

King Saud University  
College of medicine

**Cardiovascular block**

**2**

# **Anatomy of large blood vessels**

**- Arteries -**

# You should

- Define the word artery and understand the general principles of the arterial system.
- Define arterial anastomosis and describe its significance.
- Define end arteries and give examples.
- Describe the aorta and its divisions & list the branches from each part.
- List major arteries and their distribution in the head & neck, thorax, abdomen and upper & lower extremities.
- List main pulse points.

## Arteries

Aorta

Ascending  
Aorta

Arch of  
Aorta

Common  
Carotid  
Artery

External  
Carotid  
Artery

Internal  
Carotid  
Artery

Subclavian  
Artery

Upper  
limb  
arteries

Branch of  
common  
iliac

Descendin  
g thoracic  
aorta

Abdominal  
aorta

Lower  
limb  
arteries

# Arteries

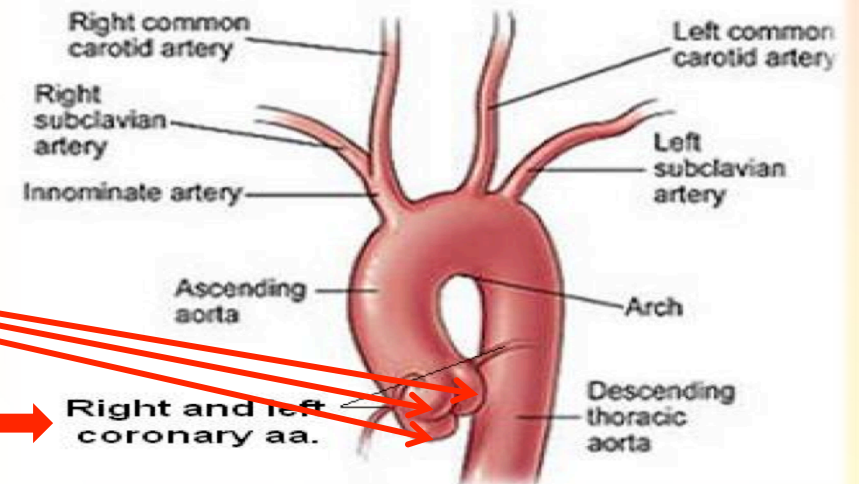
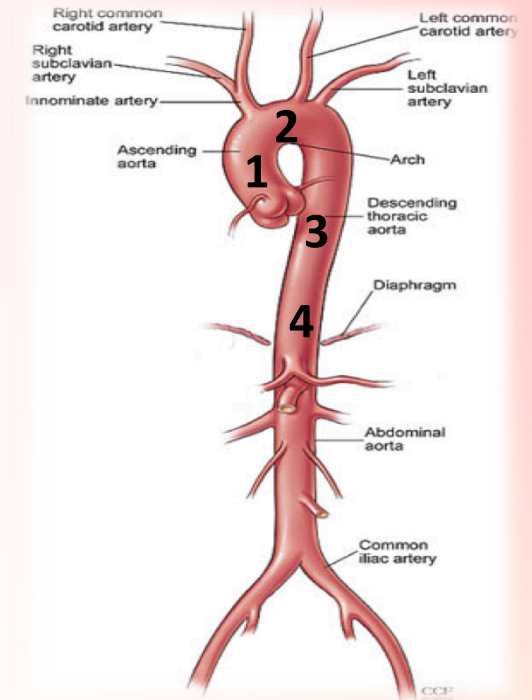
- Arteries carry blood from the heart to the body, all arteries carry **oxygenated blood**, **except** the **Pulmonary Artery and the umbilical arteries**, which carry **deoxygenated blood to the lungs (postnatal) and to the placenta (prenatal)** respectively.
- The flow of blood depends on the **pumping action of the heart**, arteries have **elastic wall with no valves**.
- The branches of arteries supplying adjacent areas **anastomose** with one another providing backup routes for blood if one artery is blocked. e.g. **arteries of limbs**.
- The arteries that doesn't have anastomosing ability in it's branches are called **End arteries or teminal arteries**, and they are of two types:
  1. **Anatomic (True) End Artery**: When no anastomosis exists, e.g. **artery of the retina**.
  2. **Functional End Artery**: When an anastomosis exists but is incapable of providing a sufficient supply of blood, e.g. **splenic artery, renal artery**.



# Aorta & Ascending aorta

- The **largest** artery in the body
- Arises from the **left ventricle** of the heart
- Carries oxygenated blood to all parts of the body
- Is divided into 4 parts:
  1. **Ascending aorta.**
  2. **Arch of aorta.**
  3. **Descending thoracic aorta.**
  4. **Abdominal aorta.**

- **Originates** from **left ventricle**, continues as the **arch of aorta**
- Has three dilatations at its base, called **aortic sinuses**
- **Branches:**
  - **Right & Left coronary arteries (supplies the heart),** arise from aortic sinuses.

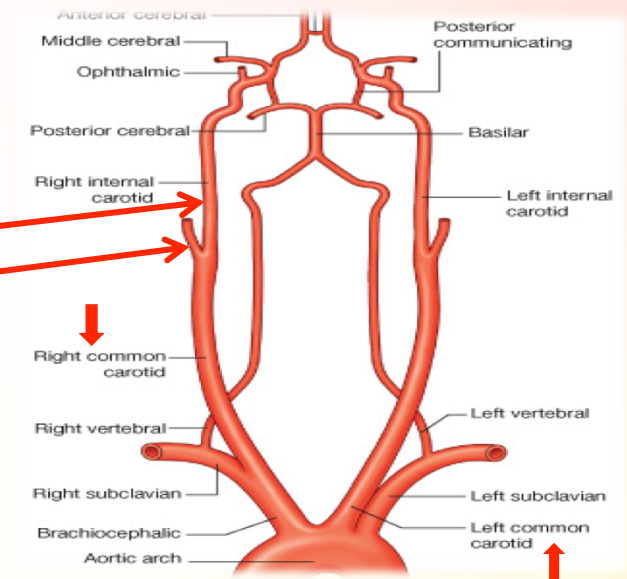
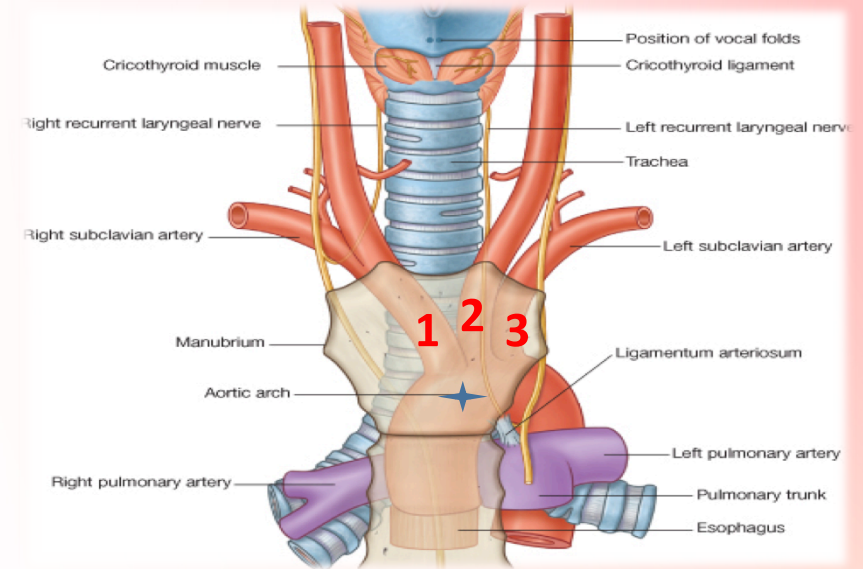




# Arch of Aorta & Common Carotid Artery

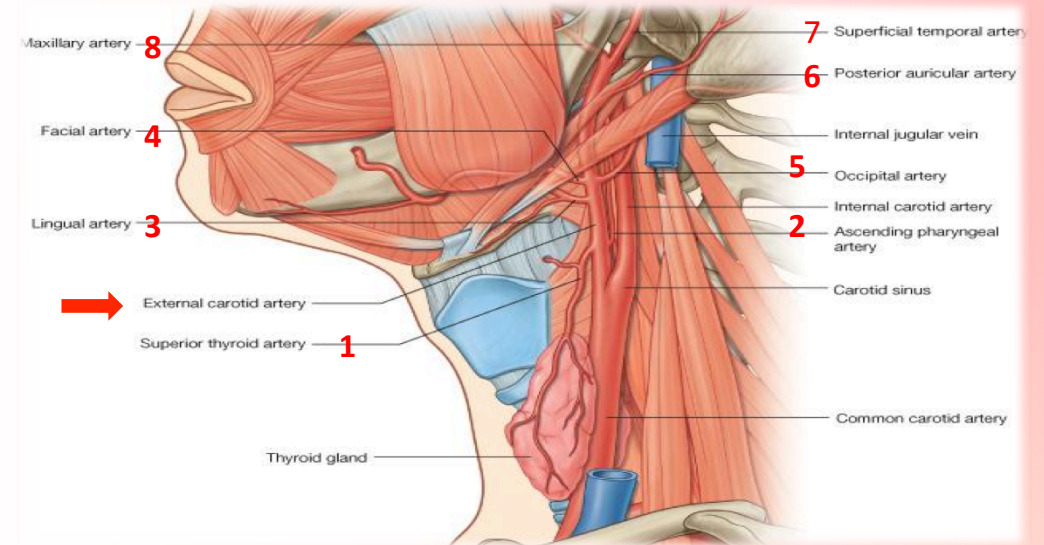
- Continuation of the ascending aorta, leads to descending aorta.
- Located **behind the lower part of manubrium sterni** and on the **left side of trachea**.
- **Branches:**
  1. **Brachiocephalic trunk.**
  2. **Left common carotid artery.**
  3. **Left subclavian artery.**

- **Origin:**
  - **Left** from **aortic arch**.
  - **Right** from **brachiocephalic trunk**.
- Each common carotid divides into two branches:
  - **Internal carotid**
  - **External carotid**

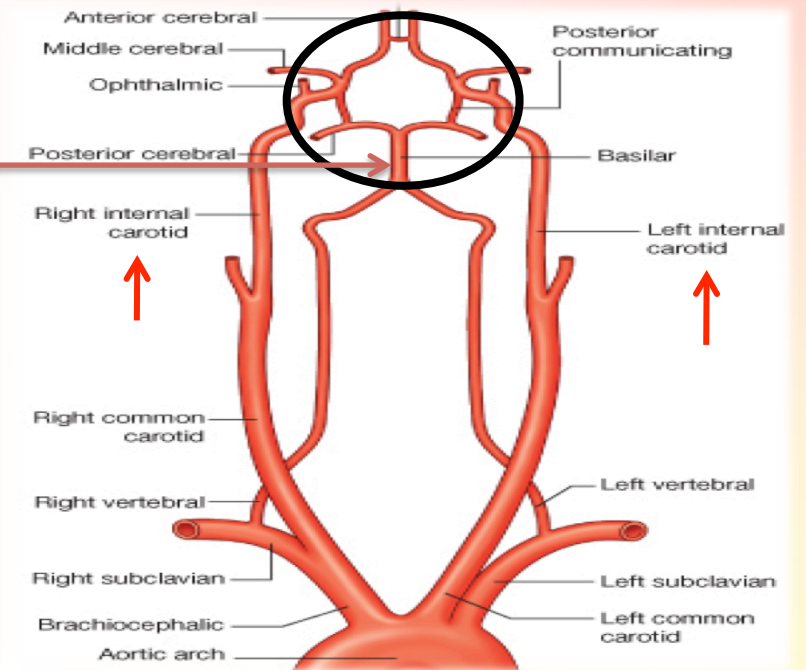


# External & Internal Carotid Arteries

- It divides **behind neck of mandible** into: **Superficial temporal & maxillary arteries**
- It supplies:
  - ❖ **Scalp**: Superficial temporal, occipital, & posterior auricular arteries
  - ❖ **Face**: Facial artery
  - ❖ **Maxilla & mandible**: Maxillary artery
  - ❖ **Tongue**: Lingual artery
  - ❖ **Pharynx**: ascending pharyngeal artery
  - ❖ **Thyroid gland**: Superior thyroid artery
  - ❖ **Scalp**: occipital artery, posterior auricular artery and superficial artery

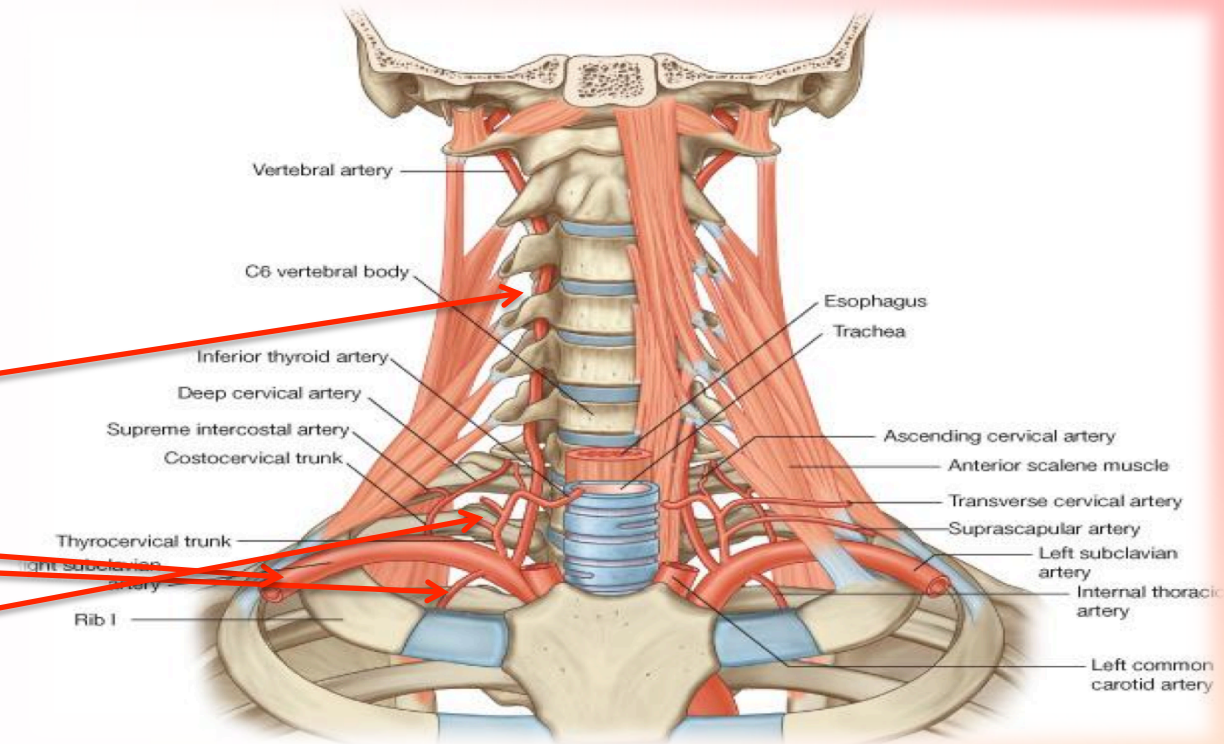


- Has **no** branches in the neck, it enters the cranial cavity, joins the **basilar artery** (*formed by the union of two vertebral arteries*) and forms **arterial circle of Willis** to supply **brain**.
- In addition, it supplies
  - **Nose**
  - **Scalp**
  - **Eye**



# Subclavian Artery

- **Origin:**
  - **LEFT:** from **arch of aorta**
  - **RIGHT:** from **brachiocephalic trunk**
- It continues, at lateral border of first rib, as **Axillary artery: artery of upper limb**
- **Main branches:**
  - **Vertebral artery:** supplies **brain & spinal cord**
  - **Internal thoracic artery:** supplies **thoracic wall and breast.**
  - **Thyrocervical trunk:** supplies **thyroid gland & neck**
- It is the main source of the arterial supply of the upper limb





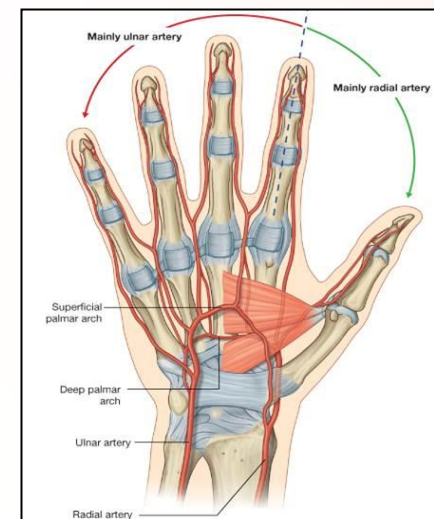
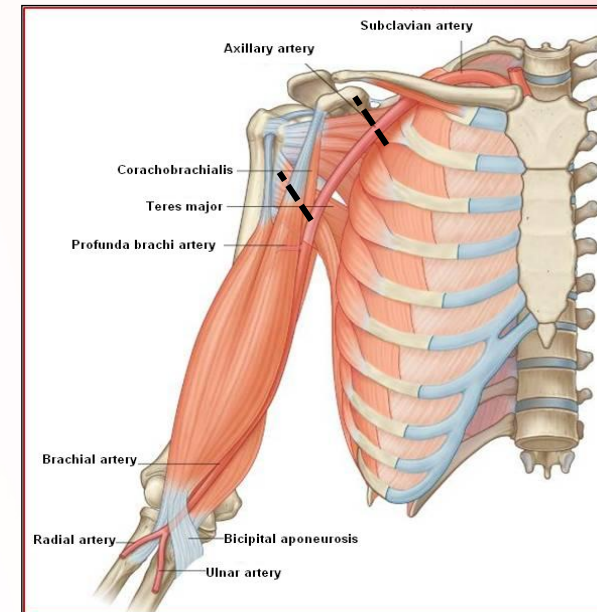
# Upper limb arteries

## Axillary artery

Begins at the **lateral border of the first rib**, as continuation of the subclavian artery, passes through the axilla and continues in the arm, **at the lower border of teres major muscle**, as the brachial artery.

## Brachial artery

Descends close to the medial side of the humerus, passes in front of the elbow joint (cubital fossa). Divides, **at the level of neck of radius**, into two terminal branches: **Ulnar & Radial**. **The** ulnar & radial arteries descend in the forearm, enter the hand and form the **palmer arches**



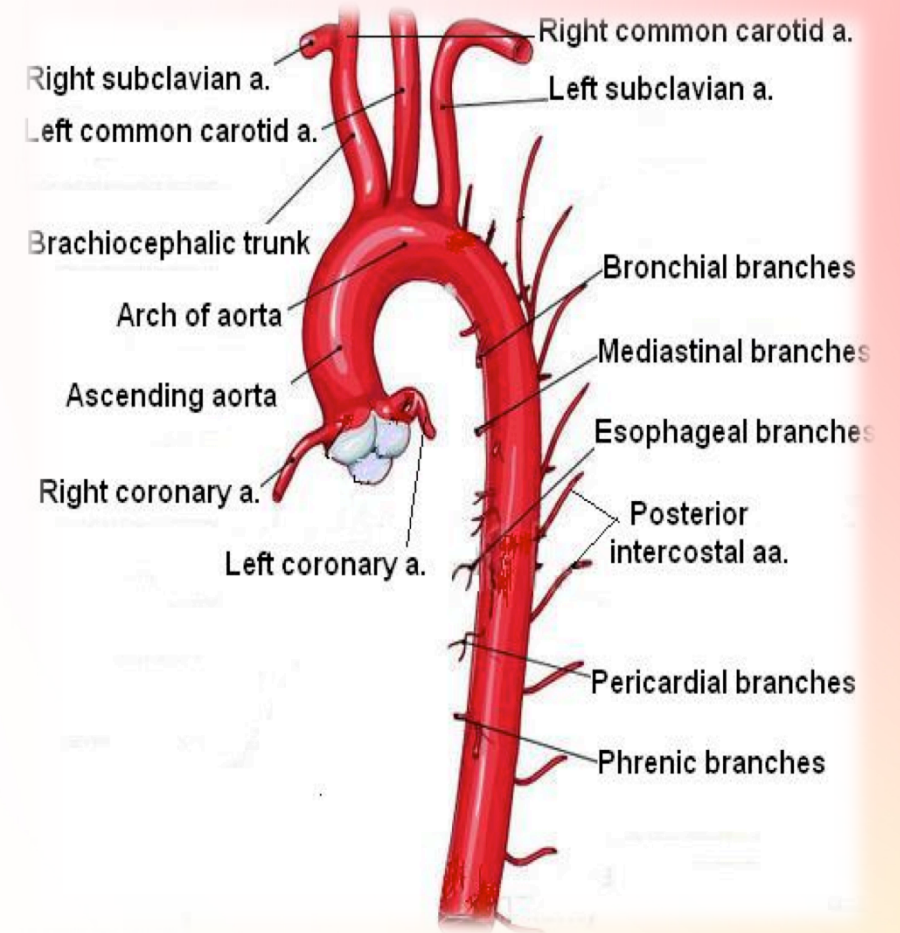
# Descending thoracic aorta and Abdominal aorta

## Descending thoracic aorta

- It is the continuation of aortic arch
- At the level of the **12<sup>th</sup> thoracic** vertebra, it passes through the diaphragm and continues as the abdominal aorta.
- Branches:
  - 1- **Pericardial**                      2- **Esophageal**
  - 3- **Bronchial**                         4- **Posterior intercostal.**

## Abdominal aorta

- It enters the abdomen through the **aortic opening of diaphragm**.
- At the level of lower border of **L4**, it divides into **two common Iliac arteries**.
- **Branches:** divided into two groups:
  - **Single branches :** ( supply gastrointestinal tract )
    - 1- **Celiac**                      2- **Superior and Inferior mesenteric arteries .**
  - **Paired branches:**
    - 1- **Inferior phrenic**    2- **Middle suprarenal**    3- **Renal**    4- **Gonadal.**
    - 5- **lumber**    6- **common iliac (terminal branch)**



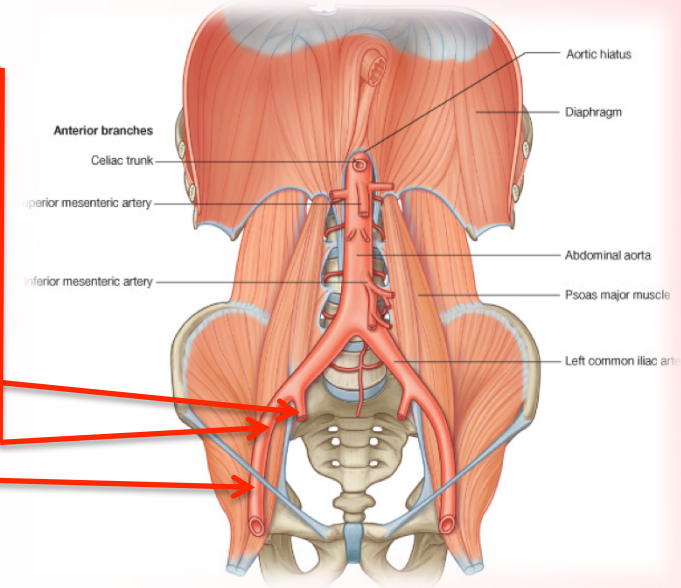
# Branches of Common Iliac Artery

## 1. External iliac artery:

Continues (at midpoint of inguinal ligament) as **femoral artery** the main supply for **lower limb**.

## 1. Internal iliac artery:

Supplies **pelvis and perineum**.



## Arteries of lower limb

### Femoral Artery :

Is the main arterial supply to lower limb

Is the continuation of external iliac artery **behind the midpoint of the inguinal ligament**

Passes **through adductor hiatus** and continues as:

### Popliteal artery

### Popliteal Artery :

Deeply placed in the **popliteal fossa**.

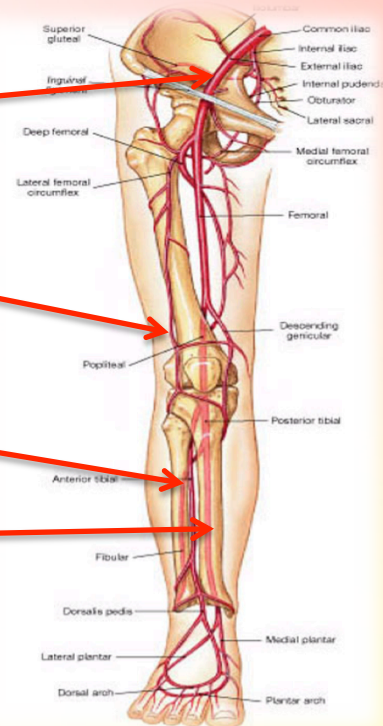
Divides, **at lower end of popliteal fossa** into:

### 1-Anterior tibial artery

continues as the **dorsalis Pedis** artery on the **dorsum of foot**

### 2-Posterior tibial artery

supply the **sole of foot**





# Summary

- The **Aorta** is the largest artery in the body and it carries blood to all parts of the body. **Ascending aorta** originates from the left ventricle, the branches of it are Right and Left coronary arteries that supply the heart. **Arch of aorta** is the continuation of Ascending aorta, it has three branches:
  1. Brachiocephalic trunk
  2. Left common carotid
  3. Left subclavian artery
- The **Common carotid artery** has two origins: Aortic arch from the left, and Brachiocephalic trunk from the right. **External carotid artery** supplies: Scalp, Face, Maxilla & Mandible, Tongue, pharynx and Thyroid gland. **Internal carotid artery** has no branches in the neck, it enters the cranial cavity, joins the basilar artery, and forms the arterial circle of Willis to supply brain.
- At the level of the **12<sup>th</sup> thoracic** vertebra, the **Descending thoracic aorta** passes through the diaphragm and continues as the **Abdominal aorta**. At the level of lower border of **L4**, Abdominal aorta divide into two common Iliac arteries.
- **External iliac artery** continue as femoral artery to supply the lower limb. **Popliteal artery** divide into : **Anterior tibial artery** and **Posterior tibial artery**.

# Questions

Answers: 1- A , 2- C , 3- C , 4- B , 5- B

**1 - Abdominal aorta will begin at:**

- A- T12.                      B- L4.  
C- S4.                        D- T7.

**2- Celiac artery is:**

- A- Paired abdominal A.                      B- Branch of left brachiocephalic A.  
C- Single abdominal artery.                D- Branch of renal A.

**3 - Gonads are supplied by branches of:**

- A- Descending aorta.                      B- External iliac A.  
C- Abdominal aorta.                        D- Femoral A.

**4 - The main supply of lower limb is:**

- A- Internal iliac A.                        B- Femoral A.  
C- Abdominal aorta.                        D- Brachial A.

**5- Has three dilatations at its base called aortic sinuses:**

- A- Arch of aorta.                        B- Ascending aorta.  
C- Abdominal aorta.                        D- Descending thoracic aorta.

For any comments  
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