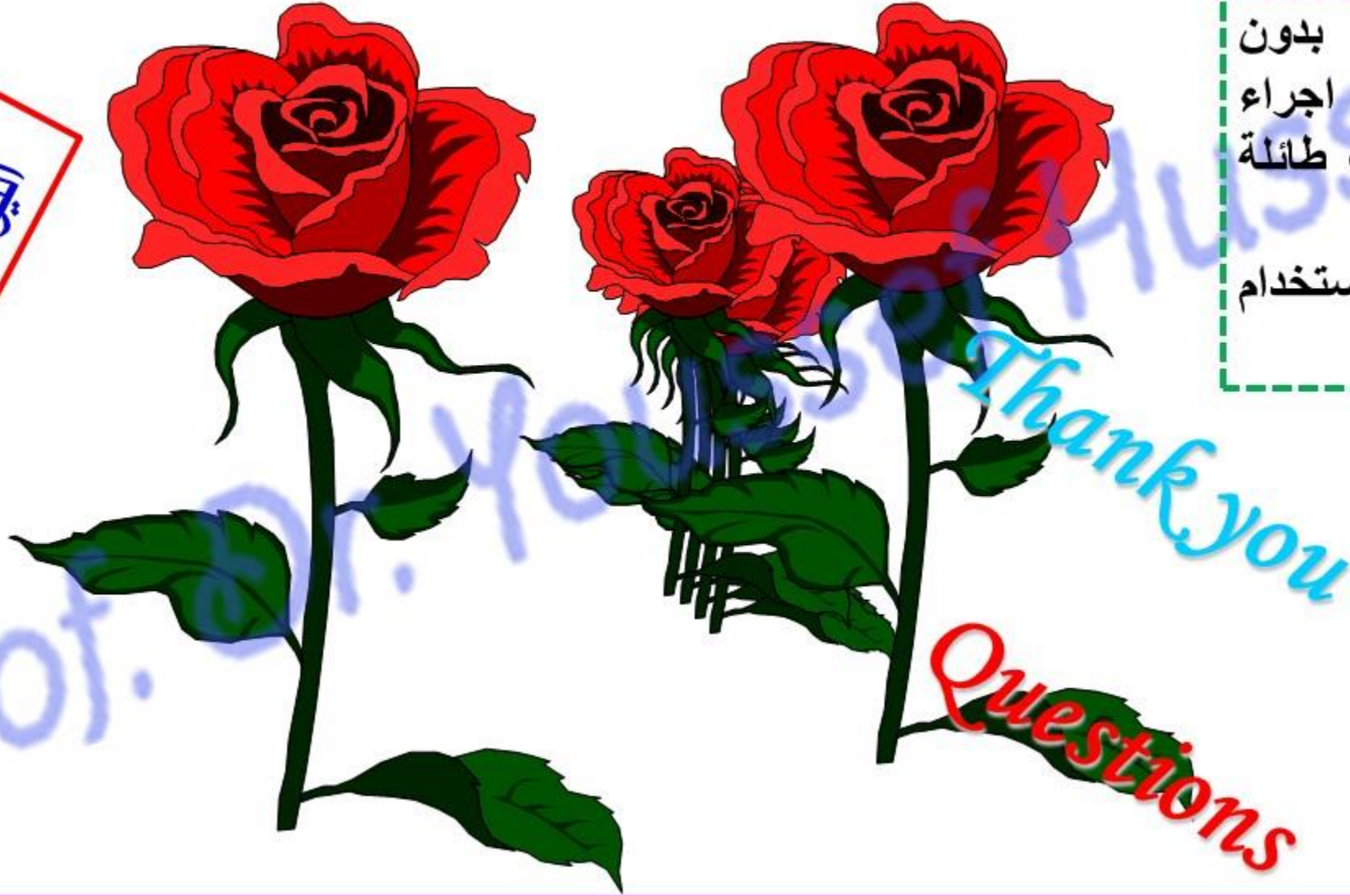
- **Kidney swelling** is felt in the renal angle (between the 12th rib and lateral border of sacrospinalis muscle).
- **The pattern of arterial supply** is useful in doing incision of the kidney.
- The relatively avascular plane between the posterior segment and other segments extends to the convex lateral border of the kidney forming bloodless **line of Brodel that** used for surgical incisions in the kidney to avoid injury of large renal blood vessels.
- **Kidney stone (renal calculus or nephrolith)** is formed by combination of a high level of calcium with oxalate, phosphate, urea, uric acid, and cystine.
- Stone is collected in calyces of the kidney or in the ureter.
- Common signs of kidney stones include **colicky pain referred to lower abdomen and groin**, vomiting, urinary frequency and urgency, and pain during urination.



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