

# **Posterior Abdominal wall – II**

**(Abdominal Aorta, Inferior Vena  
Cava, Lymph nodes)**

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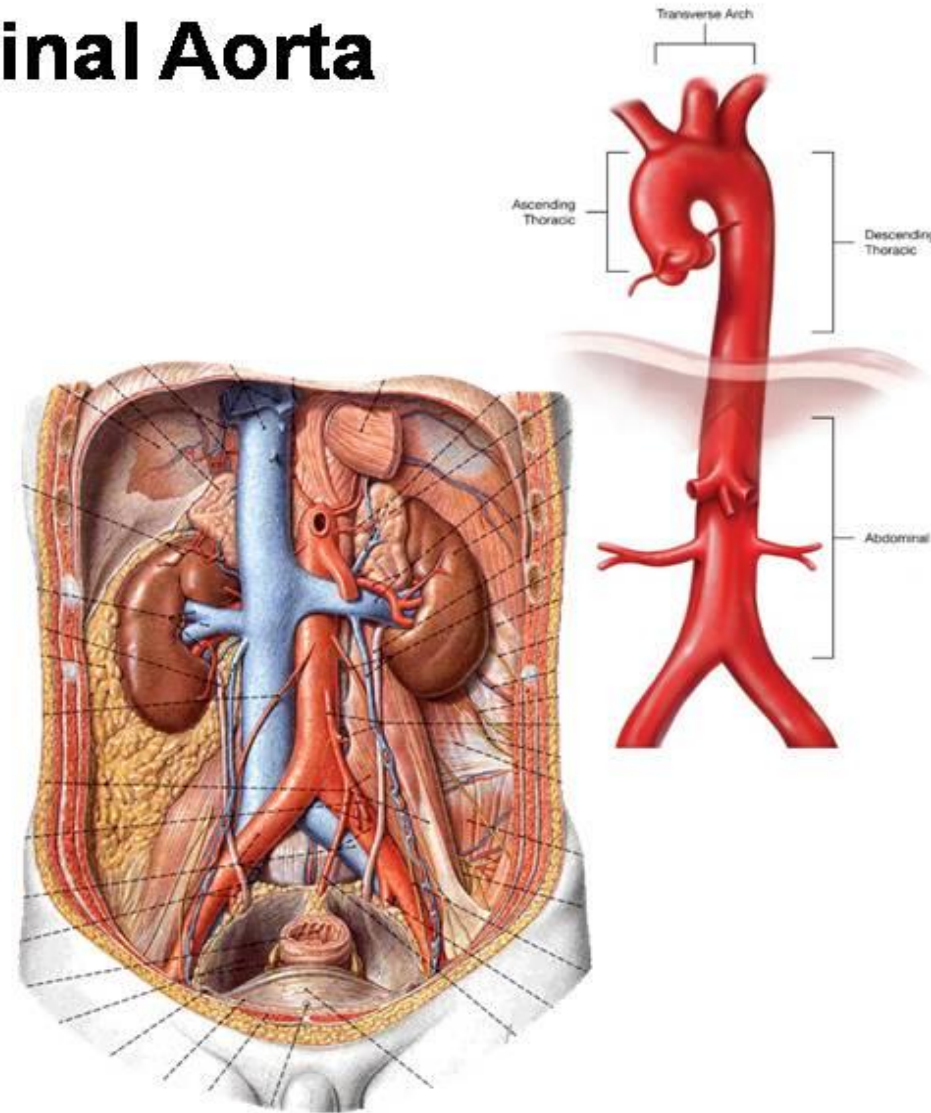
# Learning Objectives

- **At the end of this teaching session all the students should be able to:**
  - **Describe the location and vertebral extent of abdominal aorta**
  - **Enumerate the ventral, lateral, dorsal and terminal branches of abdominal aorta**
  - **Describe the relations of abdominal aorta**
  - **Describe the formation and termination of inferior vena cava (IVC)**
  - **Describe the relations of IVC**
  - **Enumerate the tributaries of IVC**
  - **Write a note on collateral pathways in IVC obstruction**
  - **Enumerate the chief lymph trunks and groups of lymph nodes in the abdomen**
  - **Write a note on territories drained by the lymph node groups present in the abdomen**

# **Abdominal Aorta**

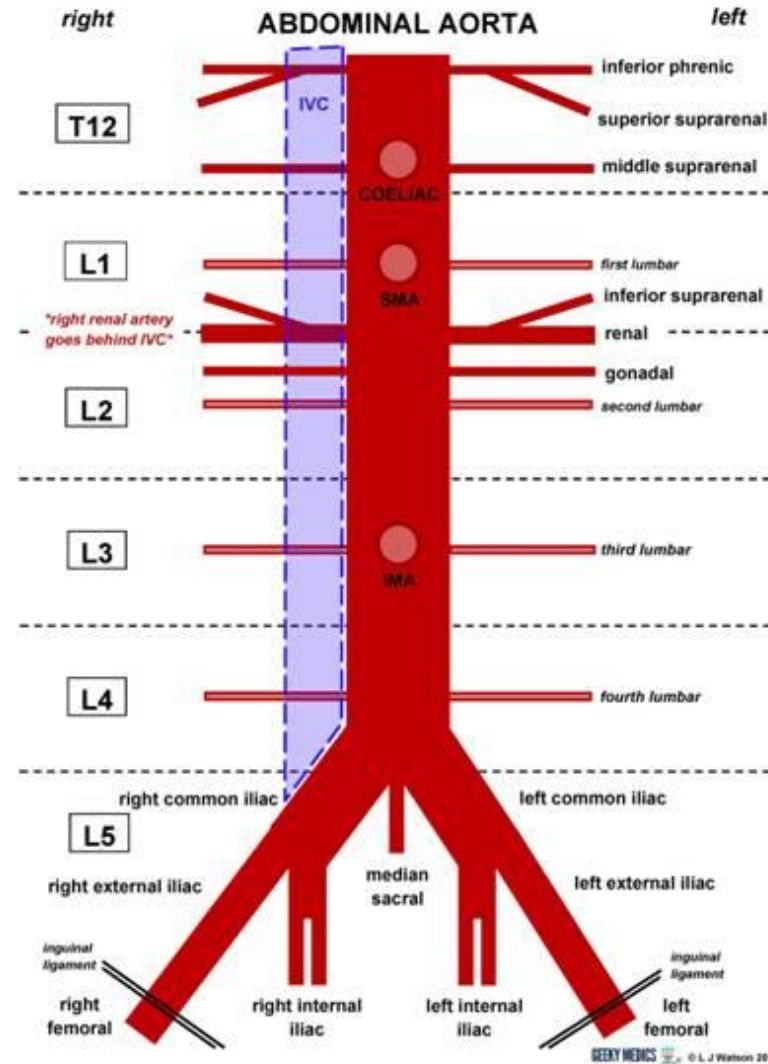
# Abdominal Aorta

- The abdominal aorta is the continuation of descending thoracic aorta at aortic orifice in the diaphragm (inferior border of T 12)
- Length- 10 – 11 cm
- Breadth: 2 cm
- Is retroperitoneal
- On posterior abdominal wall



# Vertebral extent & Termination

- Extent – from L1 to L4
- Terminates at lower border of L4 vertebra to the left of midline by dividing into right and left common iliac arteries



# Branches of abdominal aorta

## Anterior Group:

1. Celiac trunk
2. Superior mesenteric artery
3. Inferior mesenteric artery

## Dorsal Group:

1. Right & Left Lumbar arteries
2. Median sacral artery

## Lateral Group:

1. Right & Left Inferior phrenic arteries
2. Right & Left Suprarenal arteries
3. Right & Left Renal arteries
4. Right & Left Gonadal arteries

## Terminal Branches:

1. Right & Left Common iliac arteries

**Detailed course and distribution of these arteries will be taught with the respective viscera or in the specific region**

# Branches of abdominal aorta

	<b>Name of Artery</b>	<b>Type</b>	<b>Number</b>	<b>Vertebral level</b>
1	<b>Celiac trunk</b>	<b>Visceral</b>	<b>Unpaired</b>	<b>T12</b>
2	<b>Superior mesenteric artery</b>	<b>Visceral</b>	<b>Unpaired</b>	<b>L1</b>
3.	<b>Inferior mesenteric artery</b>	<b>Visceral</b>	<b>Unpaired</b>	<b>L3</b>
4	<b>Middle suprarenal arteries</b>	<b>Visceral</b>	<b>Paired</b>	<b>L1</b>
5	<b>Renal arteries</b>	<b>Visceral</b>	<b>Paired</b>	<b>L1/L2</b>
6	<b>Gonadal arteries</b>	<b>Visceral</b>	<b>Paired</b>	<b>L2</b>
7	<b>Inferior phrenic arteries</b>	<b>Parietal</b>	<b>Paired</b>	<b>T12</b>
8	<b>Lumbar arteries (L1, L2, L3, L4)</b>	<b>Parietal</b>	<b>Paired</b>	<b>L1-L4</b>
9	<b>Median sacral artery</b>	<b>Parietal</b>	<b>Unpaired</b>	<b>L4</b>
10	<b>Common Iliac arteries</b>	<b>Terminal</b>	<b>Paired</b>	<b>L4</b>



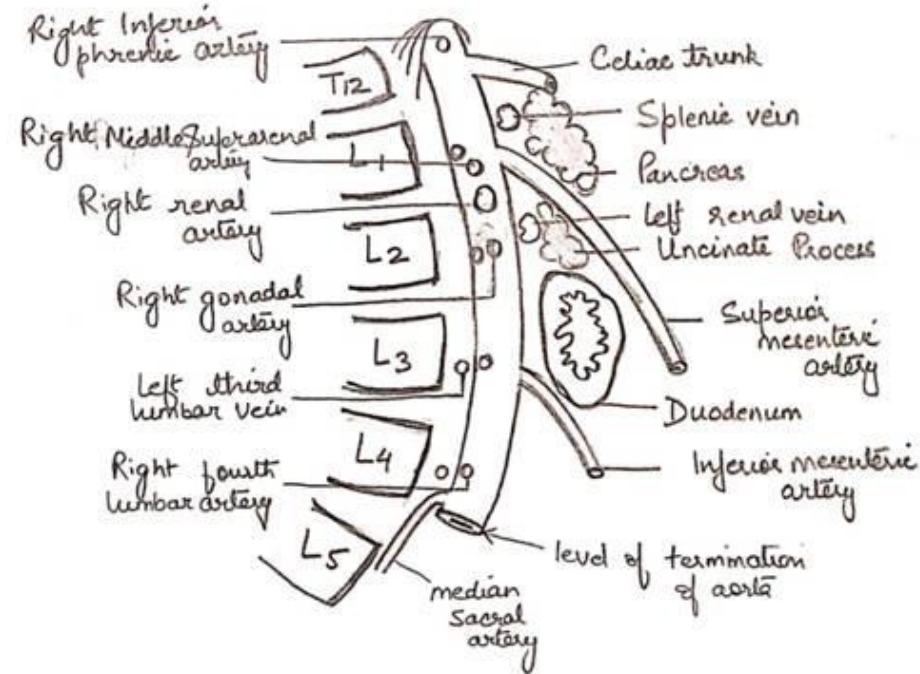
# Visceral/ structures supplied by the branches

	<b>Name of Artery</b>	<b>Distribution</b>
<b>1</b>	<b>Celiac trunk</b>	<b>Derivatives of foregut</b>
<b>2</b>	<b>Superior mesenteric artery</b>	<b>Derivatives of foregut</b>
<b>3.</b>	<b>Inferior mesenteric artery</b>	<b>Derivatives of foregut</b>
<b>4</b>	<b>Middle suprarenal arteries</b>	<b>Suprarenal gland</b>
<b>5</b>	<b>Renal arteries</b>	<b>Kidneys, suprarenal gland, ureter</b>
<b>6</b>	<b>Gonadal arteries</b>	<b>Testes / Ovaries</b>
<b>7</b>	<b>Inferior phrenic arteries</b>	<b>Diaphragm, suprarenal gland</b>
<b>8</b>	<b>Lumbar arteries</b>	<b>Abdominal wall</b>
<b>9</b>	<b>Median sacral artery</b>	<b>Vestigial artery</b>
<b>10</b>	<b>Common iliac arteries</b>	<b>Its external &amp; internal branches supply lower limb, pelvic viscera, walls of pelvis</b>

# Relations

## Anterior

- Between celiac trunk & SMA- splenic vein & body of pancreas
- Between SMA & IMA- left renal vein, uncinate process of pancreas and 3<sup>rd</sup> part of duodenum
- Below the 3<sup>rd</sup> part of duodenum – covered by parietal peritoneum of floor of infracolic compartment



**Diagrammatic representation of Aorta as seen from the right side**

## Posterior

- L1- L4, 3<sup>rd</sup> & 4<sup>th</sup> lumbar veins

## Right

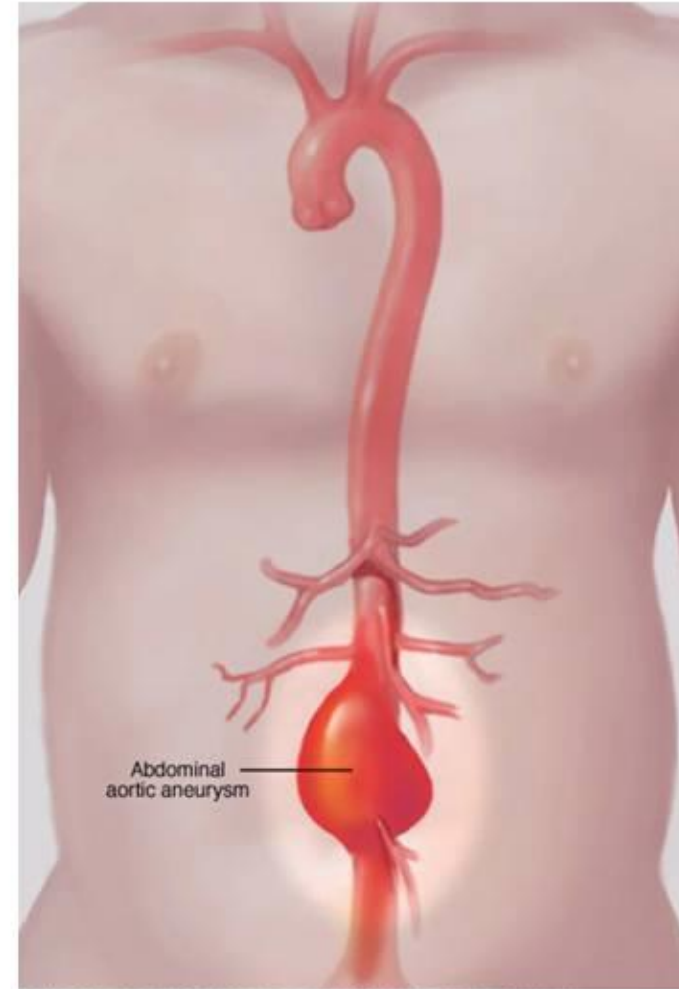
- Inferior Vena Cava

## Left

Left sympathetic trunk

# Aortic aneurysm

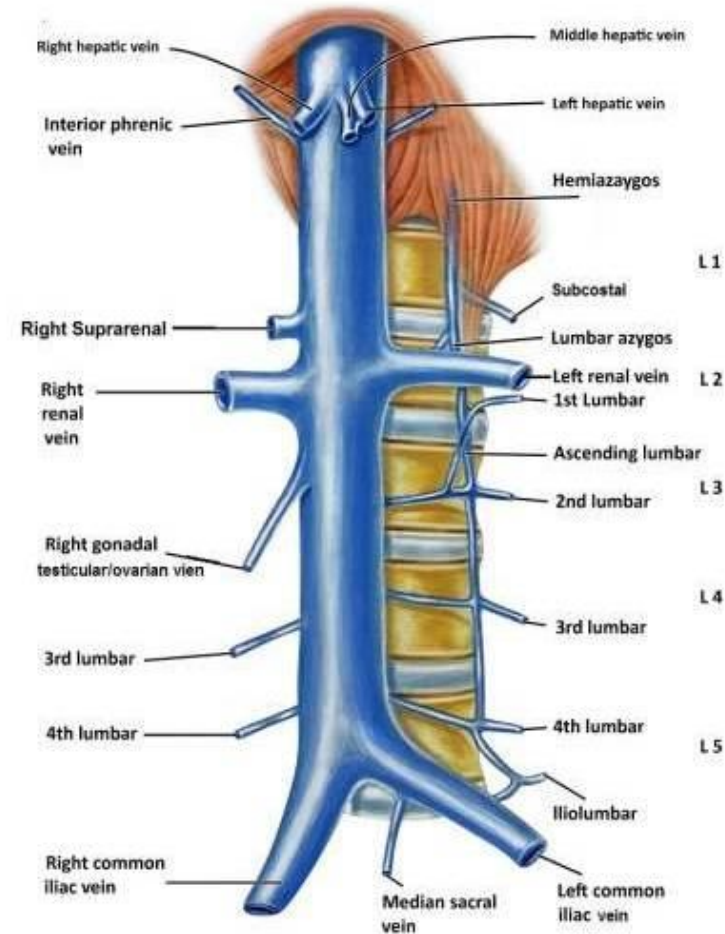
- **Aneurysm - dilation of the artery to more than 1.5 times its original size.**
- **The abdominal part of aorta - common site for aneurysmal changes.**
- **Patients - may experience abdominal pulsations, abdominal pain and back pain, may also compress nerve roots causing pain/numbness in the lower limbs.**



**Inferior Vena cava**

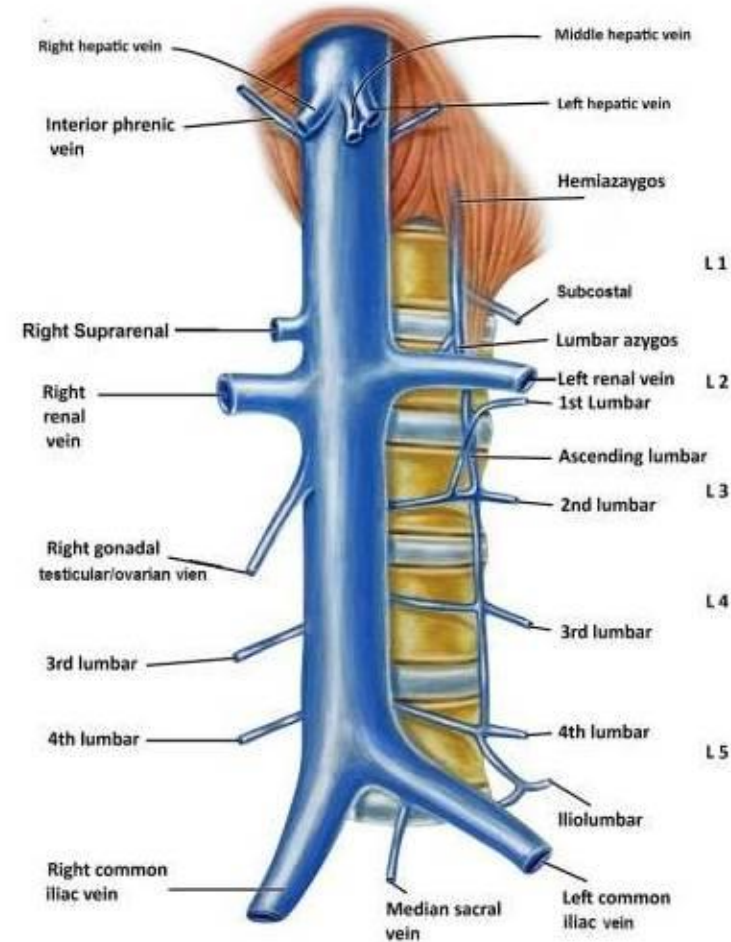
# Inferior vena cava (location & formation)

- **Largest vein**
- **Drains blood from body below diaphragm**
- **Length – 20-23 cm**
- **Breadth – 2.5 cm**
- **Formation : opposite L5 by union of right & left common iliac veins**



# Inferior vena cava (course)

- Longer course than aorta
- Ascends in front of vertebral column
- Lodges in a groove on right lobe of liver
- At T 8 passes through diaphragm (central tendon)
- Pierces fibrous pericardium
- Opens into right atrium, opening guarded by valve (semilunar valve)
- Extent – right of L5 – T8



# Relations of IVC

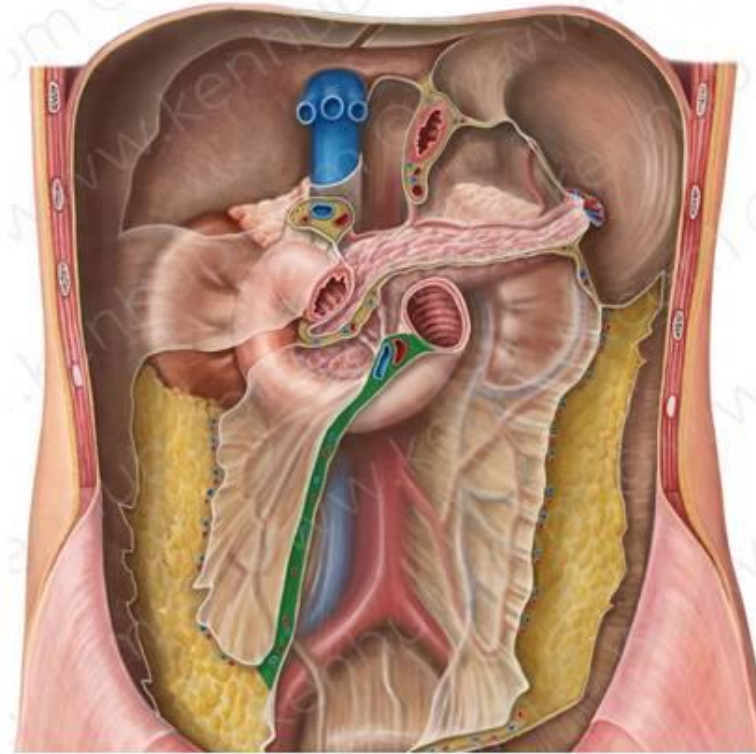
## ANTERIOR RELATIONS:

In the Infracolic compartment

1. Root of mesentery
2. Above it by 3<sup>rd</sup> part of duodenum

In the Supracolic compartment

1. First behind portal vein, head of pancreas & bile duct
2. Above it behind the peritoneum forming posterior wall of epiploic foramen



# Relations of IVC contd.....

## POSTERIOR RELATIONS:

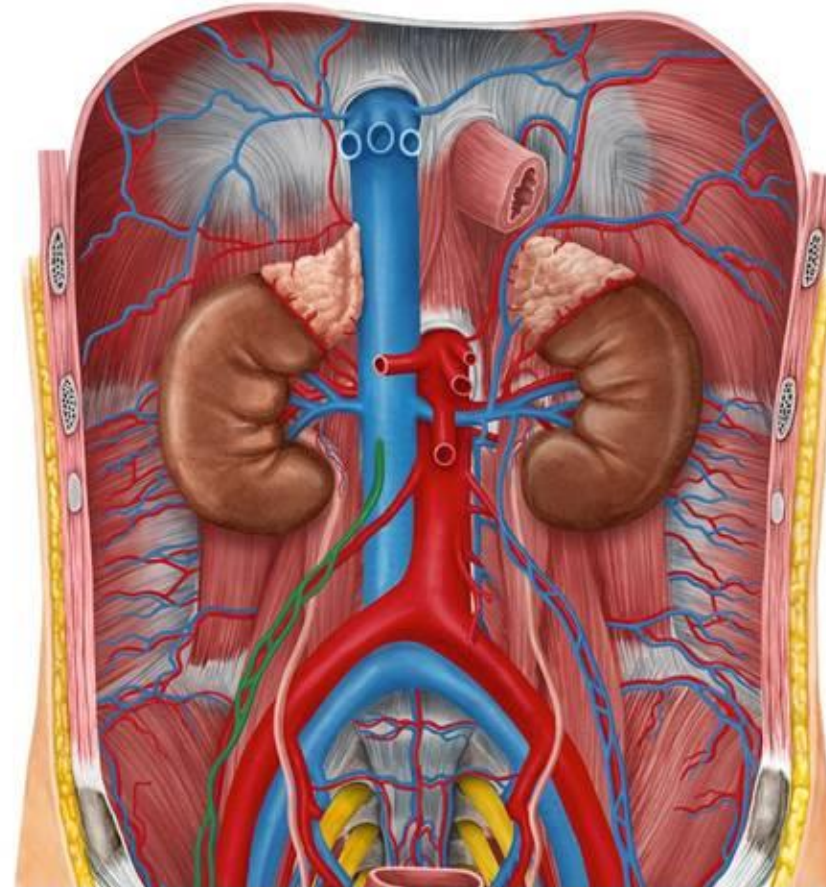
- Lumbar vertebrae
- Right psoas major
- Right crus of diaphragm

## On its RIGHT

- Right kidney & right ureter
- Hepatorenal pouch

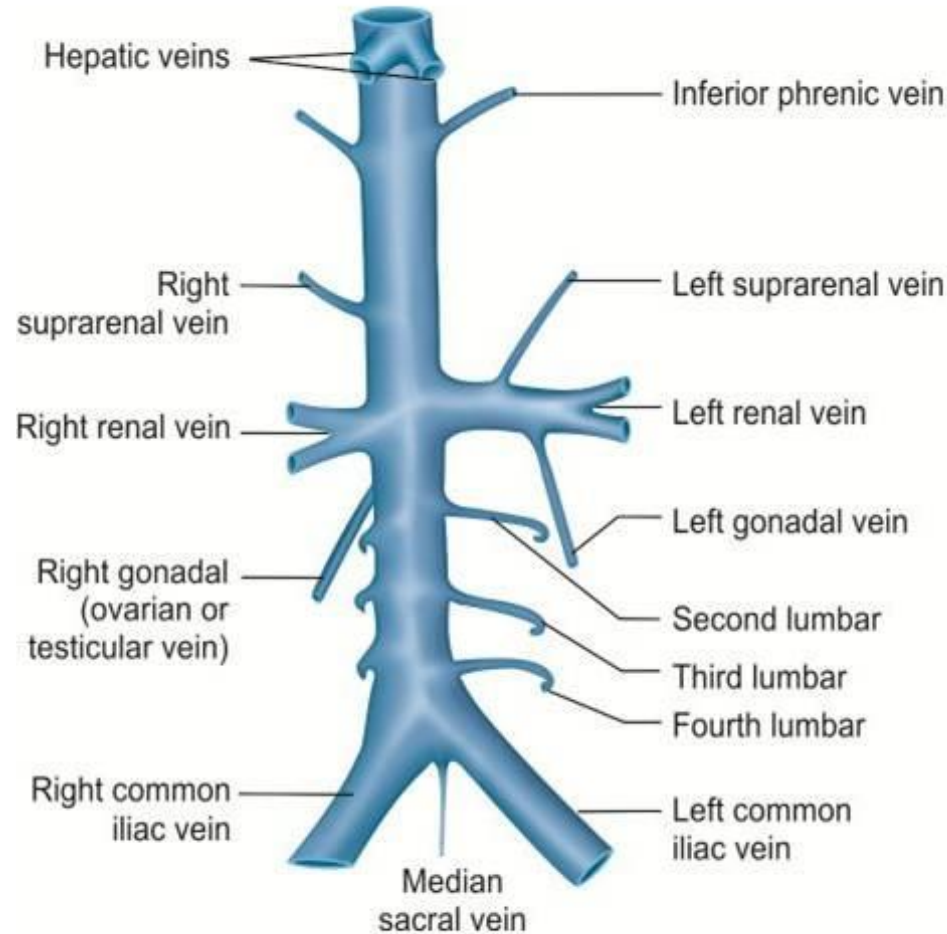
## On its LEFT

- Abdominal aorta
- Omental burse
- Caudate lobe of liver





# Tributaries



1. **Common iliac veins** (formative tributaries)
2. **Lumbar veins** – 3<sup>rd</sup> & 4<sup>th</sup>
3. **Inferior phrenic veins** - Right & left
4. **Hepatic veins** (right , middle & left
5. **Renal veins** - Right & left
6. **Gonadal vein** - Right
7. **Suprarenal vein** - Right

**Lymph nodes of  
posterior abdominal  
wall**

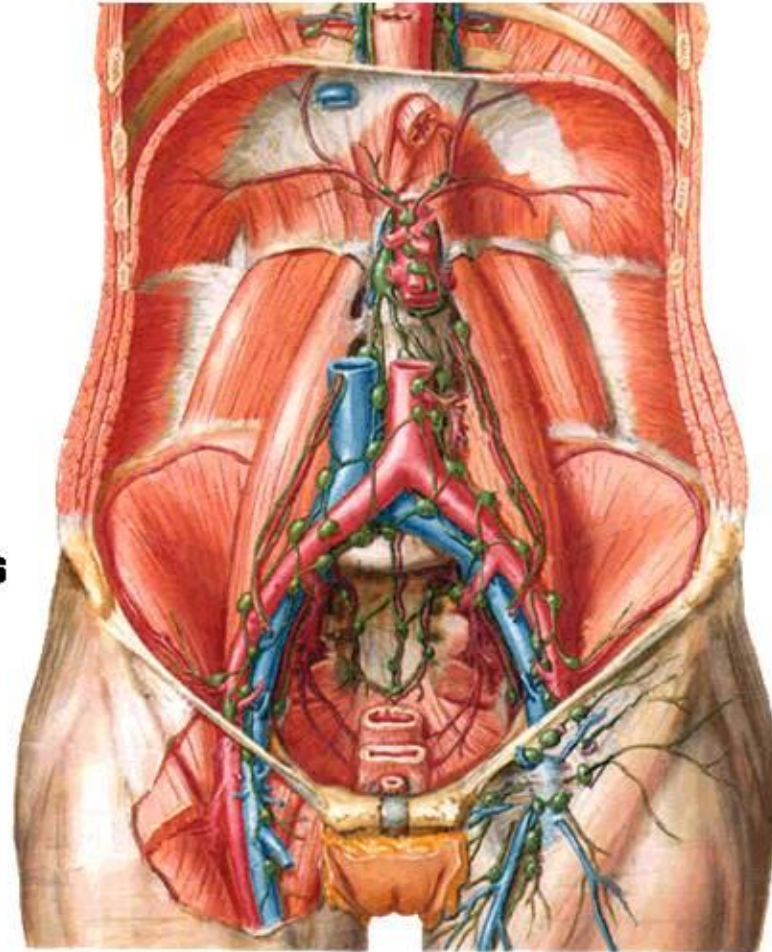
# Lymph nodes of posterior abdominal wall

Lumbar nodes consisting of:

A. Pre aortic group/ Anterior group-  
around origin of 3 ventral branches

B. Para aortic group/ Lateral group-  
alongside aorta around origins of  
paired visceral and somatic branches

lymphatic drainage from any viscera  
follows back its own artery



# Overview of Nodes – afferent & efferent lymphatics

## Celiac Nodes

- Receive afferent lymphatics from nodes draining organs supplied by three branches of celiac trunk (liver, stomach, spleen, pancreas etc.)
- Efferents drain into – intestinal trunks

## Superior & Inferior mesenteric nodes

- Receive afferent lymphatics from nodes draining digestive tract from duodenojejunal flexure upto pectinate line of anal canal
- Efferents drain into – celiac nodes

### **Para Aortic Nodes:**

- Present in relation to lateral/ dorsal paired branches of aorta
- Receive afferents from- viscera and other structures supplied by lateral / dorsal branches of aorta (kidneys, suprarenal, posterior abdominal wall, ureter, gonads, uterine tubes, upper part of uterus)
- Also receive afferents from internal & external iliac nodes – (drain pelvis & lower limb)
- Efferents drain into- lumbar trunks

**Detailed regional group of nodes and drainage pattern will be taught with the respective viscera or in the specific region**

# Lymph Nodes and lymph trunks

- Lymphatic drainage from viscera & other structures follows back alongside the arteries
- Lymphatics from all these nodes joins to form abdominal lymph trunks - usually 4 major lymph trunks are formed
  - Efferents from celiac nodes form -----2 intestinal lymph trunks
  - Efferents from paraaortic nodes form-----2 lumbar lymph trunks
- These lymph trunks unite to form CISTERNA CHYLI