

MUNI

ARTERIES

introduction into vascular system and overview of the arteries

Lecture is commented by RNDr. Michaela Račanská, Ph.D.

BLOOD VESSELS

Arteriae (terminales, collaterales)

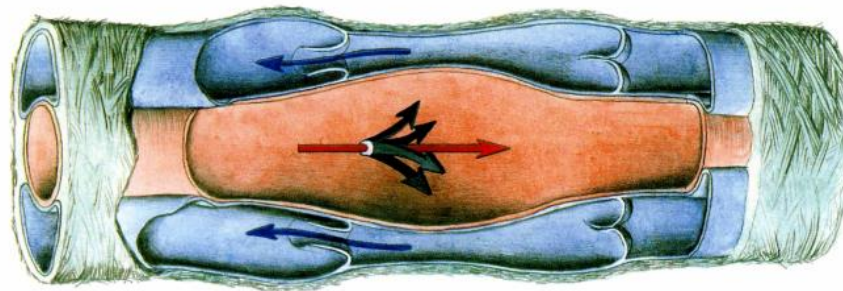
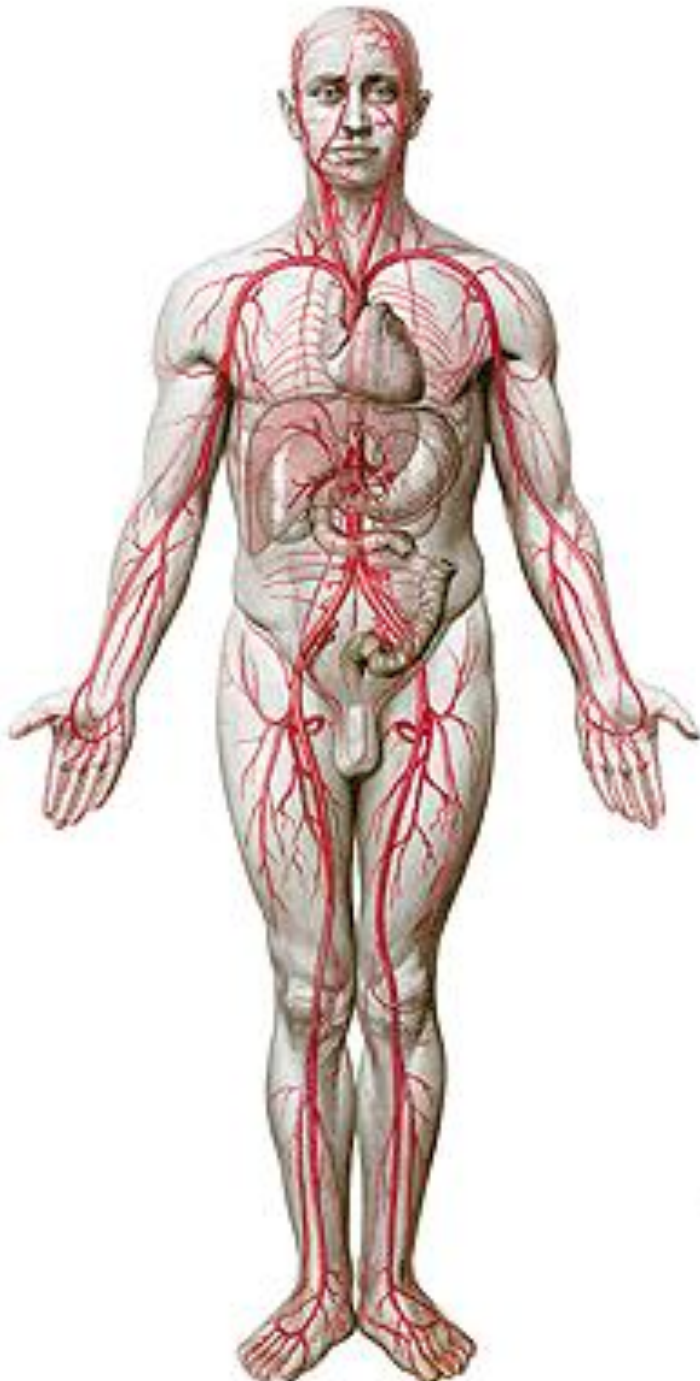
Arteriolae

Vasa capillaria (7-15 μm)

Venulae

Venae

Anastomoses

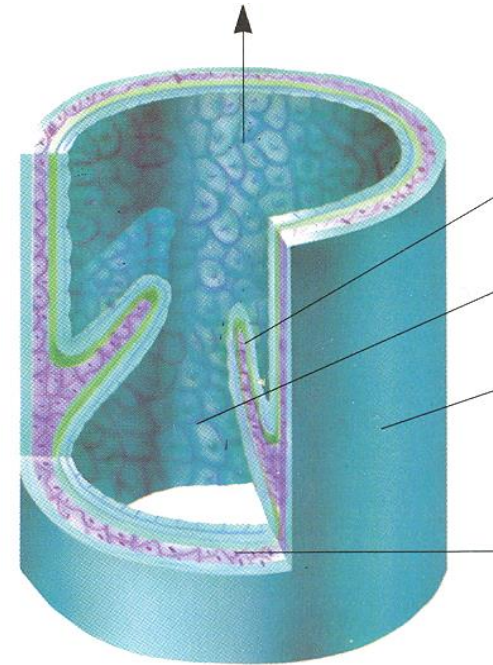


Veins

Tunica intima

Tunica media

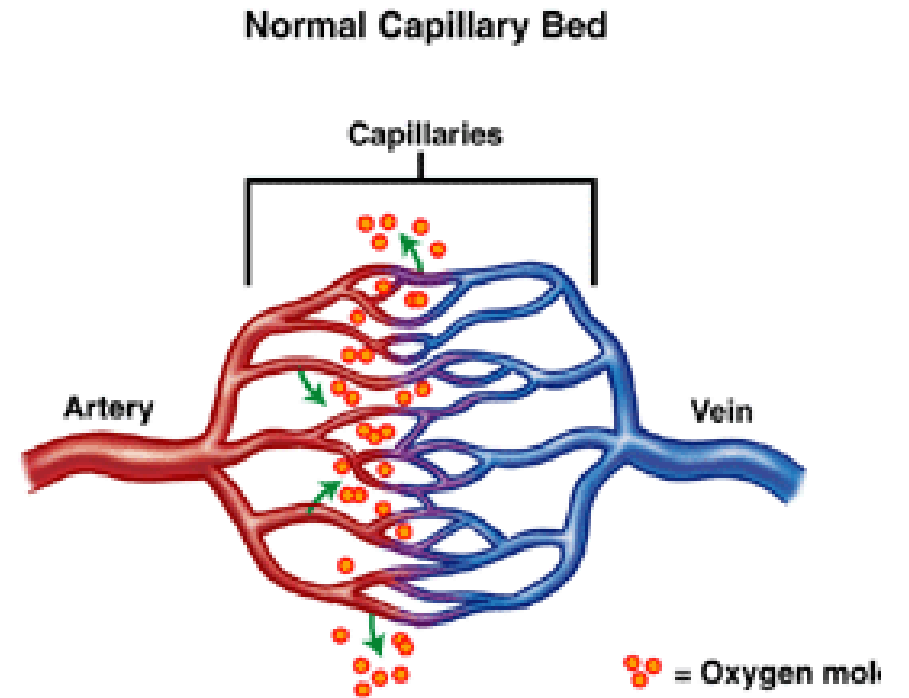
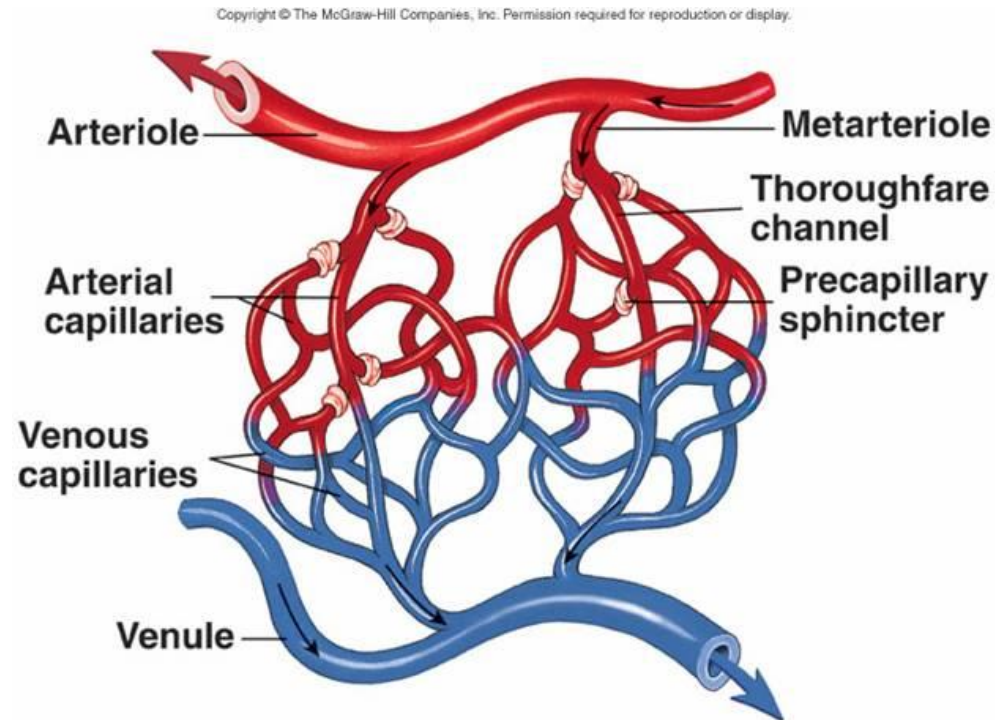
Tunica externa



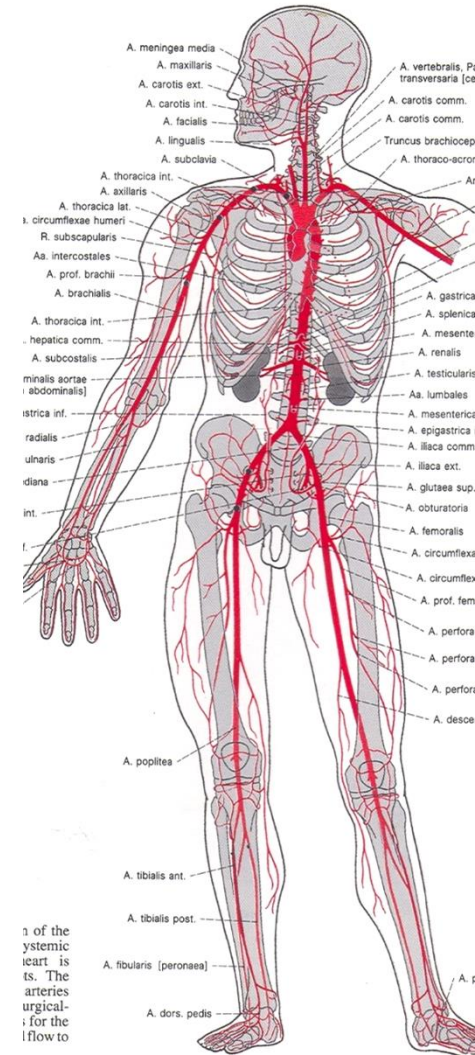
• the valves

The capillars

– the connection between the arteries and veins, the exchange of the substances between the blood and the tissues



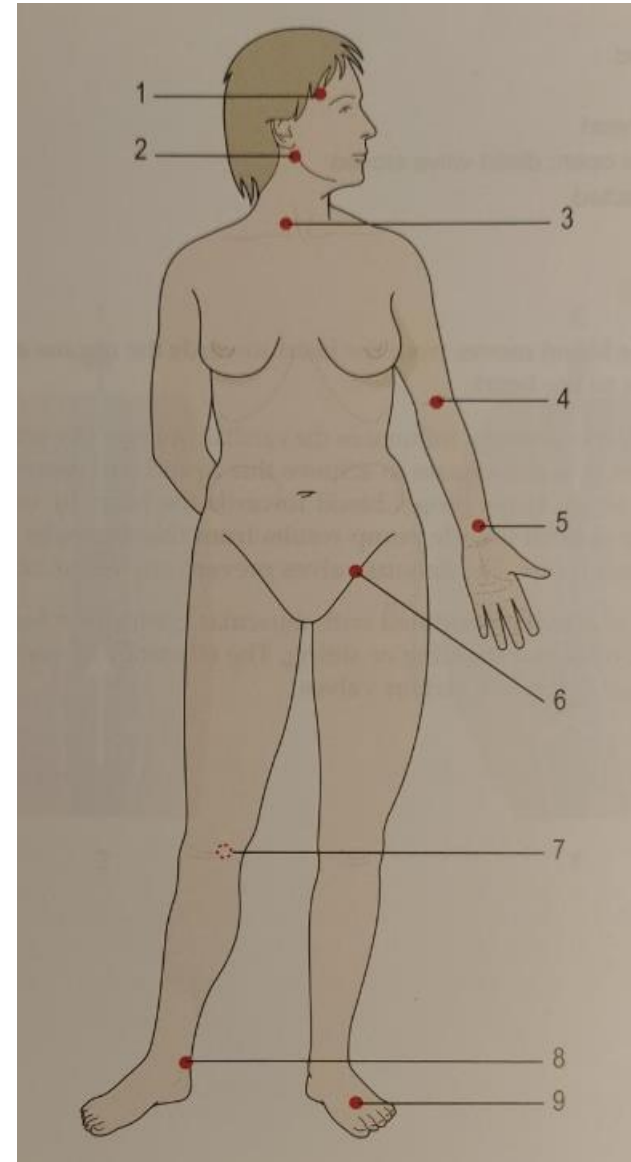
ARTERIES



of the systemic heart is ts. The arteries urgical- i for the lflow to

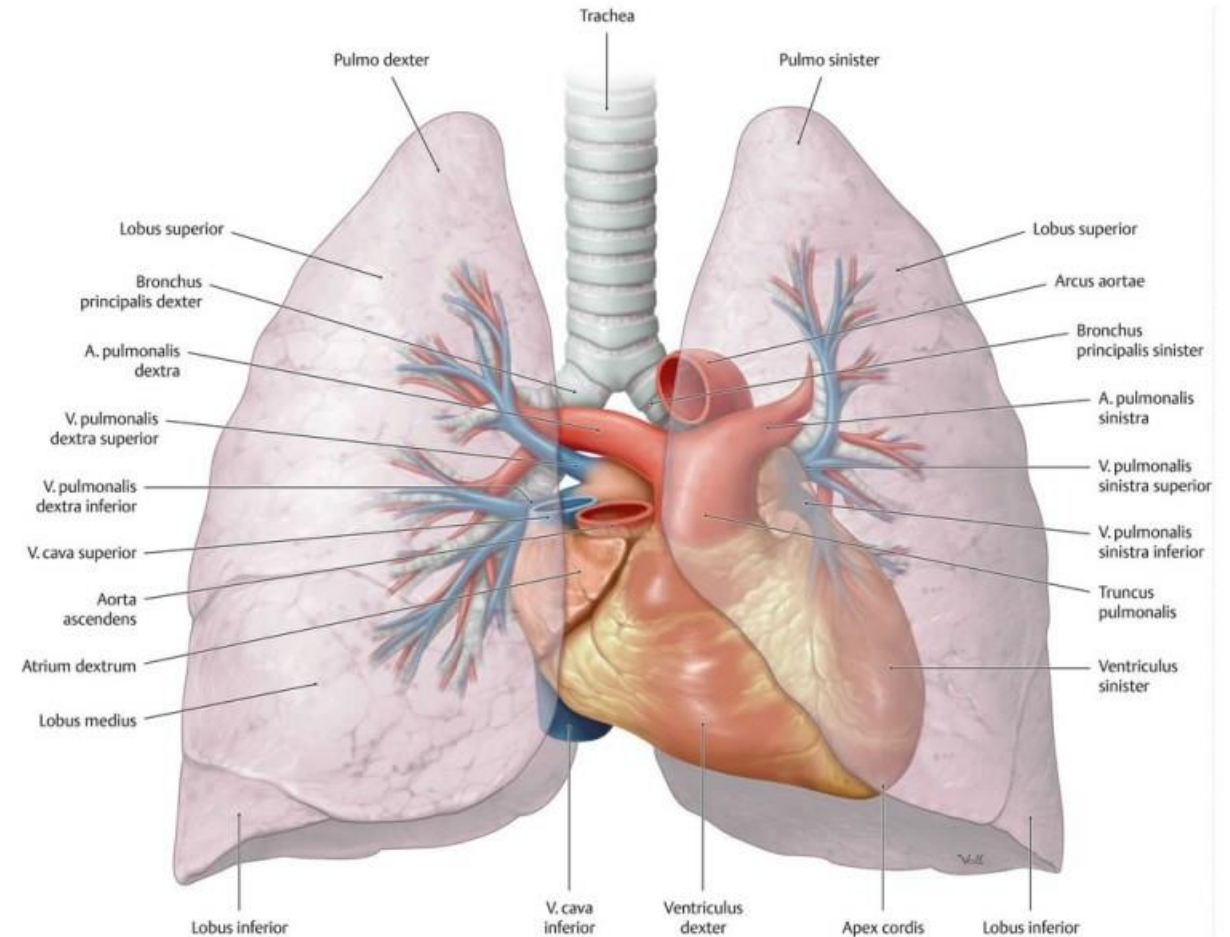
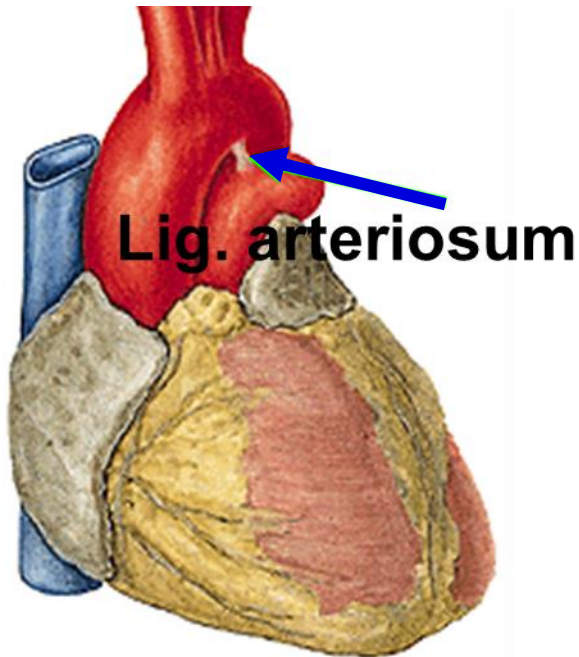
PULS

Each contraction of the left ventricle propels the 60-80mL into the aorta that is distended. The distention is propagated as a wave that is carried along the arteries. The distention wave can be felt clinically when a superficial artery is pressed against a bone. **Pulse frequency is about 70/min at rest.**



PULMONARY CIRCULATION -TRUNCUS PULMONALIS

- arteria pulmonalis dx. et sin.
- vv. pulmonales dextrae et sinistrae (sup. et inf.)
- lig. arteriosum (ductus arteriosus)



ARTERIAL CIRCULATION the Aorta

Aorta ascendens:

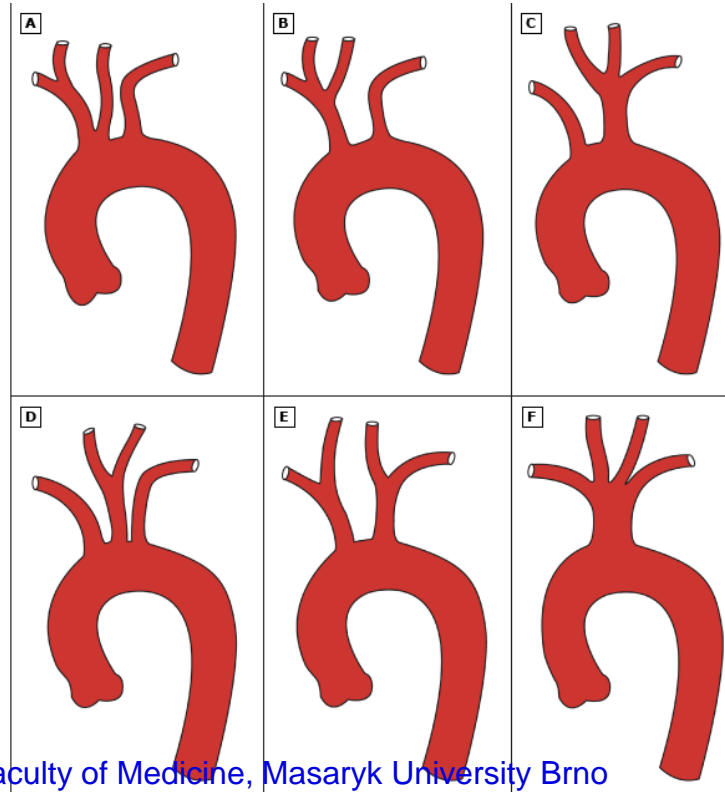
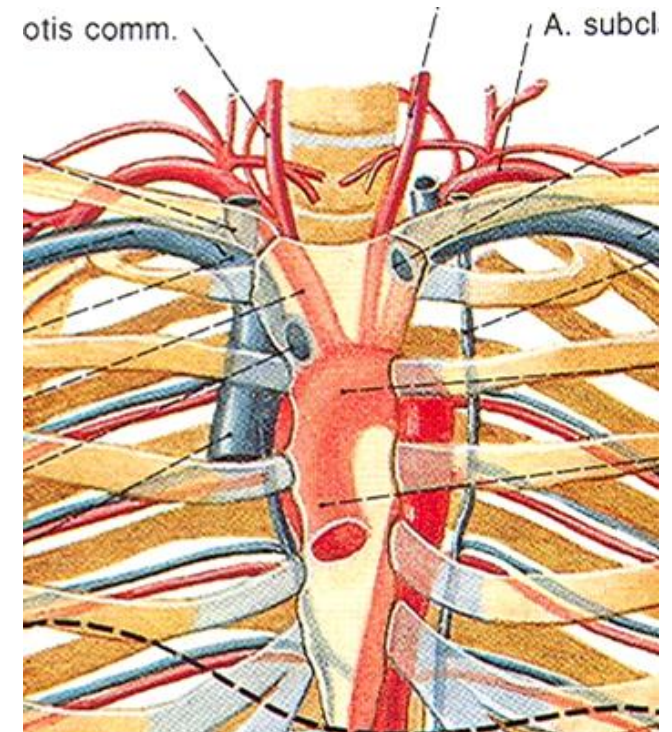
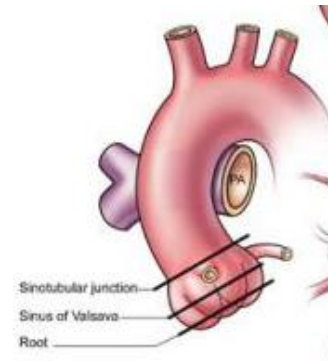
ventriculus sin. - 2. art. sternocostalis dx.
a. coronaria cordis dx. and sin.

Arcus aortae:

2. art. sternocostalis dx. - left side of Th₃
- truncus brachiocephalicus
(a. carotis communis dx.+ a. subclavia dx.)
 - a. carotis communis sin.
 - a. subclavia sin.

Aorta descendens:

Th₃ – L₄
Aorta thoracica
Aorta abdominalis (separated by the diaphragm)



1) A. carotis externa

the anterior branches:

- a. thyroidea sup. - for the thyroid gland
- a. lingualis – for the tongue
- a. facialis - regions of the face (the mimic muscles)

the lateral branches:

- a. sternocleidomastoidea

the posterior branches:

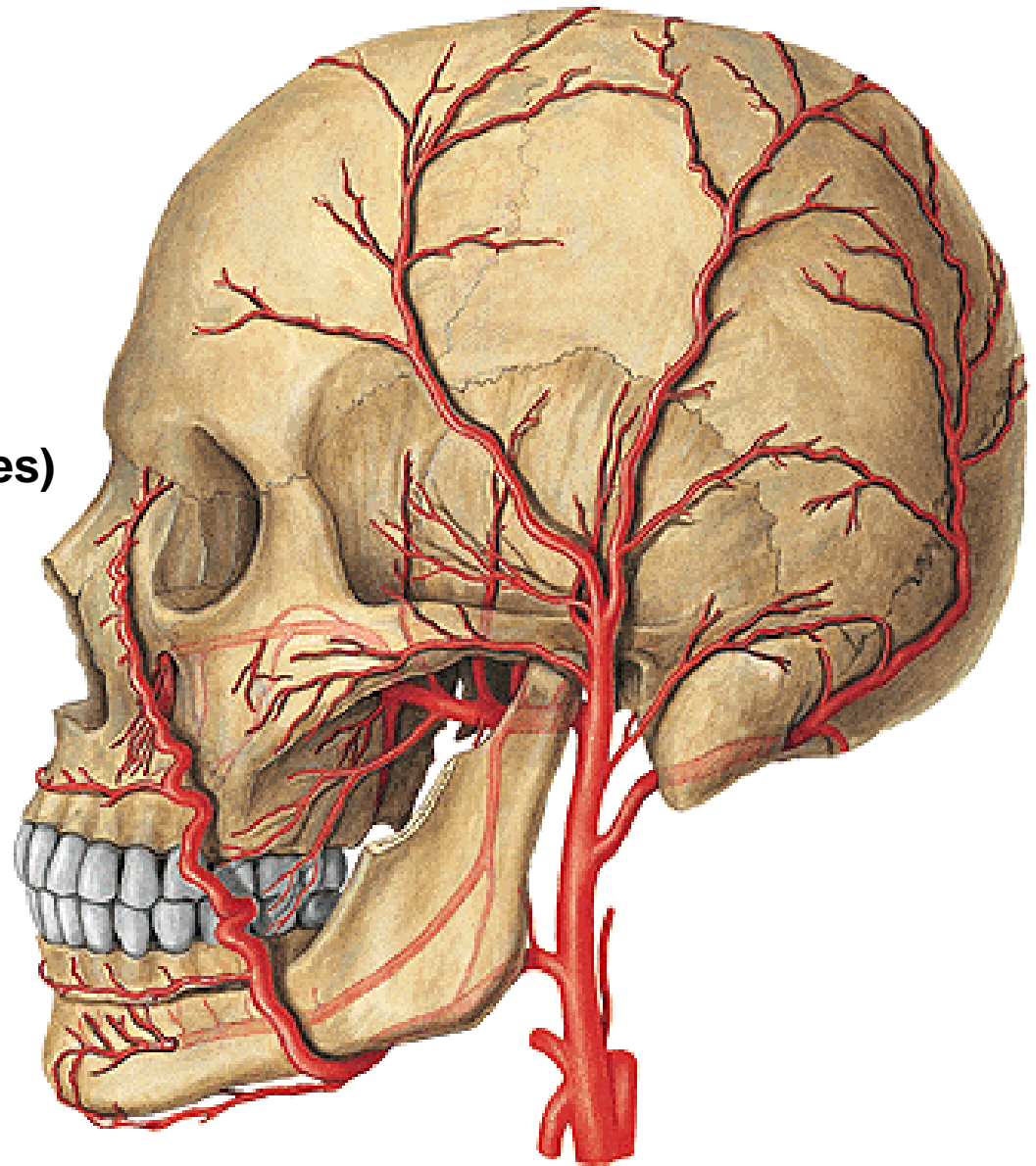
- a. occipitalis
- a. auricularis posterior

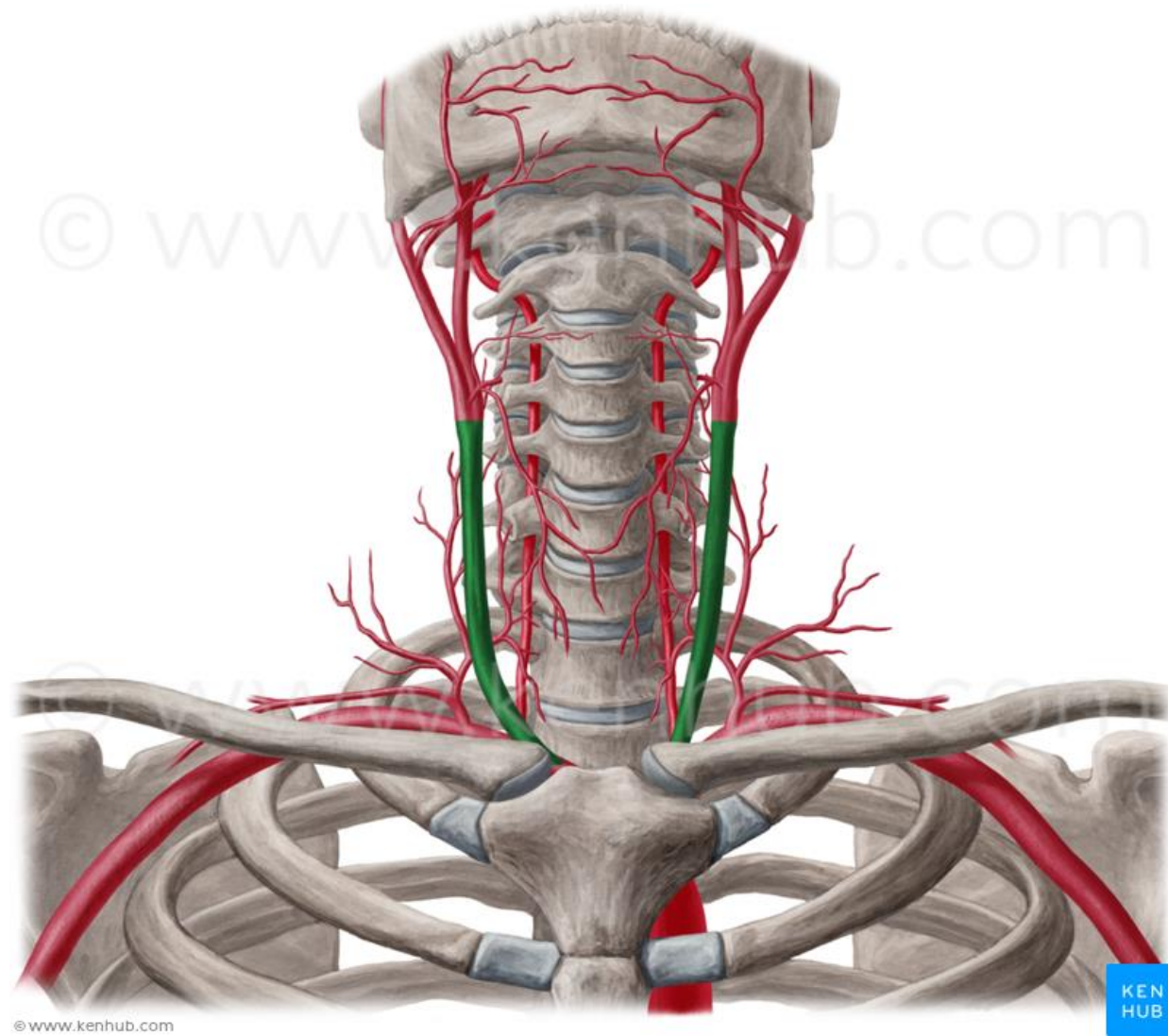
the medial branches:

- a. pharyngea ascendens

the terminal branches:

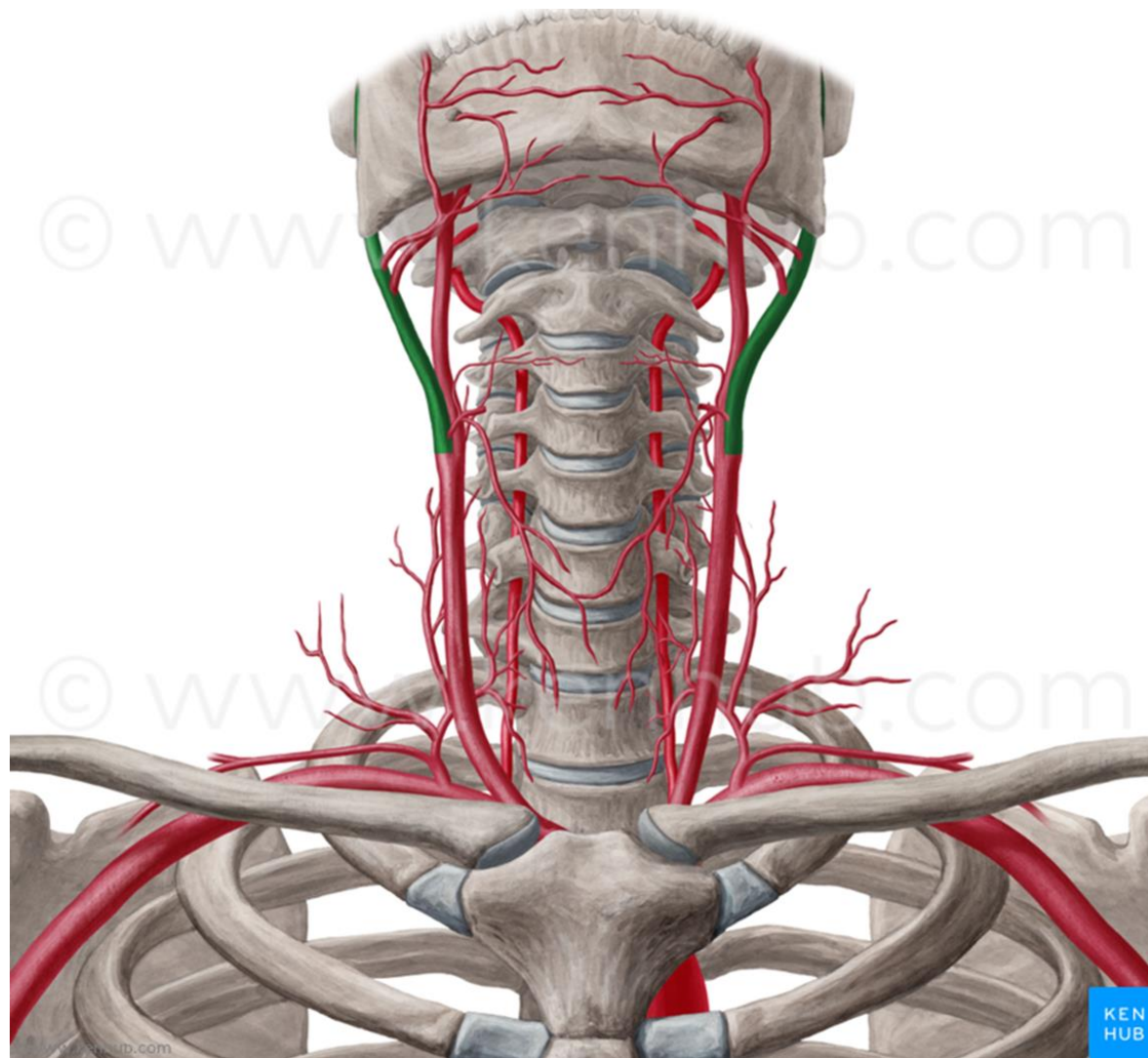
- a. temporalis superficialis
- a. maxillaris (the masticatory muscles)

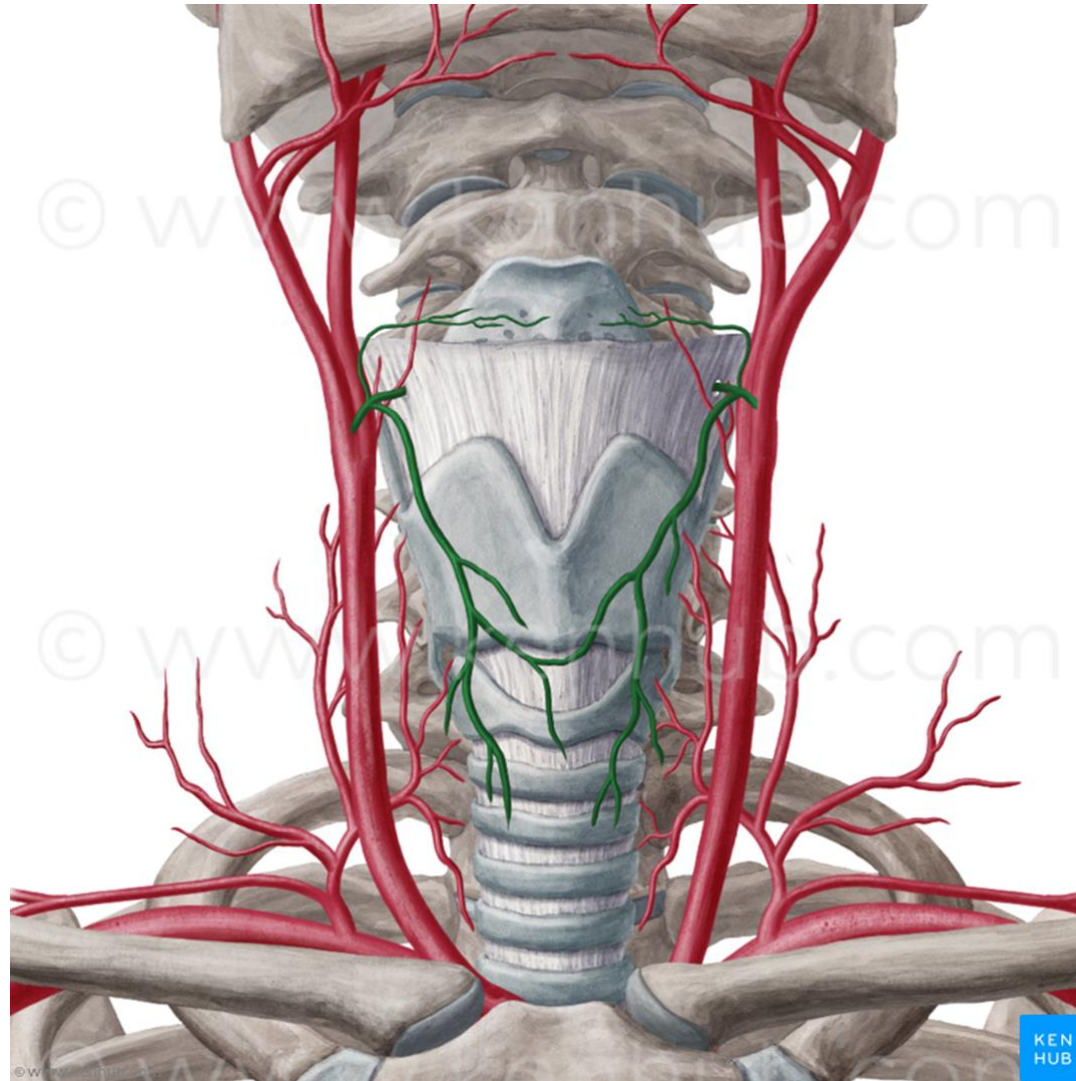


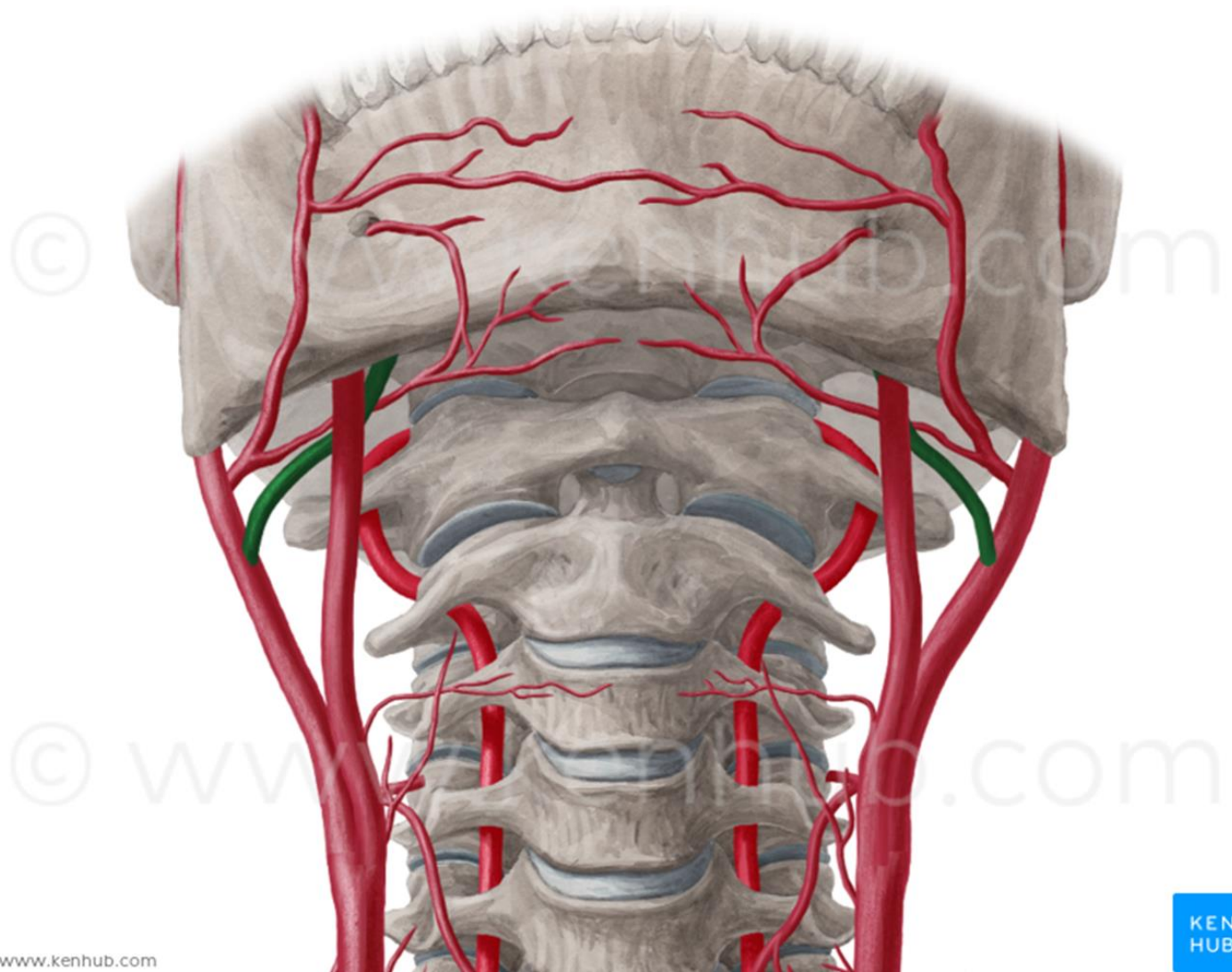


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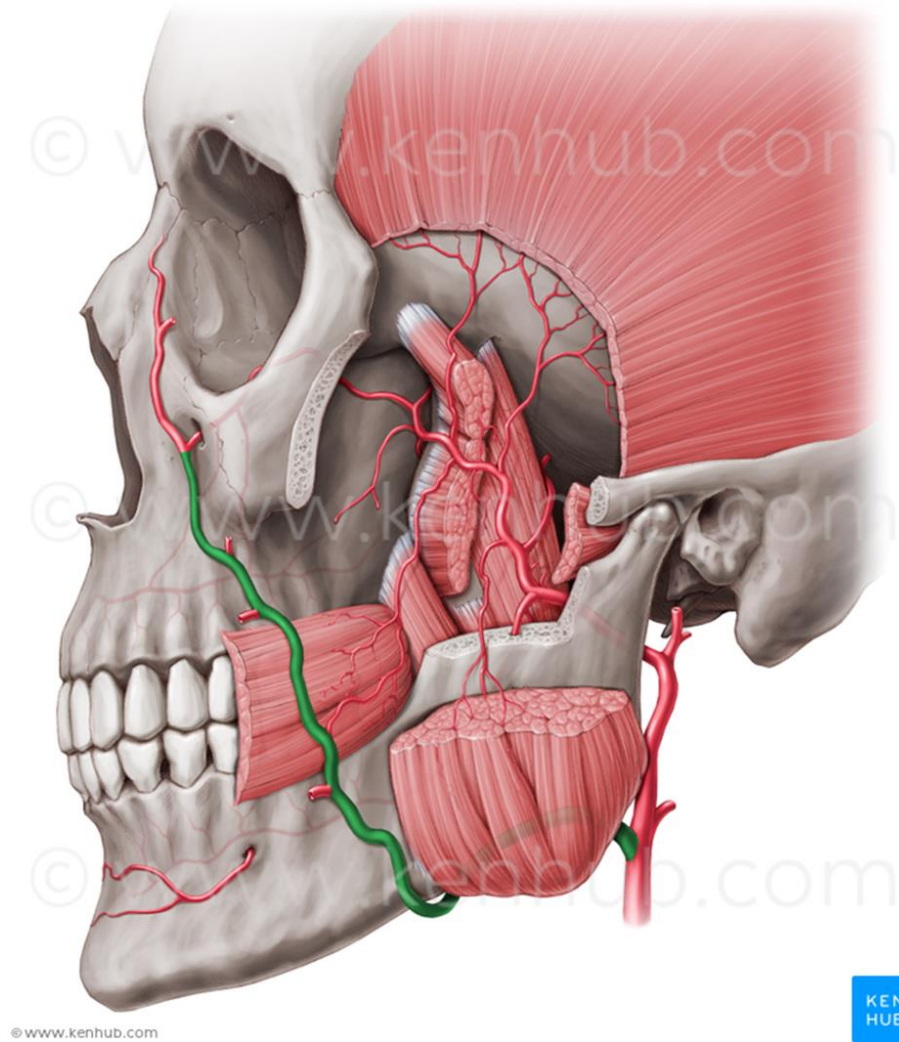




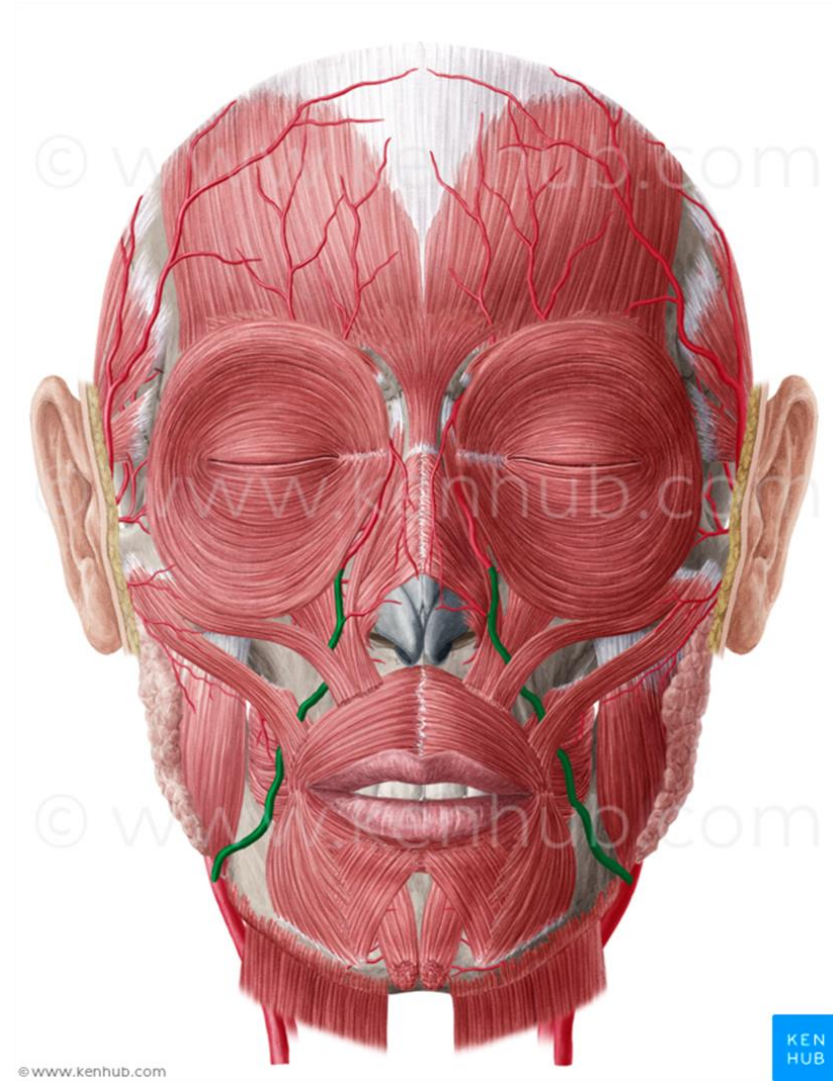


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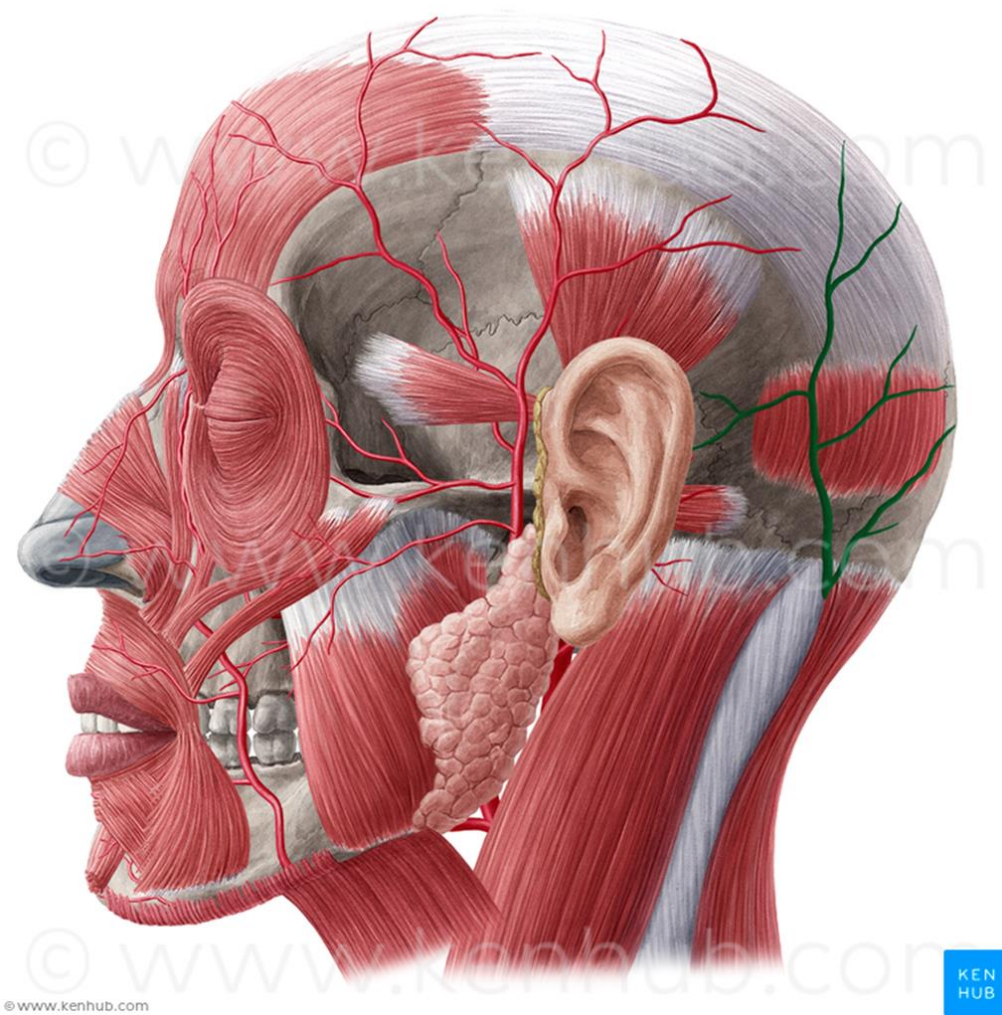


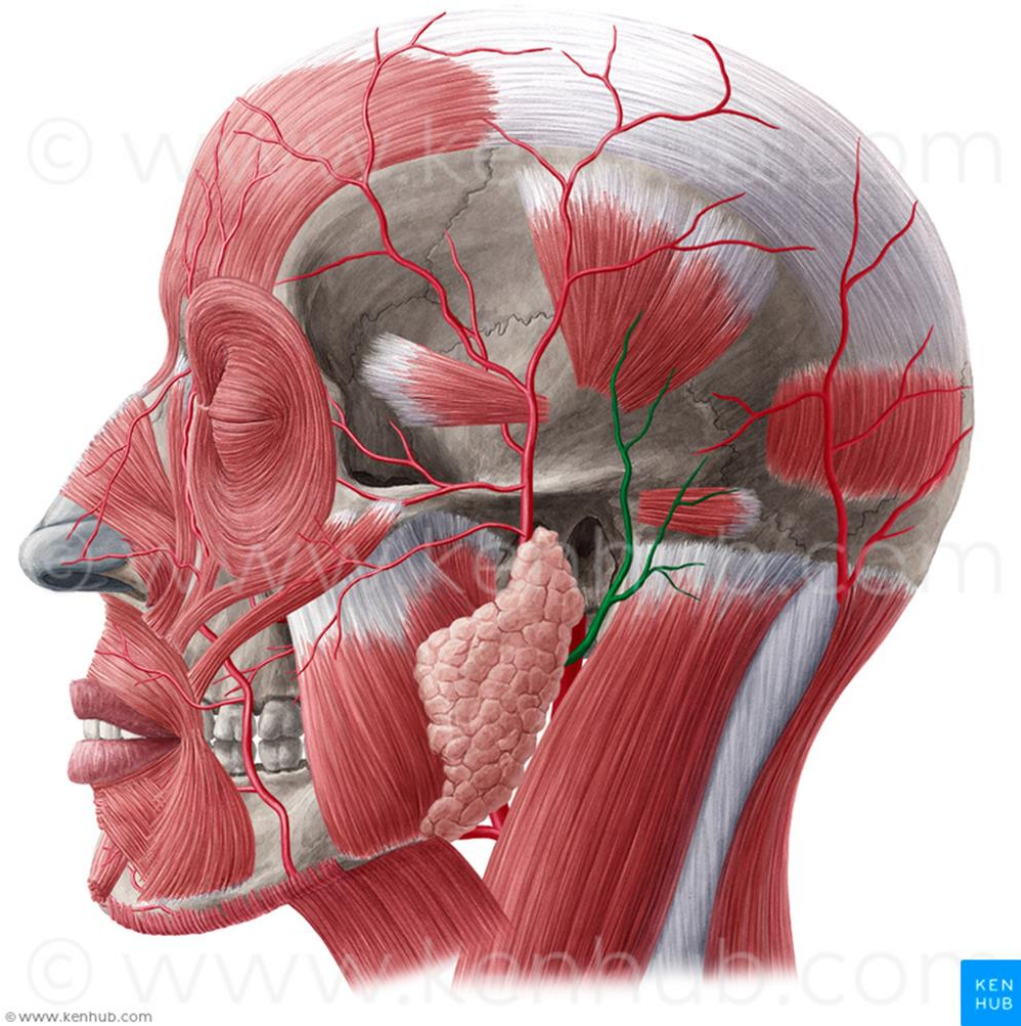
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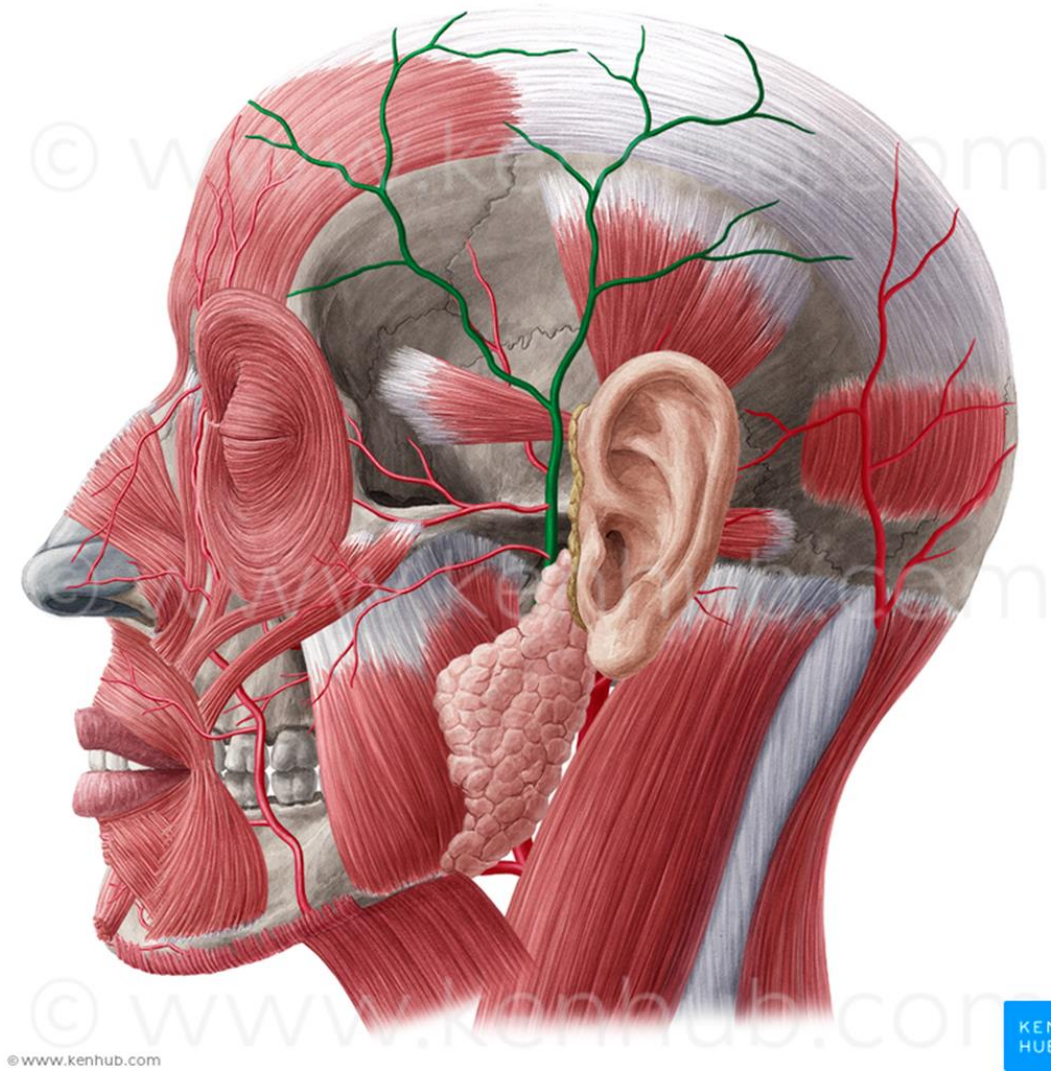
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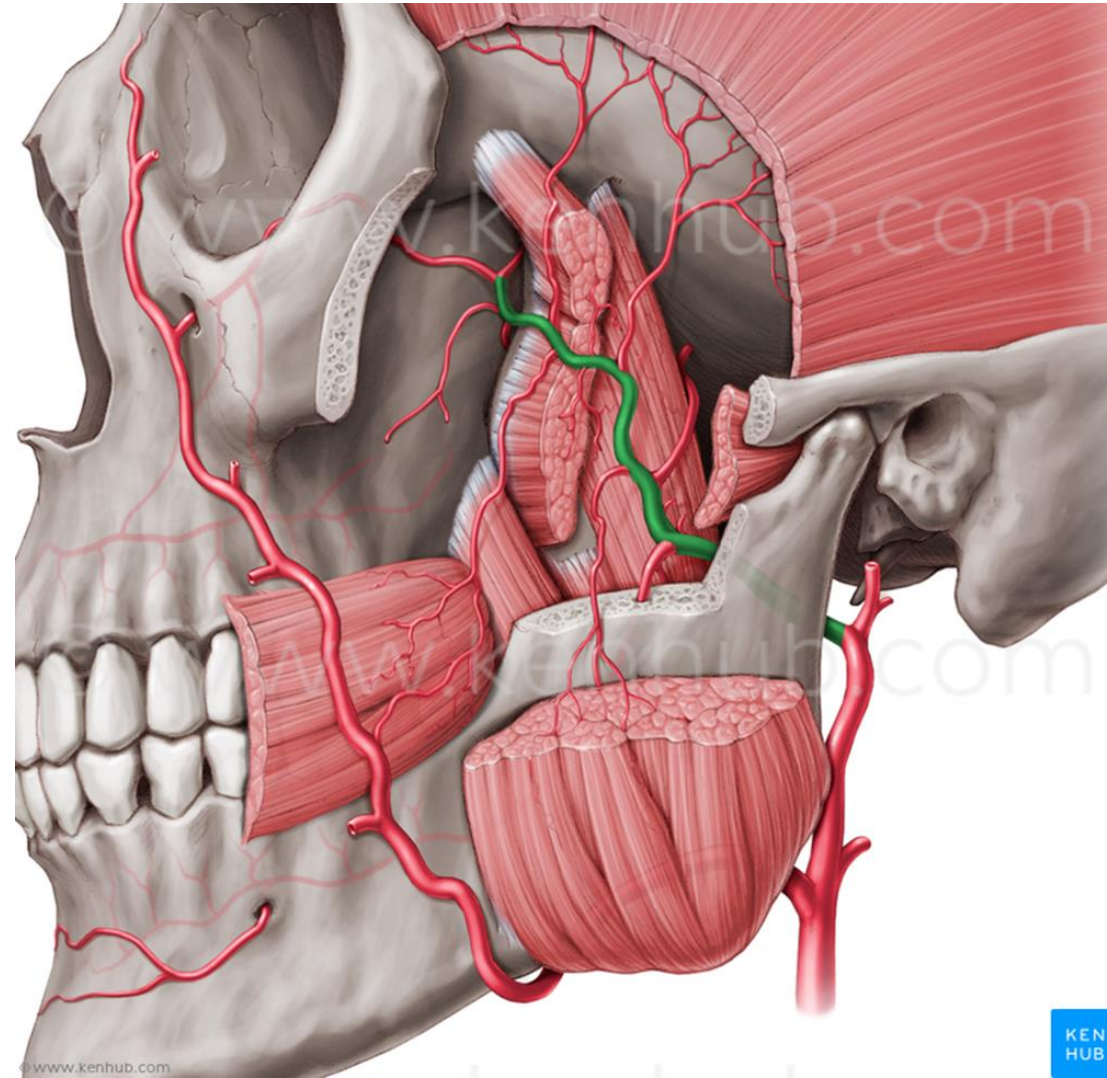


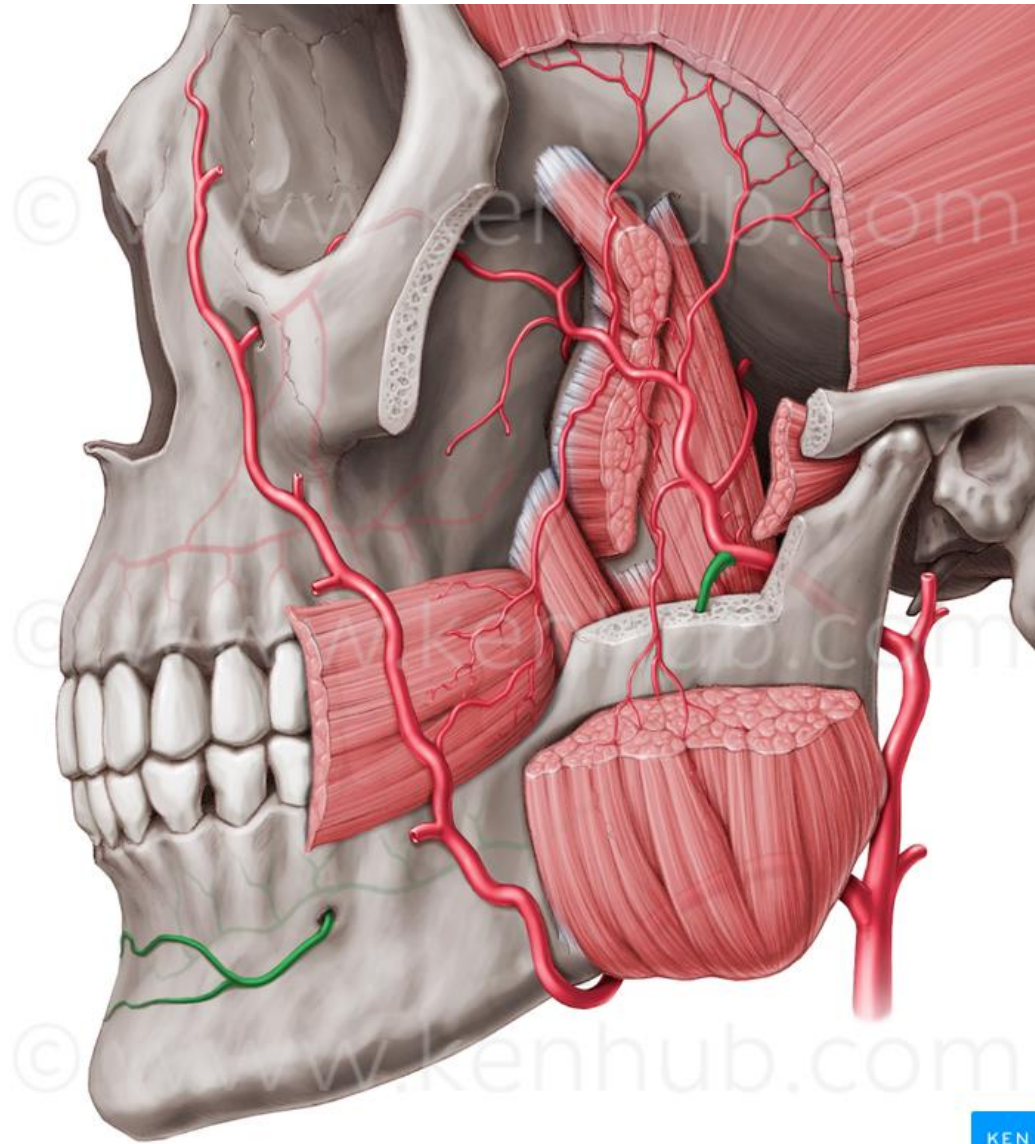






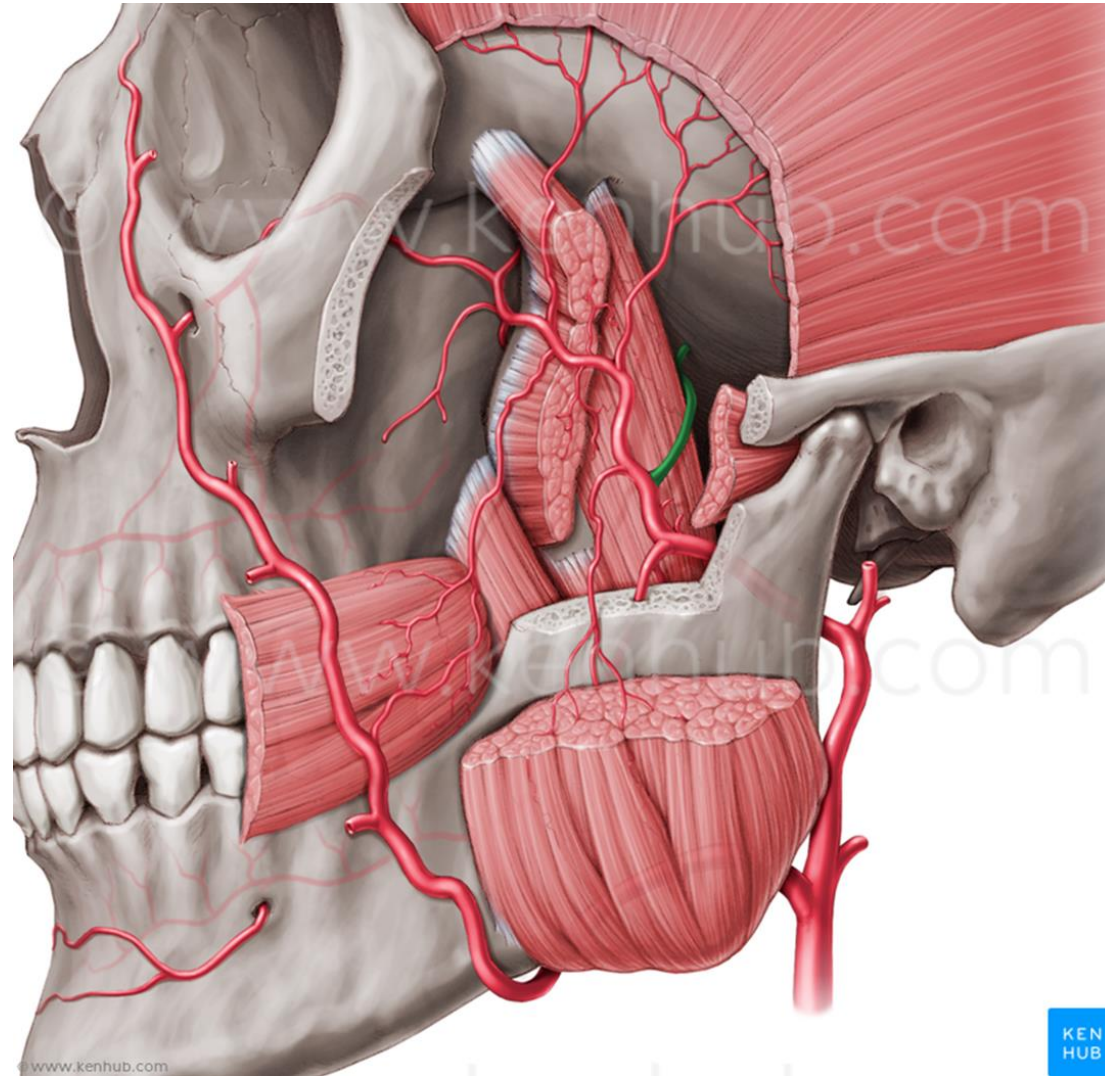


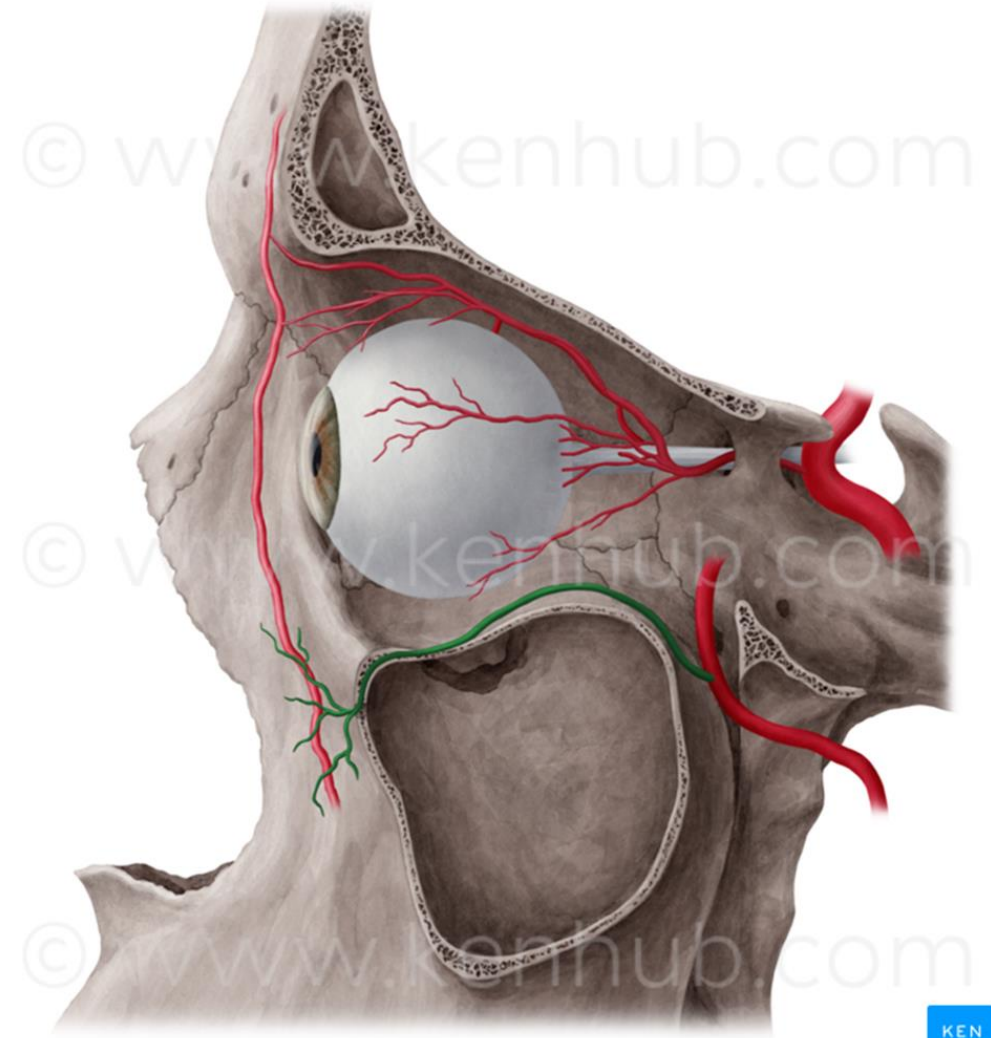
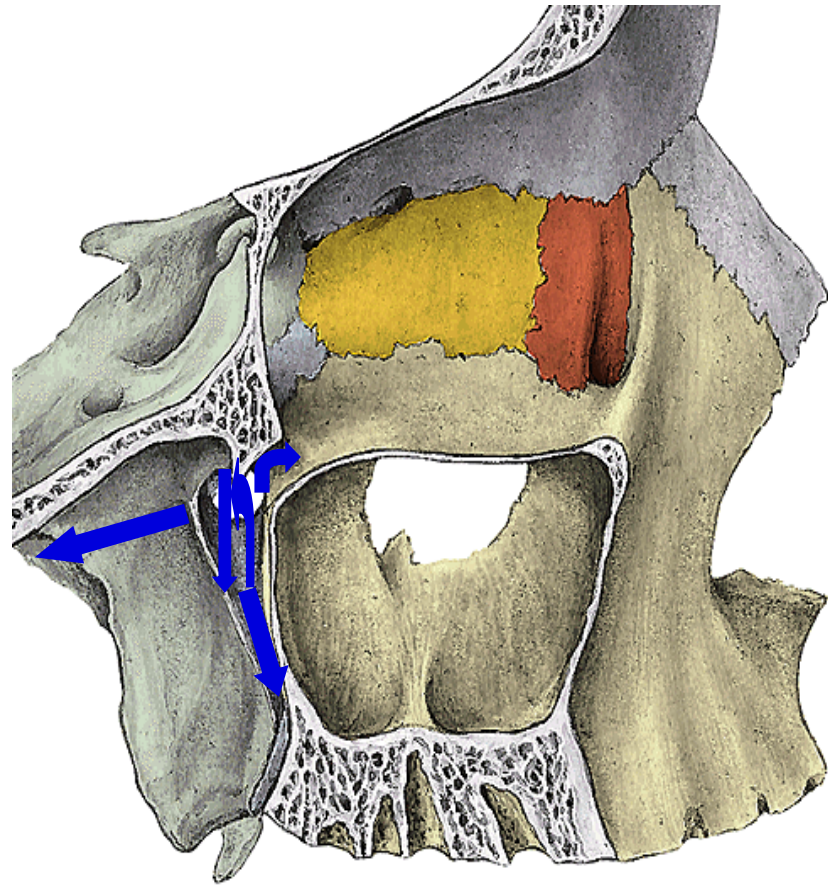




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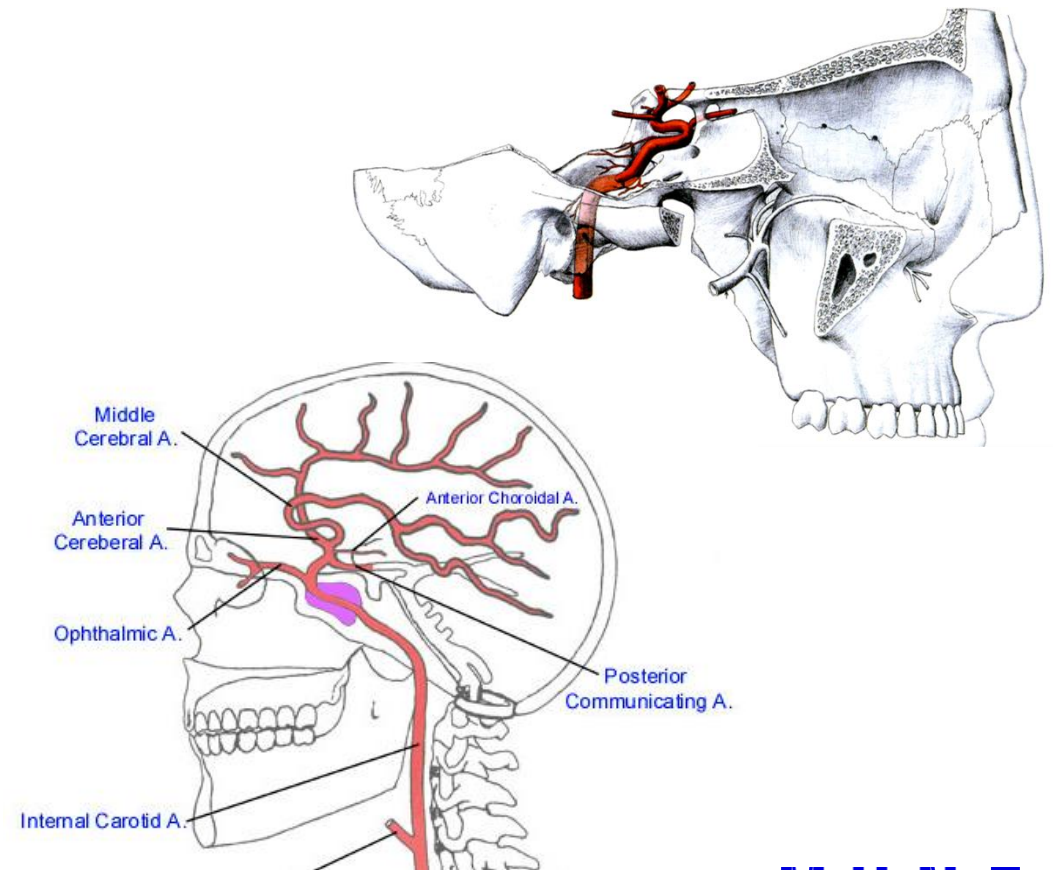
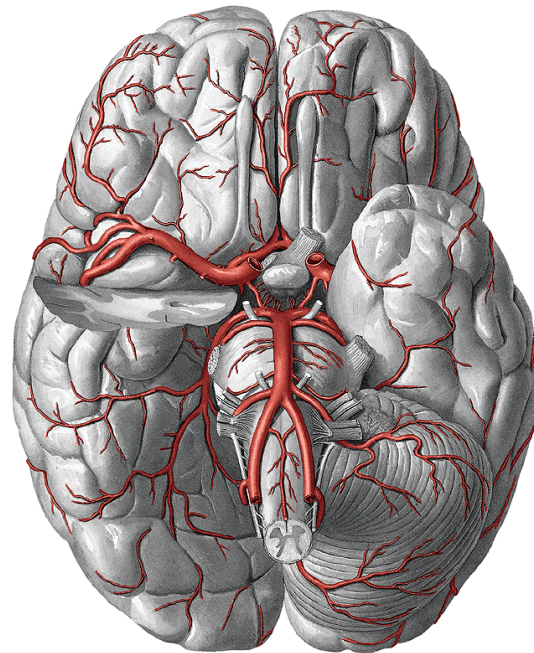
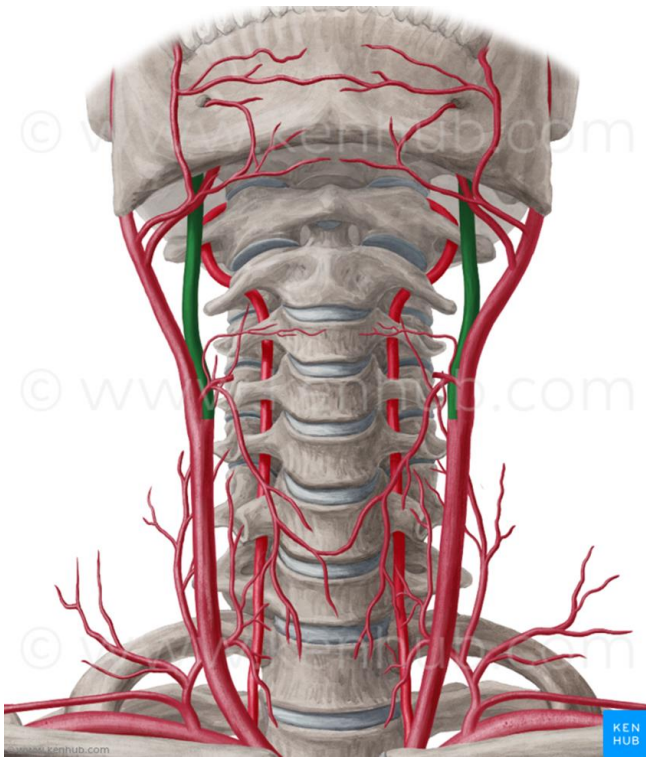


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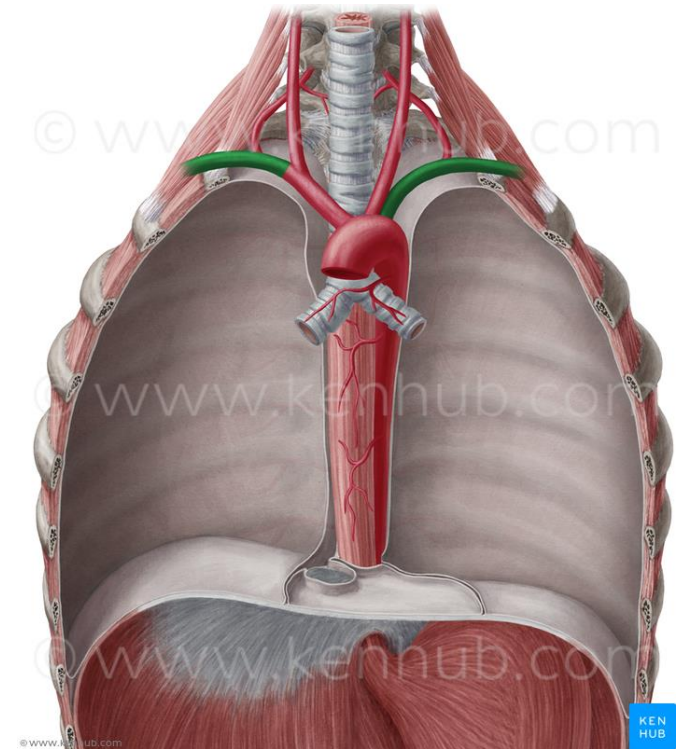
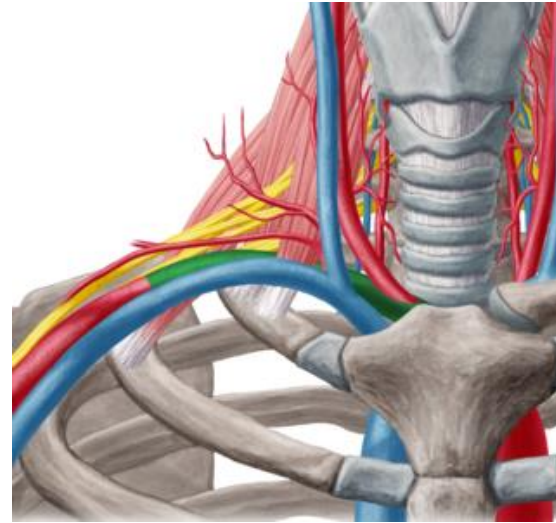
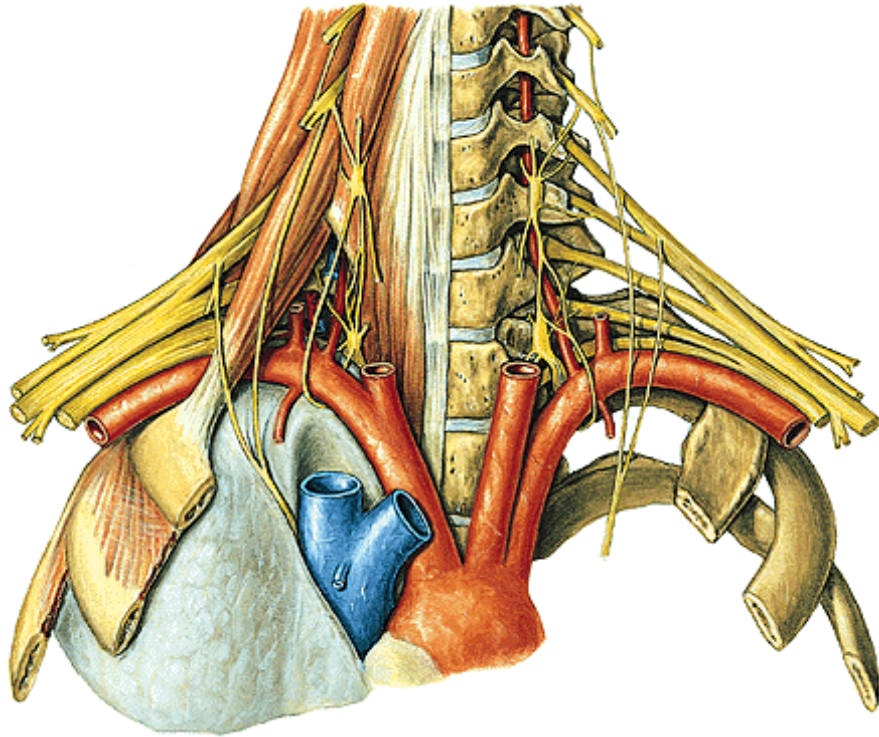
2) A. carotis interna

through apertura externa canalis carotici into fossa cranii media, it supplies the anterior parts of the hemispheres, the eye socket and the inner ear



A. subclavia

- it lies on cupula pleurae, passes through fissura scalenorum, forms sulcus a. subclaviae on the 1st rib – from the lateral edge of the 1st rib, it changes its name into a. axillaris



The branches:

1) a. vertebralis (for the brain)

2) truncus thyrocervicalis:

for the thyroid gland (a. thyroidea inferior),

for the muscles of scapula (a. suprascapularis) and

the neck (a. cervicalis ascendens, a. cervicalis superficialis)

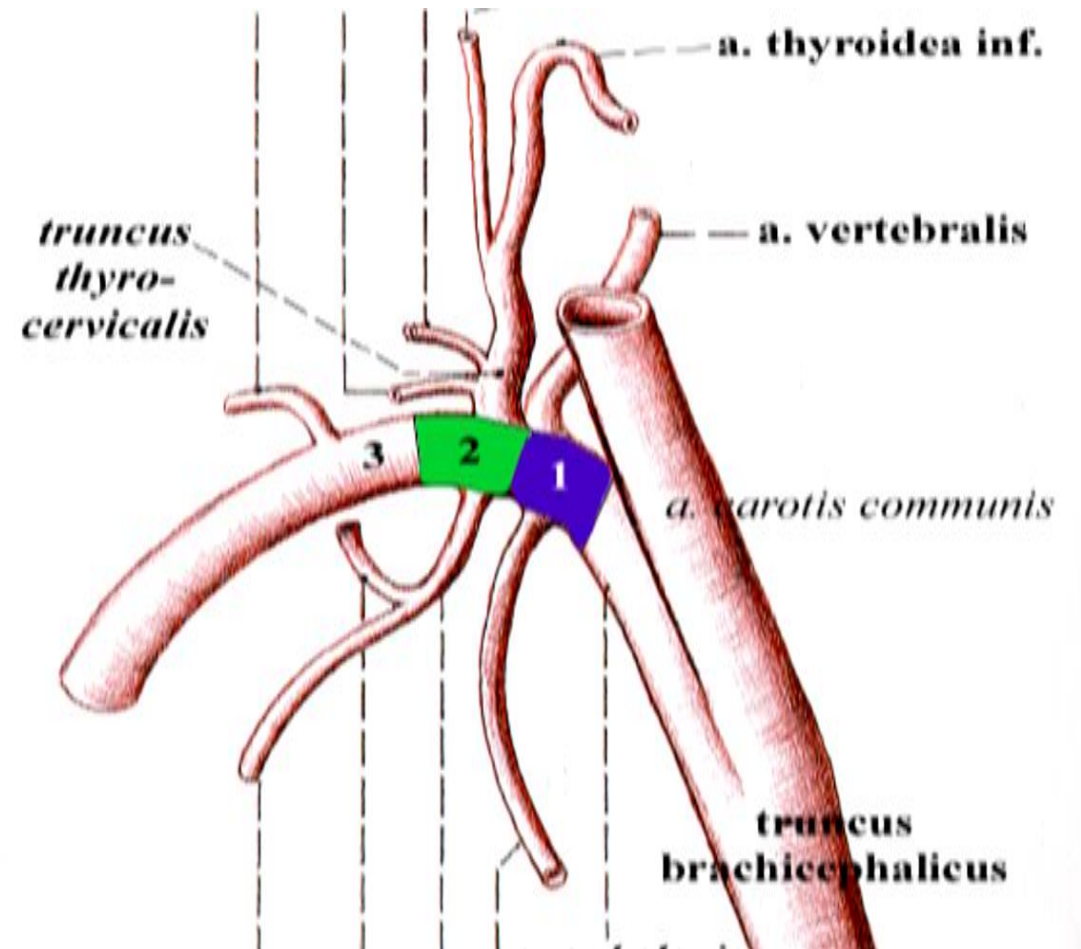
3) truncus costocervicalis

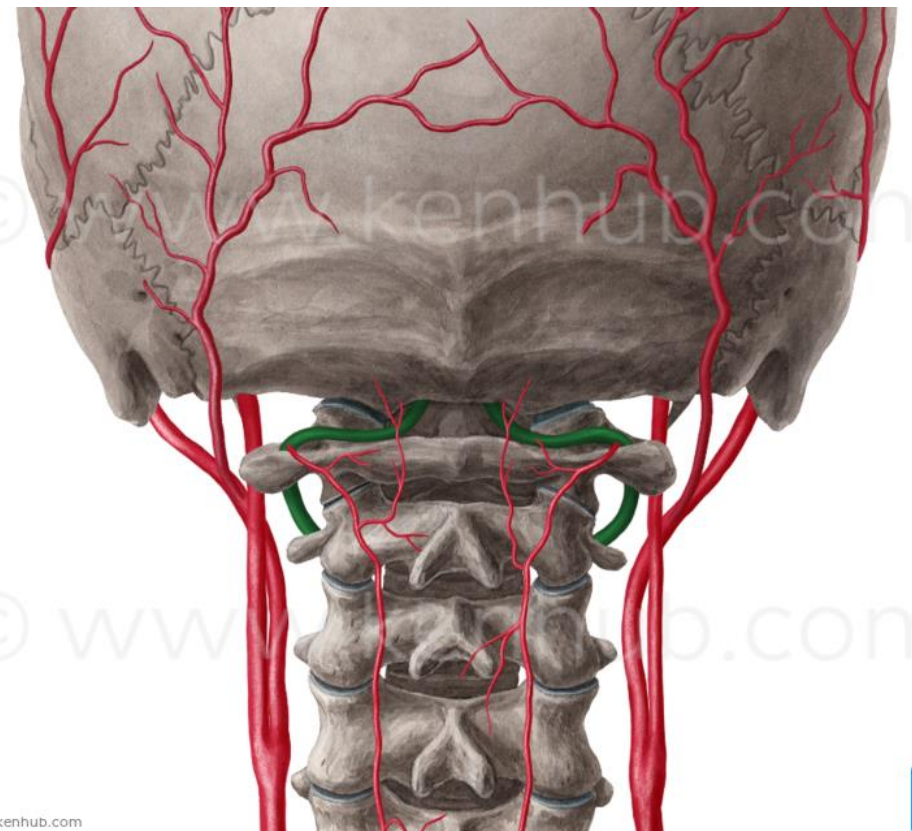
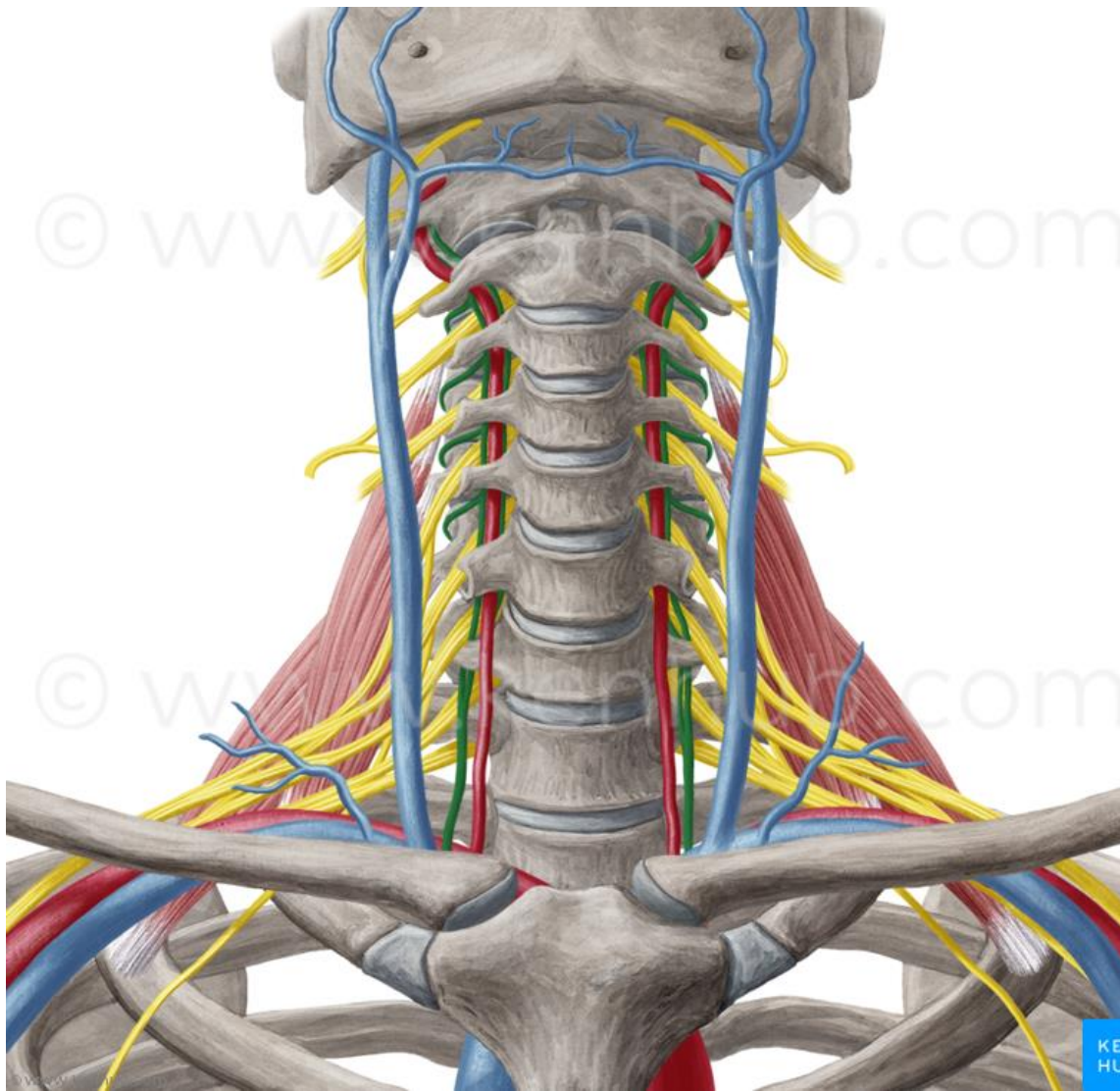
for the deep neck muscles (a. cervicalis profunda)

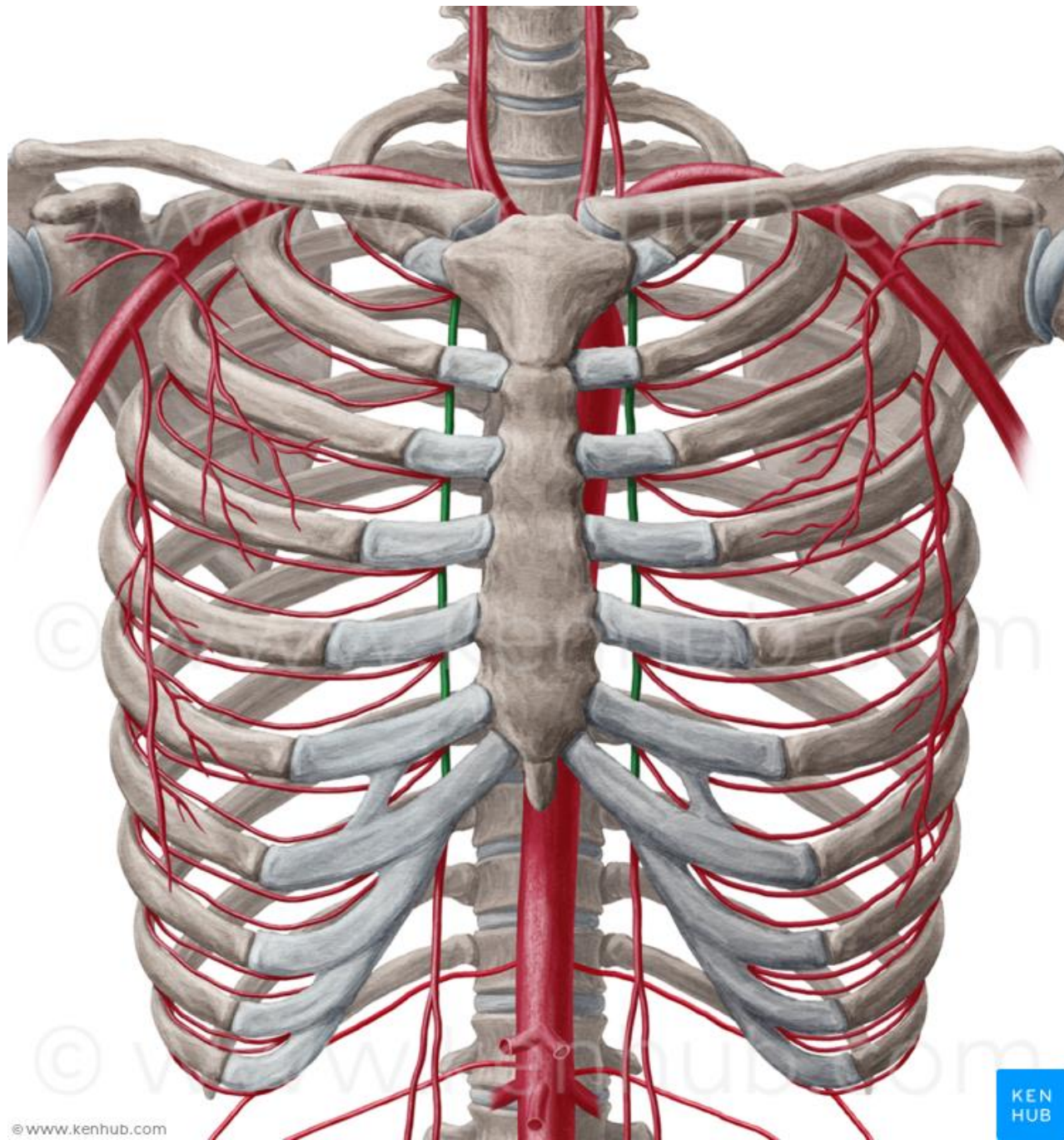
and the first two intercostal spaces (a. intercostalis suprema)

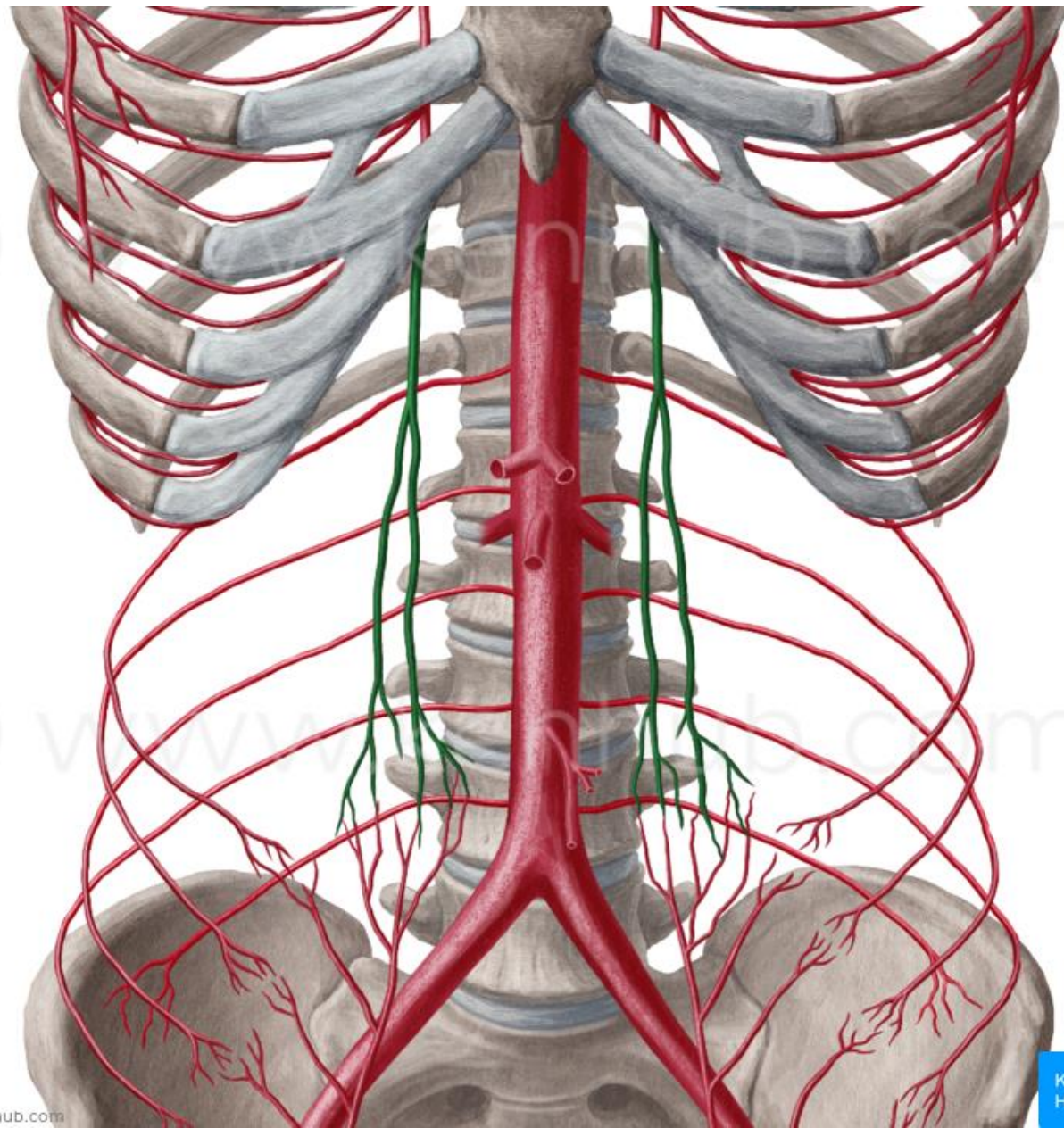
4) a. thoracica interna for m. rectus abdominis (a. epigastrica
musculophrenica)

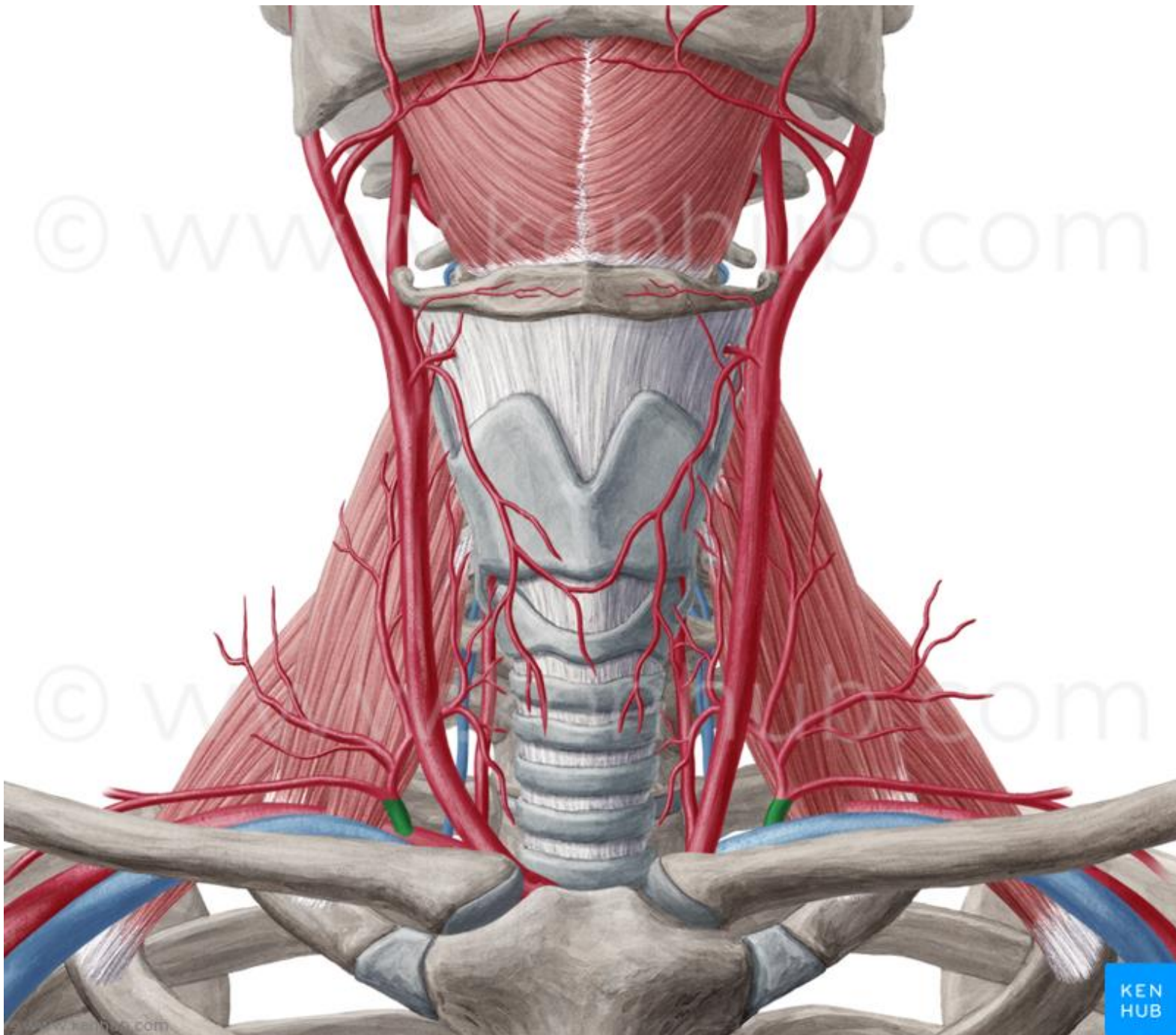
5) a. transversa colli (the nuchal muscles, the muscles of the girdle of UE, m. trapezius)

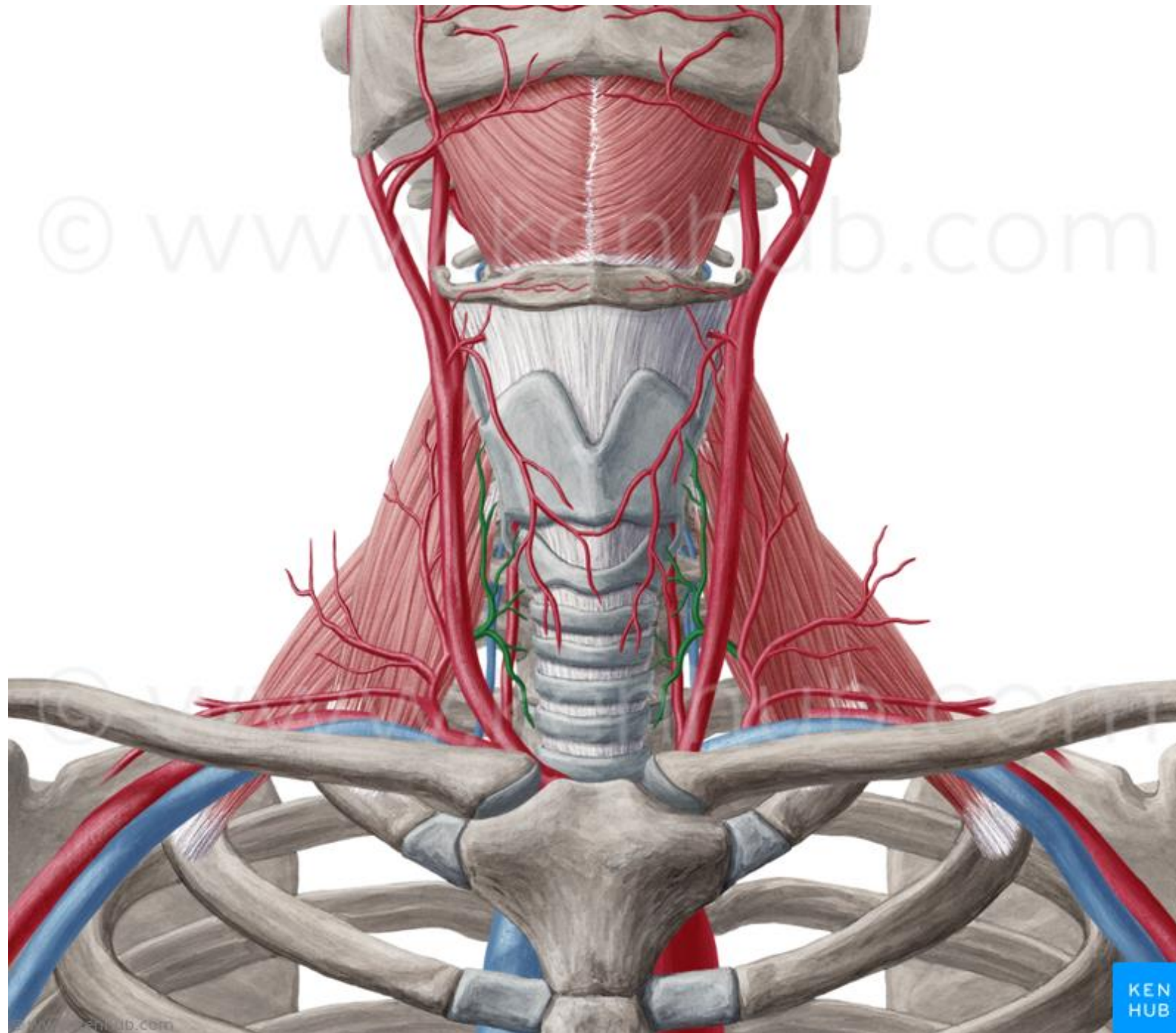


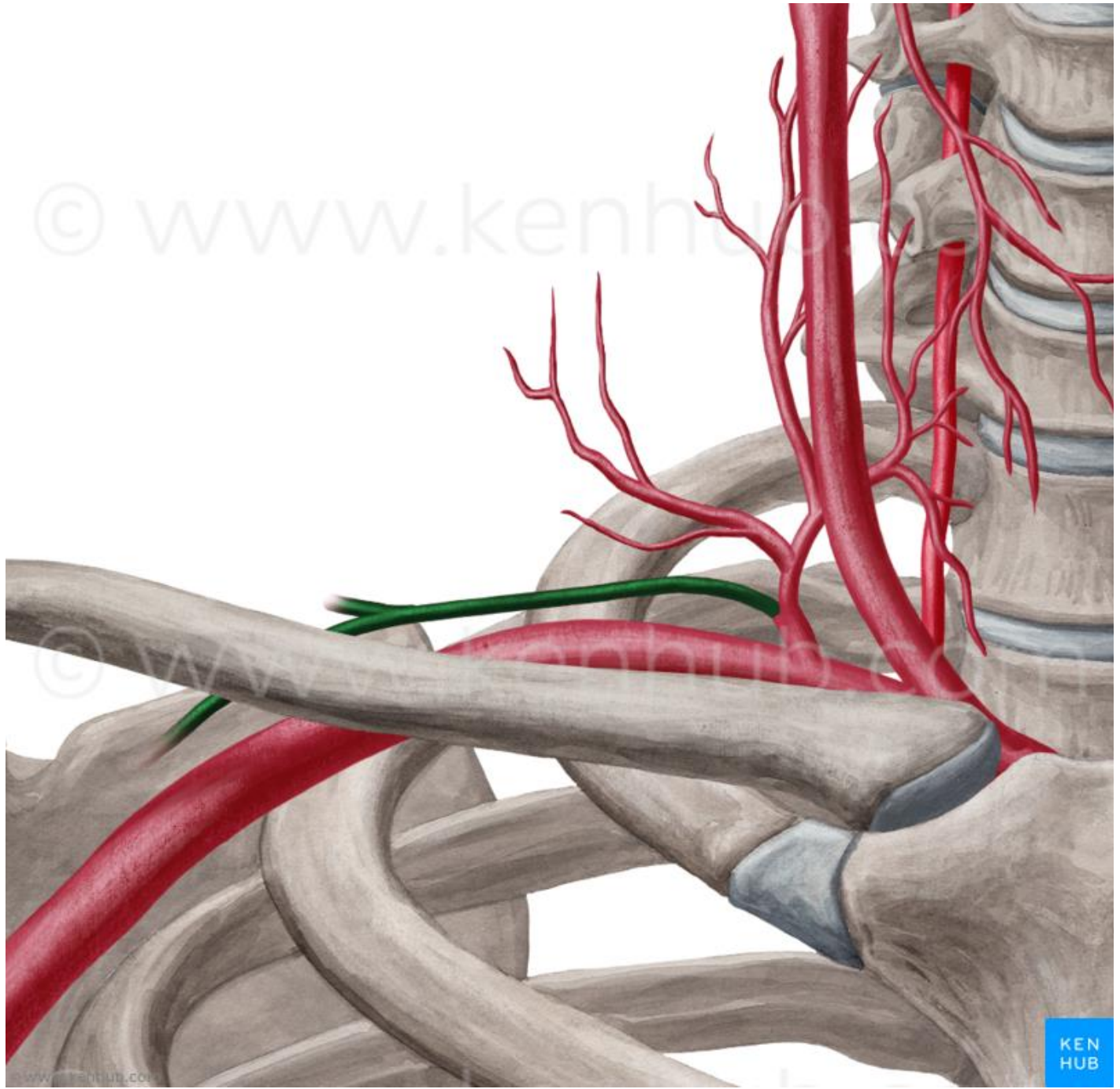


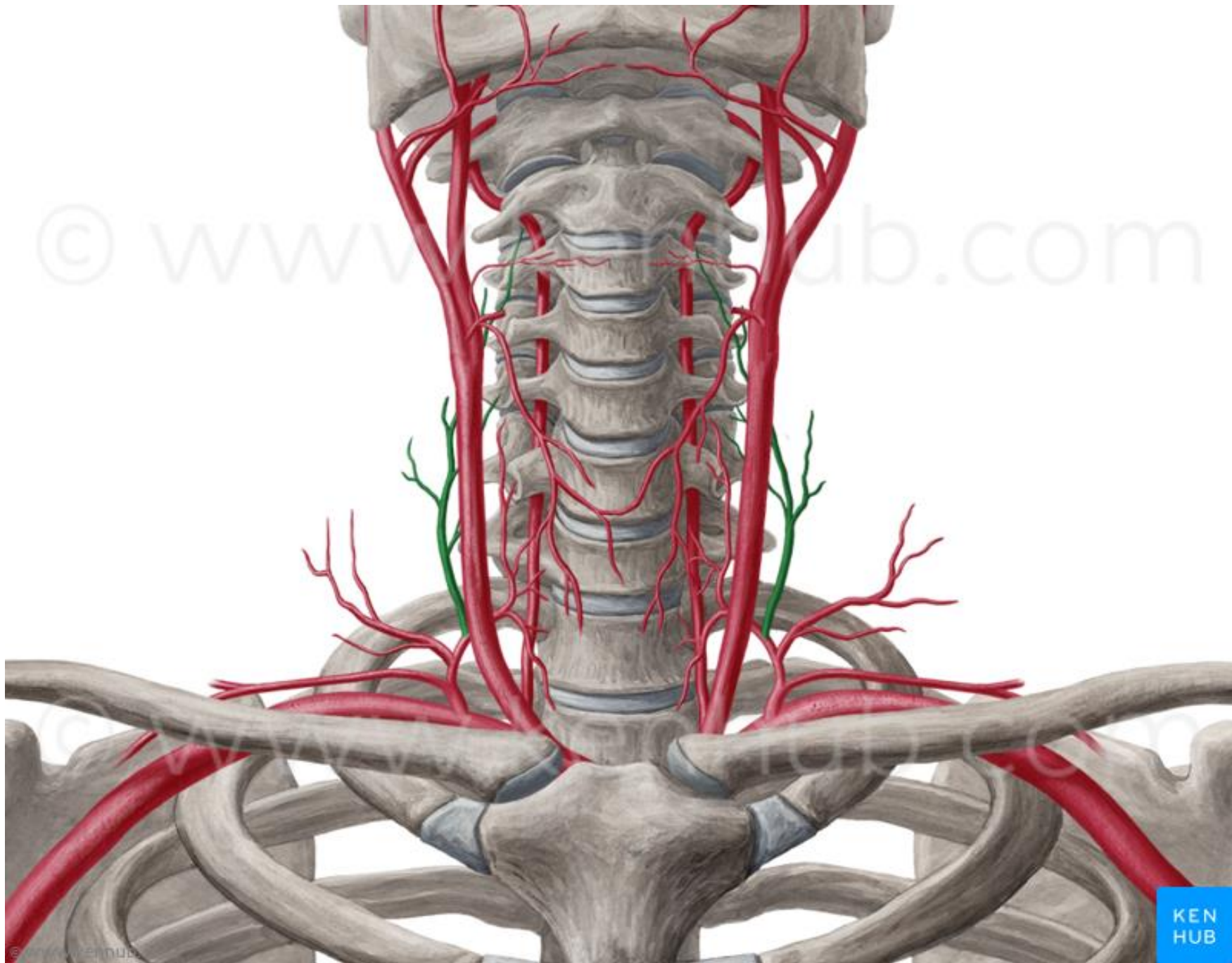


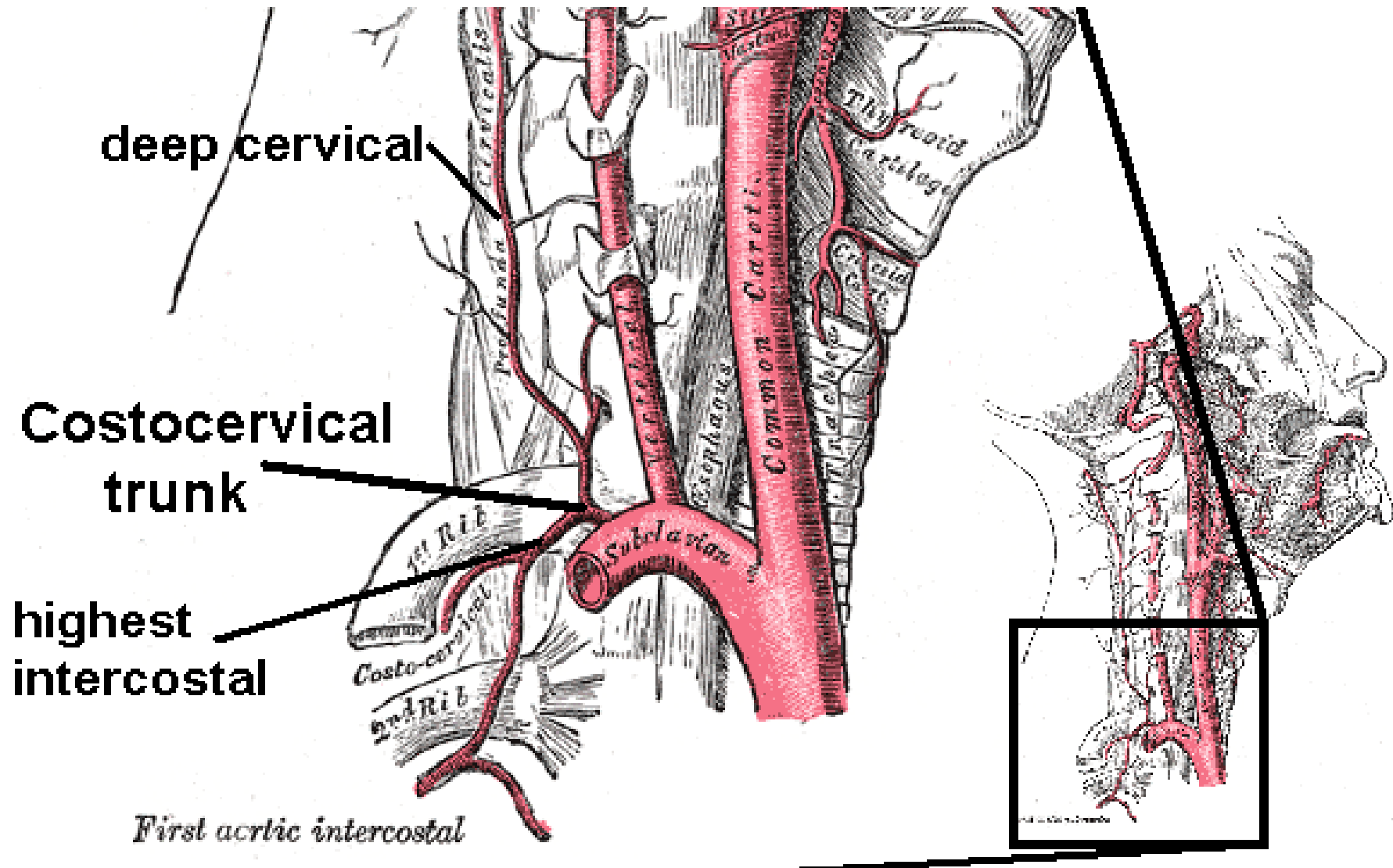




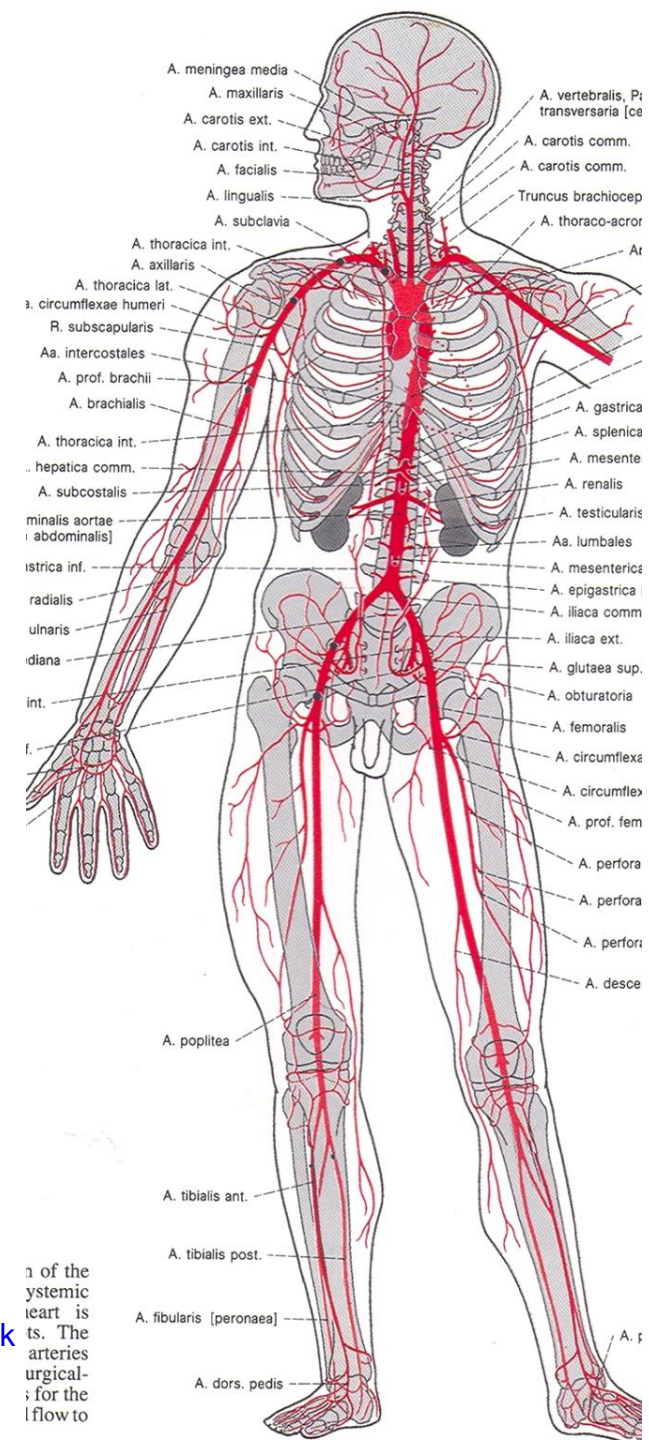
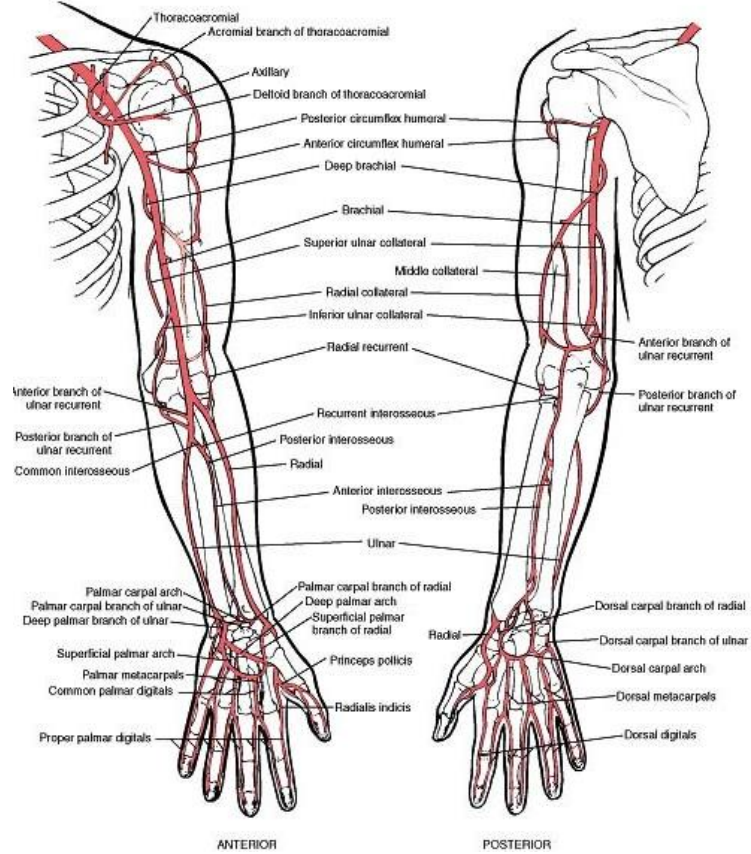








Aa. membri superioris



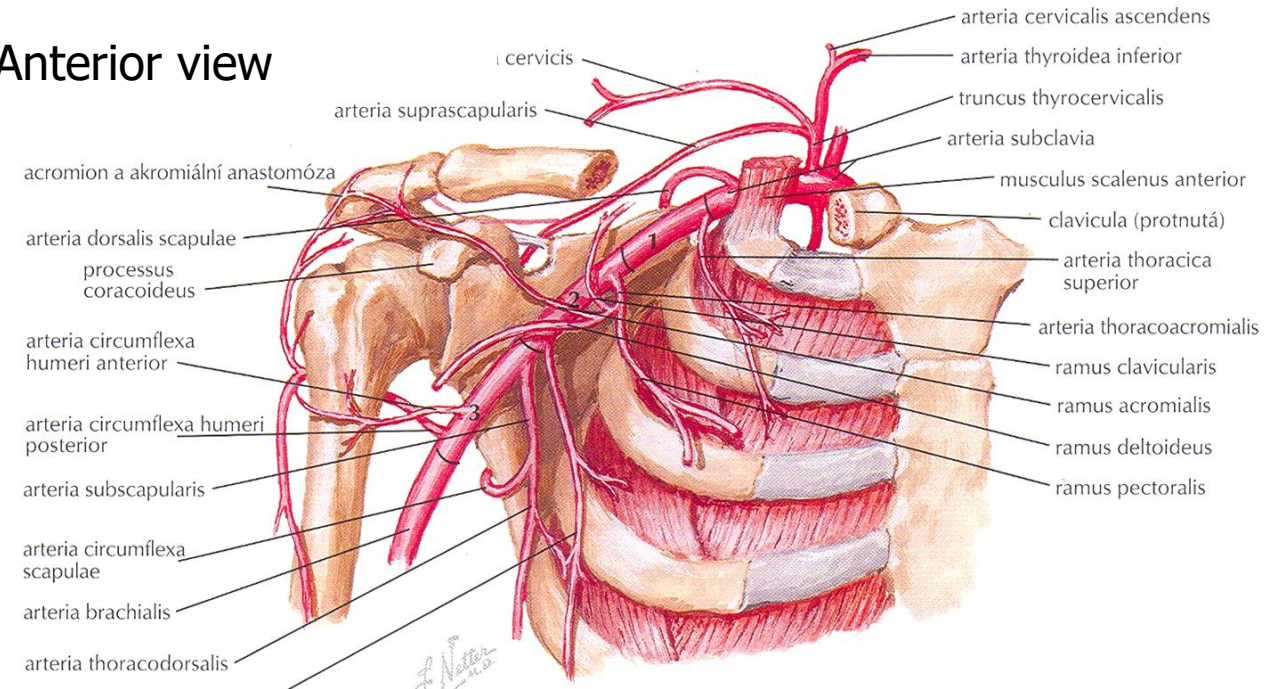
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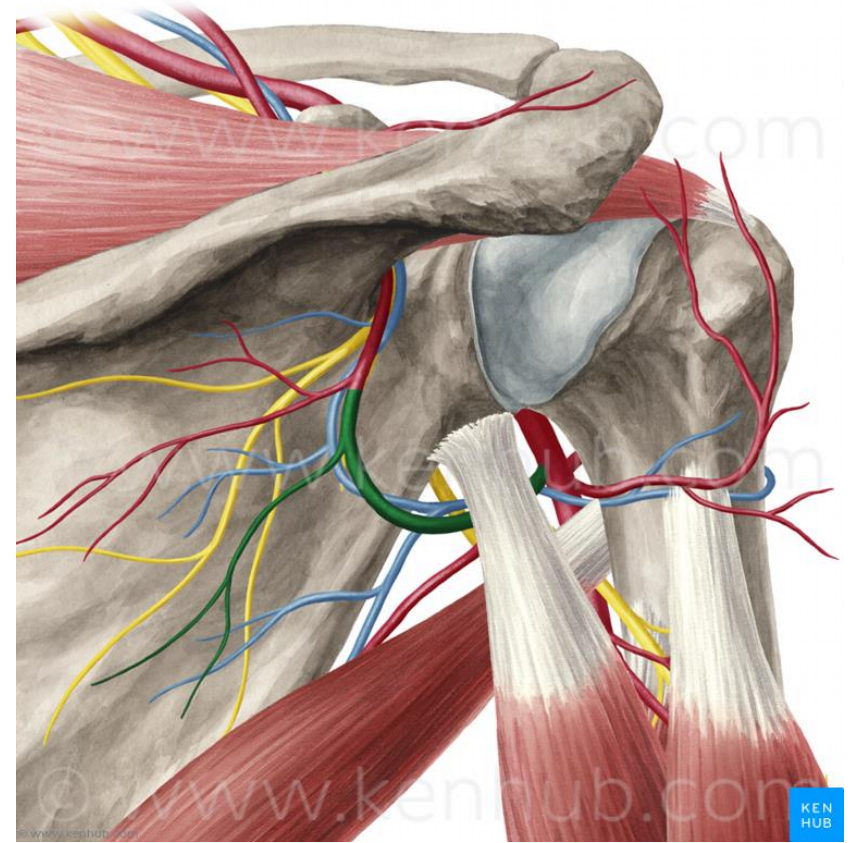
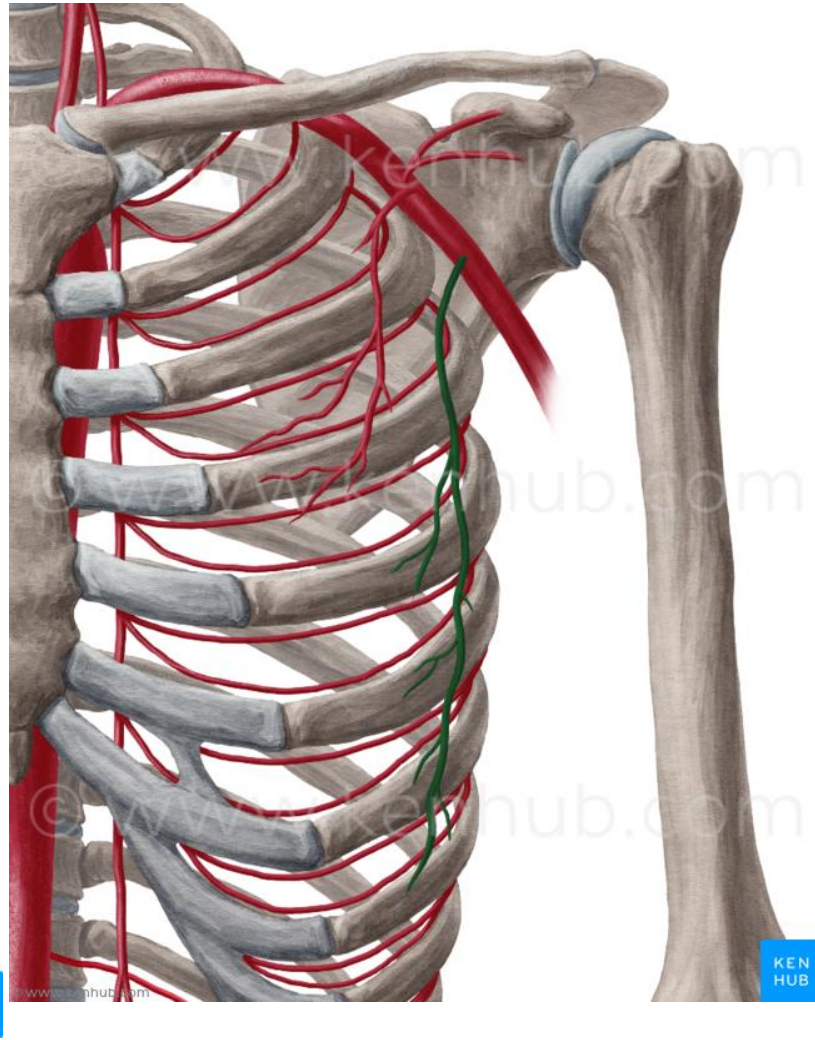
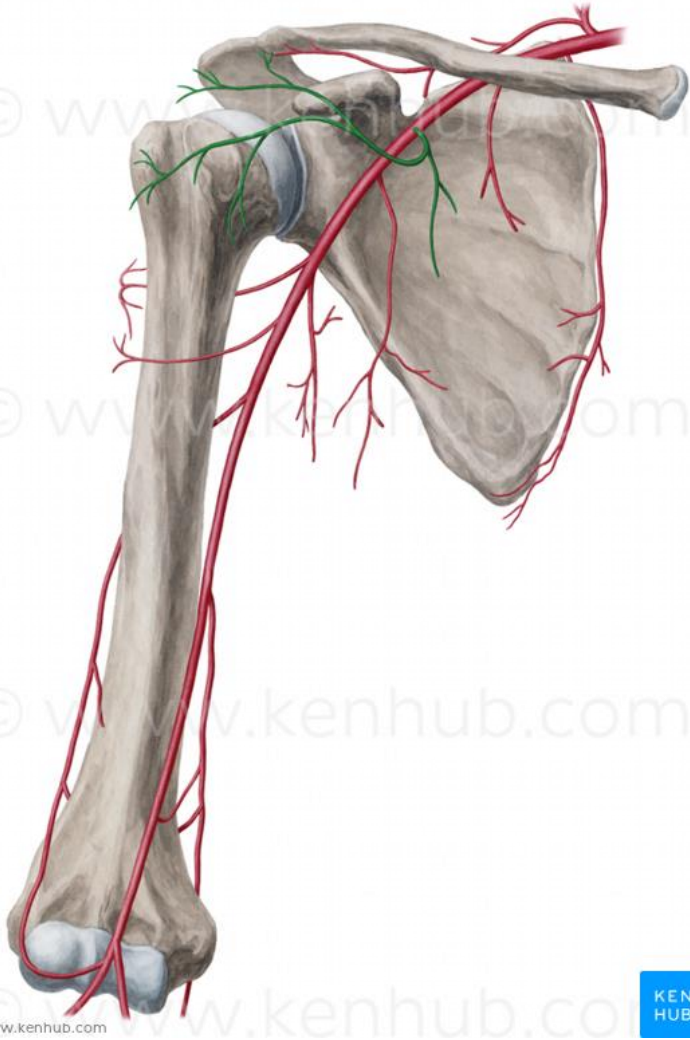
A. axillaris

from the 1st rib till the lower edge of the tendon of m. pectoralis major

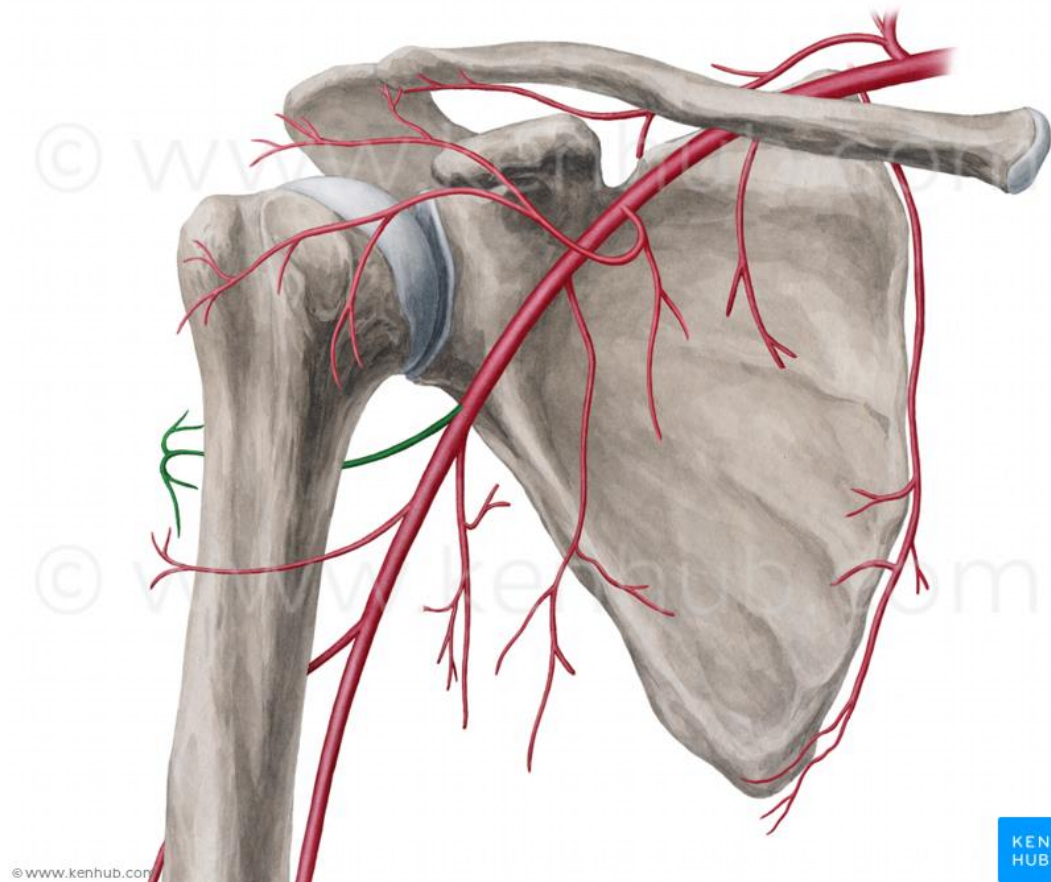
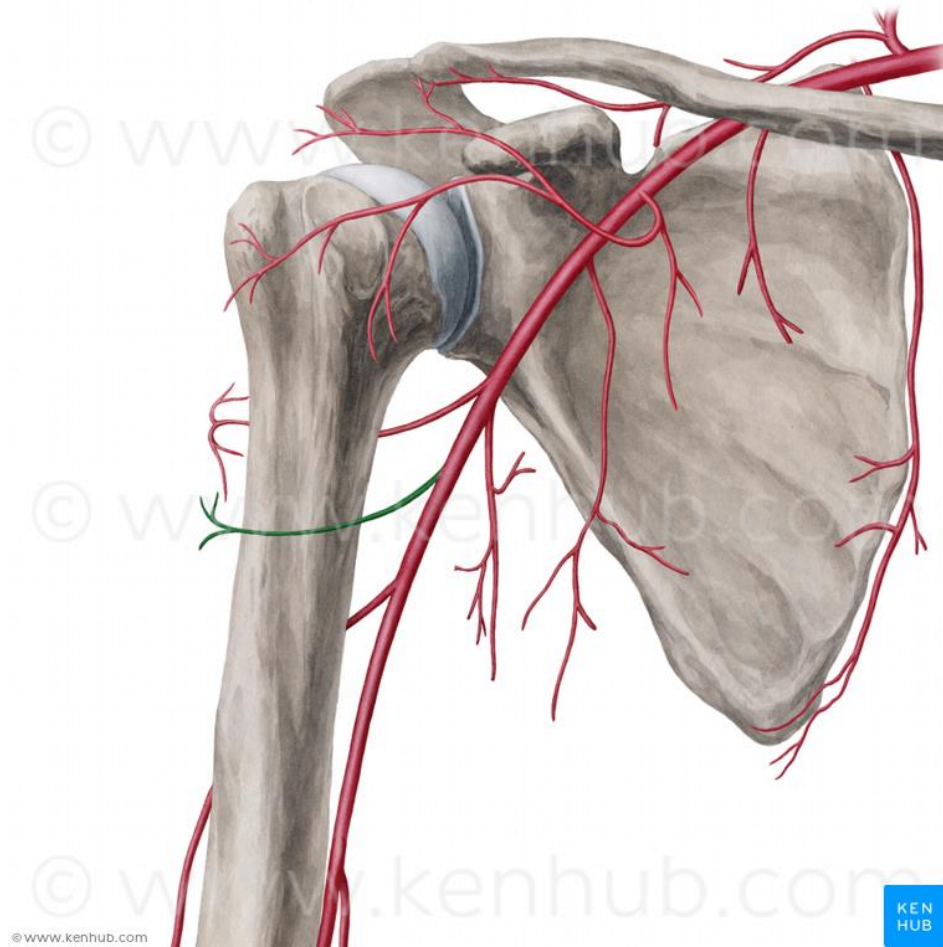
- 1) the muscular branches (rr. subscapulares)
- 2) a. thoracica suprema (first two intercostal spaces)
- 3) a. thoracoacromialis (the shoulder joint, m. deltoideus, mm. pectorales)
- 4) a. thoracica lateralis (m. serratus anterior)
- 5) a. subscapularis (a. circumflexa scapulae, a. thoracodorsalis for m. latissimus dorsi)
- 6) a. circumflexa humeri anterior
- 7) a. circumflexa humeri posterior (through foramen humerotricipitale into m. deltoideus)

Anterior view





Anastomosis of a. circumflexa humeri anterior et posterior



A. brachialis

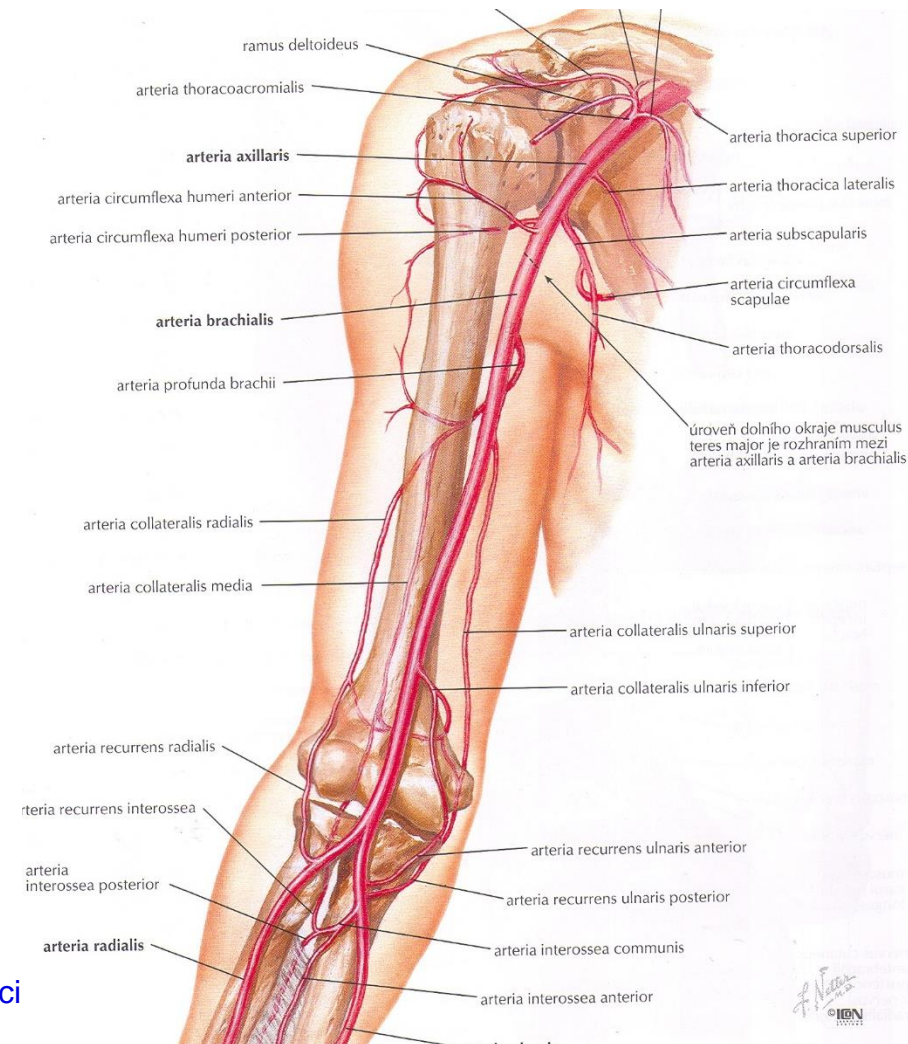
- from the edge of m. pectoralis major, inside sulcus bicipitalis medialis, inside fossa cubiti it divides into: a. radialis and a. ulnaris

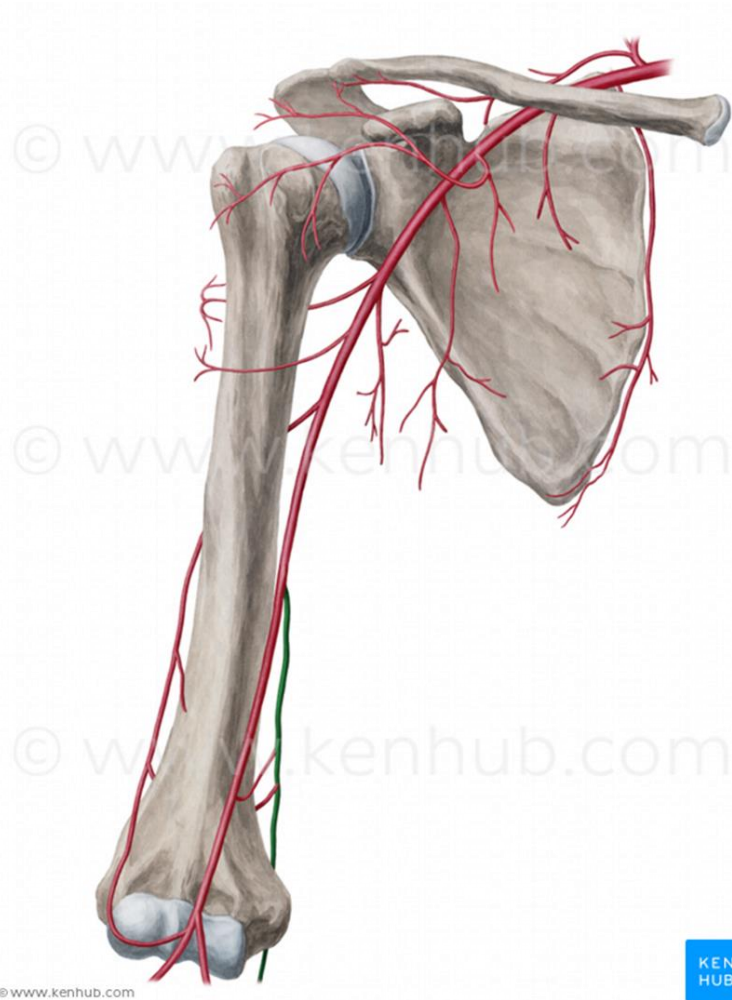
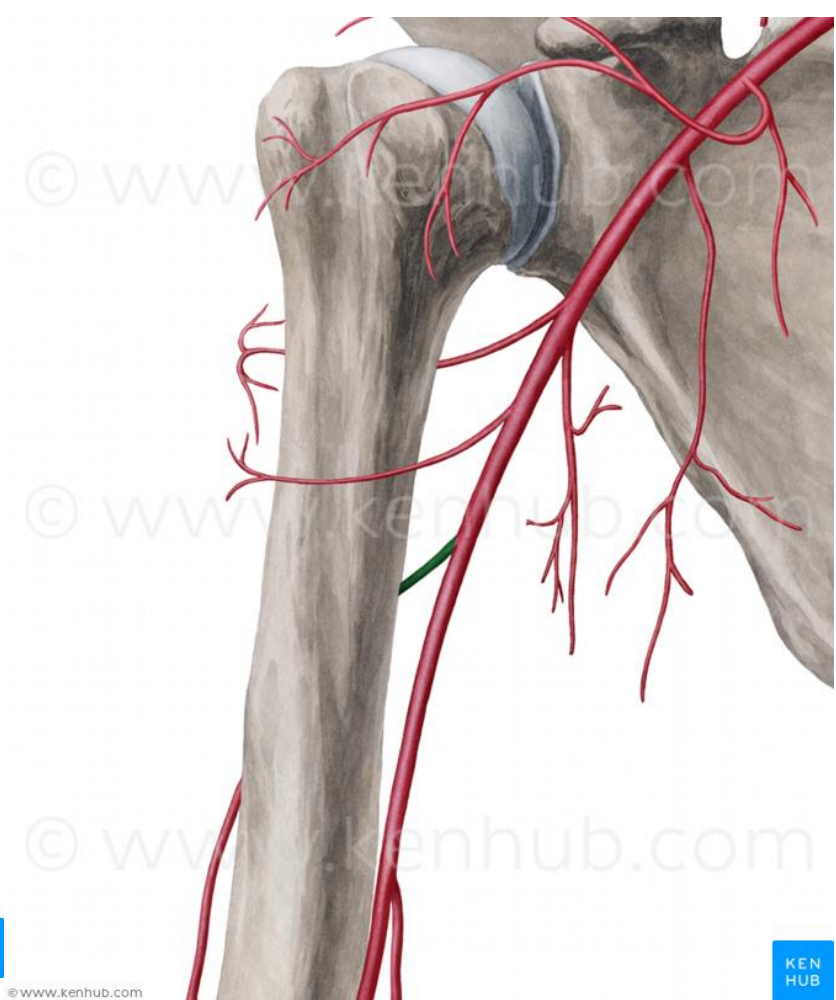
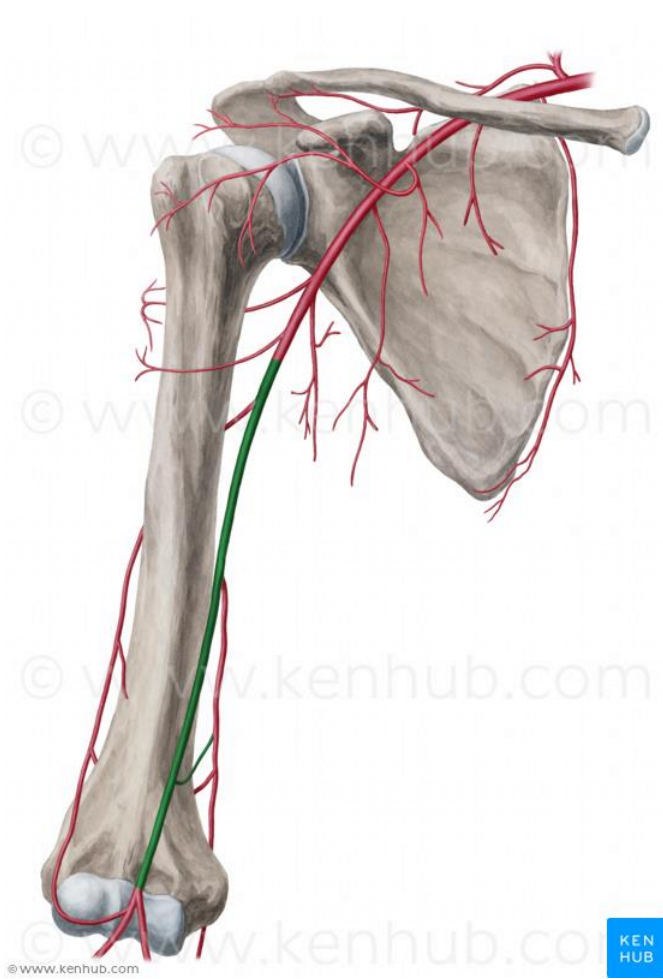
The branches:

- 1) a. profunda brachii (in sulcus n. radialis)
- 2) a. collateralis ulnaris superior (behind med. epicondyle, into the arterial net around the elbow joint)
- 3) a. collateralis ulnaris inferior (behind med. epicondyle, into the arterial net around the elbow joint)

The terminal branches:

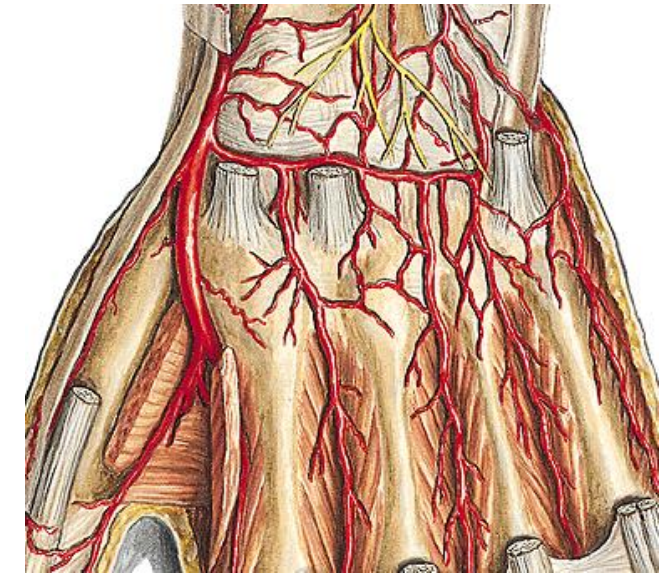
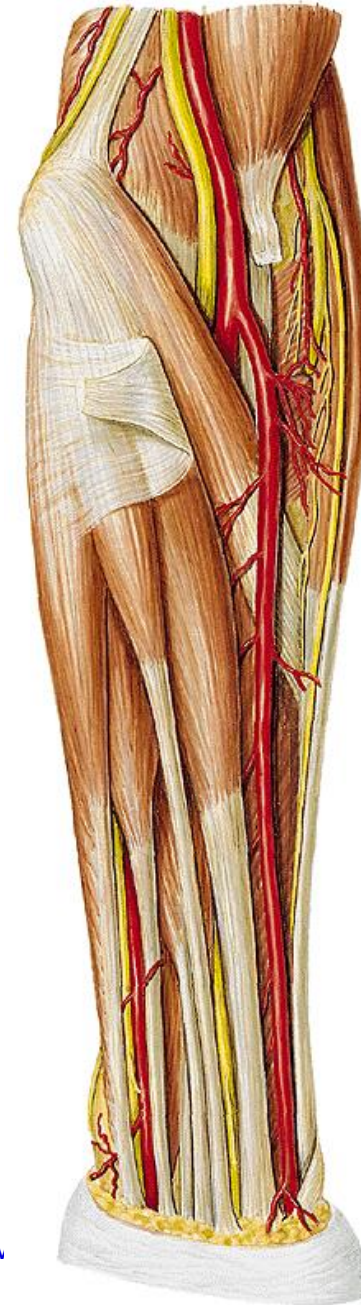
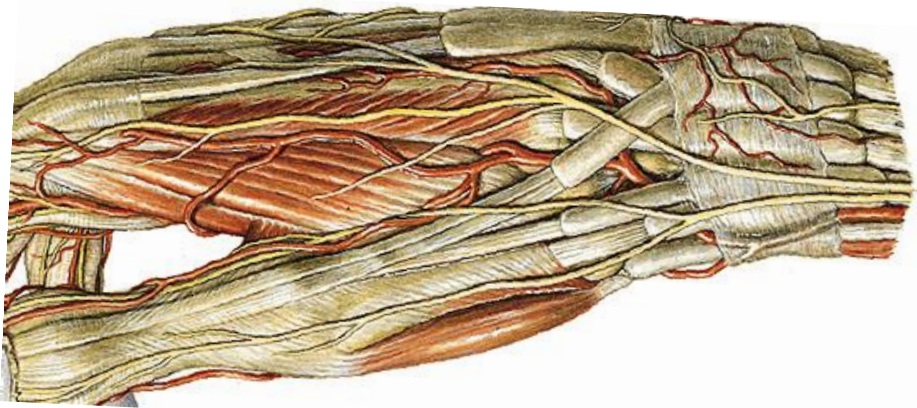
- 4) a. radialis a a. ulnaris



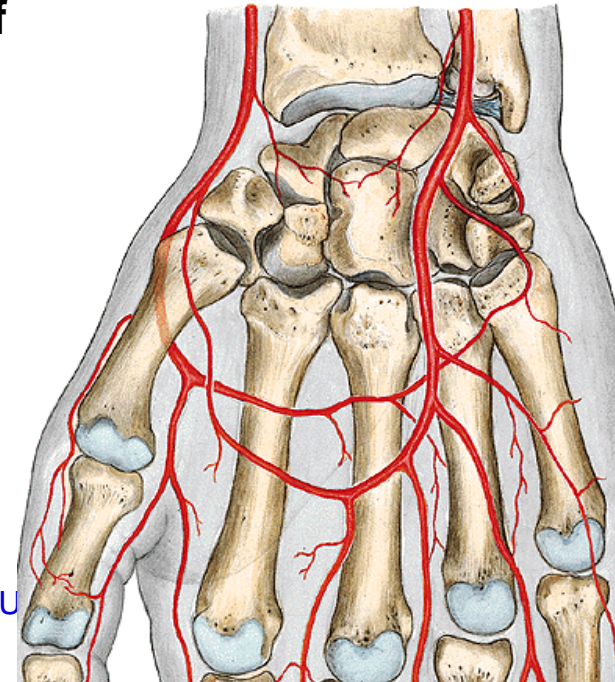
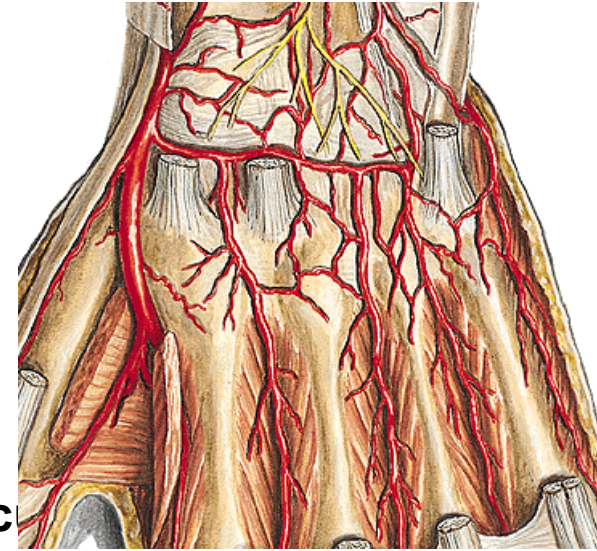


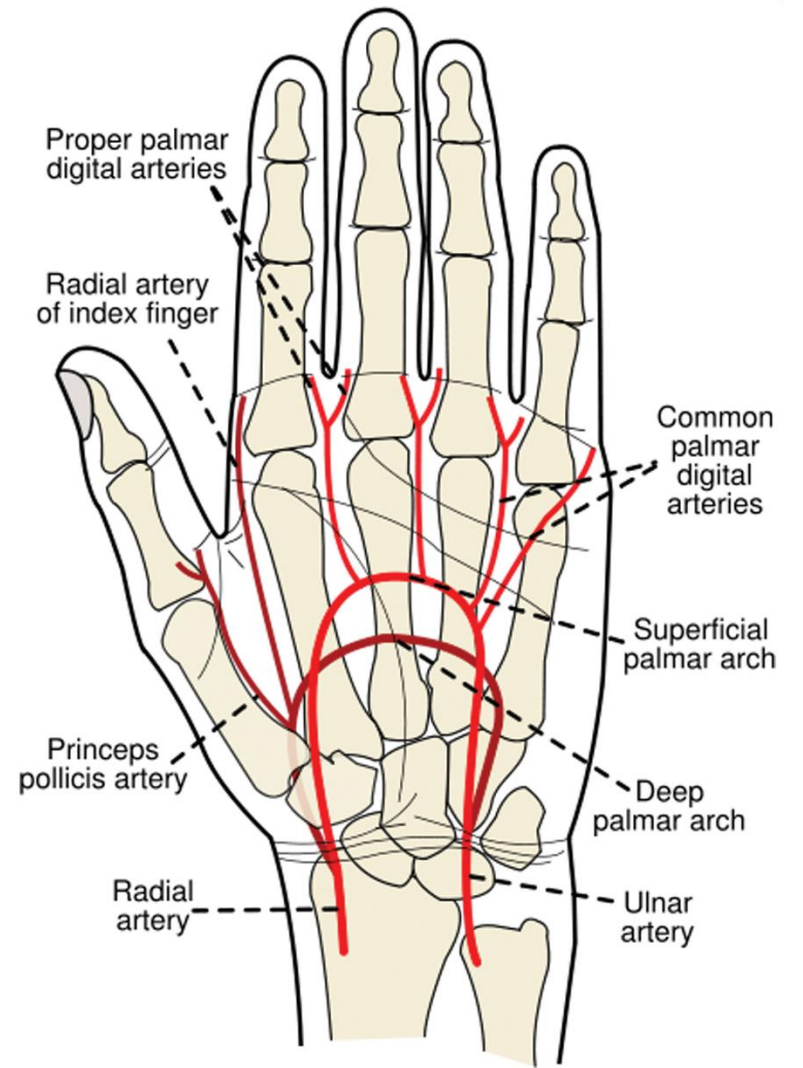
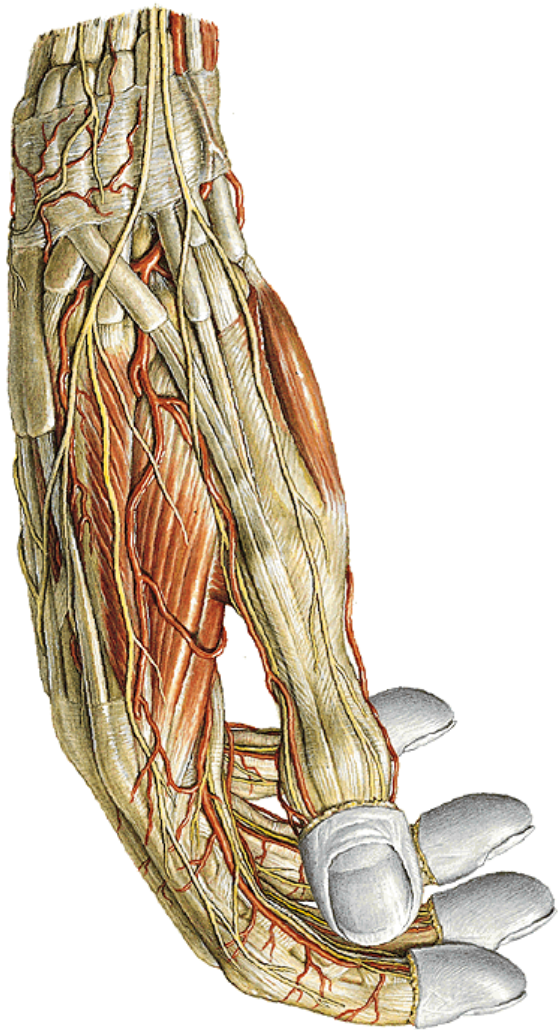
A. radialis

below m. brachioradialis, into **foveola radialis**, below the tendon of m. extensor pollicis longus, it runs onto the back of the hand, gets through m. interosseus dorsalis I. and in the palm it gives its terminal branches:
arcus palmaris profundus
a. princeps pollicis



- The branches :
- a) the branches for the elbow joint
- b) the muscular branches (radial and palmar group)
- c) r. palmaris superficialis et profundus – help create arc
- d) a. princeps pollicis- for the thumb and lateral edge of



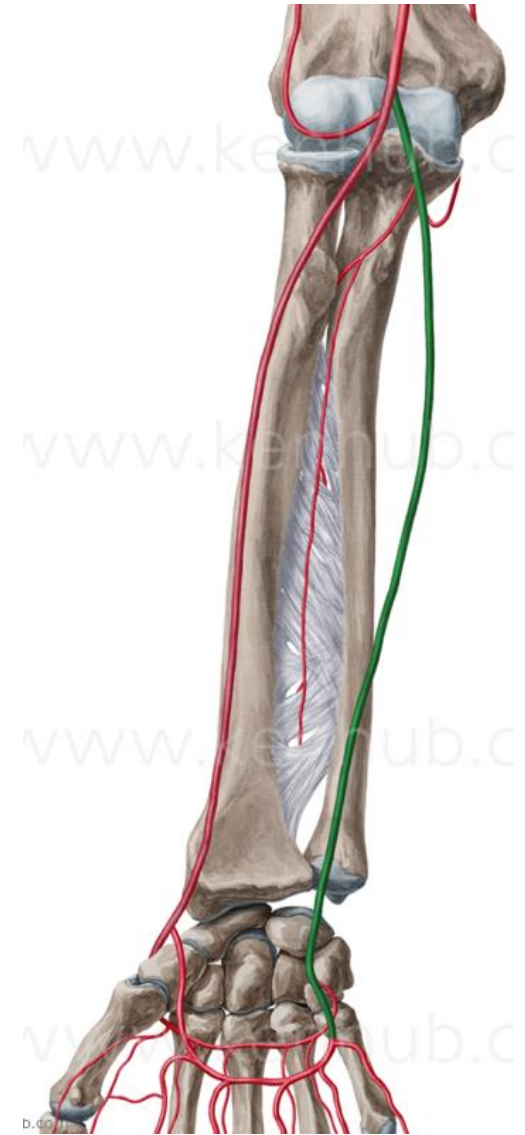
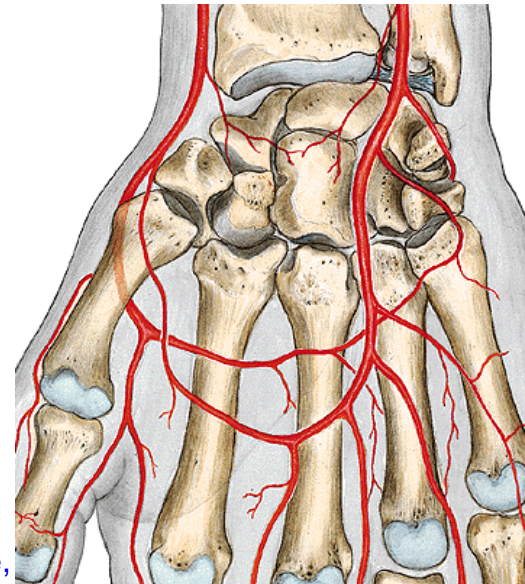
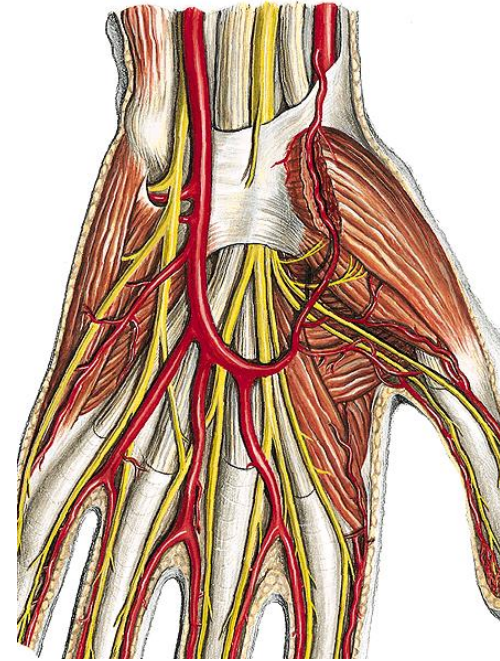


A. ulnaris

- between m. flexor digitorum profundus and superficialis
- Distally between m. flexor carpi ulnaris and m. flexor digitorum superficialis
- Into the palm on the surface of retinaculum flexorum, along the radial side of os pisiforme and divides into the terminal

branches:

- **Arcus palmaris superficialis**
- **r. palmaris profundus**



The branches:

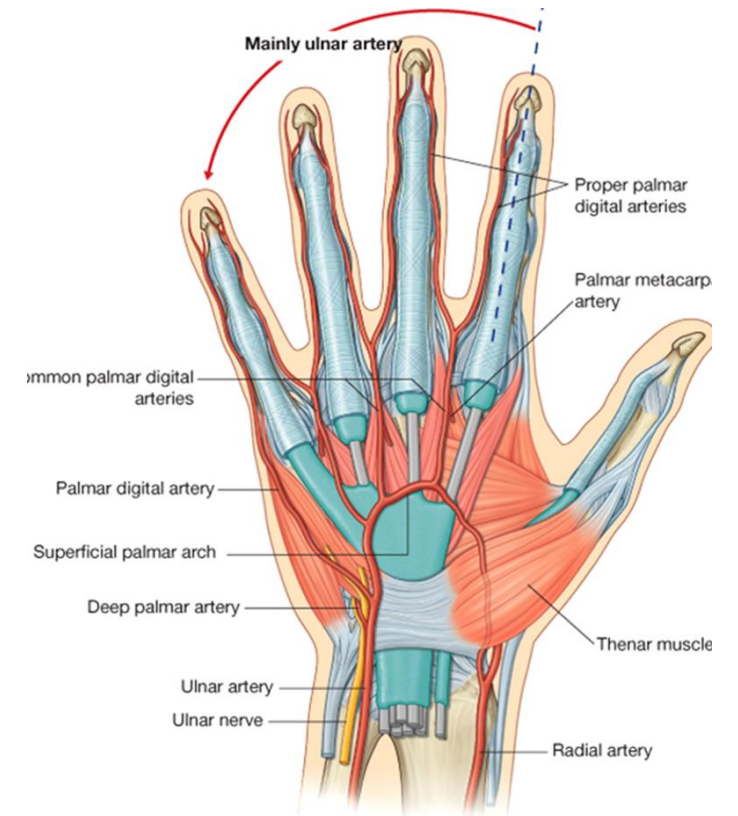
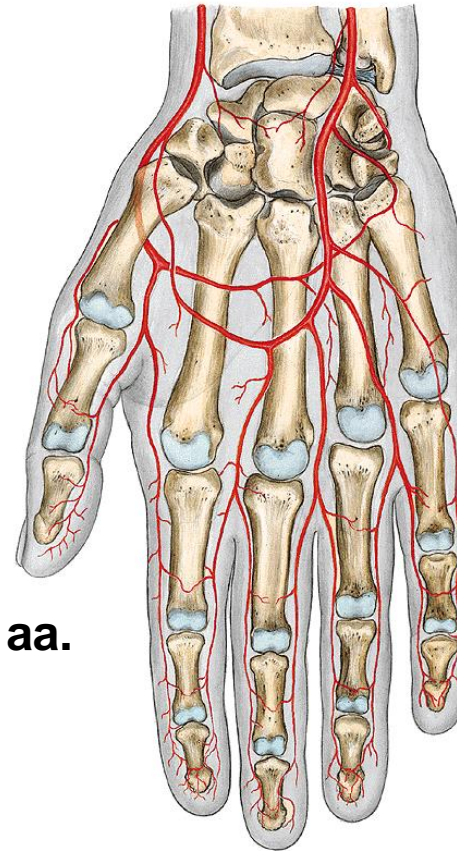
- a) the muscular branches
- b) a. interossea communis
- c) for art. radiocarpalis
- d) r. palmaris superficialis
- e) r. palmaris profundus

ARCUS PALMARIS SUPERFICIALIS

-aa. digitales palmares communes → aa. digitales palmares propriae

ARCUS PALMARIS PROFUNDUS

-aa. metacarpae palmares – connected with aa. digitales communes

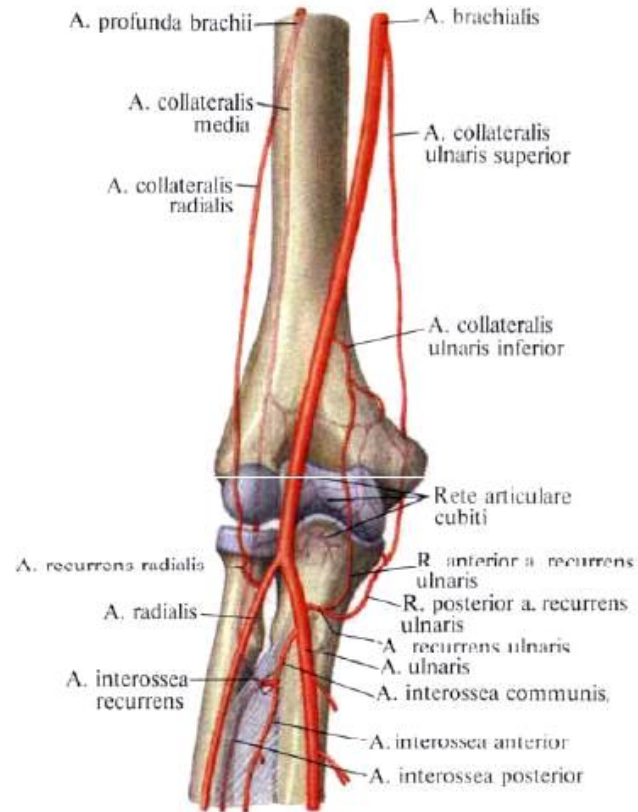


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RETE ARTICULARE CUBITI

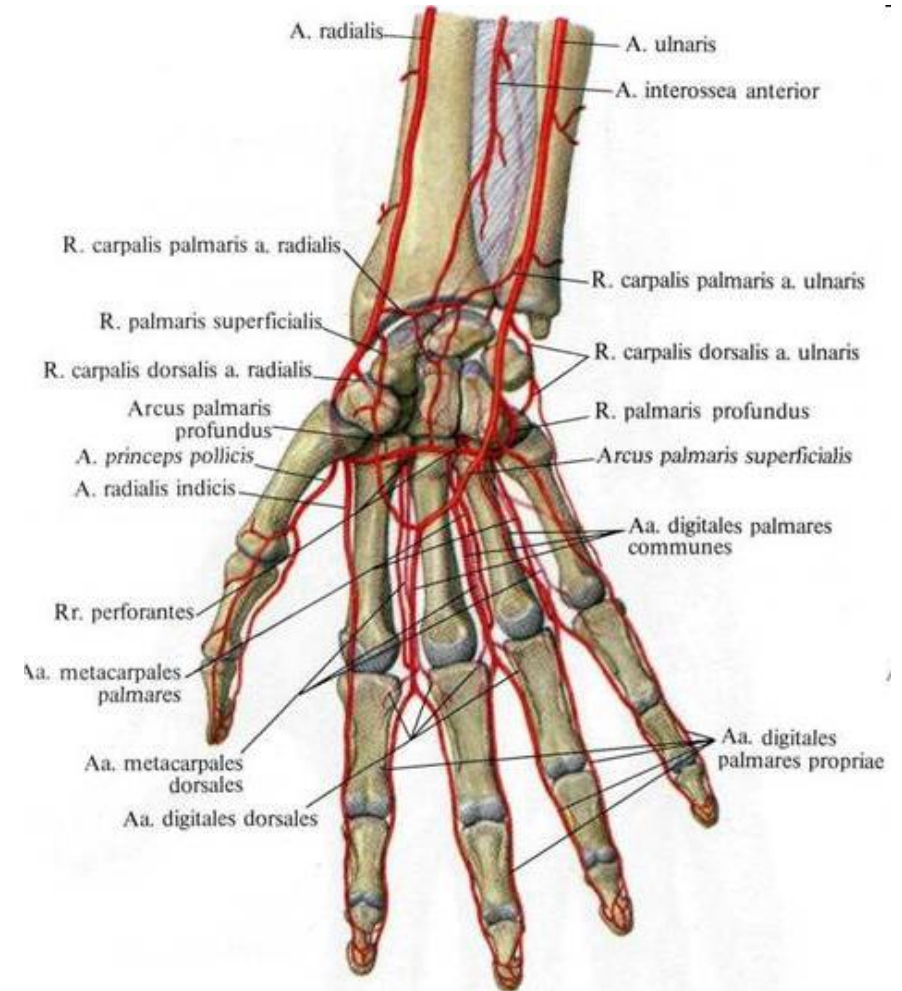
RETE CARPI PALMARE ET DORSALE

RETE ARTICULARE CUBITI

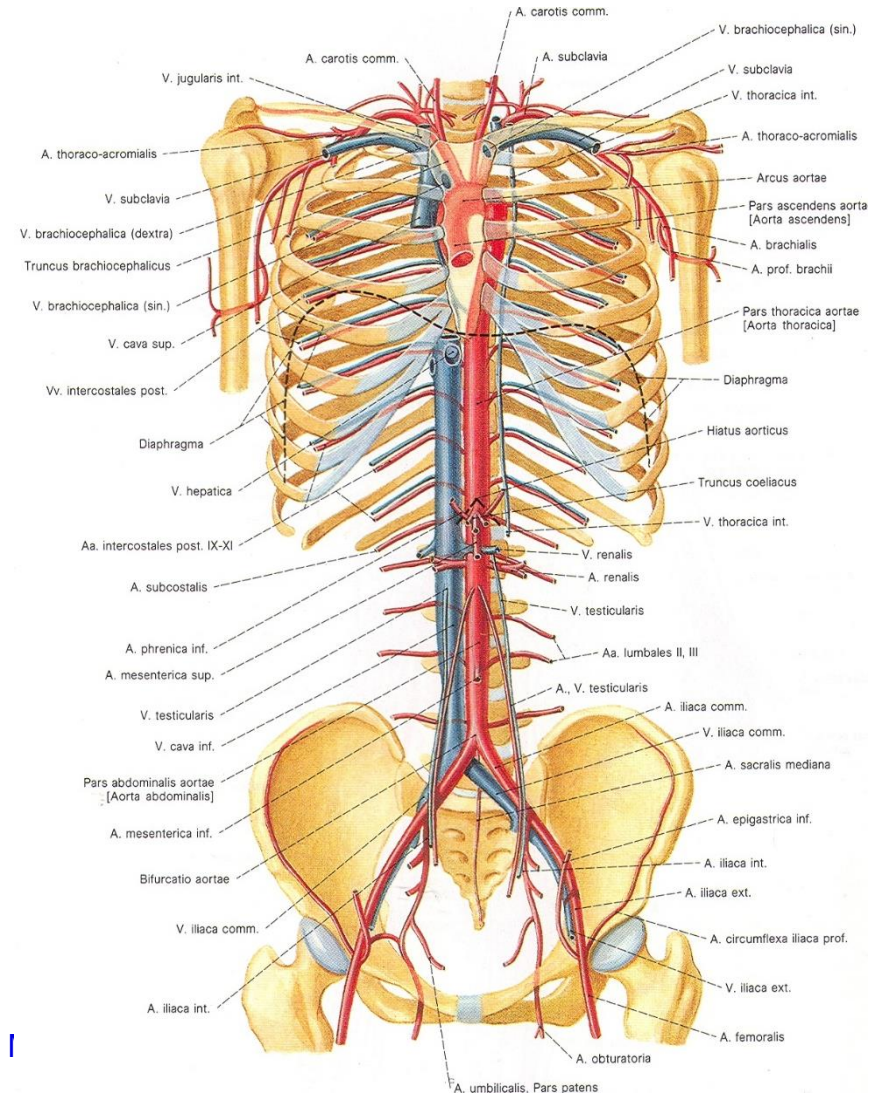
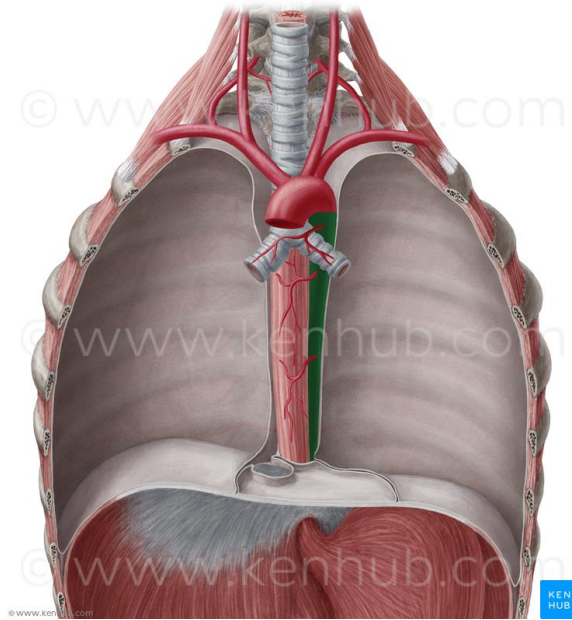


RETE CARPI PALMARE

RETE CARPI DORSALE



Aorta descendens - Th3- L4



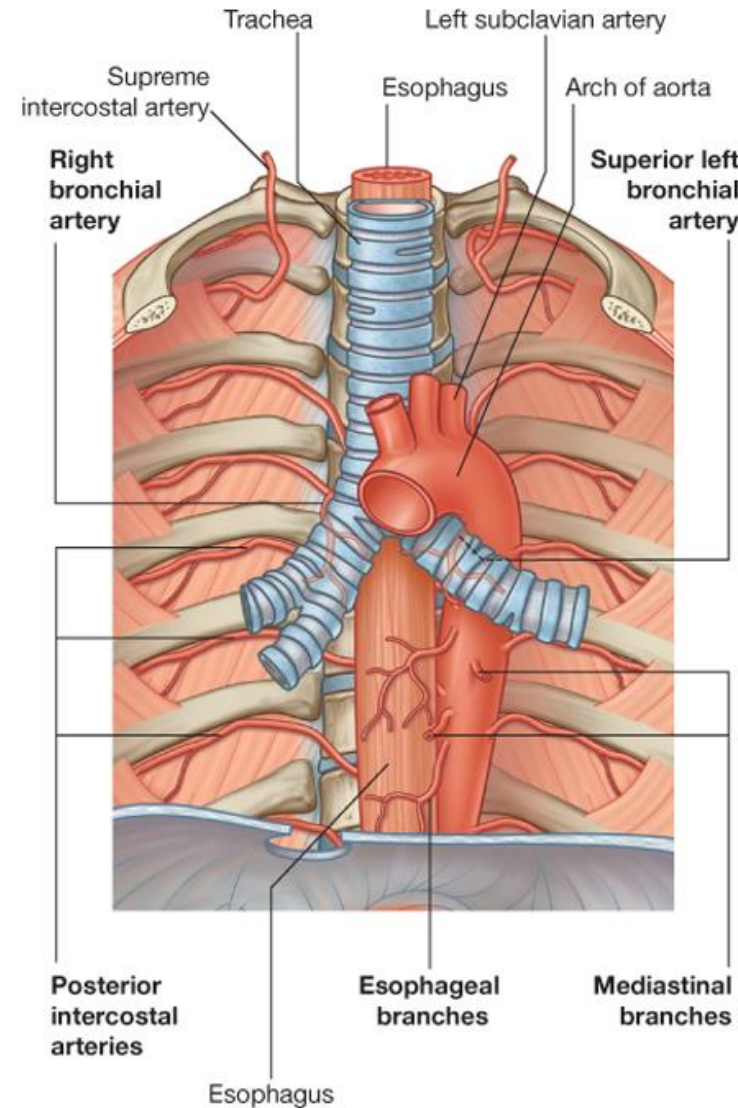
AORTA THORACICA — from Th₃ till the diaphragm (posterior mediastinum)

The parietal branches:

- aa. intercostales posteriores (intercostal spaces)
- aa. phrenicae superiores (the diaphragm)

The visceral branches:

- rr. bronchiales
- rr. oesophagei
- rr. pericardiaci
- rr. mediastinales



AORTA ABDOMINALIS – the diaphragm - L4

- retroperitoneally
- L4 - bifurcatio aortae

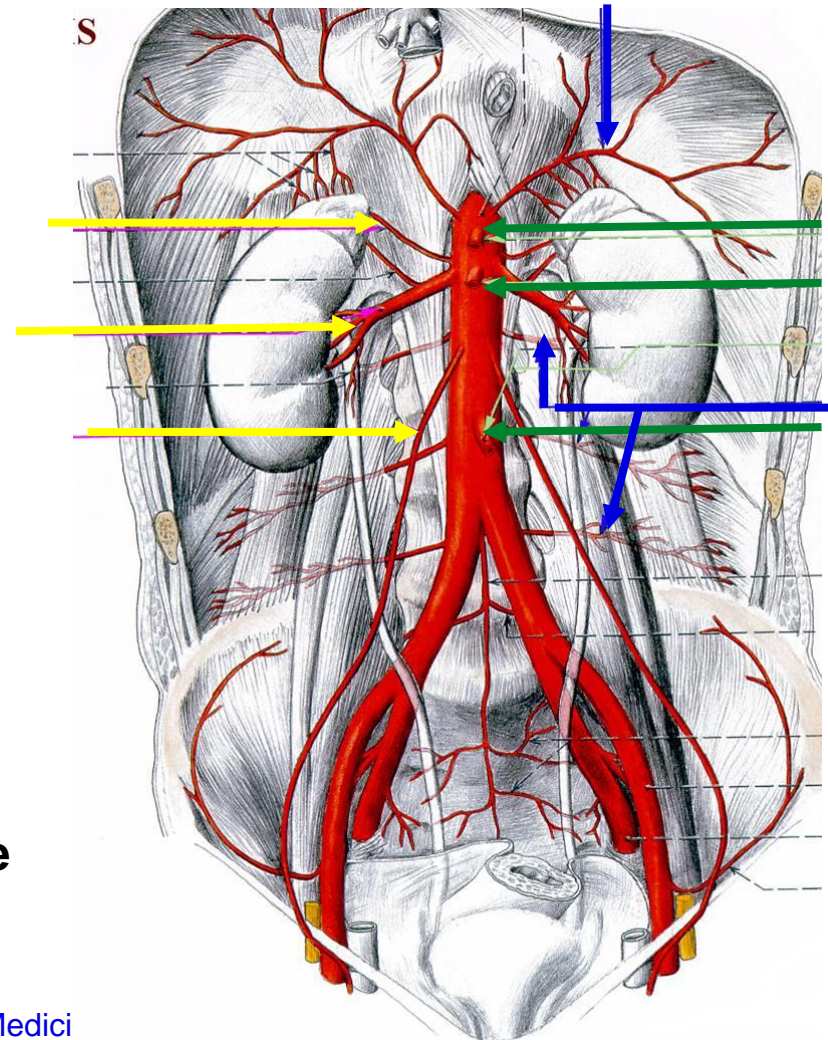
The parietal branches:

- for the abdominal wall (aa. Lumbales)
- for the diaphragm (aa. phrenicae inferiores)

The visceral branches:

the non-paired branches

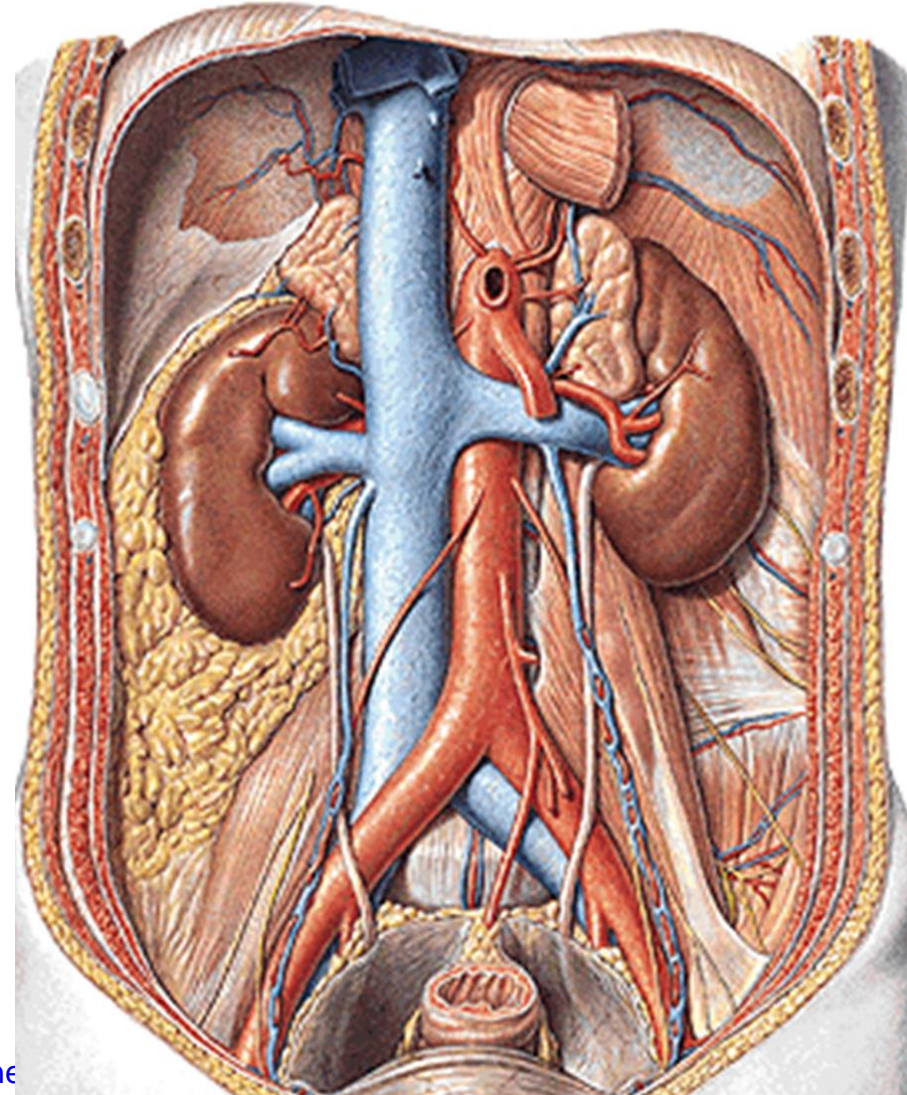
- 1) truncus coeliacus (Th₁₂-L₁) - (for the stomach, liver, spleen)
- 2) a. mesenterica superior (L₁) (for the whole small intestine and a part of the large intestine)
- 3) a. mesenterica inferior (L₃) (from flexura coli sin. downward till the cranial part of the rectum)



Visceral branches:

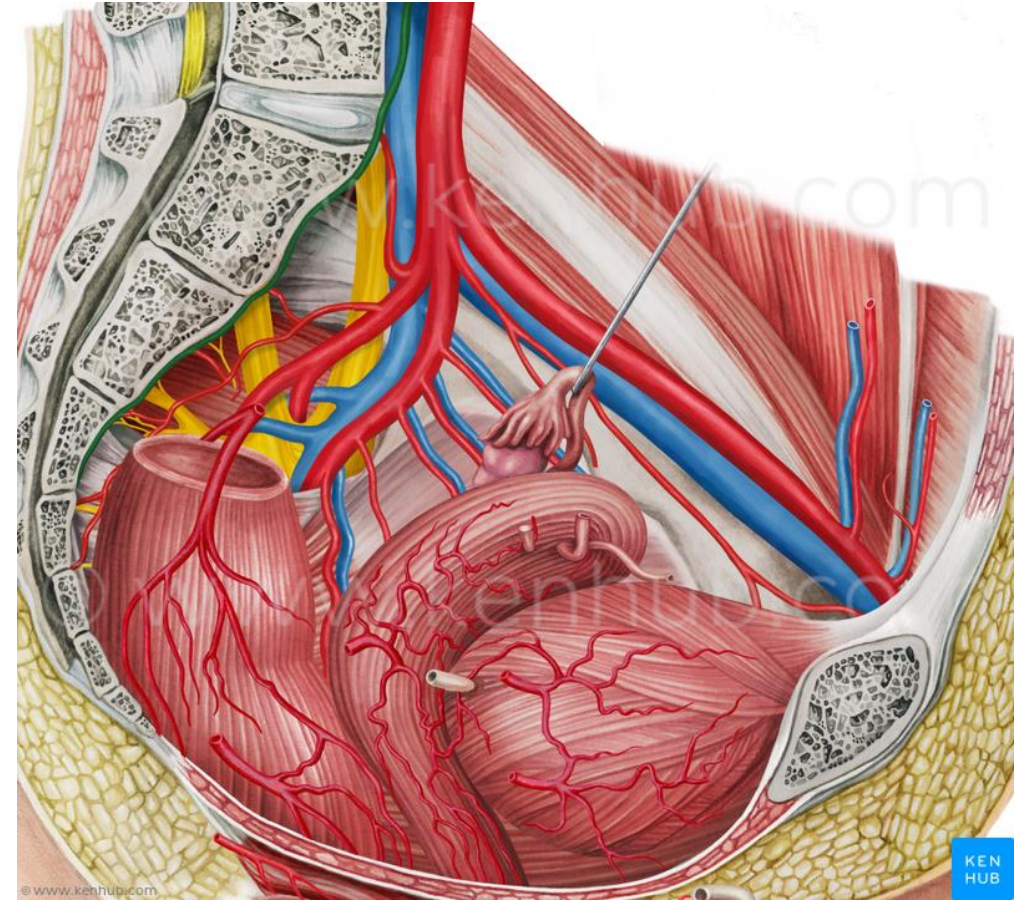
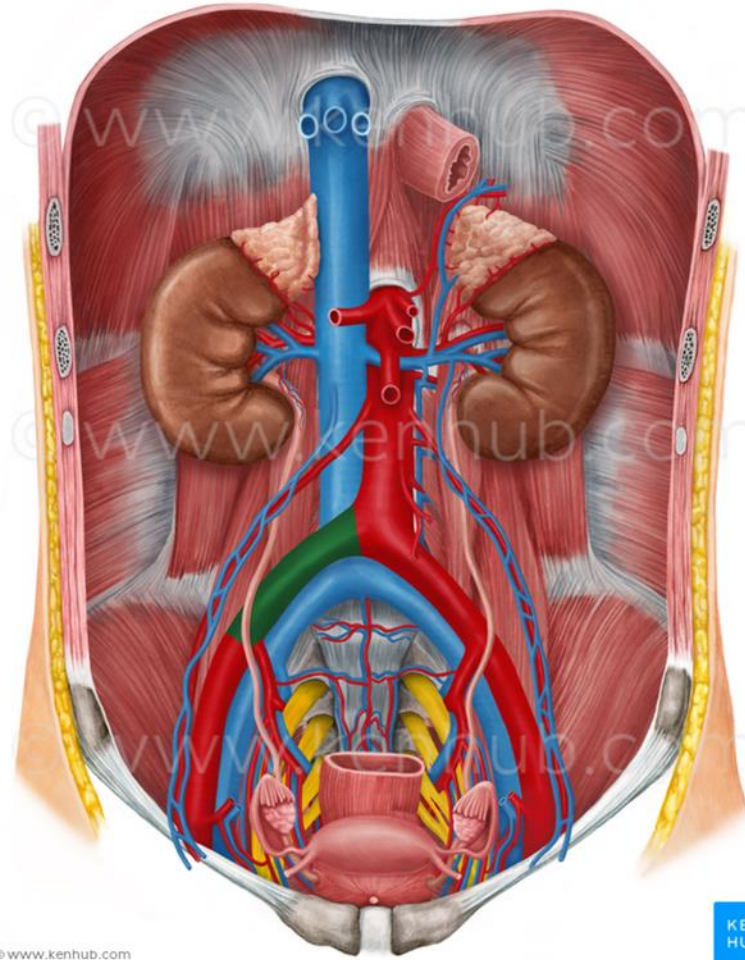
paired

- 1) for the suprarenal glands
aa. suprarenales mediae
- 2) for the kidneys
aa. renales
- 3) for the ovaries (testicles)
 - aa. testiculares
 - aa. ovaricae



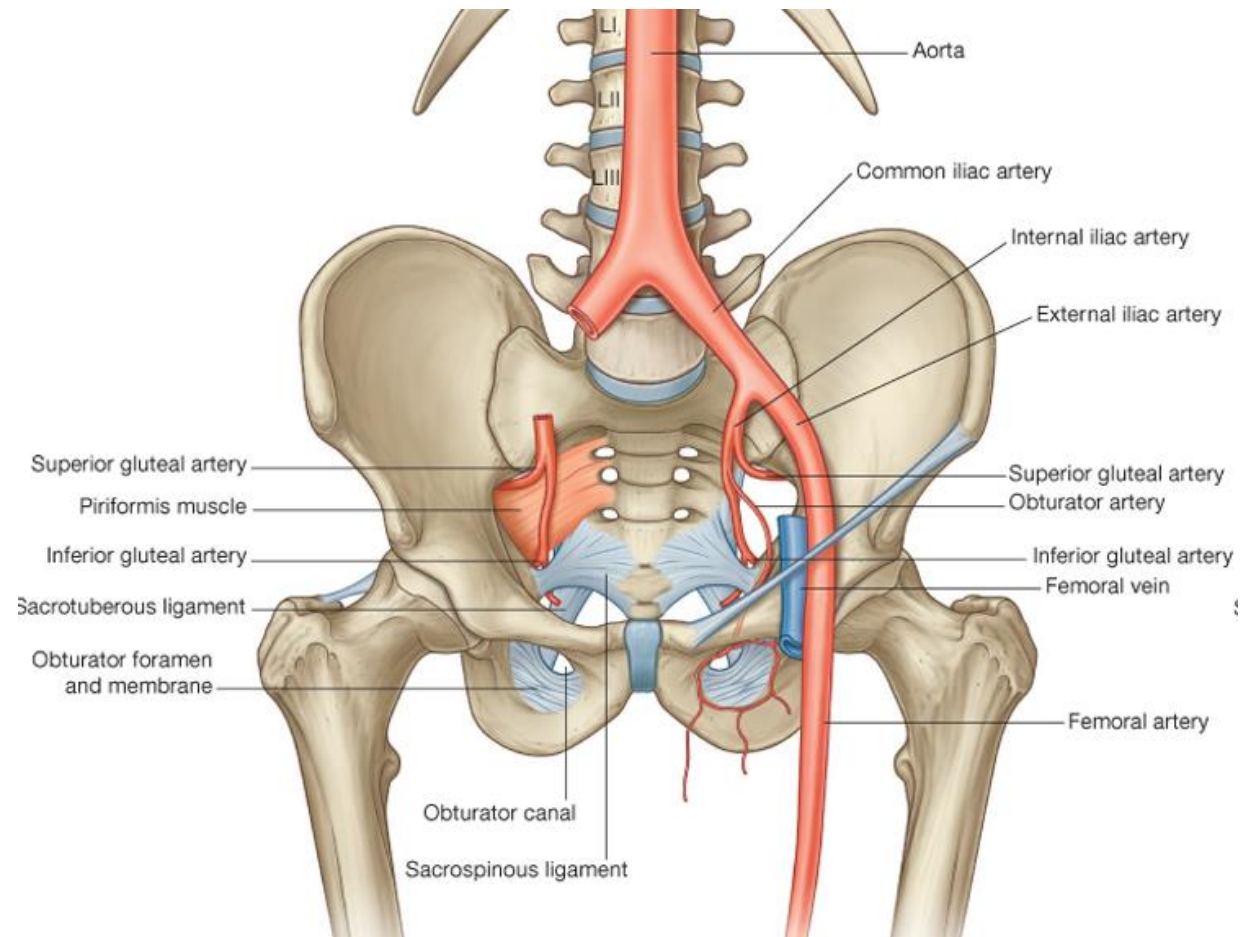
Terminal branches

- a. sacralis mediana
- aa. iliacae communes



Aa. iliaca communes

- L₄ bifurcatio aortae
- art. iliaca communis
(divides into a. iliaca int. a ext.)



A. iliaca interna

- it supplies the organs and the wall of the small pelvis

The parietal branches :

The muscular branches for the gluteal muscles

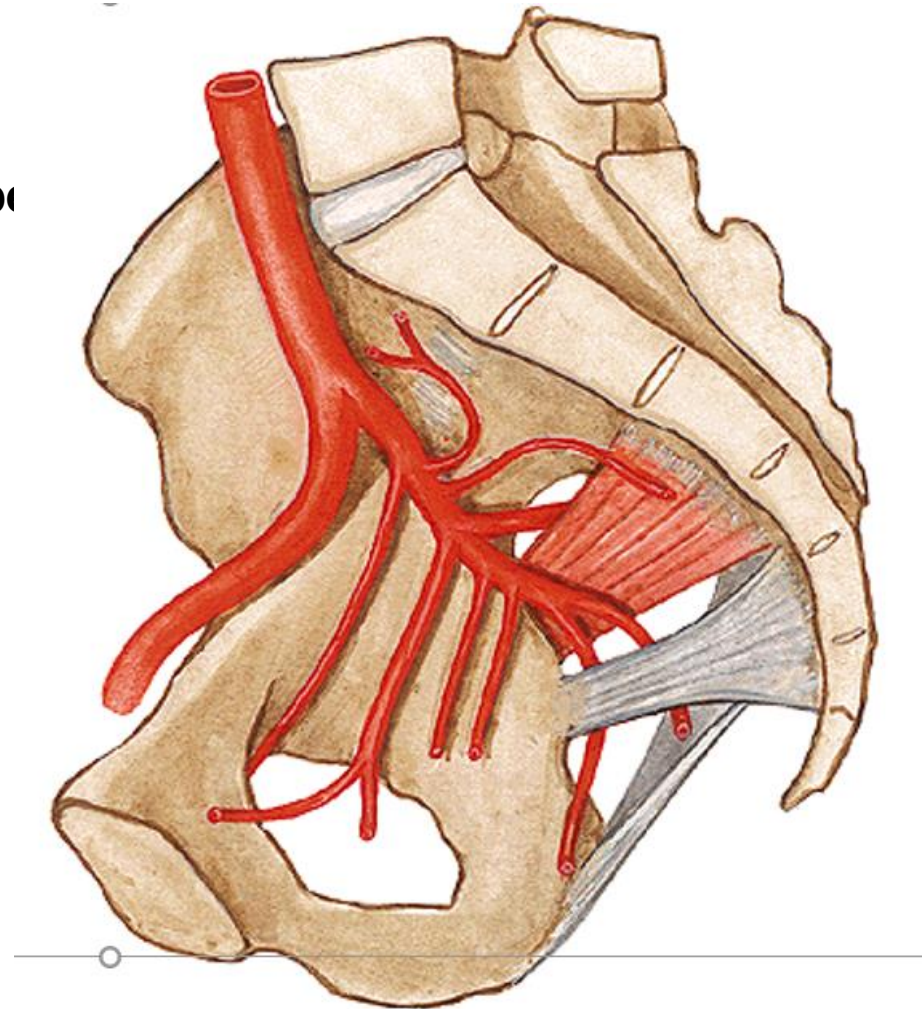
(a. glutea superior et inferior),

the wall of the small pelvis

(a. iliolumbalis, a. sacralis lateralis),

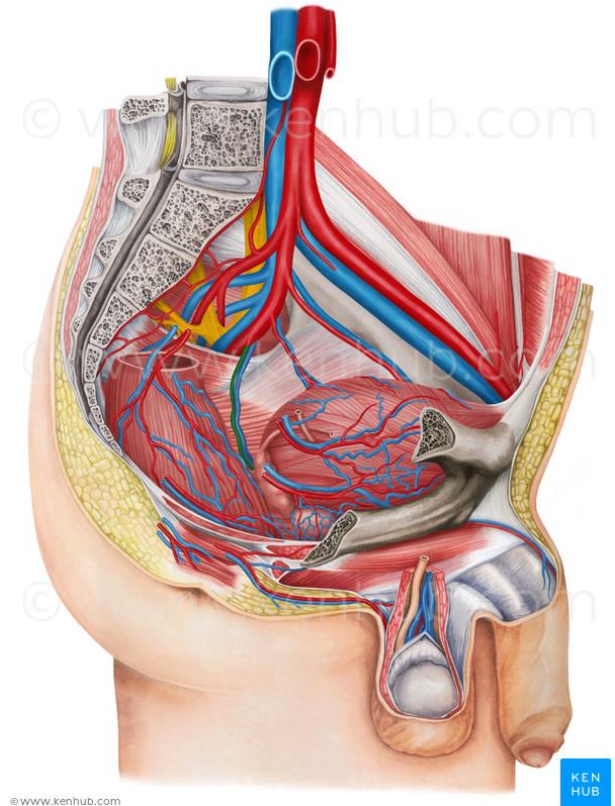
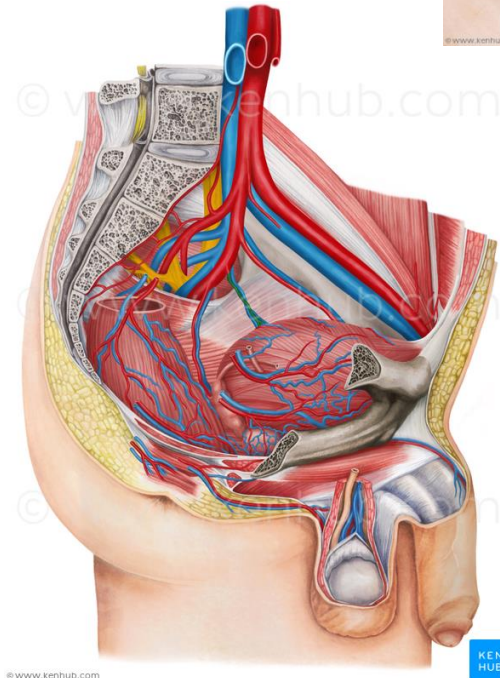
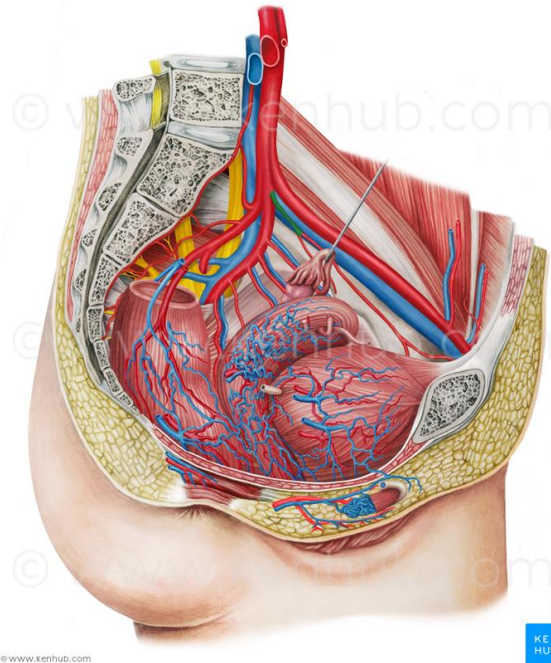
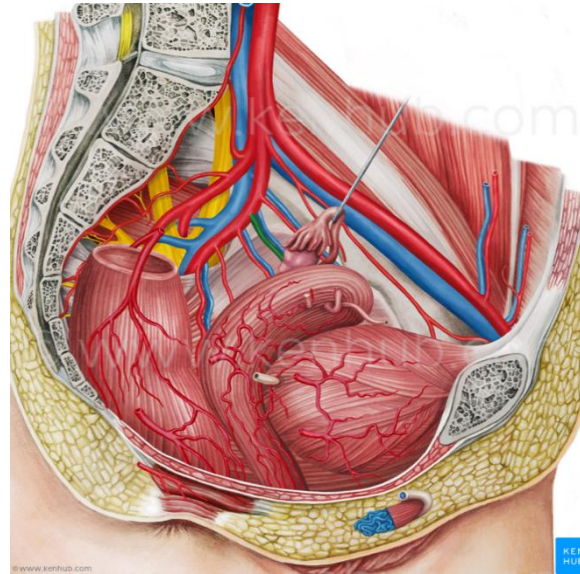
for the adductors of the thigh (a. obturatoria),

for the genital organs (a. pudenda interna)



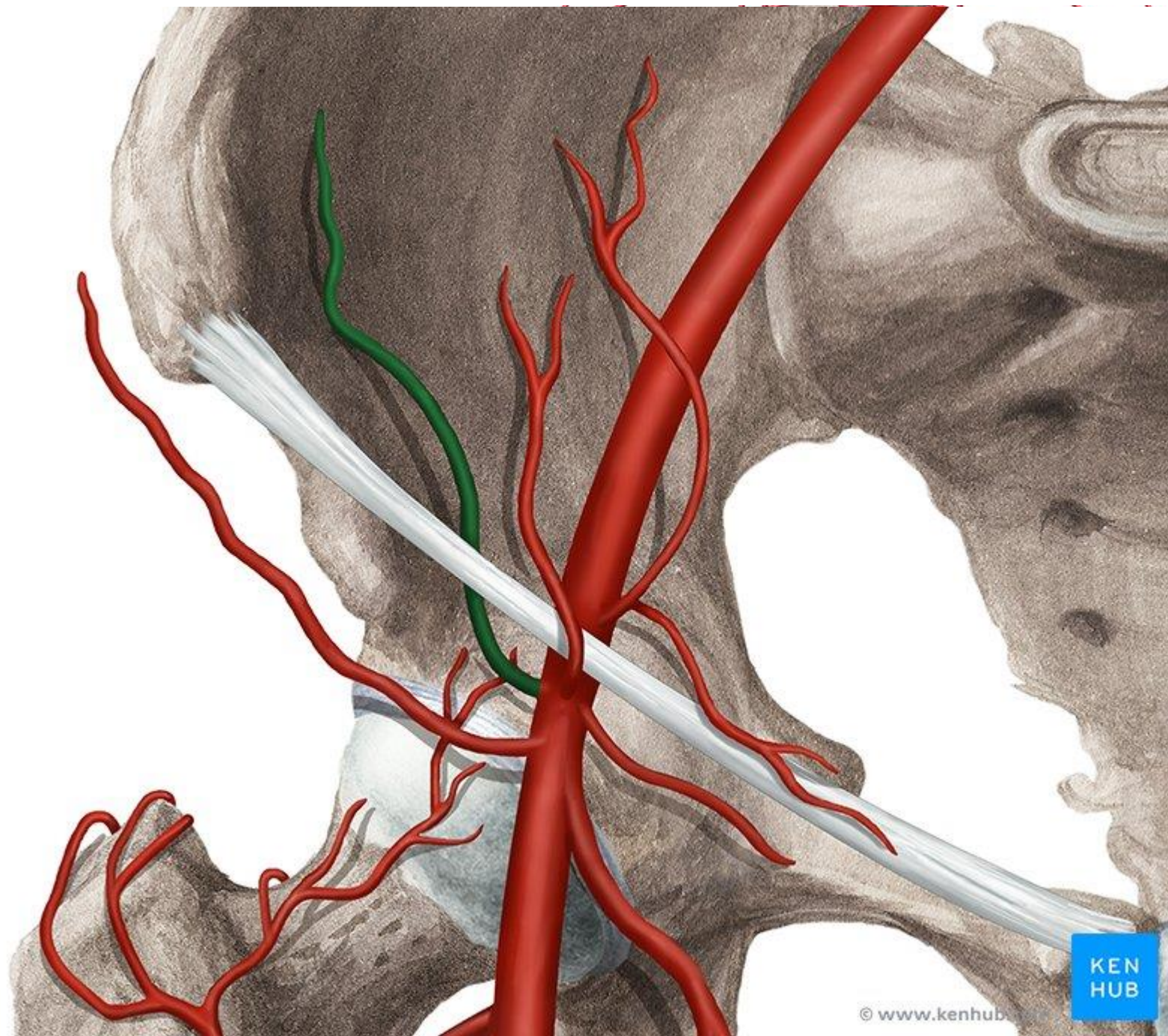
– **The visceral branches:**

- a. umbilicalis (obliterates and changes into lig. umbilicale lat.)
- for the urinary bladder (a. vesicalis inf.)
- for ductus deferens (resp. For the uterus) – a. ductus deferentis, a. uterina
- ke konečníku (a. rectalis media)



A. ilia

thicker
a. epigastric
(the abd
of the la
a. circum

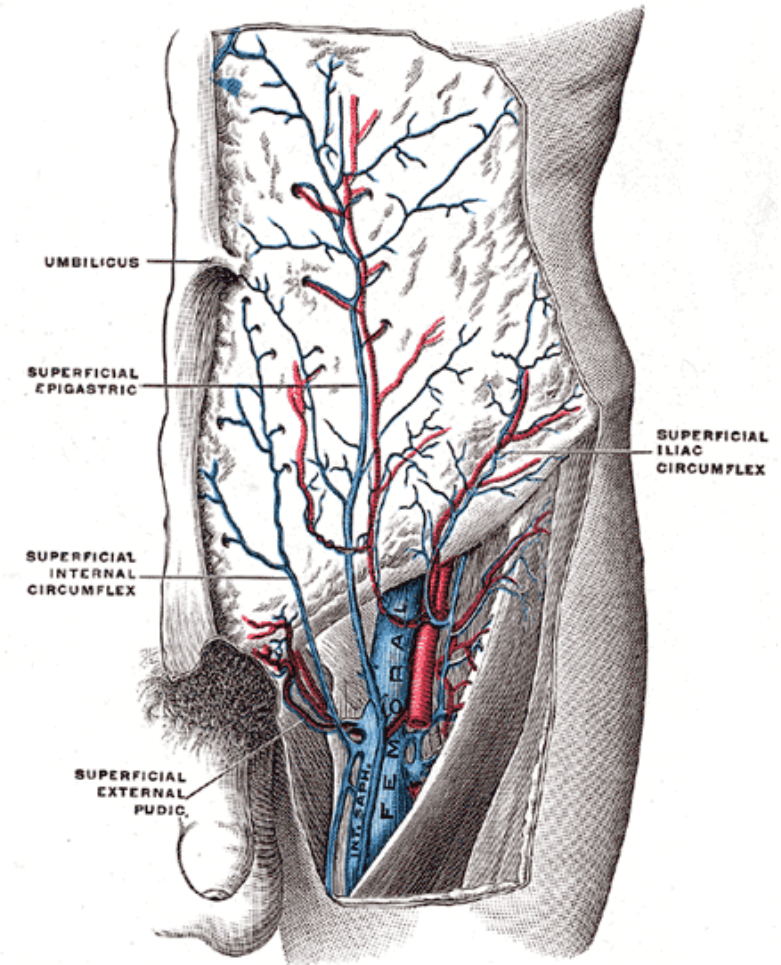
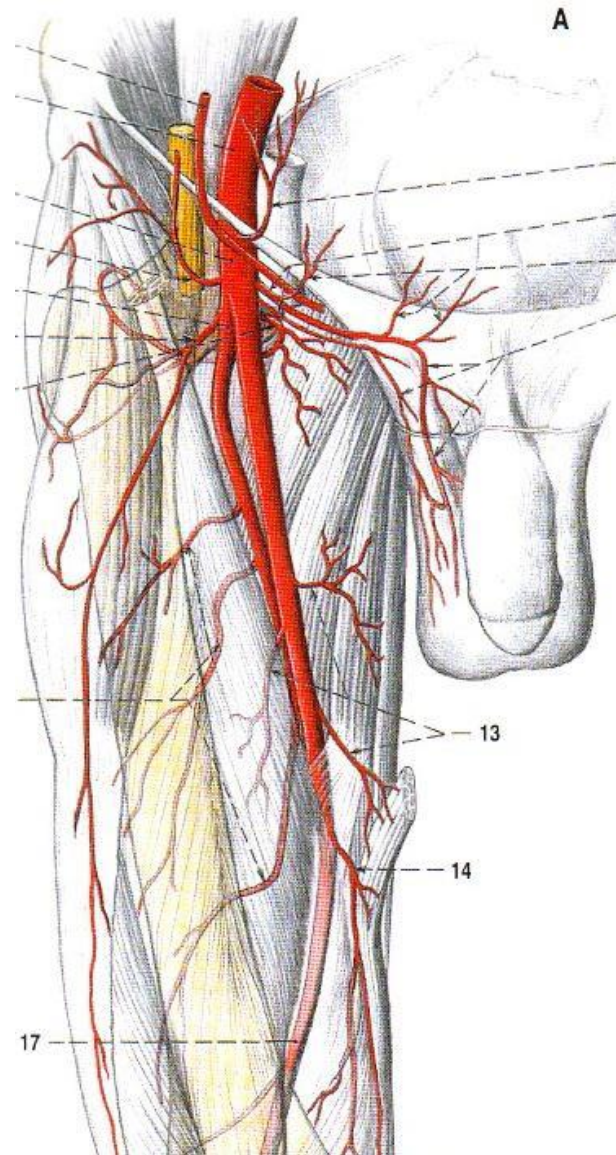


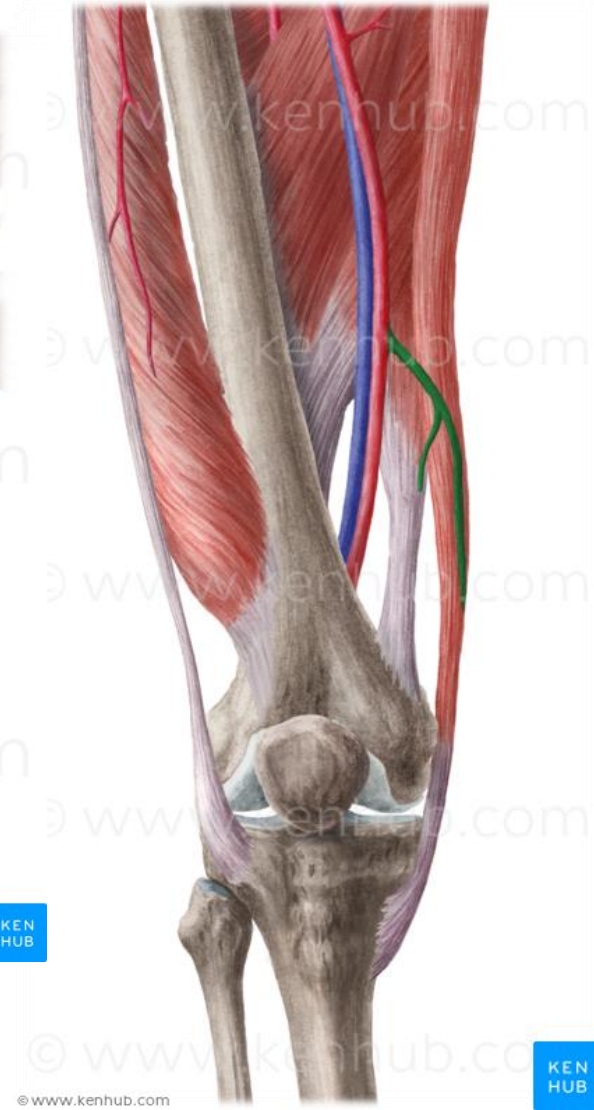
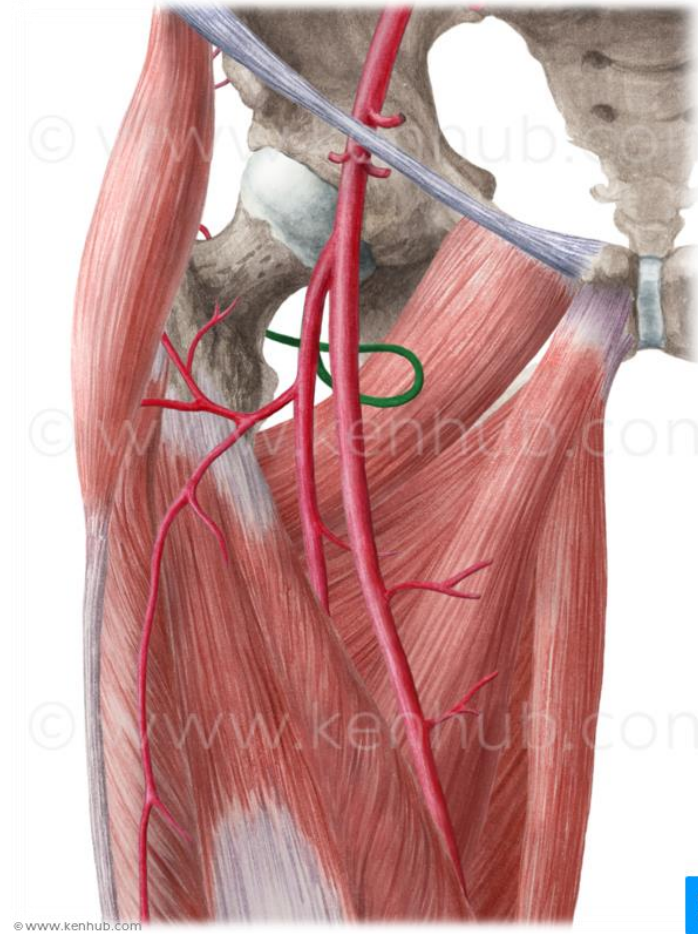
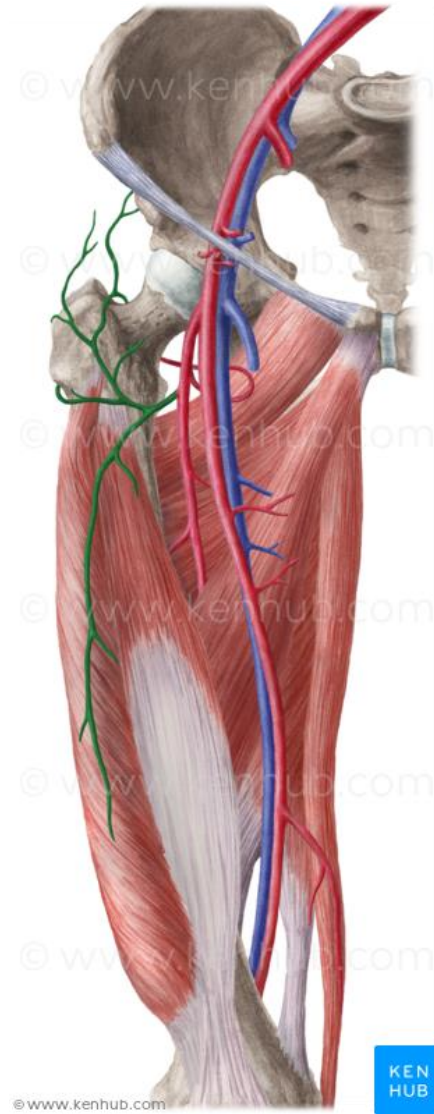
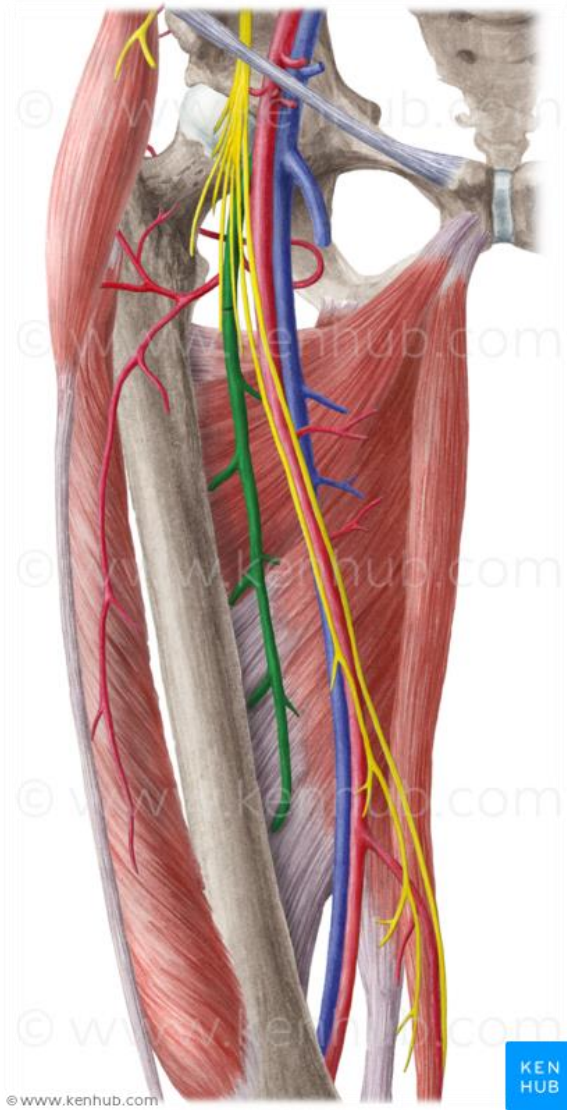
A. femoralis

- from lacuna vasorum till fossa poplitea, through fossa iliopectinea and canalis adductorius

The branches:

- 1) For the external genital organs and the abdominal wall: a. epigastrica superficialis, a. circumflexa ilium superficialis, aa. pudendae externae
- 2) **a. profunda femoris**: the main artery for the muscles of the thigh (a. circumflexa femoris med. a lat., aa. perforantes)
- 3) the muscular branches (thigh)
- 4) **a. genus descendens**: for rete articulare genus (r. saphenus)



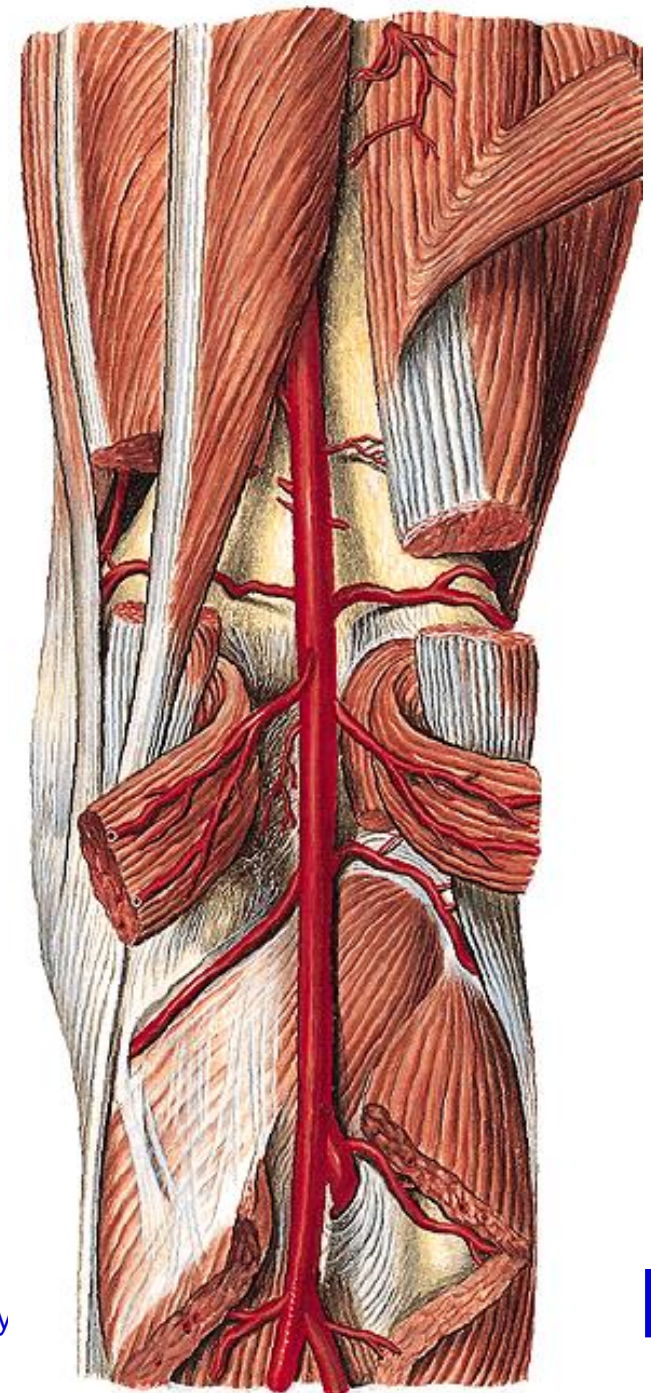


A. poplitea

- from hiatus tendineus till the distal edge of m. popliteus
- for the muscles of fossa poplitea and the knee joint

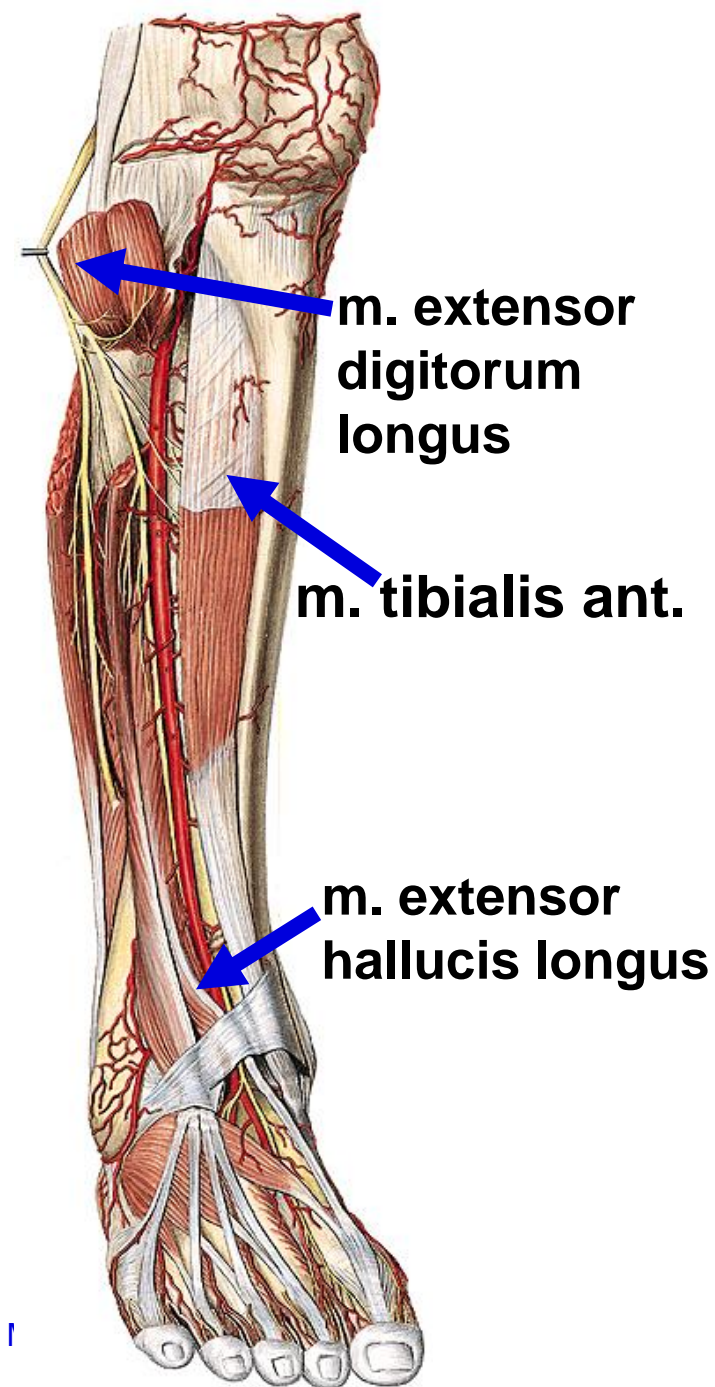
The branches:

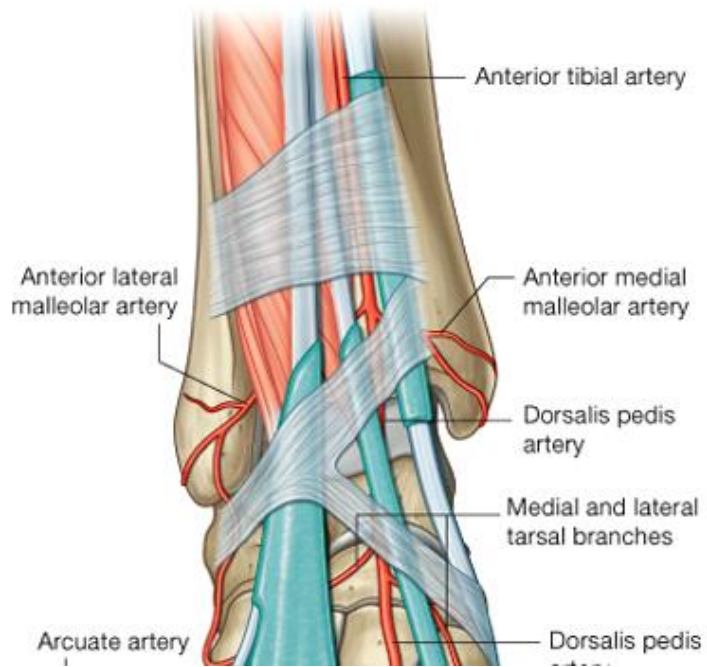
- 1) aa. surales (for m. gastrocnemius)
- 2) aa. genus – into the arterial net around the knee joint
- 3) the terminal branches:
 - a. tibialis anterior
 - a. tibialis posterior



A. tibialis anterior

- It perforates through membrana interossea cruris
- proximally between m. tibialis ant. and m. extensor digitorum longus
- distally between m. tibialis ant. and m. extensor hallucis longus – under retinaculum extensorum
- From the passing under retinaculum extensorum – it is called – **a. dorsalis pedis**





- It supplies the knee joint, the anterior side of the lower leg, the foot and the fingers

The branches:

- 1) into arterial net around the knee joint
- 2) The muscular branches
- 3) into arterial net around both ankles
- 4) a. dorsalis pedis



The branches of a. dorsalis pedis:

a. tarsalis lateralis

aa. tarsales mediales

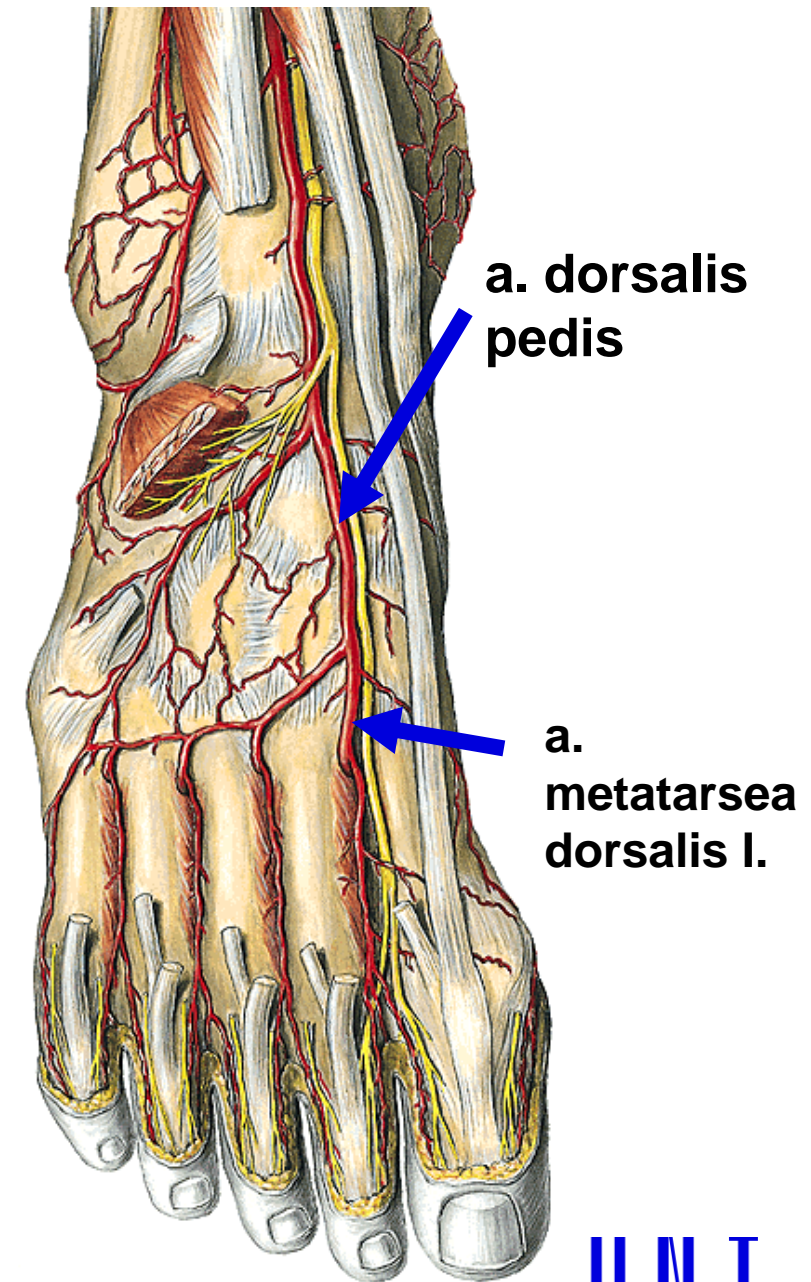
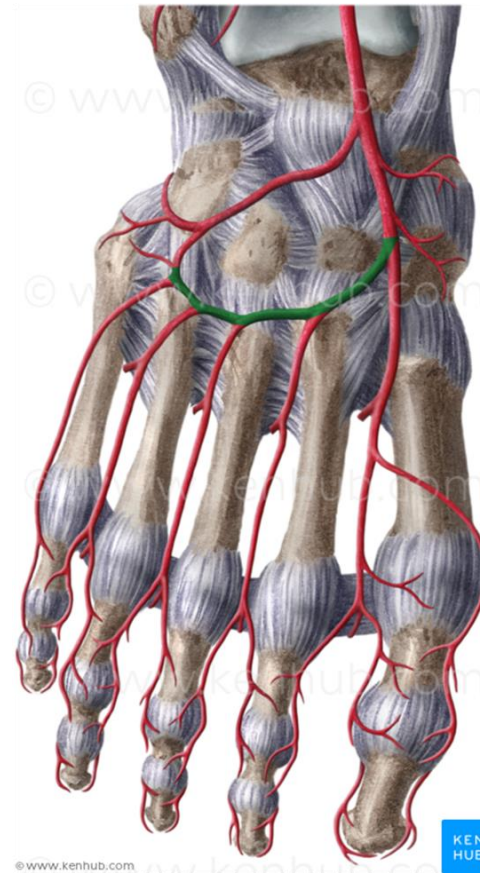
a. arcuata

•aa. metatarsae dorsales

•aa. digitales dorsales

a. metatarsa dorsalis I.

r. plantaris profundus (into planta pedis-arcus plantaris)

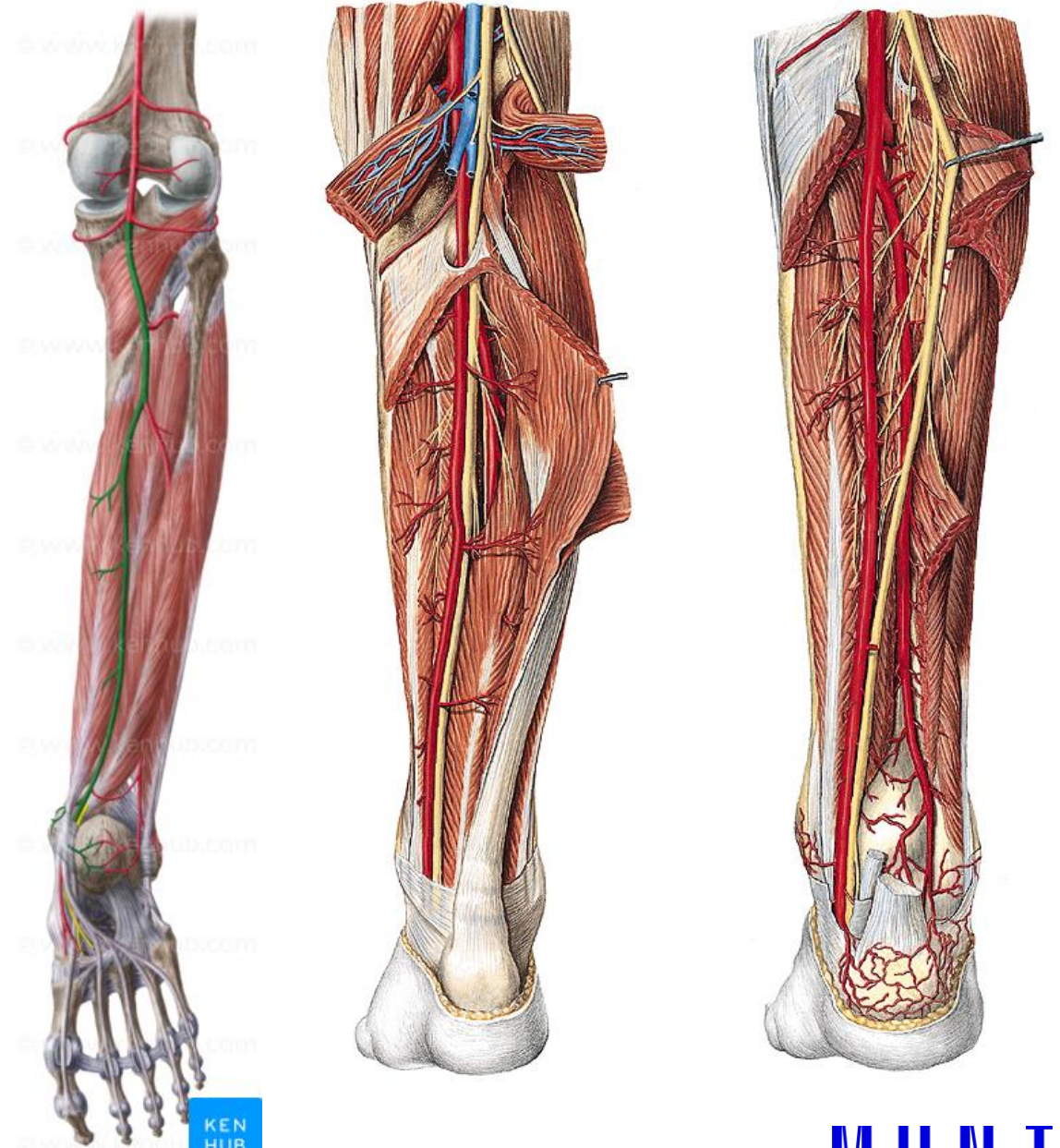


A. tibialis posterior

under arcus tendineus m. solei, it lies onto the deep flexors of the lower leg, behind the medial ankle runs into planta pedis

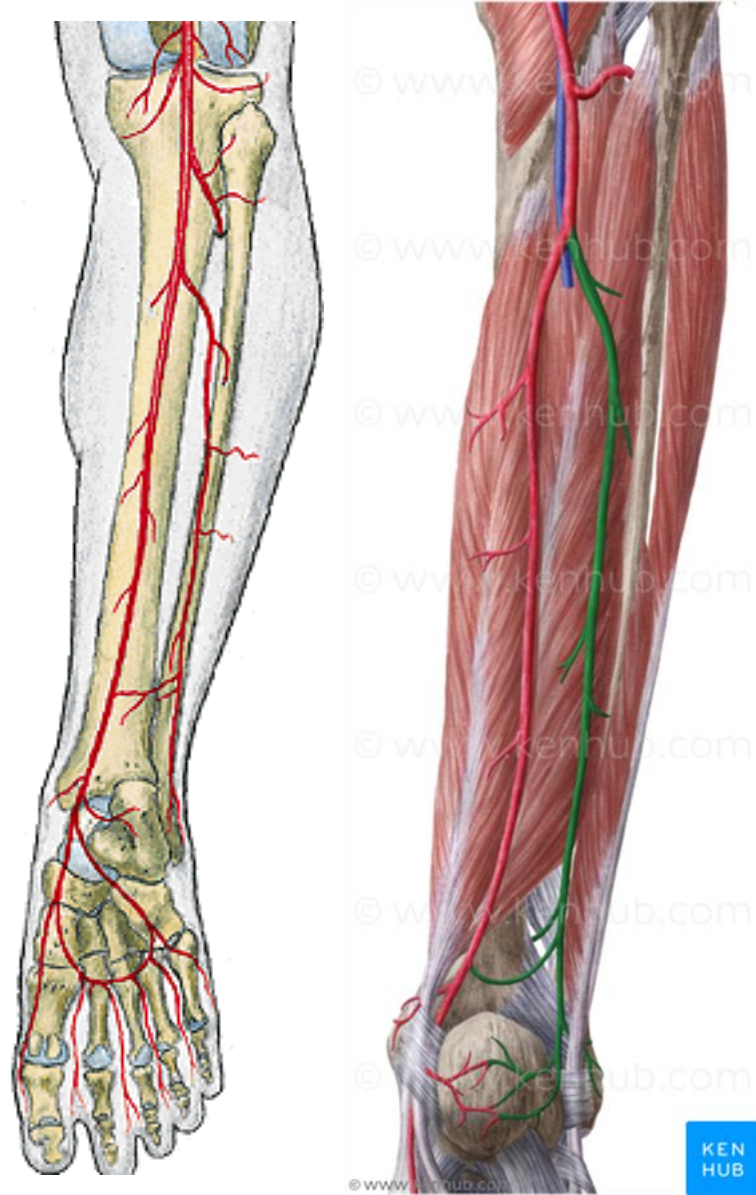
canalis malleolaris (the structures behind the medial ankle)

- m. tibialis posterior
- m. flexor digitorum longus
- a. et vv. tibiales posteriores
- n. tibialis
- m. flexor hallucis longus



the branches:

- 1) into the arterial net around the knee joint
- 2) a. fibularis - supplies fibula and surrounding muscles
- 4) into the arterial net around the medial ankle
- 5) into the arterial net around the heel



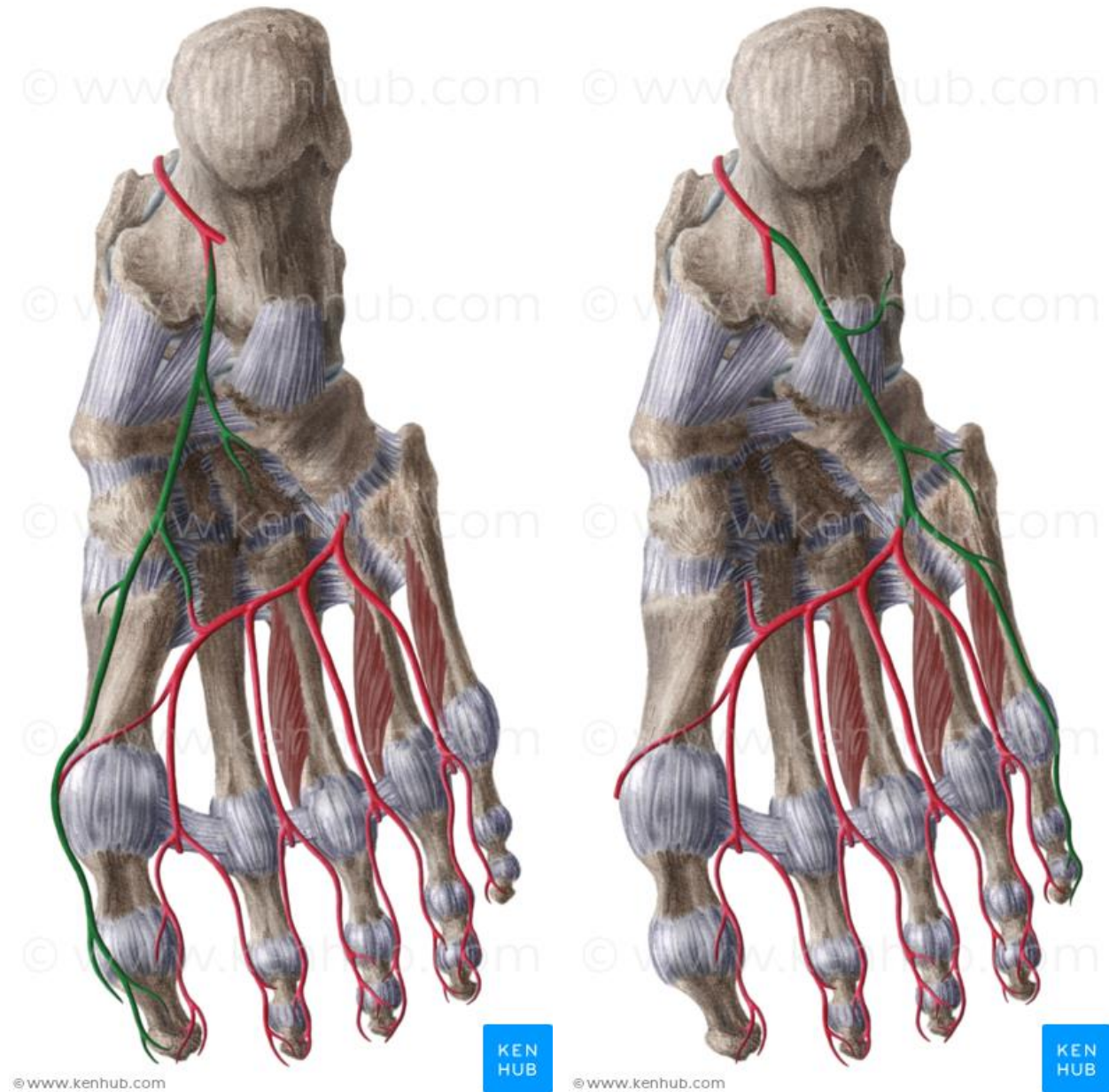
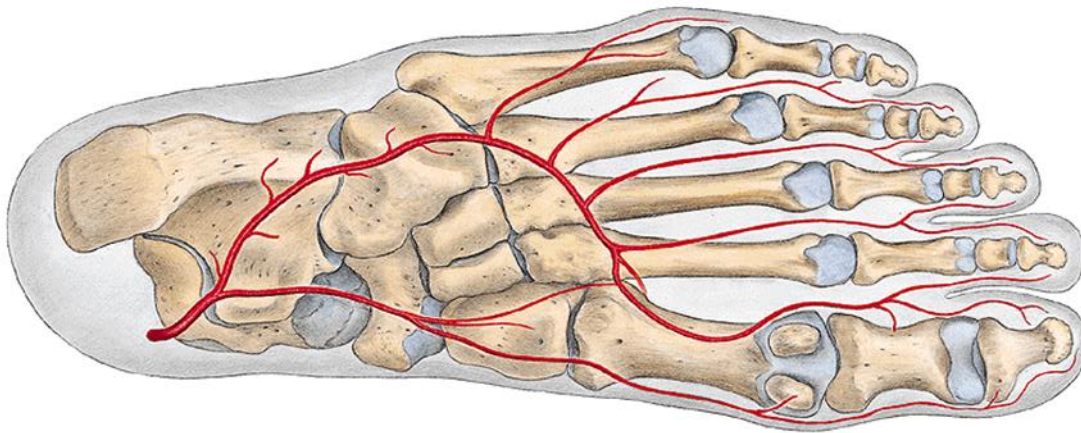
the terminal branches:

a. plantaris medialis

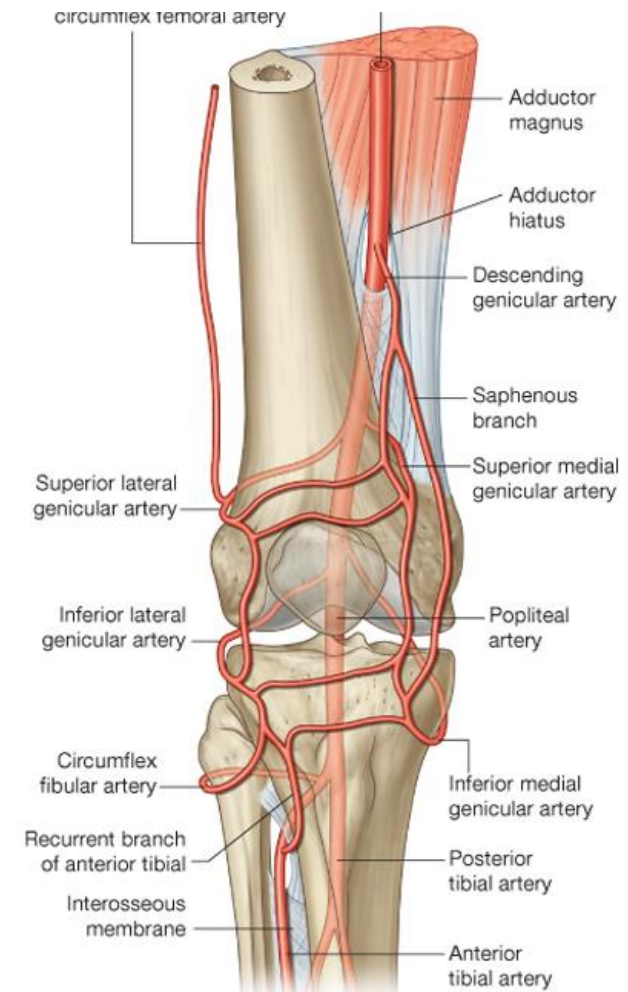
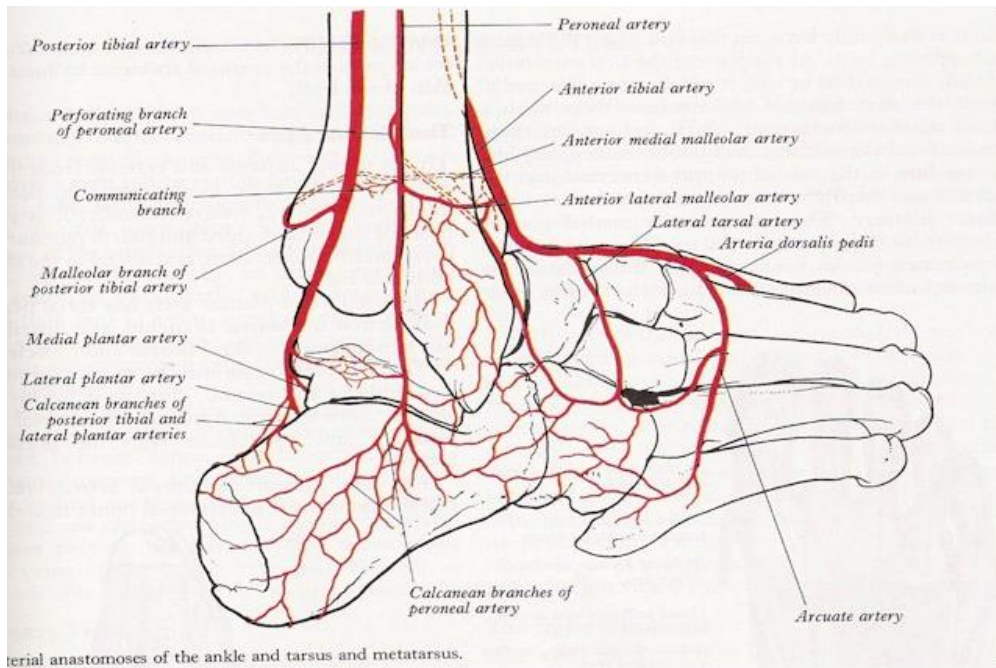
a. plantaris lateralis

(arcus plantaris – aa. metatarsae plantares

aa. digitales plantares)



- **RETE ARTICULARE GENUS (rete patellae)**
- **RETE MALLEOLARE MEDIALE**
- **RETE MALLEOLARE LATERALE**
- **RETE CALCANEUM**
- **RETE DORSALE PEDIS**



...to be continued with the lecture about the veins and lymphs

Obrázky:

Atlas der Anatomie des Menschen/Sobotta. Putz, R., und Pabst, R.
20. Auflage. München: Urban & Schwarzenberg, 1993

Netter: Interactive Atlas of Human Anatomy.

Naňka, Elišková: Přehled anatomie. Galén, Praha 2009.

Čihák: Anatomie I, II, III.

Drake et al: Gray's Anatomy for Students. 2010

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