MED441
KING SAUD UNIVERSITY

ANATOMY 441

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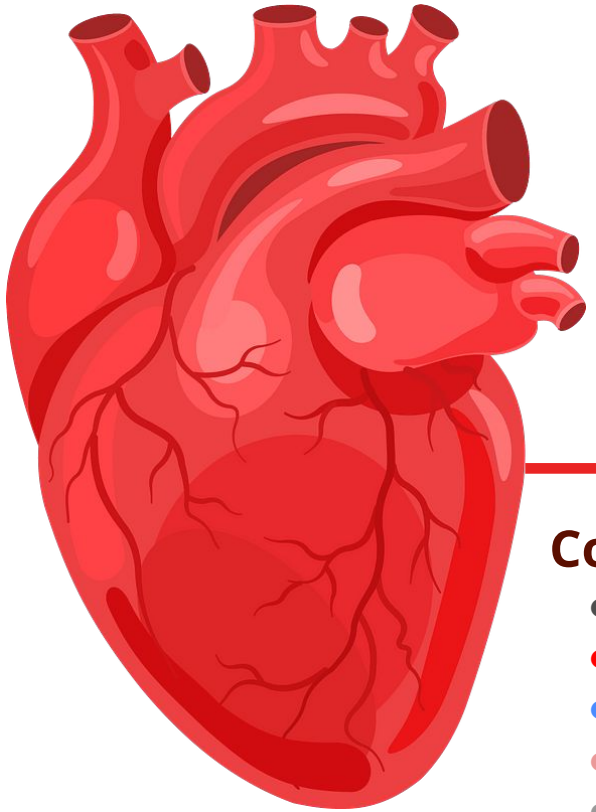
Faye Wael Sendi



Major arteries of the body

Color index:

- Main text
- **Important**
- **In male's slides only**
- **In female's slides only**
- Extra information, explanation
- **Doctors notes**

Editing file CVS

Objectives

01.

Define the word ‘artery’ and understand the general principles of the arterial system.

02.

Define arterial anastomosis and describe its significance

03.

Define end arteries and give examples

04.

Describe the aorta and its divisions & list the branches from each part.

05.

List major arteries and their distribution in the head & neck, thorax, abdomen and upper & lower extremities.

06.

List main pulse points

Introduction

- Blood vessels are the part of the circulatory system that transports blood throughout the human body.

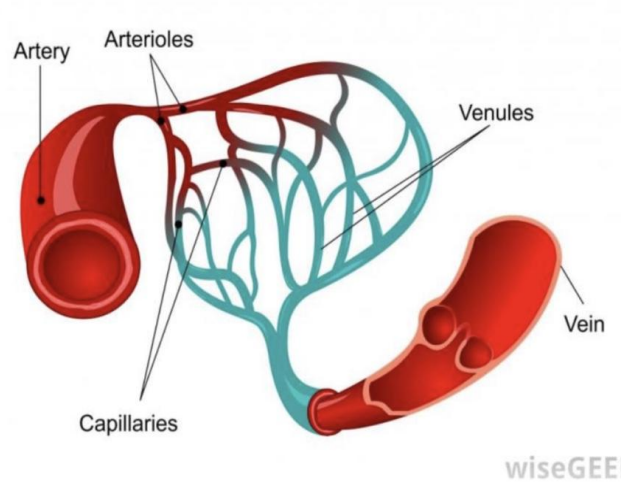
- The word vascular, meaning relating to the blood vessels, is derived from the Latin vas, meaning vessel.
  Avascular refers to being without (blood) vessels.

- There are three major types of blood vessels:

1. Arteries: which carry the blood away from the heart.

2. Capillaries: which enable the actual exchange of water and chemicals between the blood and the tissues.

3. Veins: which carry blood from the capillaries back toward the heart.

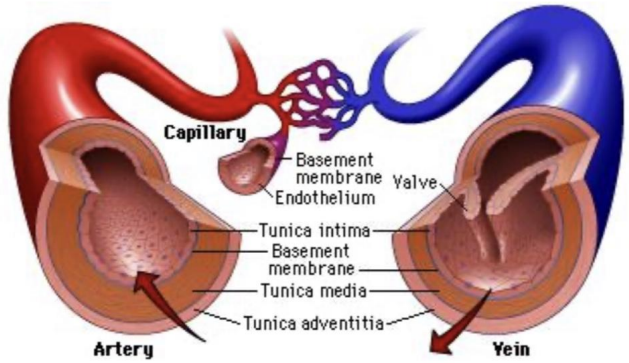


Microscopic Structure

- The arteries and veins have three layers, but the middle layer is thicker in the arteries than it is in the veins:

1. **Tunica Intima** (the thinnest layer): a single layer of simple squamous endothelial cells.
2. **Tunica Media** (the thickest layer in arteries): is made up of smooth muscle cells and elastic tissue.
3. **Tunica Adventitia** (the thickest layer in veins) entirely made of connective tissue.

- Capillaries consist of little more than a layer of endothelium and occasional connective tissue.



Arteries and their general principles

- Arteries are blood vessels that carry blood from the heart to the body.
- ALL Arteries carry **oxygenated** blood, EXCEPT the **PULMONARY** and umbilical arteries, carrying deoxygenated blood to the lung and to the placenta respectively.
- The flow of blood depends on the pumping action of the heart. (pulsation)
- Arteries have Elastic Wall containing NO valves

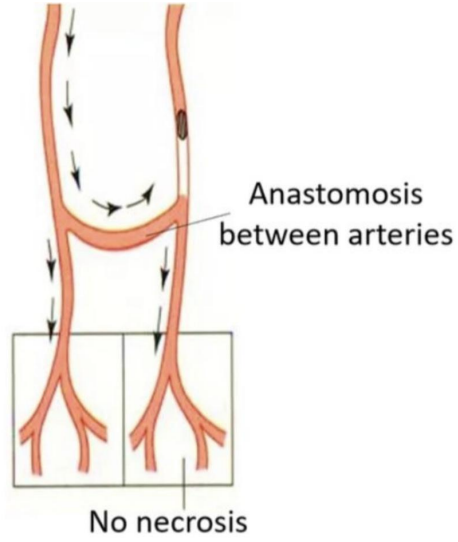
(because blood in arteries flows with gravity. However, in veins, there are valves because blood flows against gravity)

- Elasticity decreases with age resulting in atherosclerosis which raises the blood pressure.

✦ The branches of arteries supplying adjacent areas normally ANASTOMOSE with one another freely providing backup routes for blood to flow if one artery is blocked, e.g. arteries of limbs , GIT

Arteries form **branches** (تتفرع)

Veins form **tributaries** (تتجمع)



Extra picture:)

Only found in girls slides

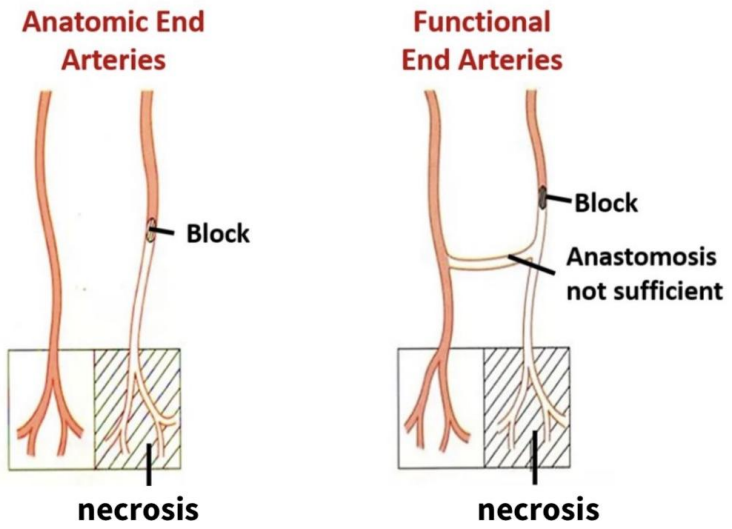
The arteries whose terminal branches do **NOT ANASTOMOSE** with branches of adjacent arteries are called **“END ARTERIES”.**
it has 2 types:

Anatomic (True) End Artery

When NO anastomosis exists, e.g.

- **artery of the retina.**

this artery is affected frequently in diabetic patients
If the branch is blocked, there will be no arterial supply which will lead to blindness.



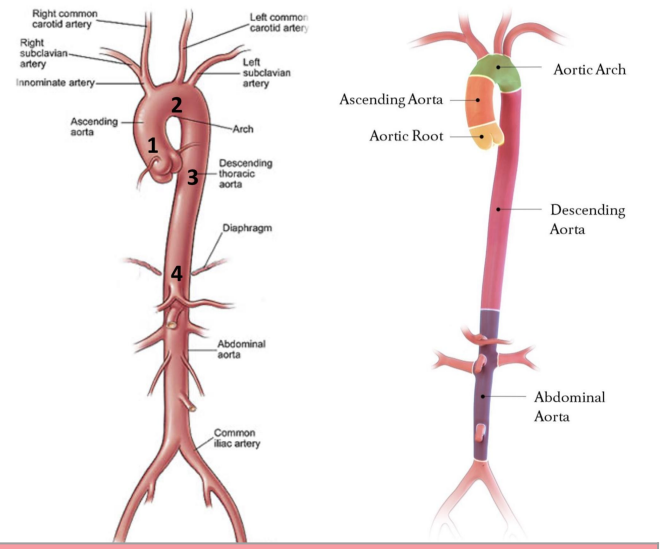
Extra picture:)

Functional End Artery

When an anastomosis exists but is incapable of providing a sufficient supply of blood,
e.g.

- splenic artery
- renal artery.

Aorta :



- The **largest** artery in the body.
- Carries oxygenated blood to all part of the body.
- The Aorta begins in the thorax and ends in the abdomen
- Divided into 4 parts:
  1. Ascending aorta 2 .Arch of aorta
  3. Descending aorta 4. Abdominal aorta

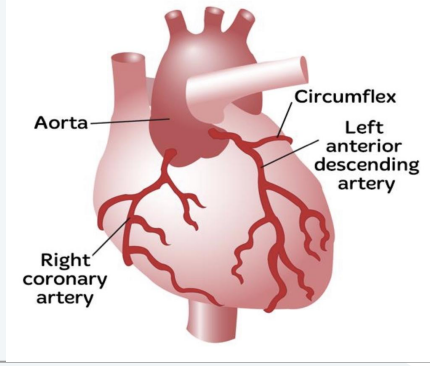
Ascending aorta

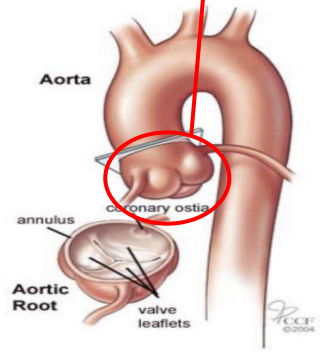
- Originated from **left ventricle** .
- Ascends upward until sternal angle.
- Continues as the **arch of aorta** .
- Has 3 dilatations at its base called aortic sinus .

❖ **Branches :**

1. Right coronary arteries
2. Left coronary arteries

} supplying heart,arise from aortic sinuses



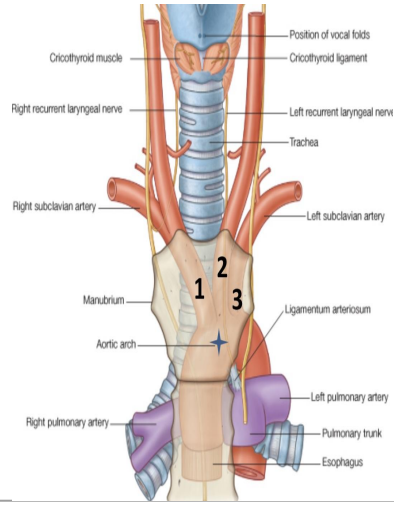


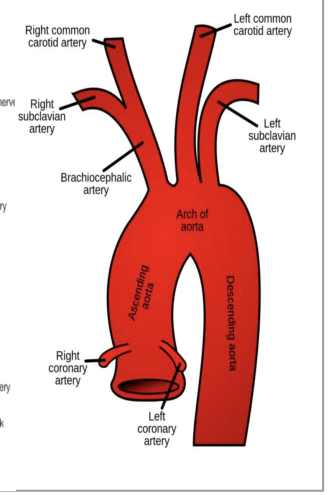
Arch of aorta

- Originates from **left ventricle.**
- Continuation of the ascending aorta . (at the level of T4)
- Leads to descending aorta .
- located **behind the lower part of manubrium sterni** and on the left side of trachea .

❖ **Branches :**

1. Brachiocephalic trunk :
   - o Right Subclavian artery
   - o Right Common Carotid artery
2. Left common carotid artery .
3. Left subclavian artery .





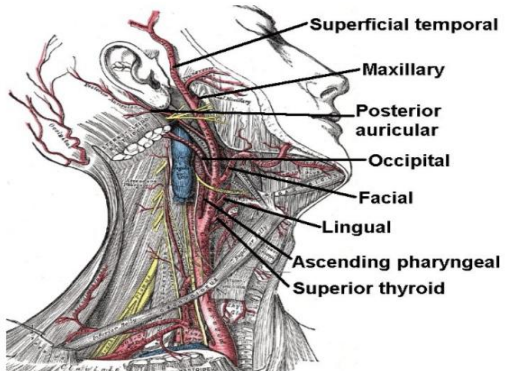
Common Carotids artery

- **Origin:** ★ **LEFT** from **aortic arch** ☆**RIGHT** from **brachiocephalic trunk**.
- carotid divides into two branches:

External carotid

It divides **behind neck of mandible** into:
Superficial temporal & maxillary arteries
It supplies:

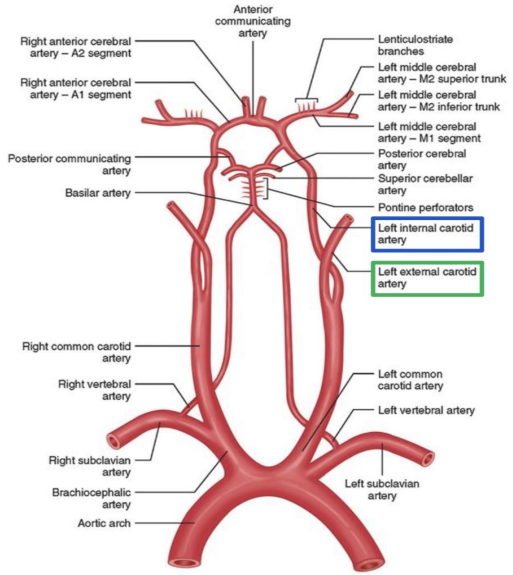
- **Scalp**:
  1. Superficial temporal artery
  2. Occipital artery
  3. posterior auricular arteries
- **Face**: Facial artery
- **Maxilla & mandible**: Maxillary artery
- **Tongue**: Lingual artery
- **Pharynx**: ascending pharyngeal artery
- **Thyroid gland**: Superior thyroid artery



Mnemonic: from bottom to top

Some American Ladies Found Our Pants So Magnificent

Some Anatomists Like Freaking Out Poor Medical Students

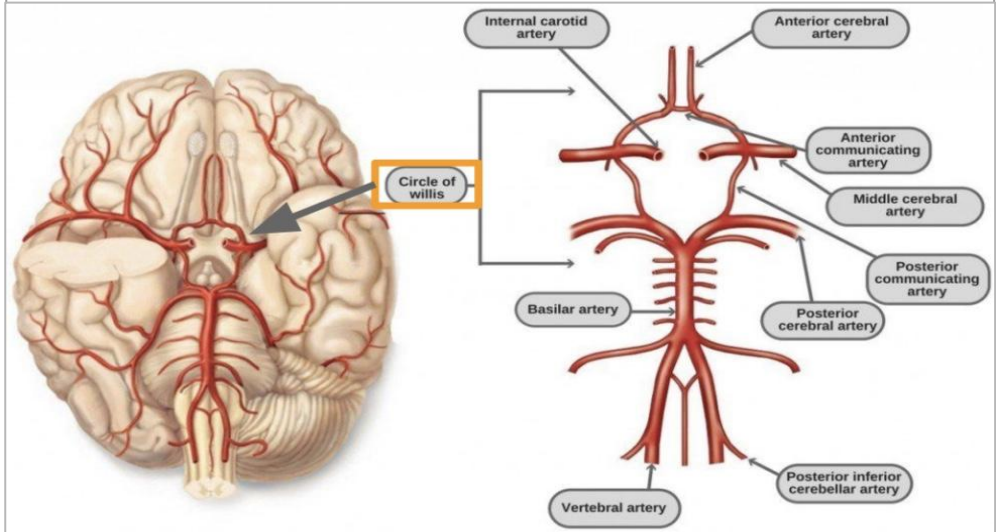


Internal carotid

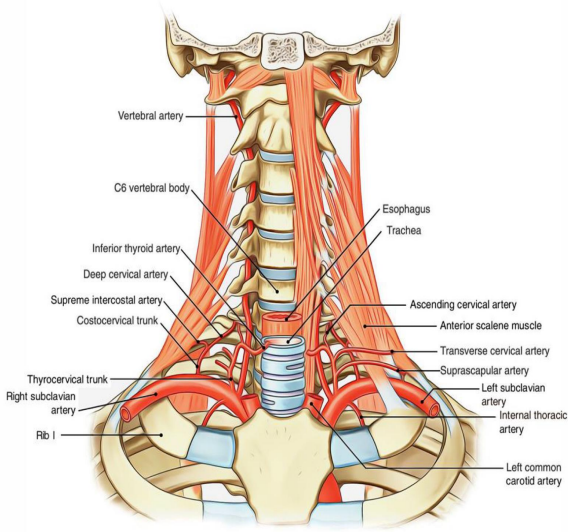
- Has NO branches in the neck
- Enters the cranial cavity,
- joins the basilar artery (formed by the union of two vertebral arteries) and forms

'arterial circle of Willis' to supply :

1. **brain**
2. Nose (anterior and posterior ethmoidal)
3. Scalp (supraorbital artery)
4. Eye (ophthalmic artery)



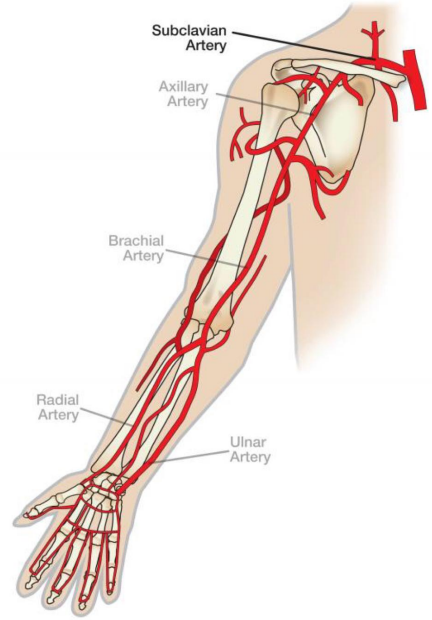
Subclavian Artery (Arteries of the upper limb)



- **Origin:**
  Left: from arch of aorta.
  Right: from brachiocephalic trunk

- **Main branches of subclavian artery :**
  1. **Vertebral artery:** supplies brain and spinal cord
     (ascends in vertebral canal through foramen transversarium of cervical vertebra)
  2. **Internal thoracic artery**: (also called internal mammary) supplies thoracic wall
     (it's give anterior intercostal arteries)

Axillary Artery



At lateral border of the first rib, it is continuous in the axilla as the Axillary artery

- **It is the source of the arterial supply of the upper limb.**

Axillary artery is the continuation of the subclavian artery.

Beyond the lower margin of teres major muscle, the axillary artery become brachial artery.

It descends close to the medial side of the humerus to the cubital fossa to divide into:

1. **Radial artery: The smaller terminal branch**
2. **Ulnar artery: The larger terminal branch**

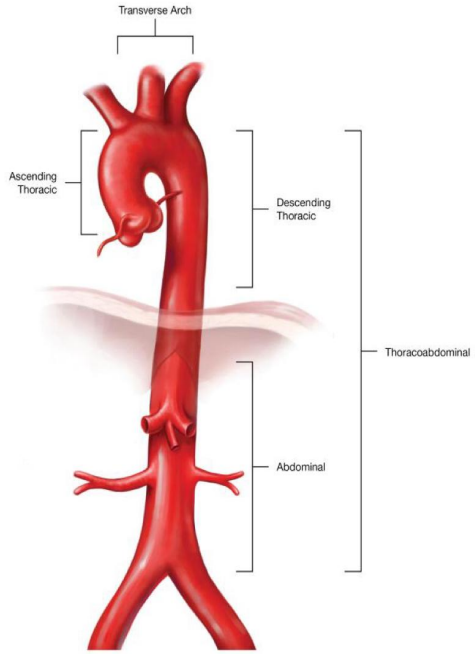
The superficial and deep palmar arches are formed by both ulnar & radial arteries.

Descending thoracic and Abdominal aorta

Descending thoracic aorta:

- It is the continuation of the **aortic arch**
- At the level of the **T12**, it passes through the diaphragm and continues as the **abdominal aorta**

- Descending thoracic Aorta begins at the sternal angle and ends at T12.



Branches:

- Pericardial
- Esophageal
- Bronchial
- Posterior intercostal

- Descending thoracic Aorta supplies the whole thorax except the heart.

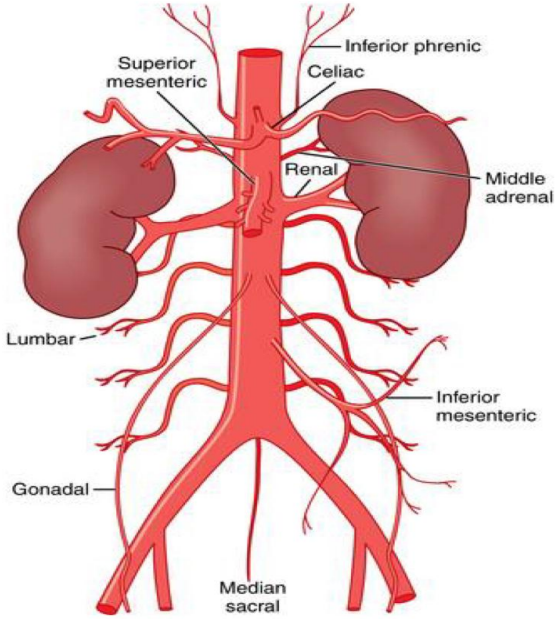
Abdominal Aorta:

- 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:

1. Single Abdominal Branches
2. Paired Abdominal Branches

- Abdominal Aorta begins at T12 and ends at L4.

(Discussed in detail next slide)



Single and Paired Abdominal Branches

Single Abdominal Branches:

"SUPPLYING GASTROINTESTINAL TRACT"

▪ Celiac Trunk at T12

- Left gastric artery to stomach
- Hepatic artery to liver and pancreas
- Splenic artery to spleen

▪ Superior Mesenteric Artery at L1

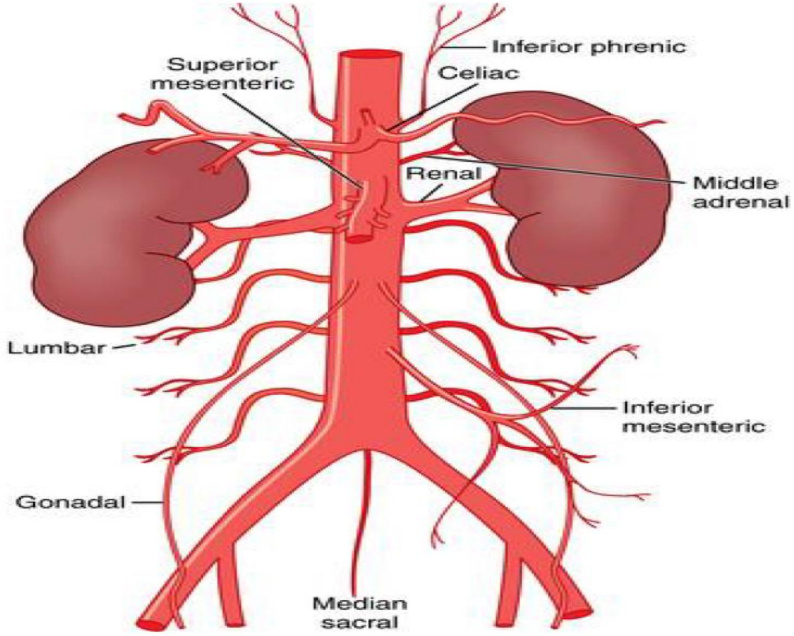
- Pancreas
- Small and large intestine
- Right 2/3 of Transverse Colon

▪ Inferior Mesenteric Artery at L3

- Large intestine
- Left 1/3 of transverse colon & descending colon
- Rectum and anal canal

Paired Abdominal Branches:

- Gonadal arteries (Testicular and Ovarian)
- Renal arteries
- Suprarenal arteries
- Common Iliac arteries



Common iliac artery

BRANCHES OF COMMON ILIAC ARTERY

Internal Iiac Artery:

It supplies the following organs in **pelvic** region:

- Uterus
- Vagina
- Pelvic Walls
- Perineum
- Rectum & Anal canal
- Urinary Bladder

EXTERNAL ILIAC ARTERY:

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

Arteries of the lower limb

The text that is in blue color is extra from male's slides

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

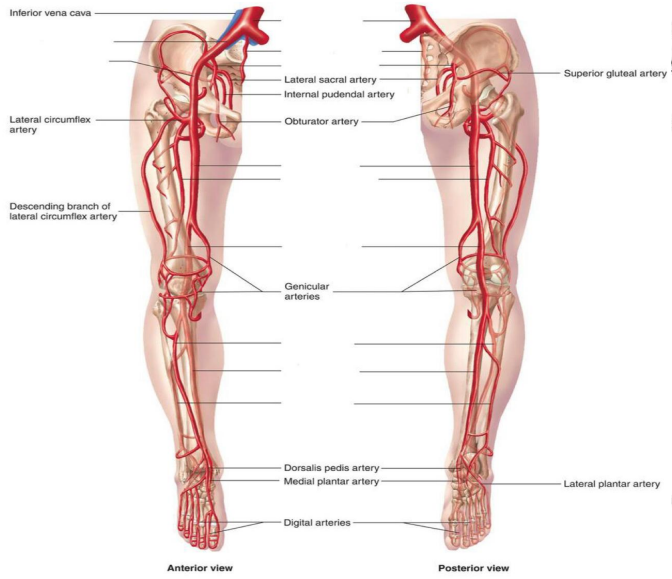
- Deeply placed in the popliteal fossa.
- Divides, at lower end of popliteal fossa into:

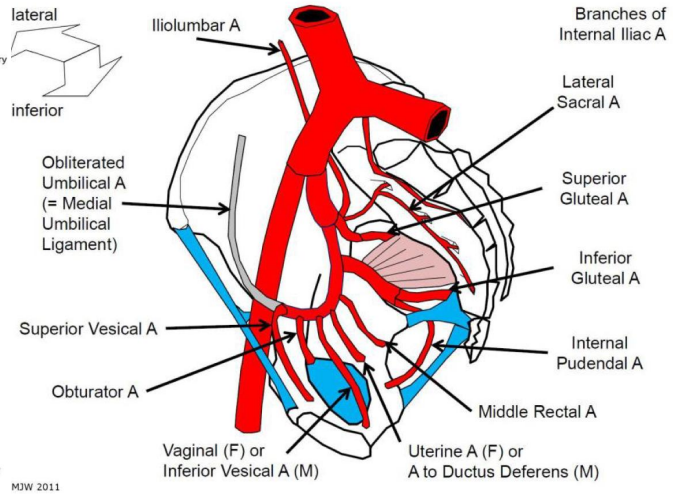
1-Anterior Tibial Artery forms dorsalis pedis artery

2-Posterior Tibial Artery forms sole of foot

The Abdominal Aorta terminates, at the level of the 4th lumbar vertebra into:

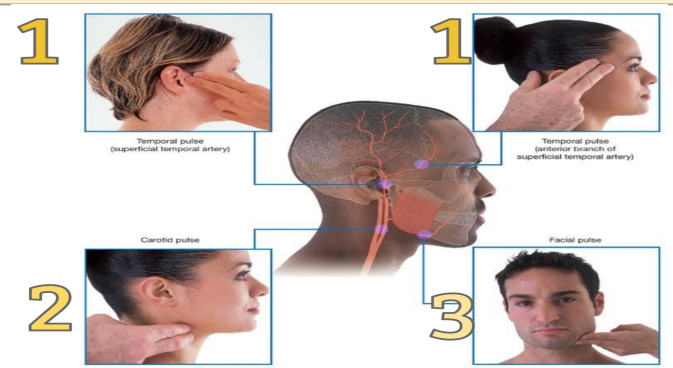
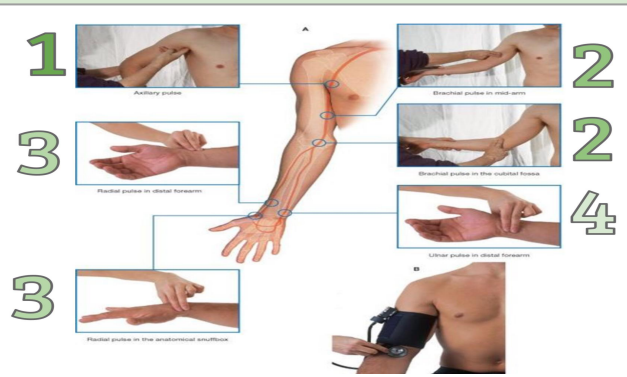
- Right common iliac artery
- Left common iliac artery
  - Each divides into external & internal iliac arteries
- Internal supplies the pelvic region
- External supplies the lower limbs





Extra: Subclavian Pulse
(as it crosses the first rib) found in male slides.

Main Pulse Point

Head and Neck	Upper Limb	Lower limb
1. Temporal pulse • Superficial temporal artery (in front of the ear) • Anterior branch of Superficial temporal artery 2. Carotid pulse (just below the angle of the mandible) 3. Facial pulse (in front of the masseter muscle)	1. Axillary pulse (lateral wall of the axilla) 2. Brachial pulse in • mid arm • cubital fossa (medial to the biceps tendon) 3. Radial pulse in : • distal forearm (lateral to FCR) • anatomical snuffbox 4.Ulnar pulse (lateral to FCU in the)	1. Femoral pulse (just below the midpoint of the inguinal ligament) 2. Popliteal pulse (center of the popliteal fossa) 3. Posterior tibial (Behind and below the medial malleolus) 4. Dorsalis pedis pulse (Between the 1st and 2nd metatarsal bones, lateral to EHL)
		

Arterial Anastomosis and its Sites

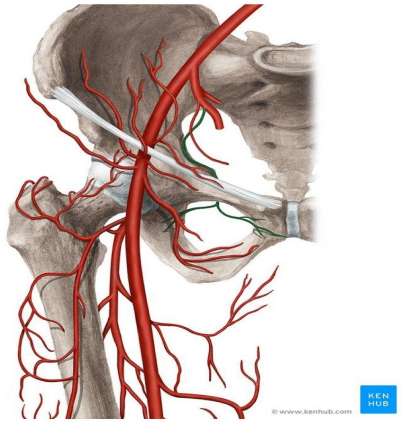
Arterial Anastomosis:

- Anastomosis is the connection of two structures.
- Arterial anastomosis is the joining of branches of arteries supplying adjacent areas.
- What is the main reason for having an arterial anastomosis?

• To have multiple supply to a region (so in case one artery is blocked, the distal region is still perfused)

- Anatomic end arteries

• Their terminal branches do not anastomose with branches of adjacent arteries



Sites of Anastomosis:

- In the upper limb

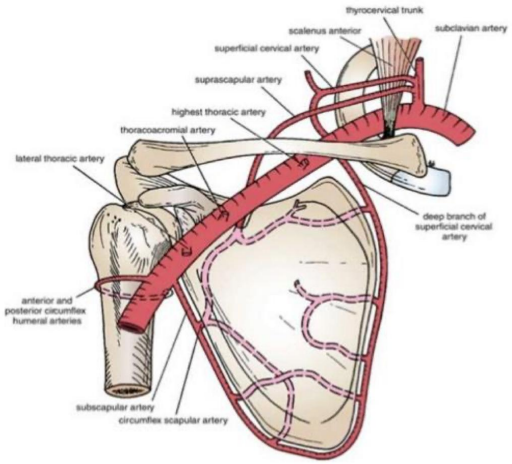
• Scapular anastomosis between branches of Subclavian and Axillary

- Around the elbow

• Brachial, Radial and Ulnar

- In the lower limb

• Trochanteric & Cruciate to provide anastomosis between internal iliac and f



TEST YOURSELF!

Q1: Explain the difference between the types of end arteries. Give examples on each.
A: 1- Anatomical end arteries: no anastomosis exists. Ex: artery of the retina 2- Functional end arteries: when an anastomosis exists but is incapable of supplying a sufficient supply of blood. Ex: splenic artery, renal artery.
Q2: what is the location of the arch of Aorta? What are its branches?
A: The arch of aorta is located behind the lower part of manubrium sterni and on the left side of trachea. 1- brachiocephalic trunk: -right common carotid artery -right subclavian artery 2-left common carotid artery 3-left subclavian artery

THANK YOU !

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Click here for questions done by Q Bank team!