

O ANATOMIJI

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2022.

Podela

- Morfologija i fiziologija životinja
- Makroskopska i mikroskopska
- Zootomia, phytotomia i anthropotomia
- Sistematska i topografska
- Specijalna i komparativna
- Rendgenska, ultrazvučna anatomija

Grane sistematske anatomije

1. Osteologija
2. Syndesmologia
3. Myologia
4. Splanchnologia
5. Angiologia
6. Neurologia
7. Aesthesiologia

Equus caballus



Equus asinus



Bos taurus



Ovis aries



Capra hircus



Sus scrofa domesticus



Canis familiaris i felis domestica



Galus domesticus



Meleagris gallopavo



Anser domesticus



Anas domestica





- **Vertebrate**
- Delove tela kičmenjaka
- Funkcija skeleta
- Kičma
- Čemu služi kičma – pridržiava glavu i osovina za telo
- lobanja (štiti mozak i čulne organe u glavi)
- grudni koš (štiti srce i pluća)
- Ekstremiteti su po istom principu (rameni i karlični pojas)

Vezivno tkivo

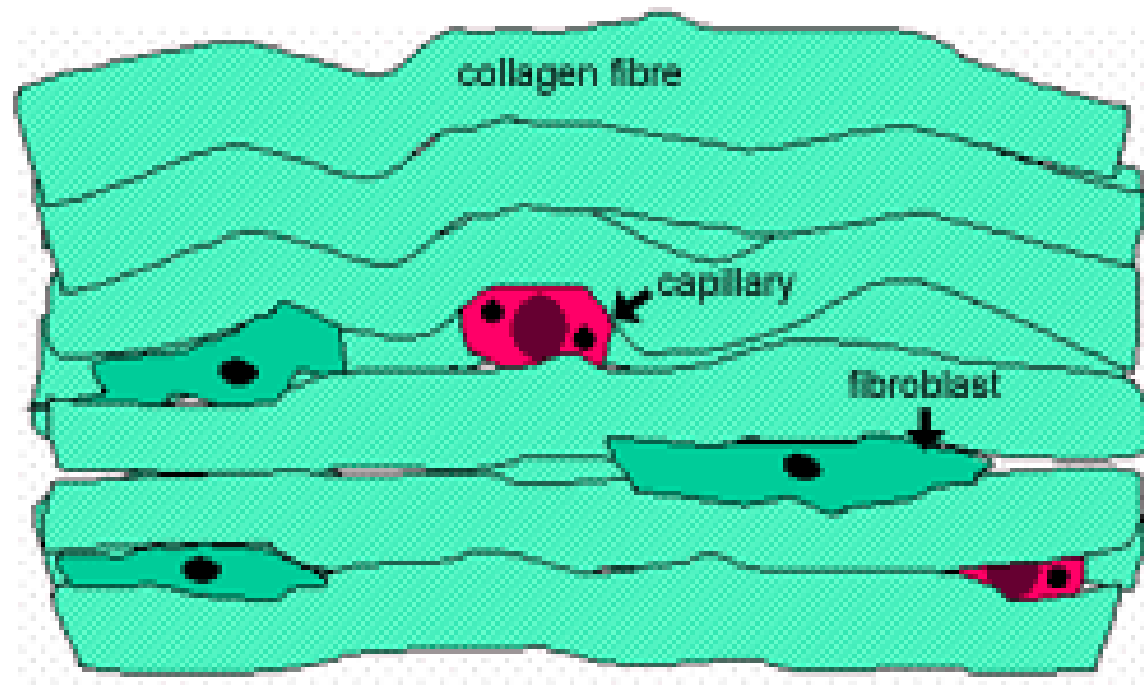
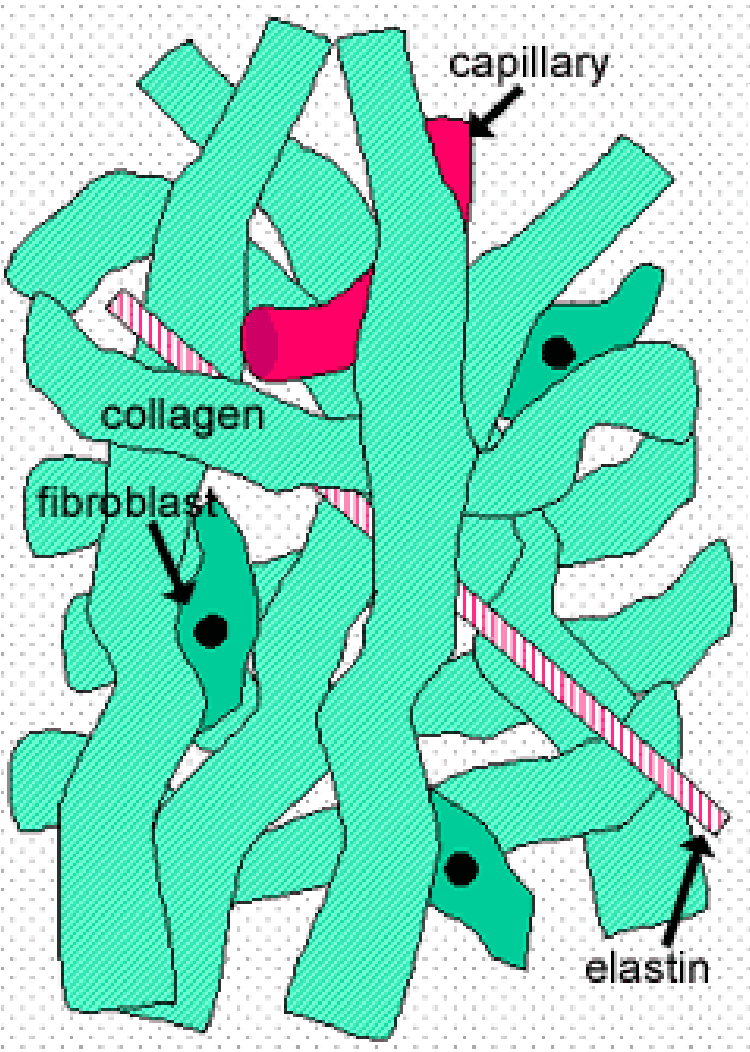
-pravo vezivno tkivo, u uzem
smislu:rastresito i gusto

-specijalizovana vezivna tkiva
mogu biti

tečna i čvrsta:potporna vezivna

tkiva: hrskavica i kost su čvrsta

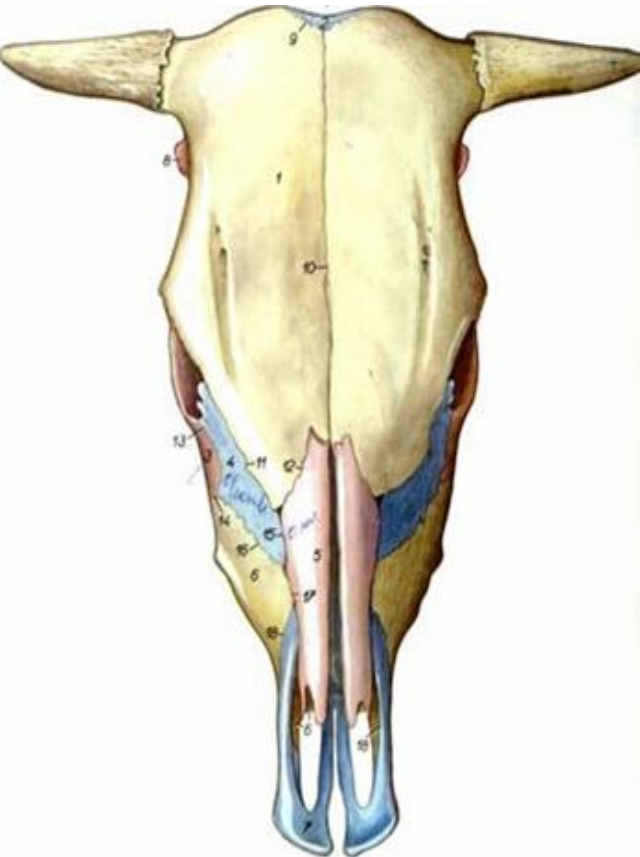
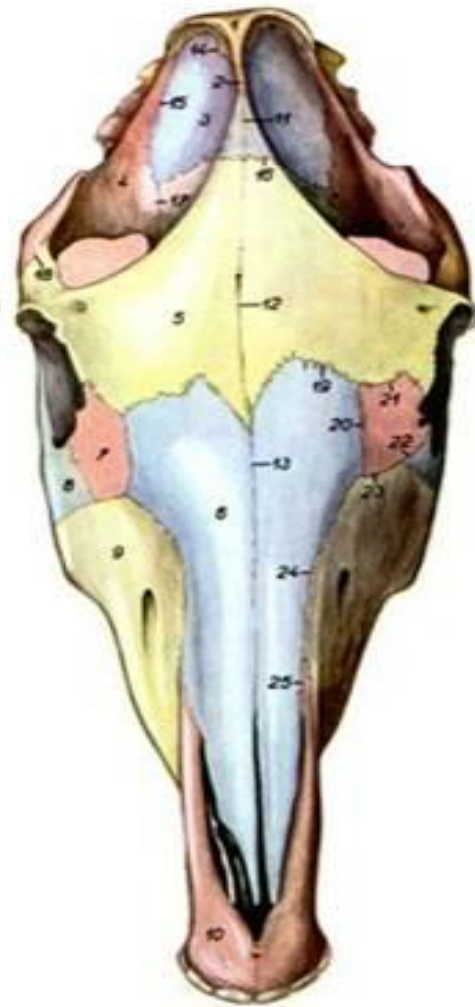
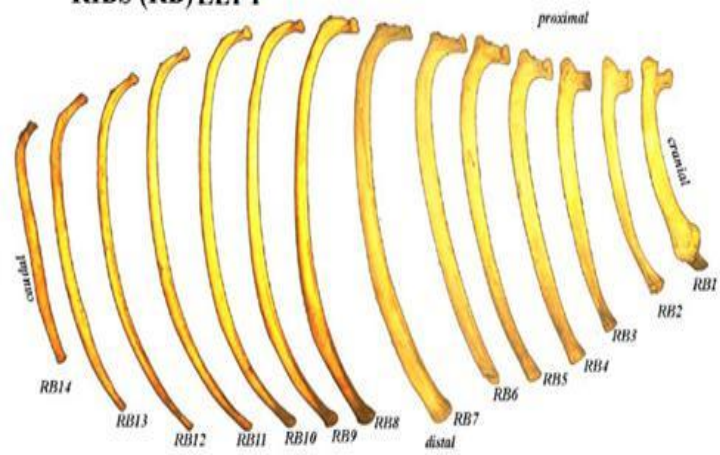
-krv i limfa su tečna



Uloga kosti

- Podrška
- **Zaštita unutrašnjih organa**
- **Pomažu kretanje**
- **Mineral homeostasis** : zaliha Ca i P
- **Stvaranje krvnih elemenata u kosnoj srži?**
- Kost je izgrađena od ćelija i **extracelularnog matrixa**
- **Ćelije su** : **osteoblasti** i **osteociti**, (osteo – bone)
- **osteoprogenitor cells** i **osteoklasti**

RIBS (RB) LEFT



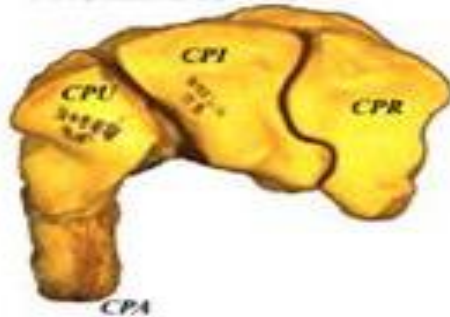
OSSA PLANA



LEFT CARPALS - LATERAL VIEW



LEFT CARPALS PROXIMAL VIEW



LEFT CARPALS CRANIAL VIEW

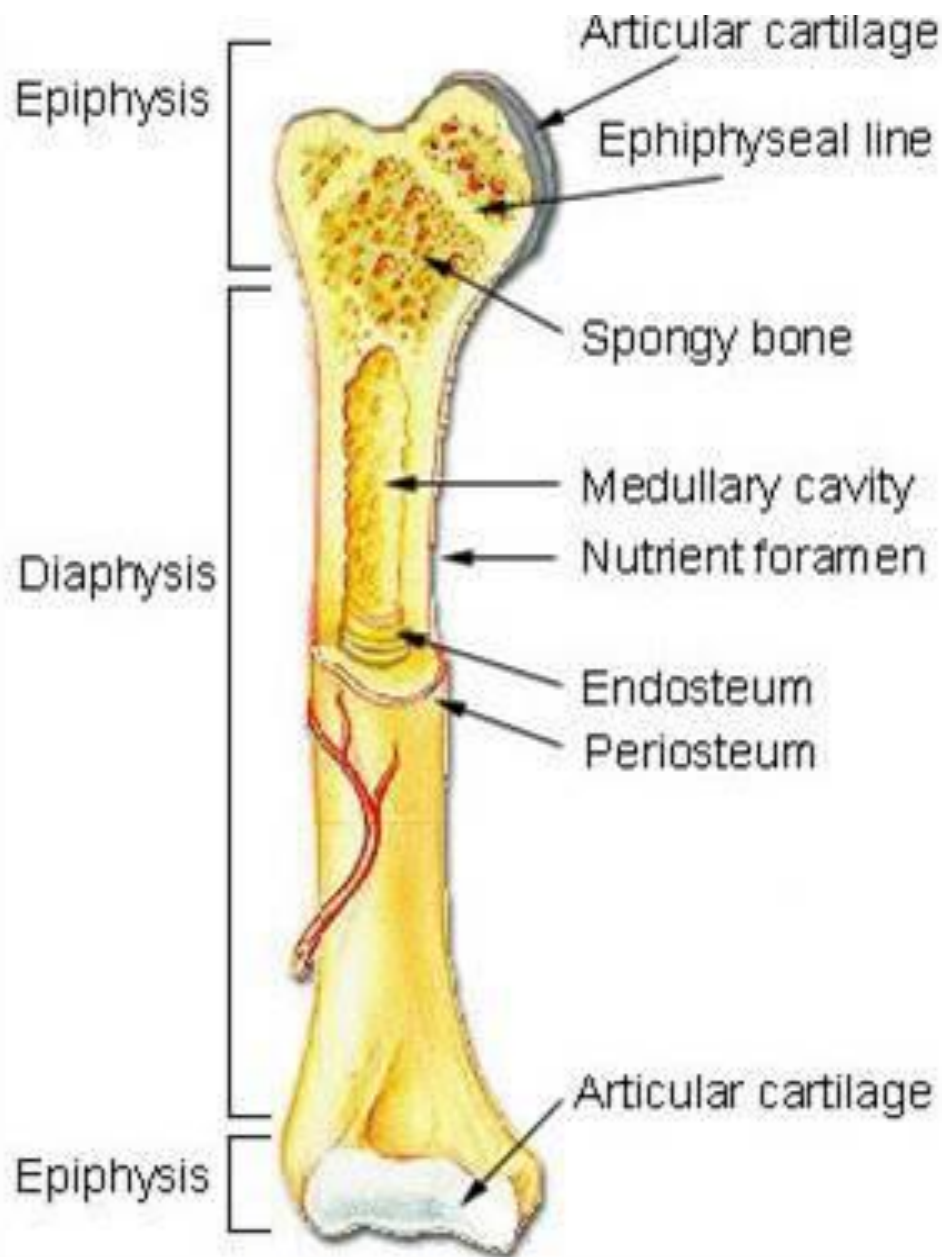


OSSA BREVIA



OSSA IRREGULARIA

OSSA LONGA – DUGE KOSTI



**TELO OD KOMPAKTNE
KOŠTANE MASE**

**OKRAJCI OD
SUNĐERASTE
KOŠTANE MASE**

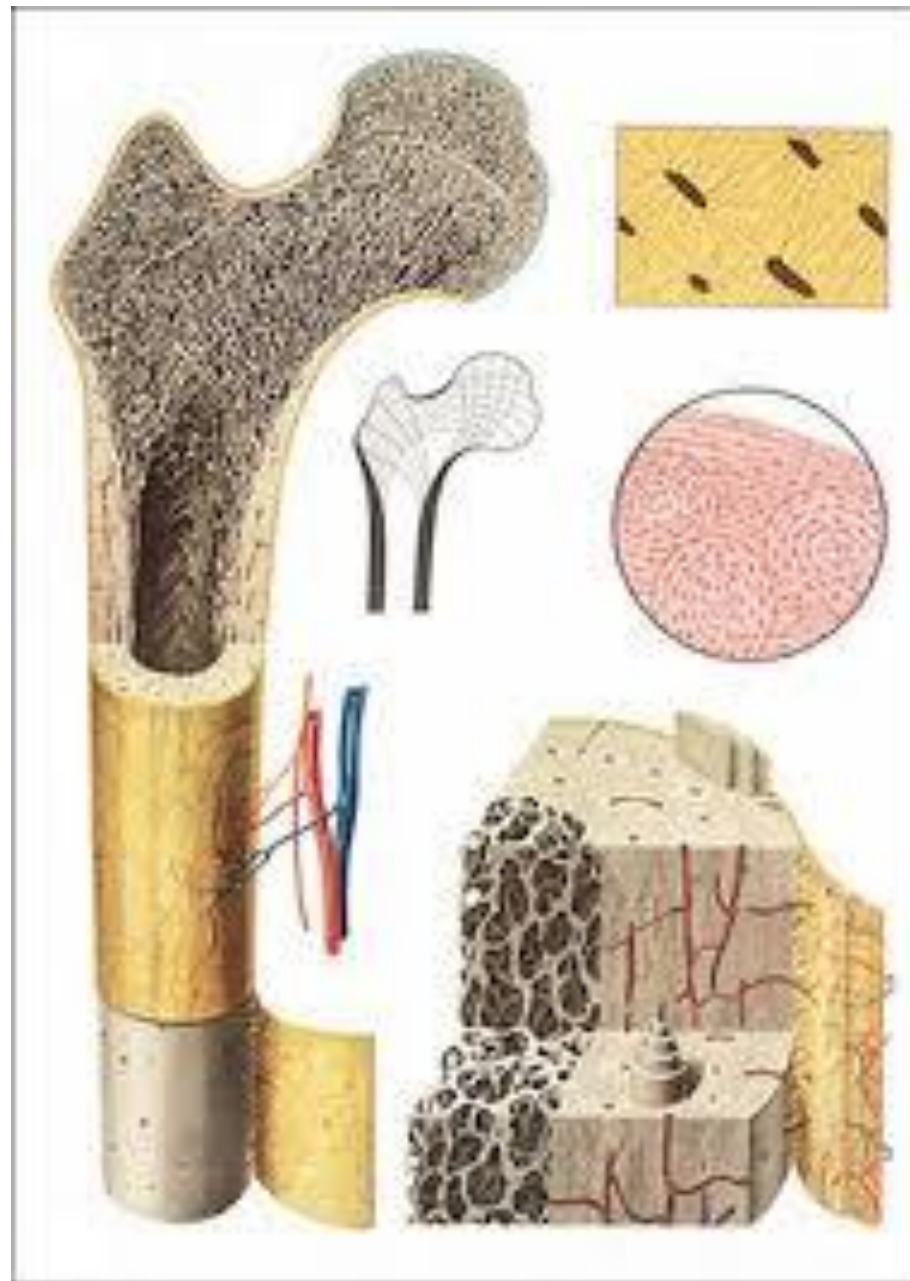
PERIOSTEUM POKOSNICA

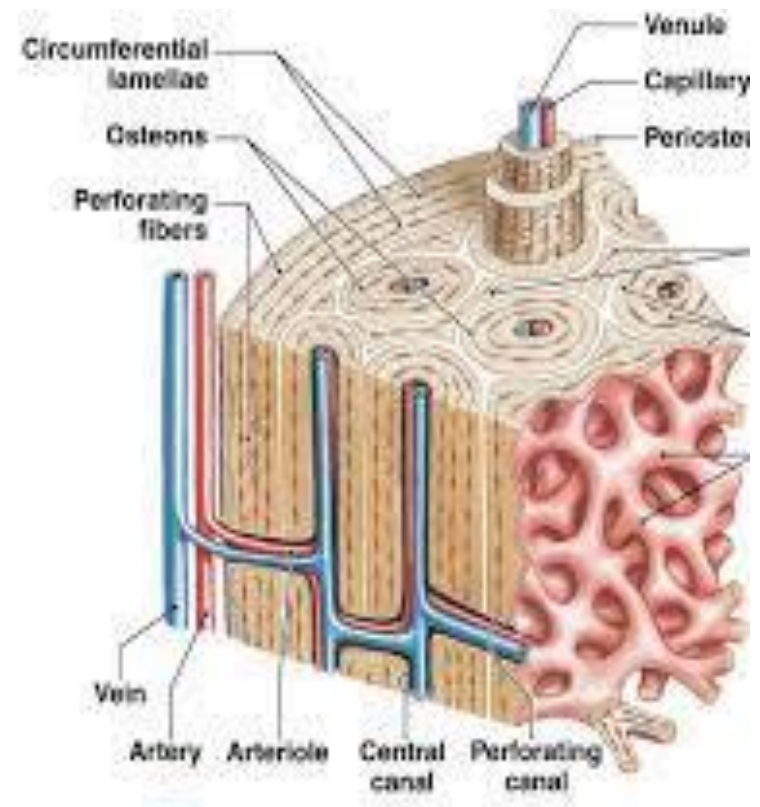
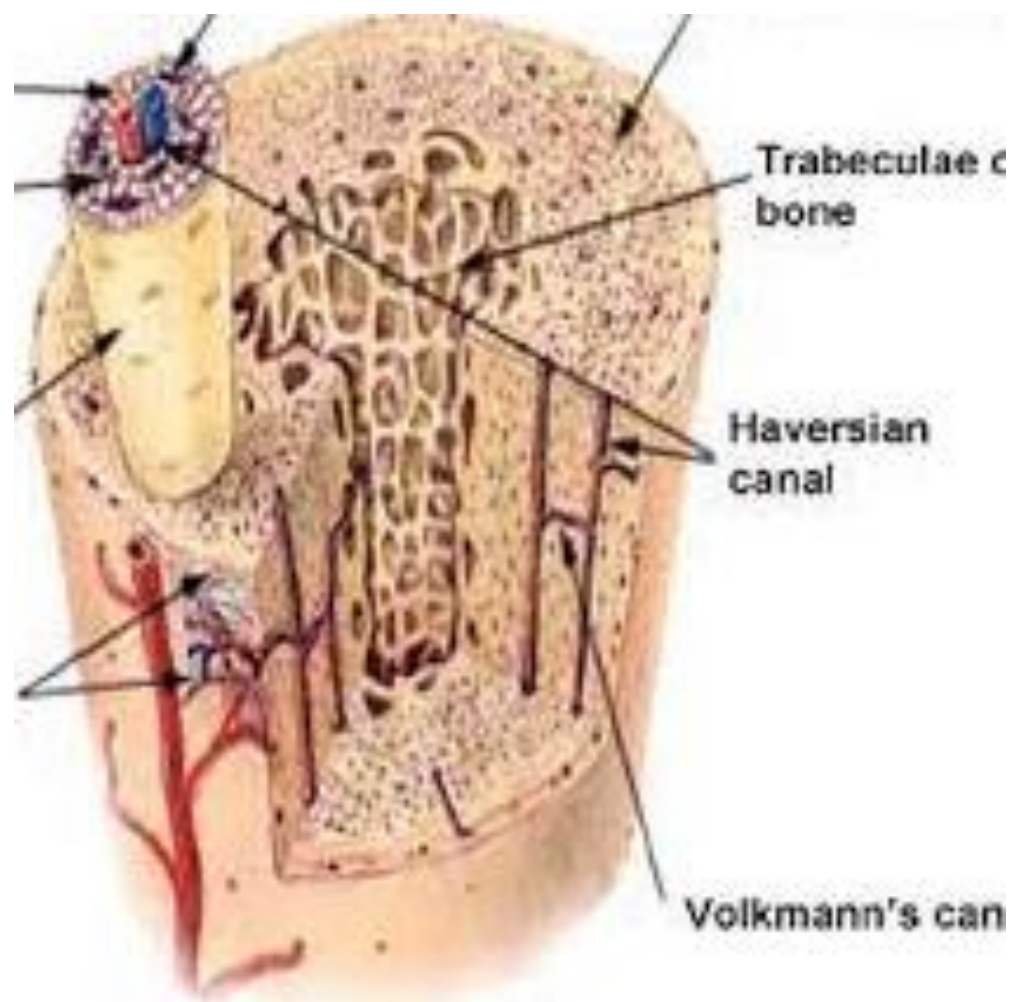
CAVUM MEDULLARE

ŠUPLJINA KOSTI

DIAPHYSIS TELO KOSTI

EPIPHYSIS OKRAJCI

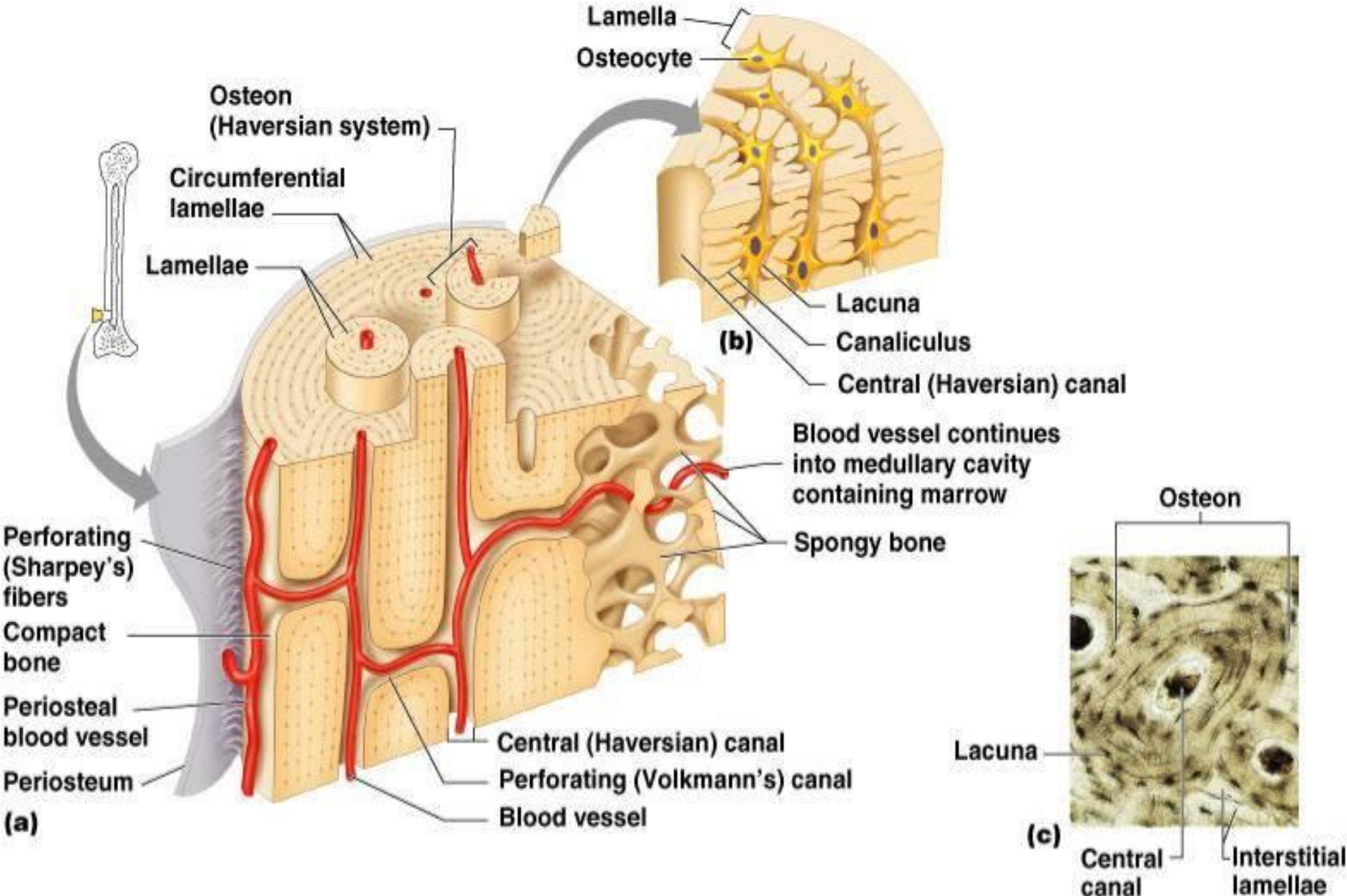


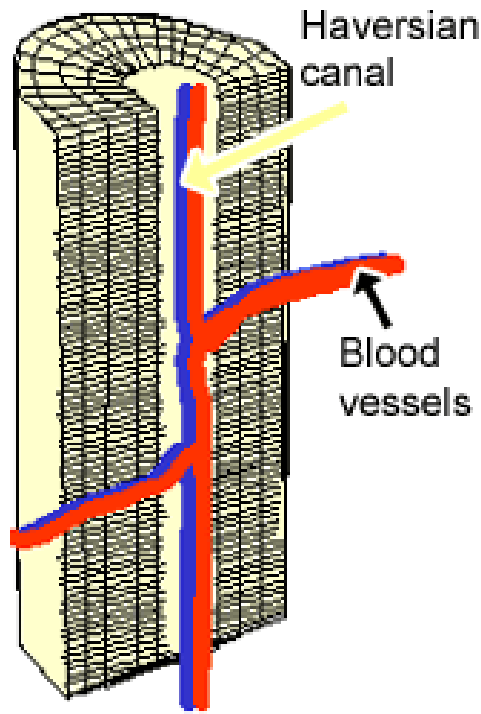
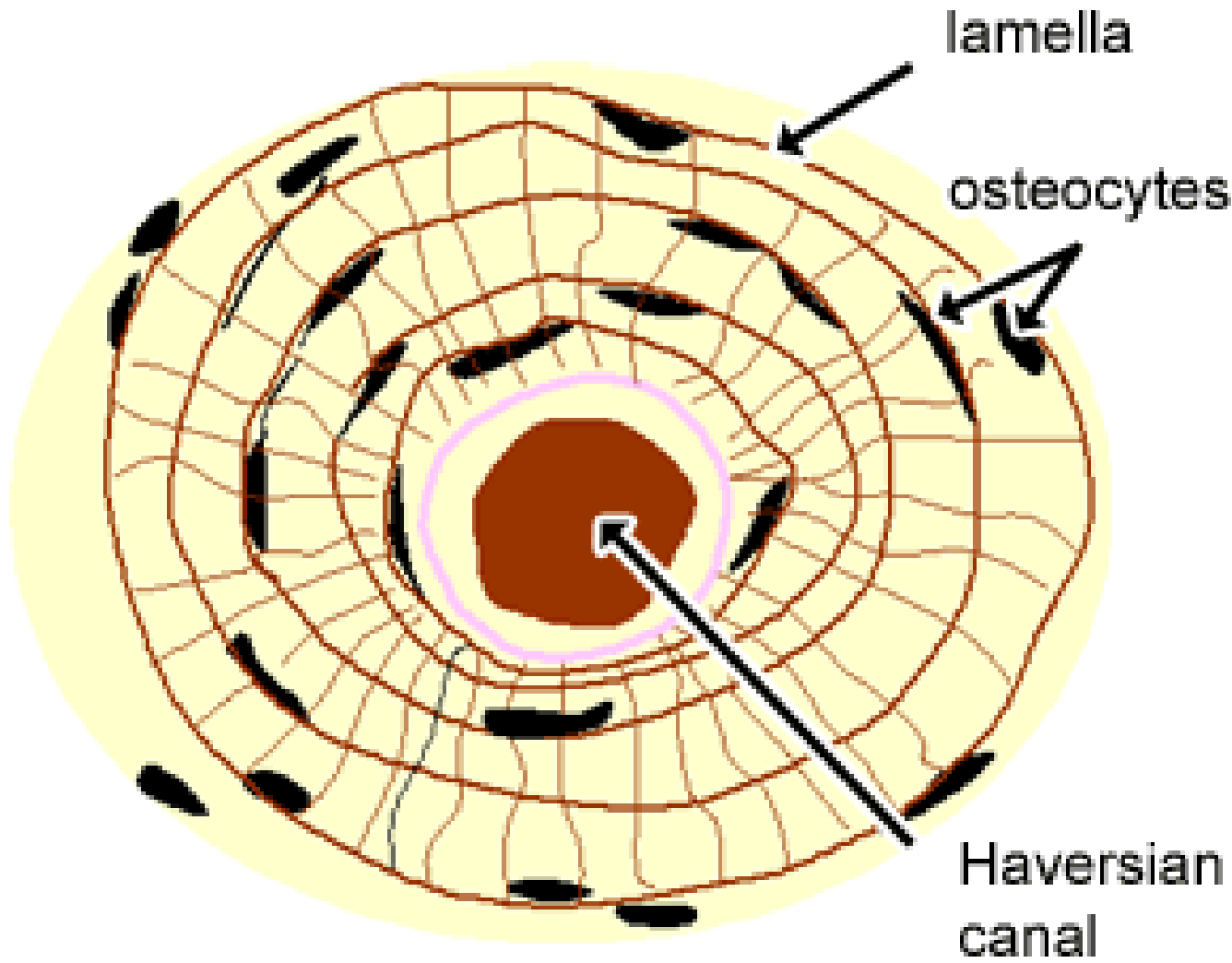


The organization of osteons and lamellae in compact bone

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GRAĐA KOSTIJU

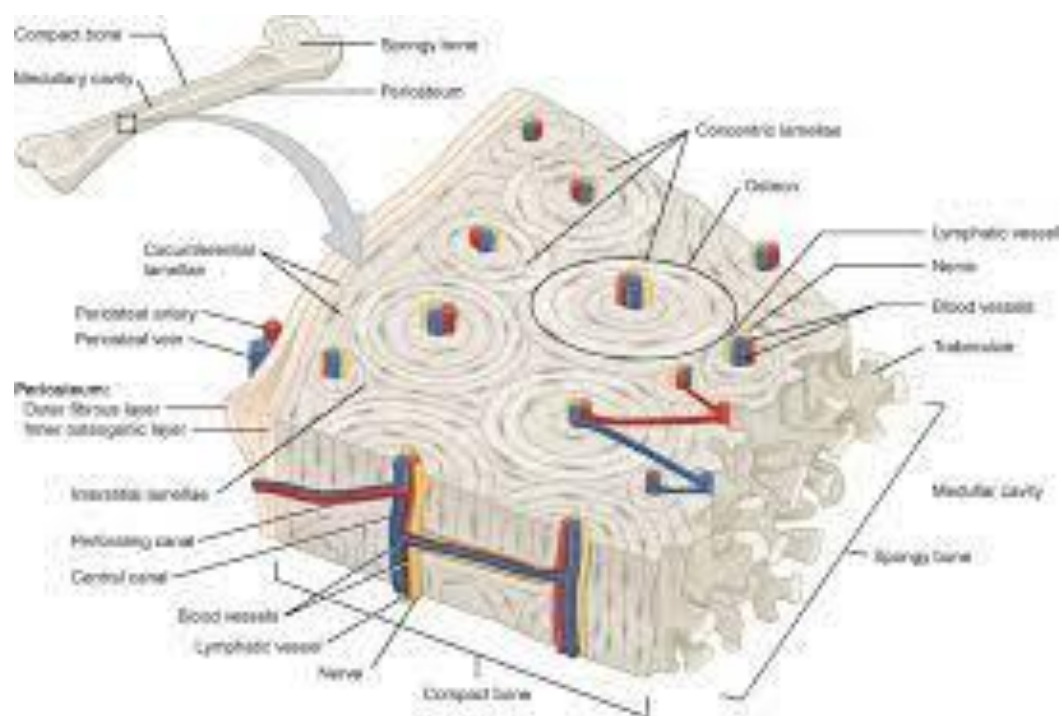
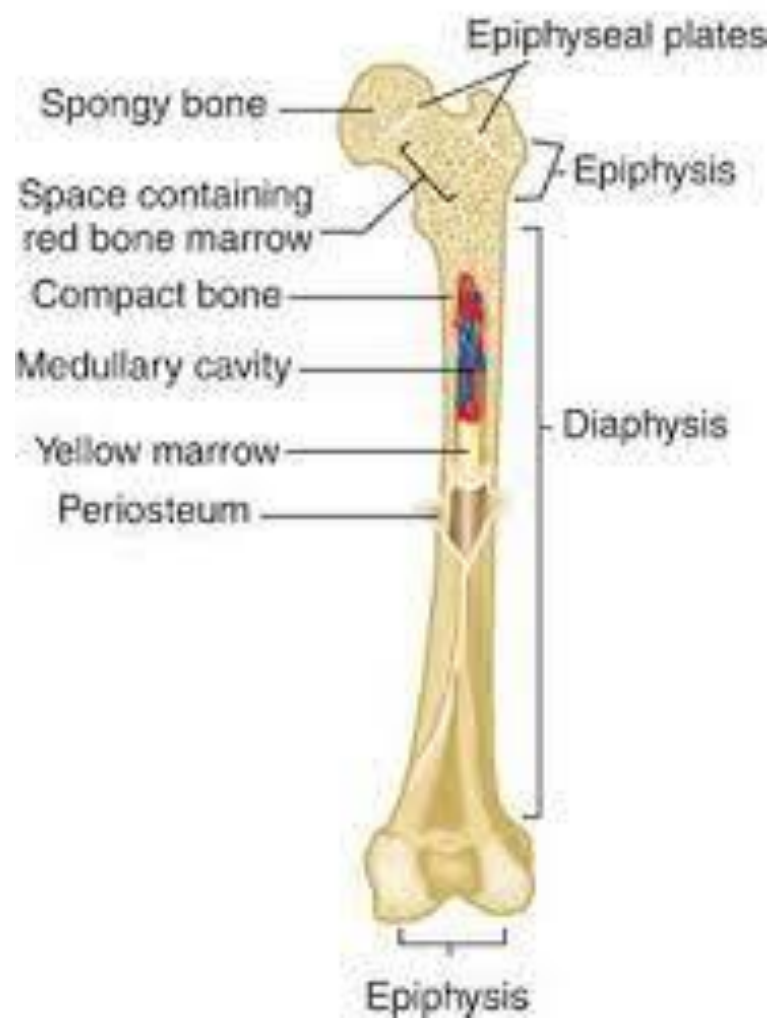




Compact bone is not the lifeless material it may appear at first glance. It is a living dynamic tissue with blood vessels, nerves and living cells that continually rebuild and reshape the bone structure as a result of the stresses,

Compact bone is composed of microscopic hollow cylinders that run parallel to each other along the length of the bone. Each of these cylinders is called a **Haversian system**. Blood vessels and nerves run along the central canal of each Haversian system. Each system consists of concentric rings of bone material (the **matrix**) with minute spaces in it that hold the bone cells. The hard matrix contains crystals of calcium phosphate, calcium carbonate and magnesium salts with collagen fibres that make the bone stronger and somewhat flexible. Tiny canals connect the cells with each other and their blood supply

Femur

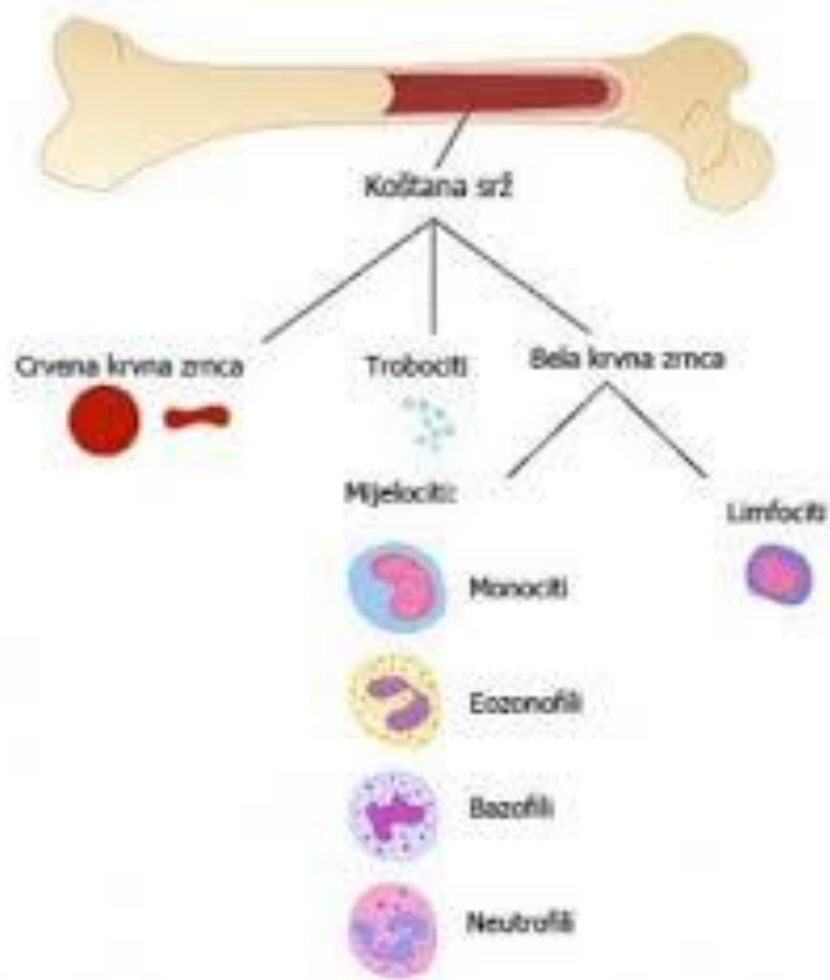






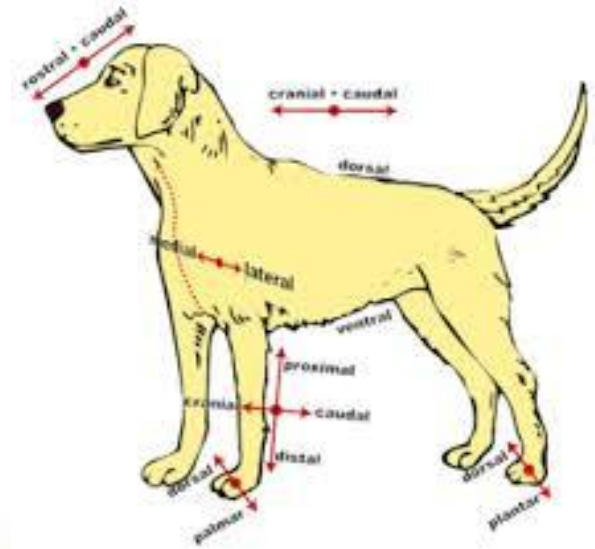
Spongy Bone

Makes up most of the bone tissue of the limb girdles, ribs, sternum, vertebrae and skull. The spaces contain red marrow, which is where red blood cells are made and stored.



Anatomski termini

1. Cranialis
2. Caudalis
3. Lateralis
4. Medialis
5. Sagittalis
6. Transversalis
7. Rostralis
8. Nasalis
9. Oralis



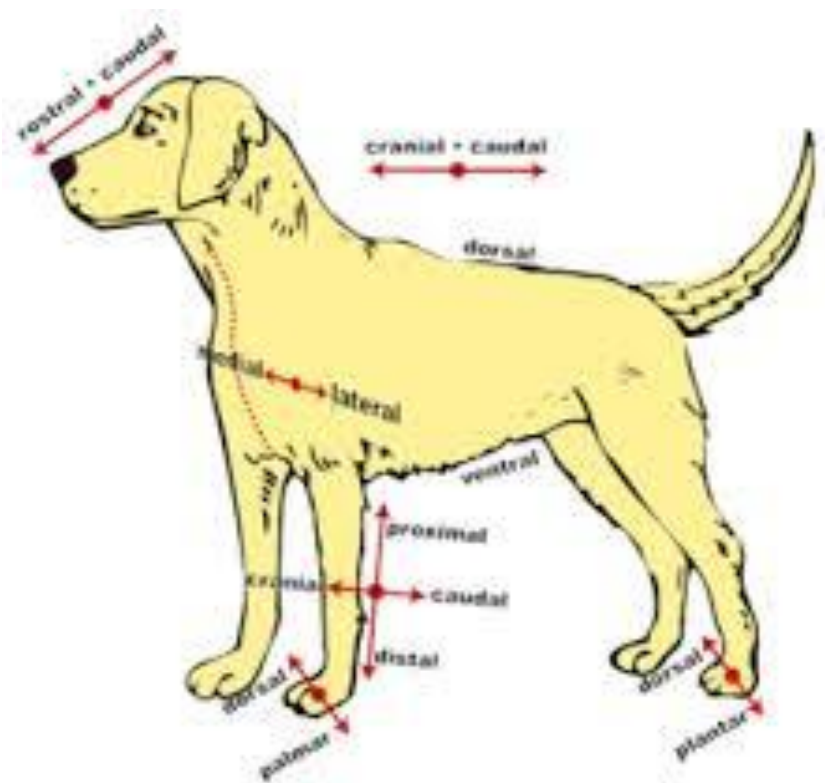
10. dorsalis

11. ventralis

NA EKSTREMITETIMA

Cranialis - dorsalis

Caudalis - palmaris na prednjim ekstremitetima
plantaris na zadnjim ekstremitetima

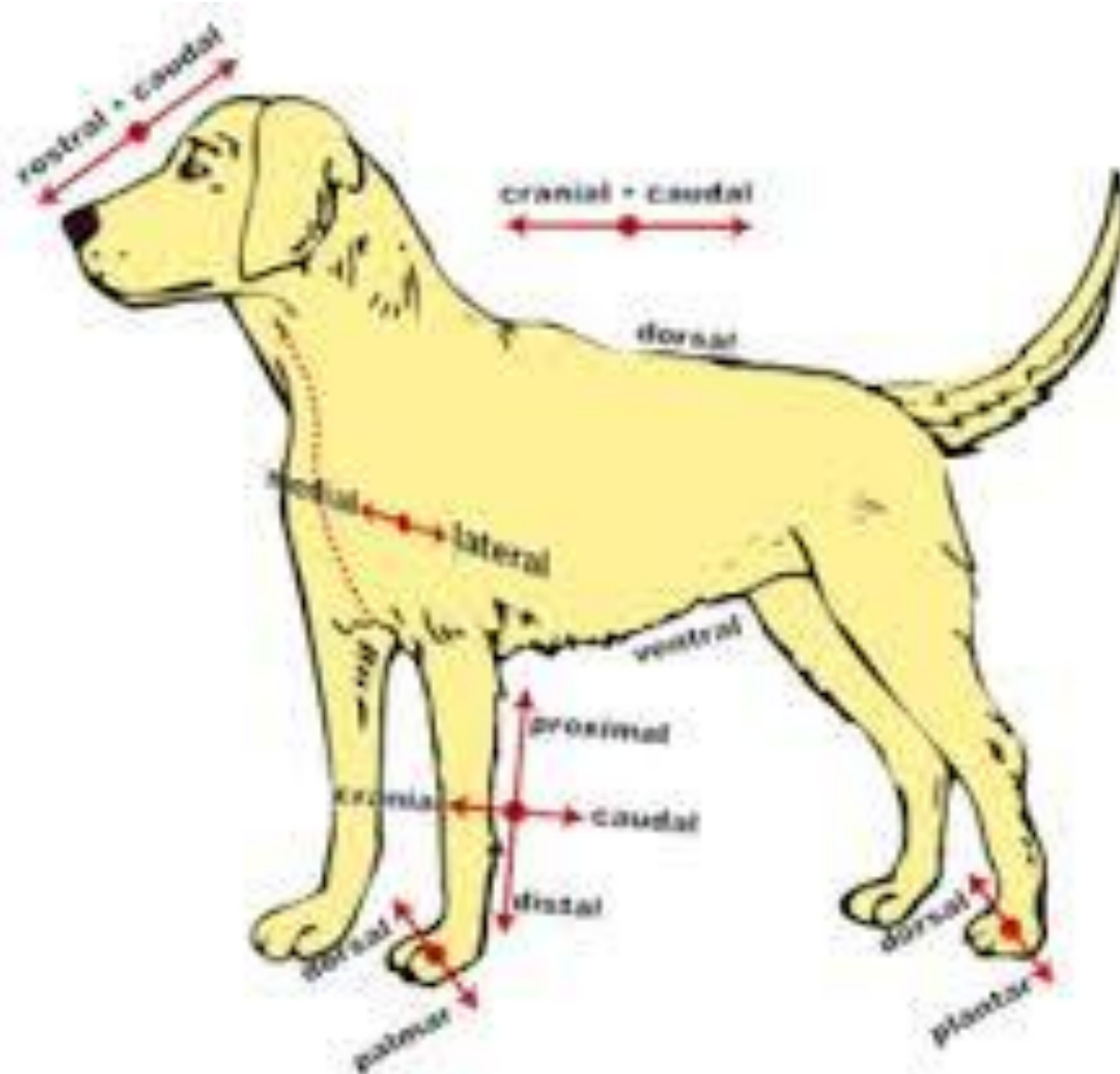


Nazivi pojedinih delova kostiju

1. Corpus
2. Extremitas
3. Diaphysis /epiphysis
4. Caput
5. Capitulum
6. Processus
7. Ala
8. Tuber
9. Tuberculum

1. Tuberositas
2. Condylus
3. Trochlea
4. Trochanter
5. Spina
6. Crista
7. Facies
8. Margo
9. Angulus

1. Fossa
2. Fovea
3. Foramen
4. Canalis
5. Sulcus
6. Incisura
7. Fissura
8. Spatium
9. Cavum
10. Sinus



Planum medianum Sagitalne ravni



- The Structure Of Long Bones[[edit](#) | [edit source](#)]
- A long bone consists of a central portion or **shaft** and two ends called **epiphyses** (see diagram 6.12). Long bones move against or articulate with other bones at joints and their ends have flattened surfaces and rounded protuberances (condyles) to make this possible. If you carefully examine a long bone you may also see raised or rough surfaces. This is where the muscles that move the bones are attached. You will also see holes (a hole is called a **foramen**) in the bone. Blood vessels and nerves pass into the bone through these. You may also be able to see a fine line at each end of the bone. This is called the **growth plate** or **epiphyseal line** and marks the place where increase in length of the bone occurred (see diagram 6.16).
- Diagram 6.12 - A femur
- 6.13 - A longitudinal section through a long bone
- If you cut a long bone lengthways you will see it consists of a hollow cylinder (see diagram 6.13). The outer shell is covered by a tough fibrous sheath to which the tendons are attached. Under this is a layer of hard, dense **compact bone** (see below). This gives the bone its strength. The central cavity contains fatty **yellow marrow**, an important energy store for the body, and the ends are made from honeycomb-like bony material called **spongy bone** (see box below). Spongy bone contains **red marrow** where red blood cells are made.

- Compact Bone[[edit](#) | [edit source](#)]
- Compact bone is not the lifeless material it may appear at first glance. It is a living dynamic tissue with blood vessels, nerves and living cells that continually rebuild and reshape the bone structure as a result of the stresses, bends and breaks it experiences. Compact bone is composed of microscopic hollow cylinders that run parallel to each other along the length of the bone. Each of these cylinders is called a **Haversian system**. Blood vessels and nerves run along the central canal of each Haversian system. Each system consists of concentric rings of bone material (the **matrix**) with minute spaces in it that hold the bone cells. The hard matrix contains crystals of calcium phosphate, calcium carbonate and magnesium salts with collagen fibres that make the bone stronger and somewhat flexible. Tiny canals connect the cells with each other and their blood supply (see diagram 6.14).
- Diagram 6.14 - Haversian systems of compact bone

- Spongy Bone[[edit](#) | [edit source](#)]
- Spongy bone gives bones lightness with strength. It consists of an irregular lattice that looks just like an old fashioned loofah sponge (see diagram 6.15). It is found on the ends of long bones and makes up most of the bone tissue of the limb girdles, ribs, sternum, vertebrae and skull. The spaces contain red marrow, which is where red blood cells are made and stored.
- Diagram 6.15 - Spongy bone

- Bone Growth[[edit](#) | [edit source](#)]
- The skeleton starts off in the foetus as either cartilage or fibrous connective tissue. Before birth and, sometimes for years after it, the cartilage is gradually replaced by bone. The long bones increase in length at the ends at an area known as the **epiphyseal plate** where new cartilage is laid down and then gradually converted to bone. When an animal is mature, bone growth ceases and the epiphyseal plate converts into a fine **epiphyseal line** (see diagram 6.16).
- Diagram 6.16 - A growing bone
- Broken Bones[[edit](#) | [edit source](#)]
- A fracture or break dramatically demonstrates the dynamic nature of bone. Soon after the break occurs blood pours into the site and cartilage is deposited. This starts to connect the broken ends together. Later spongy bone replaces the cartilage, which is itself replaced by compact bone. Partial healing to the point where some weight can be put on the bone can take place in 6 weeks but complete healing may take 3–4 months.

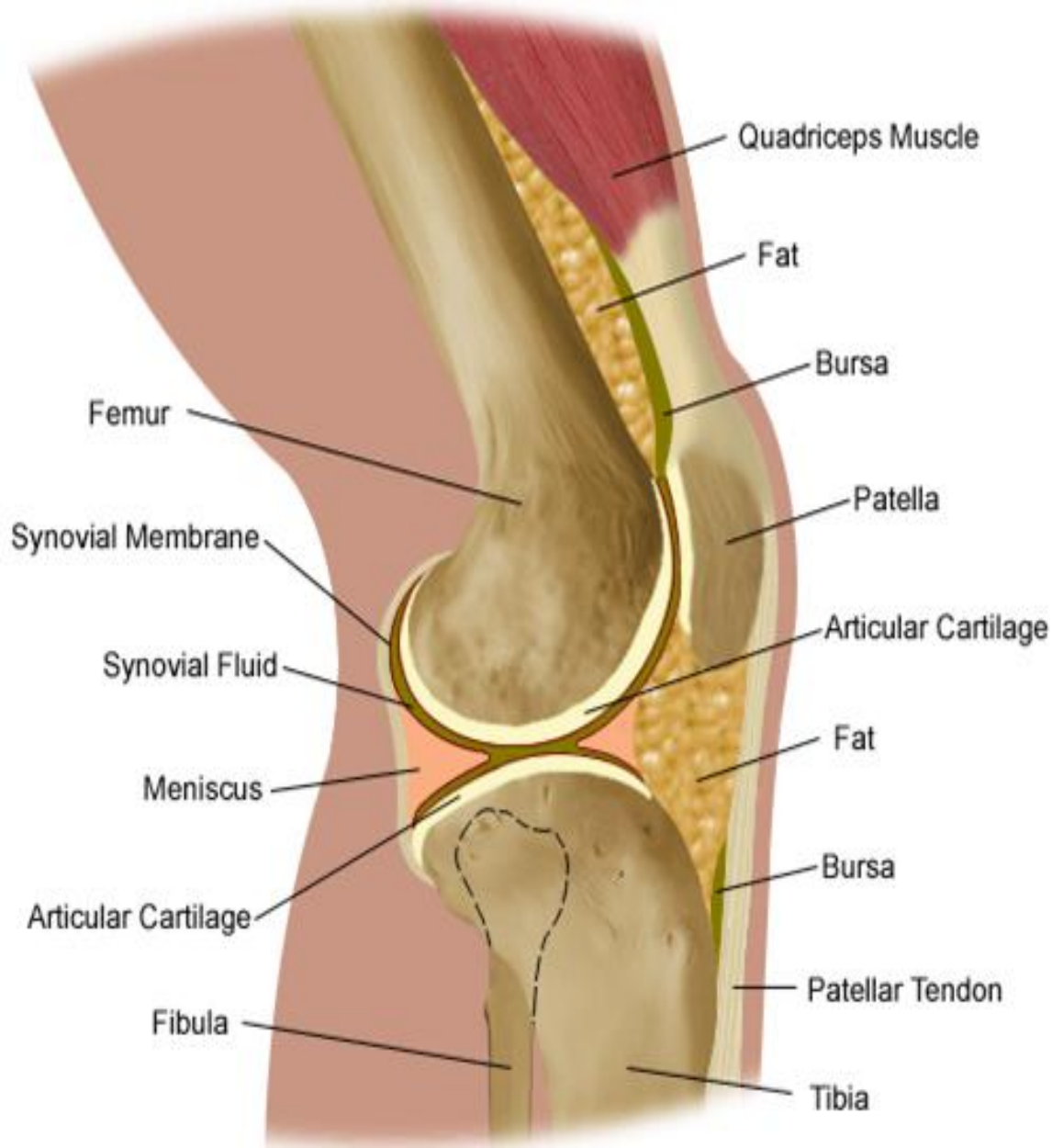
- Locomotion[[edit](#) | [edit source](#)]
- Different animals place different parts of the foot or forelimb on the ground when walking or running.
- Humans and bears put the whole surface of the foot on the ground when they walk. This is known as **plantigrade locomotion**. Dogs and cats walk on their toes (**digitigrade locomotion**) while horses and pigs walk on their “toenails” or hoofs. This is called **unguligrade locomotion** (see diagram 6.20).
- **Plantigrade locomotion** (on the “palms of the hand) as in humans and bears
- **Digitigrade locomotion** (on the “fingers”) as in cats and dogs
- **Unguligrade locomotion** (on the “fingernails”) as in horses

- Summary[[edit](#) | [edit source](#)]
- The skeleton maintains the shape of the body, protects internal organs and makes locomotion possible.
- The **vertebrae** support the body and protect the spinal cord. They consist of: **cervical vertebrae** in the neck, **thoracic vertebrae** in the chest region which articulate with the ribs, **lumbar vertebrae** in the loin region, **sacral vertebrae** fused to the pelvis to form the sacrum and **tail** or **coccygeal vertebrae**.
- The **skull** protects the brain and sense organs. The **cranium** forms a solid box enclosing the brain. The **mandible** forms the jaw.
- The forelimb consists of the **humerus, radius, ulna, carpals, metacarpals** and **phalanges**. It moves against or **articulates** with the **scapula** at the shoulder joint.
- The hindlimb consists of the **femur, patella, tibia, fibula, tarsals, metatarsals** and **digits**. It moves against or articulates with the **pelvis** at the hip joint.
- Bones articulate against each other at **joints**.
- **Compact bone** in the shaft of long bones gives them their strength. **Spongy bone** at the ends reduces weight. Bone growth occurs at the **growth plate**.

POKRETNE VEZE KOSTIJU

- SYNCHONDROSIS POMOĆU HRSKAVICE
- SYNDESMOSIS VEZIVNIM TKIVOM
- SYNSARCOSIS POMOĆU MIŠIĆA
- DIARTHROSIS ZGLOBNA VEZA

DIARTHROSIS – ZGLOBNA VEZA



ARTICULUS SIMPLEX

PROST ZGLOB

ARTICULUS COMPOSITUS SLOŽEN
ZGLOB

CAPSULA ARTICULARIS ZGLOBNA
ČAURA

SYNOVIA ARTICULARIS ZGLOBNA
TEČNOST

ZGLOBNE POVRŠINE
OBLOŽENE
HRSKAVICOM

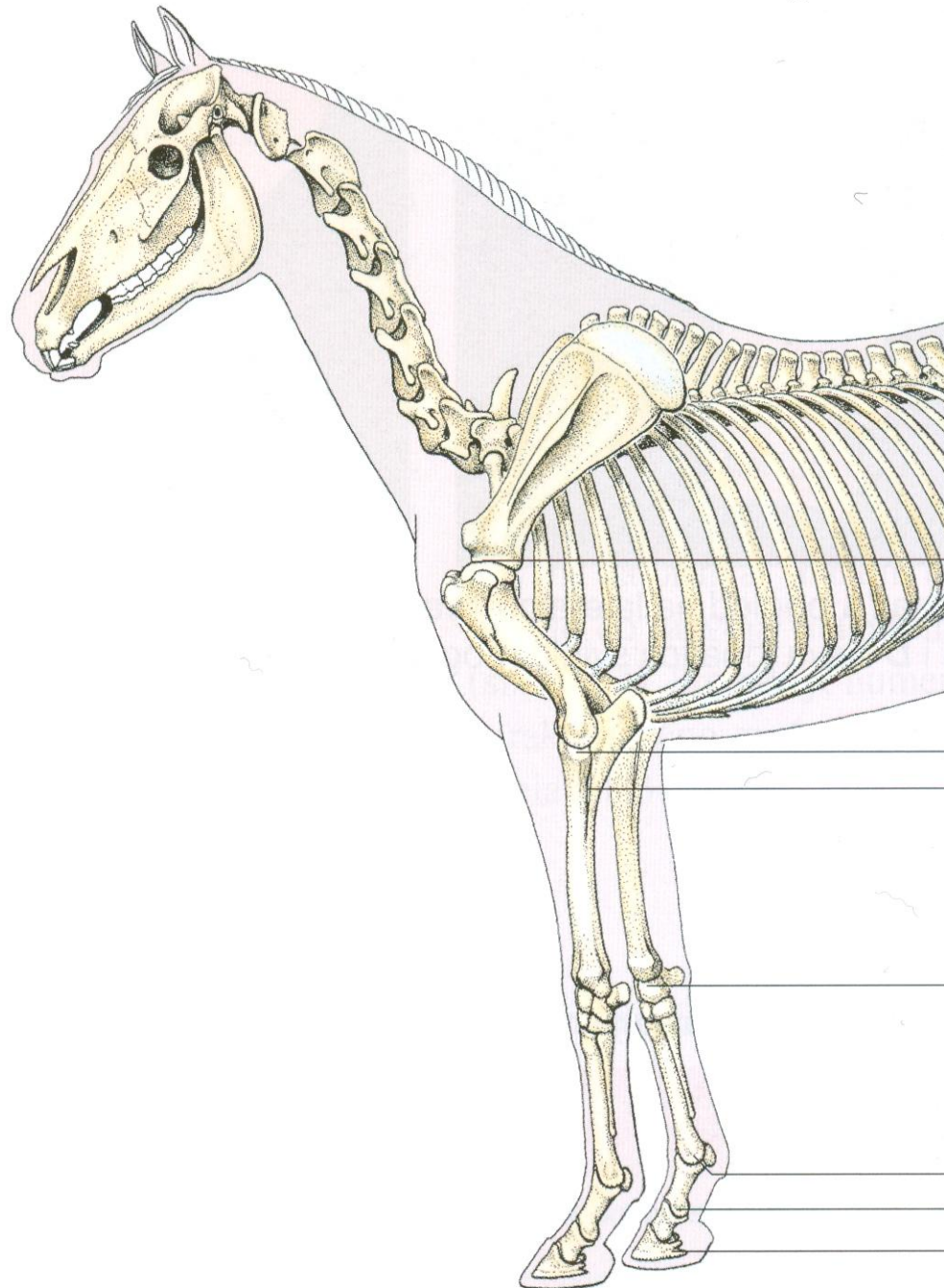
FLEXIO SAVIJANJE

EXTENSIO OPRUŽANJE

ADDUCTIO PRIVLAČENJE

ABDUCTIO ODMICANJE

ROTATIO OBRTANJE



Art. humeri

Art. cubiti
Art. radioulnaris

Art. carpi
Art. antebrachiocarpea
Art. mediocarpea
Art. carpometacarpea
Art. intercarpea
Art. ossis carpi accessorii

Art. metacarpophalangea
Art. interphalangea proximalis
Art. interphalangea distalis

KOSTI PREDNJEG EKSTREMITETA

SCAPULA LOPATICA

HUMERUS LAKATNA KOST

OSSA ANTEBRACHI PODLAKTNE
KOSTI

a) RADIUS ŽBICA

b) ULNA LAKATNA KOST

OSSA CARPI – PREDNJE KOLENO

OSSA METACARPI PREDNJA
CEVANICA

PHALANGES – ČLANCI PRSTIJU

OSSA SESAMOIDEA SEZAMOIDNE
KOSTI

SCAPULA - LOPATICA

FACIES LATERALIS

SPINA SCAPULAE

GREBEN LOPATICE

FOSSA SUPRASPINATA

PREDGREBENSKA POVRŠINA

FOSSA INFRASPINATA

ZAGREBENSKA POVRŠINA

COLLUM SCAPULAE VRAT

CAVITAS GLENOIDALIS ČAŠICA

CARTILAGO SCAPULAE HRŠKAVICA

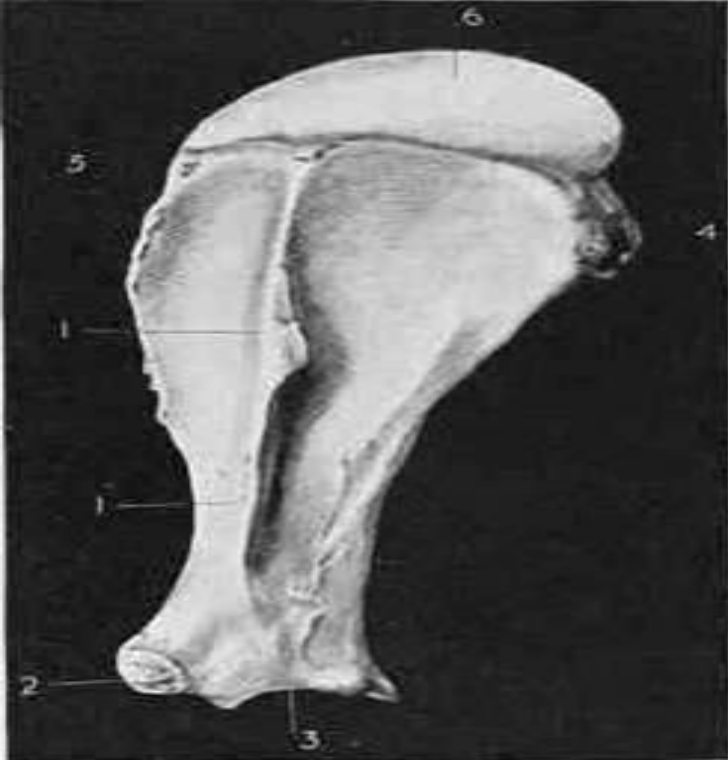
FACIES MEDIALIS

FOSSA SUBSCAPULARIS

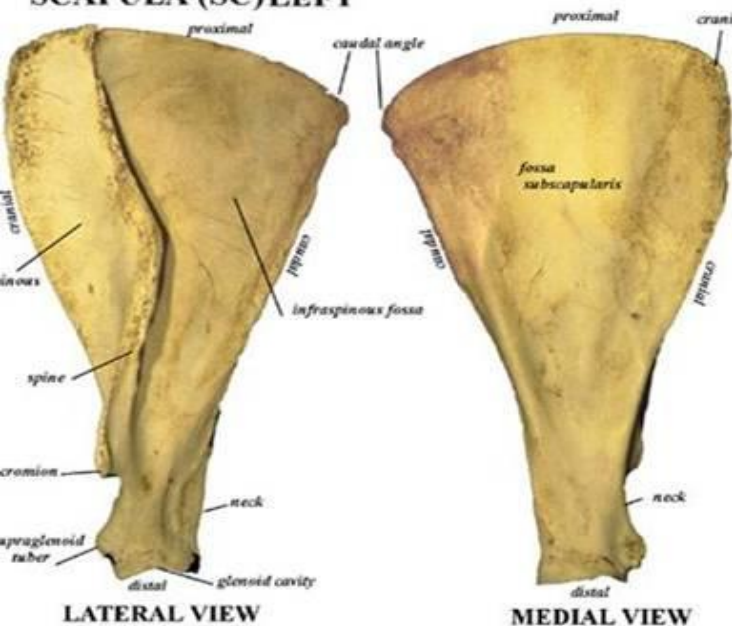
PODLOPATIČNA UDUBINA

FACIES SERATA

HRAPAVA POVRŠINA



SCAPULA (SC) LEFT



LATERAL VIEW

MEDIAL VIEW

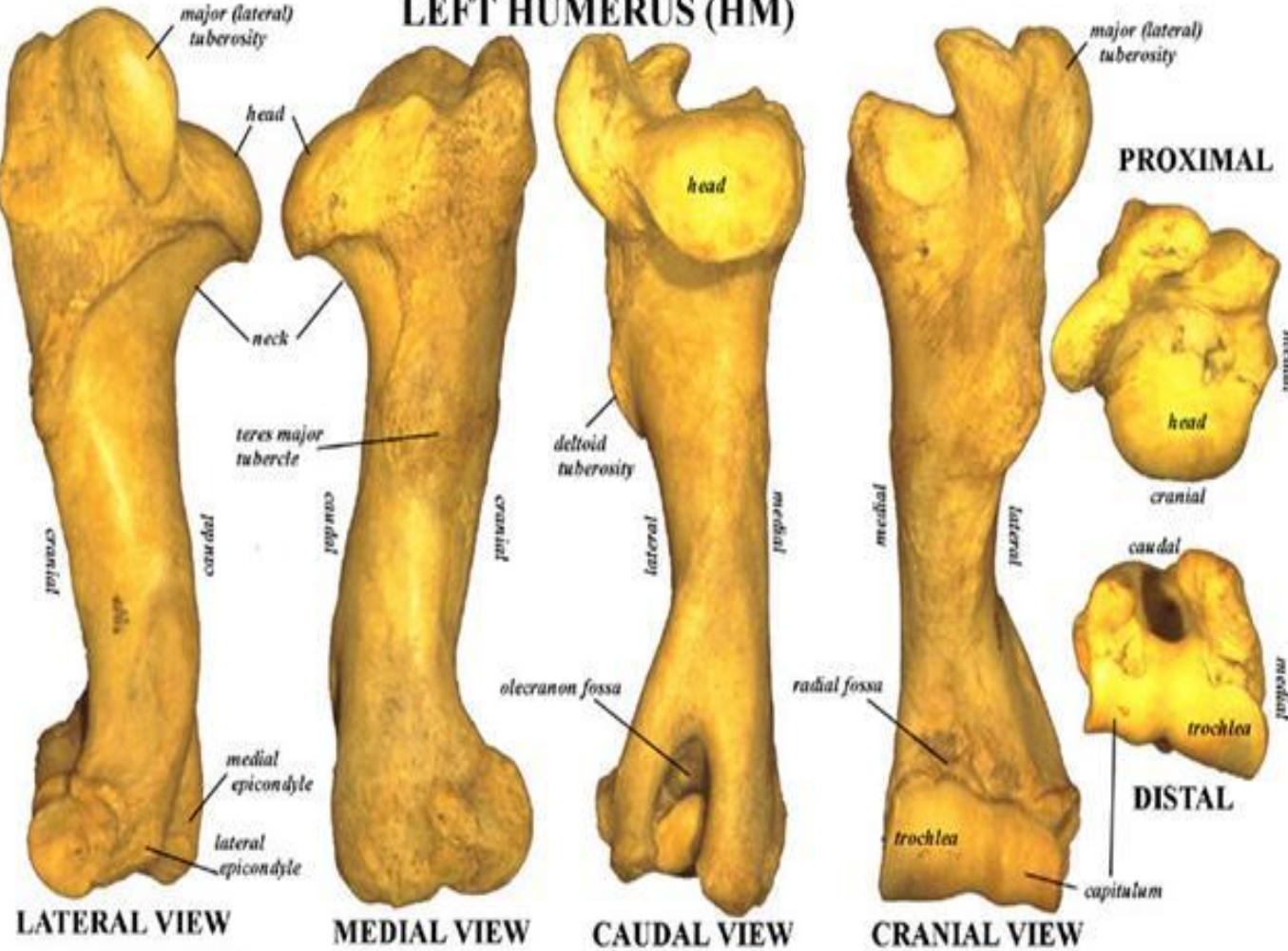
Scapula

Lateral View



HUMERUS – RAMENA KOST

LEFT HUMERUS (HM)



CAPUT HUMERI

GLAVA

CORPUS HUMERI

TELO

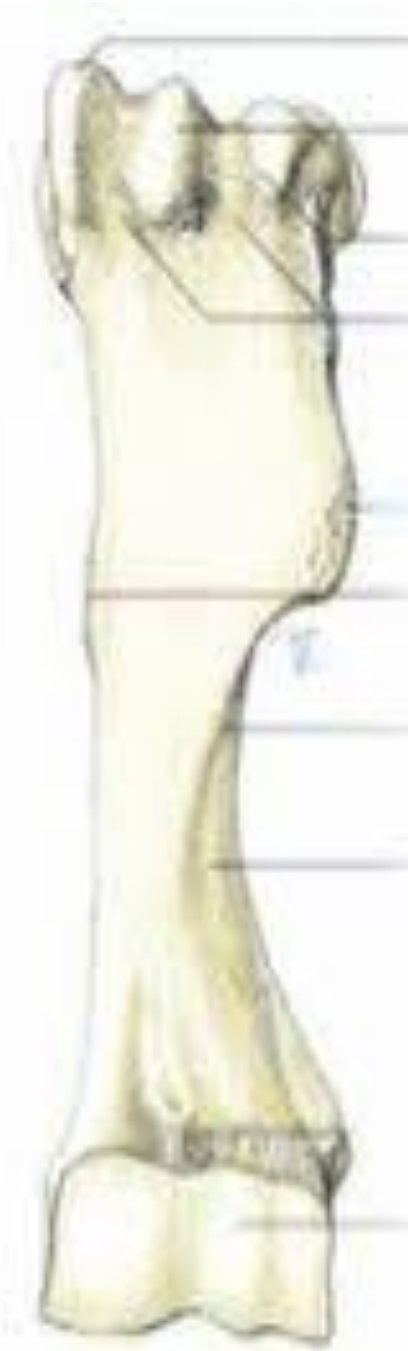
CRISTA HUMERI

GREBEN

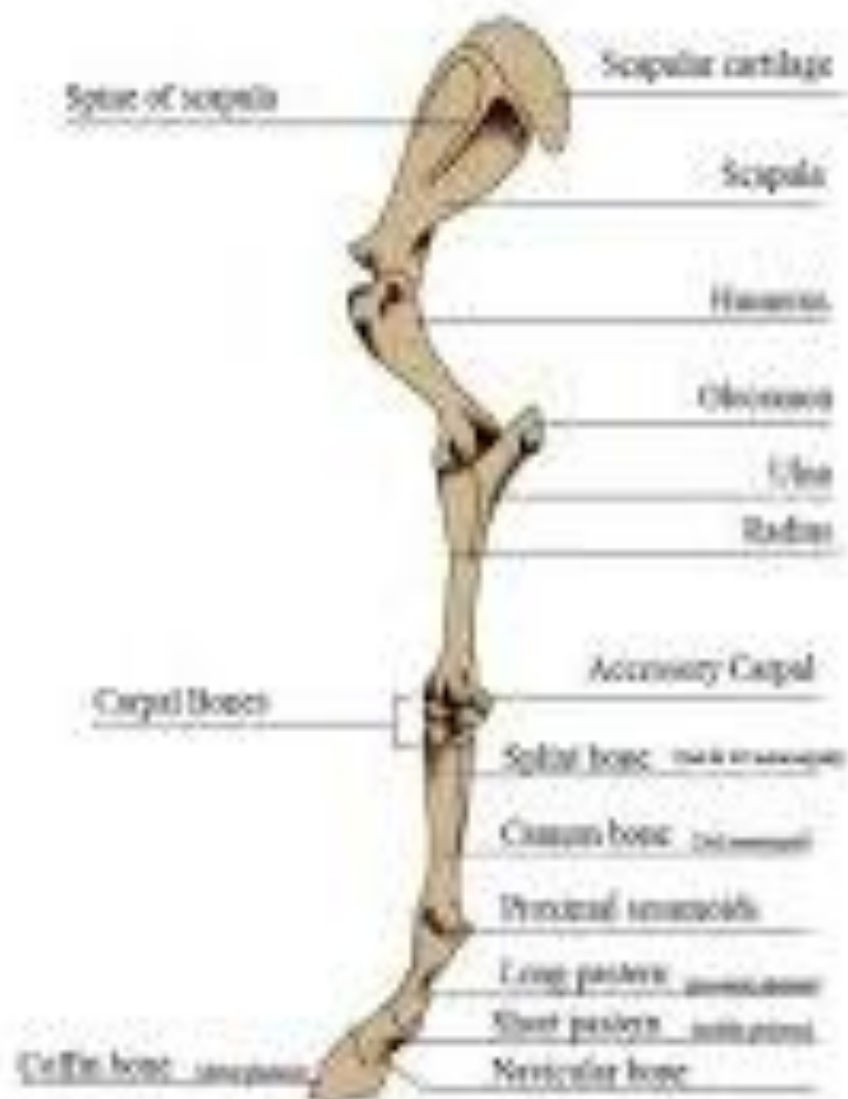
FOSSA OLECRANI

LAKATNA JAMA

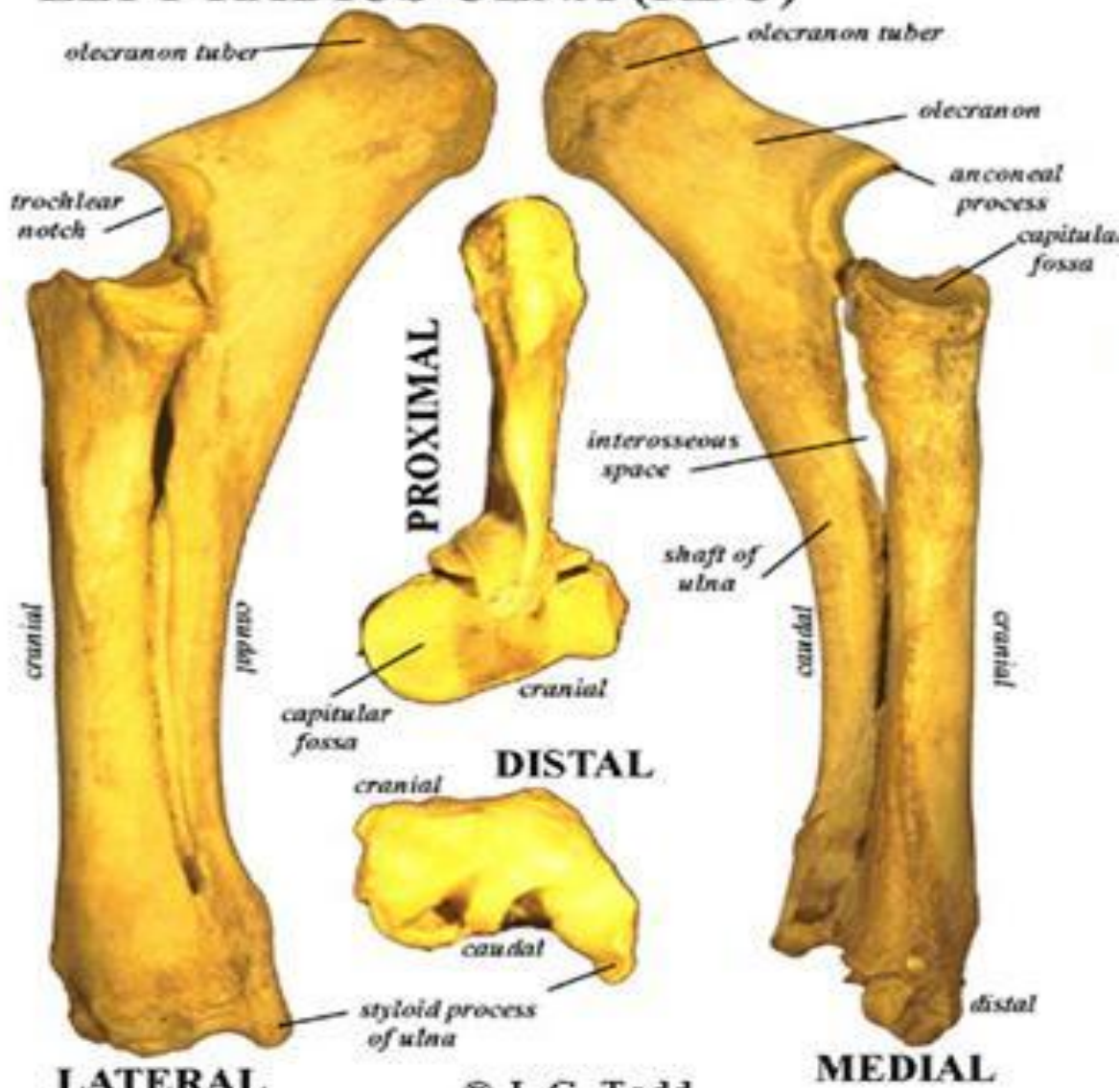








LEFT RADIUS-ULNA (RDU)



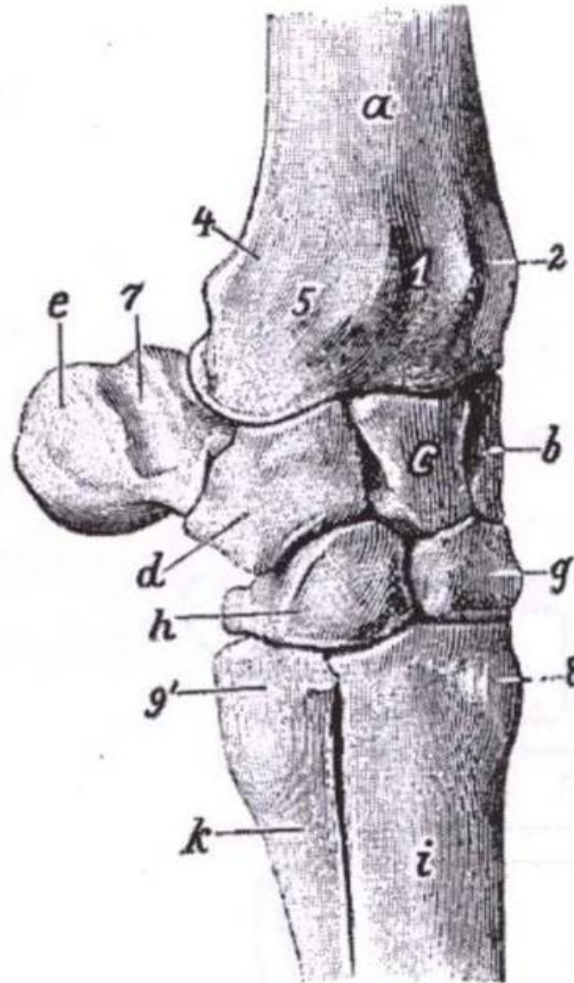
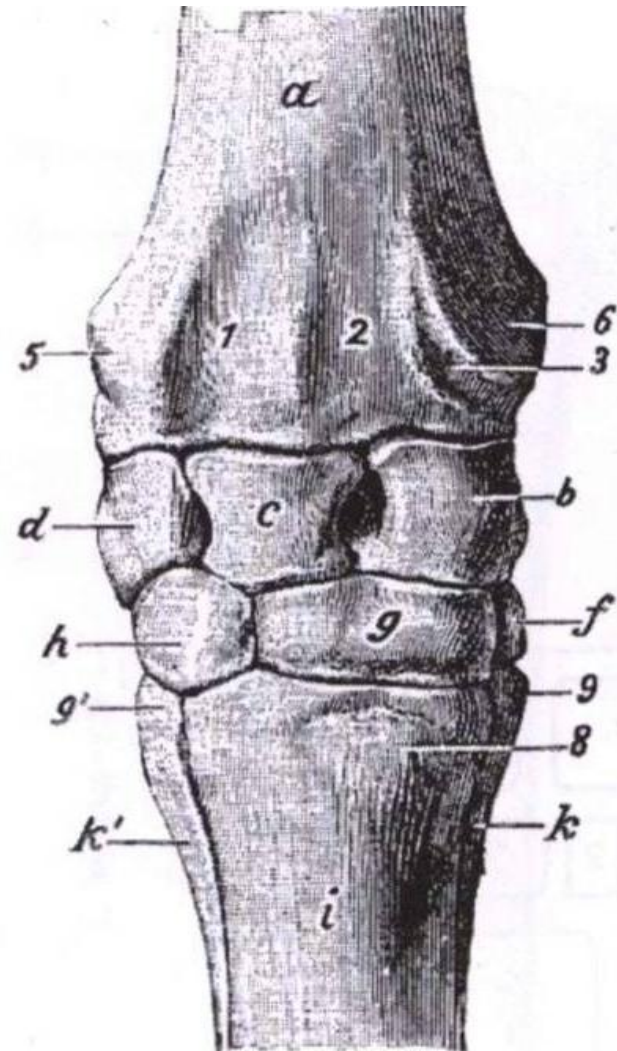
RADIUS

ŽBICA

ULNA

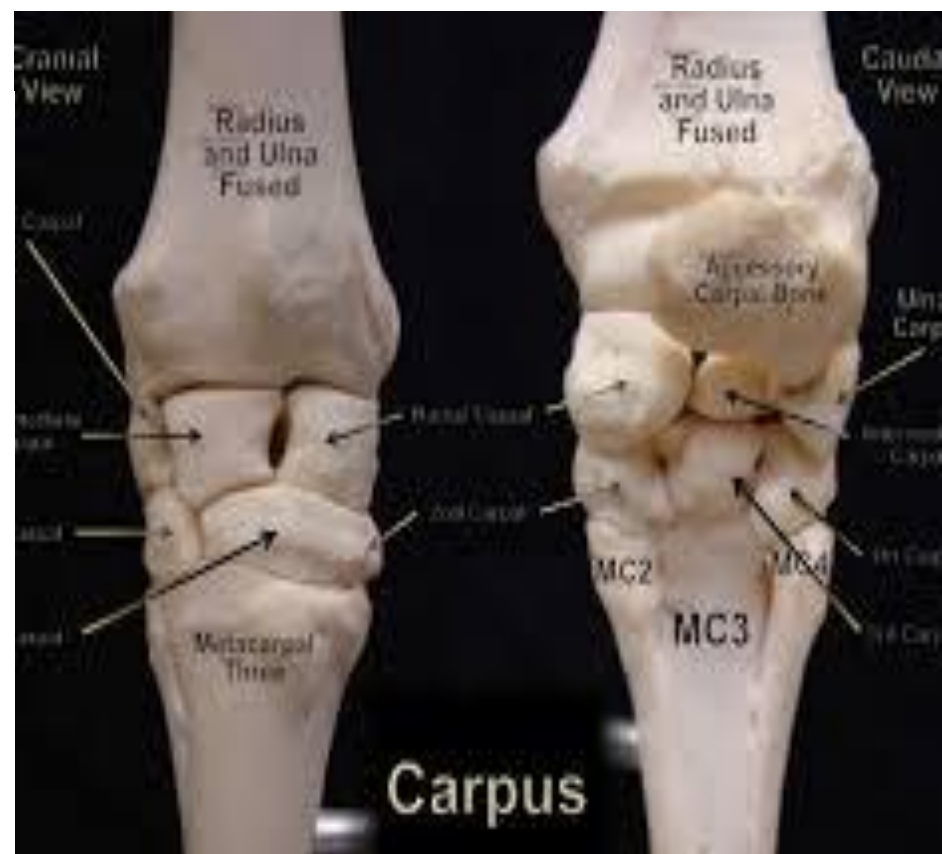
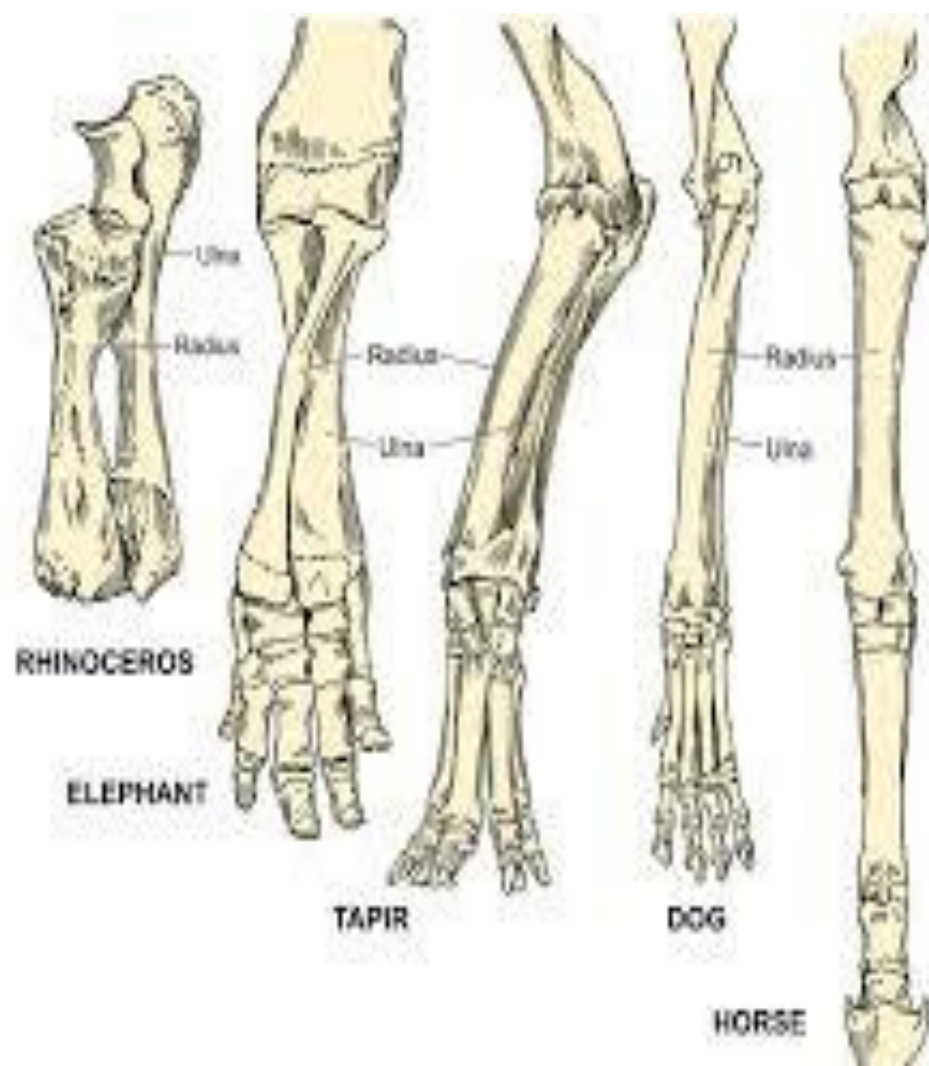
LAKATNA KOST

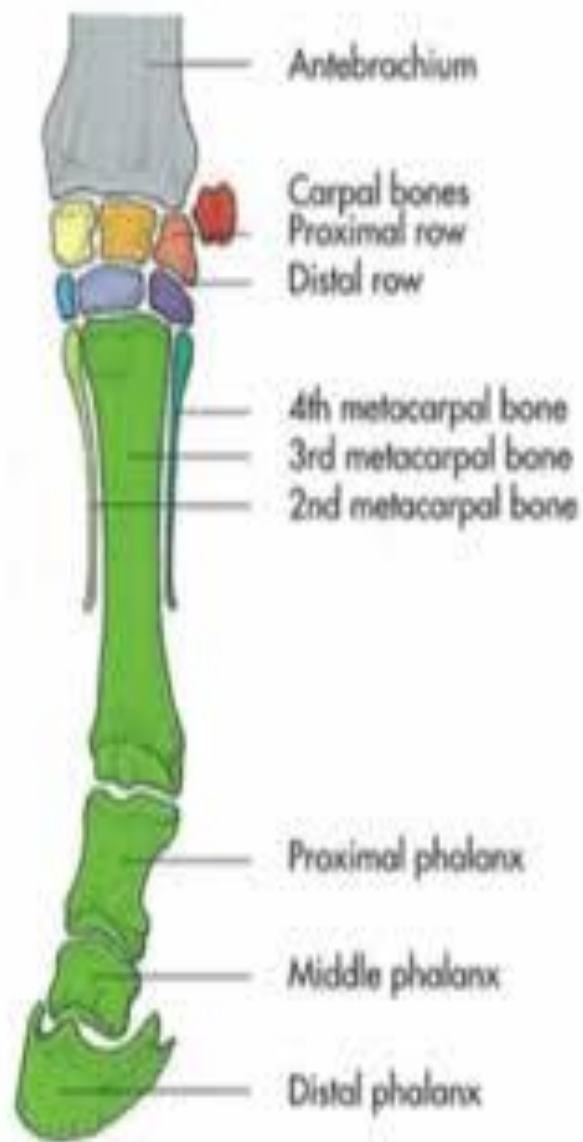
OSSA CARPI – PREDNJE KOLENO



SVINJA	4+4
KONJ	4+3
PREŽIVARI	4+2
PAS	3+4

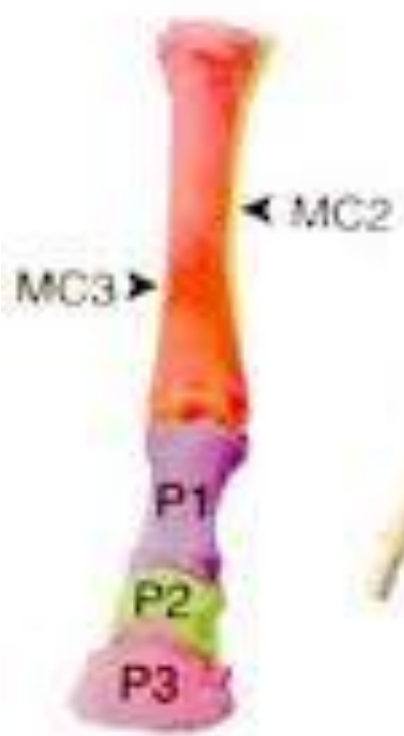
**KRATKE KOSTI
POREĐANE
U DVA REDA**



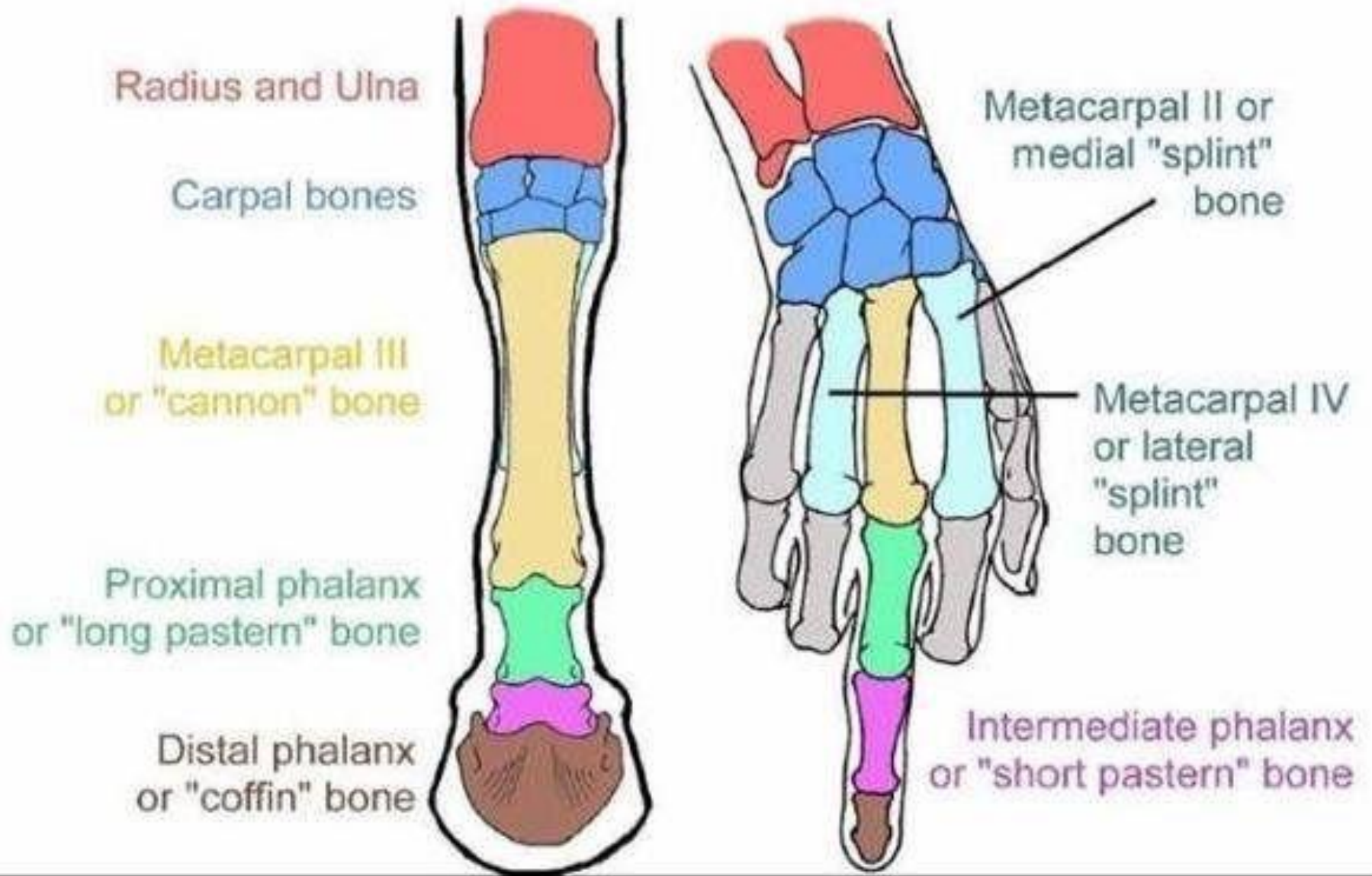


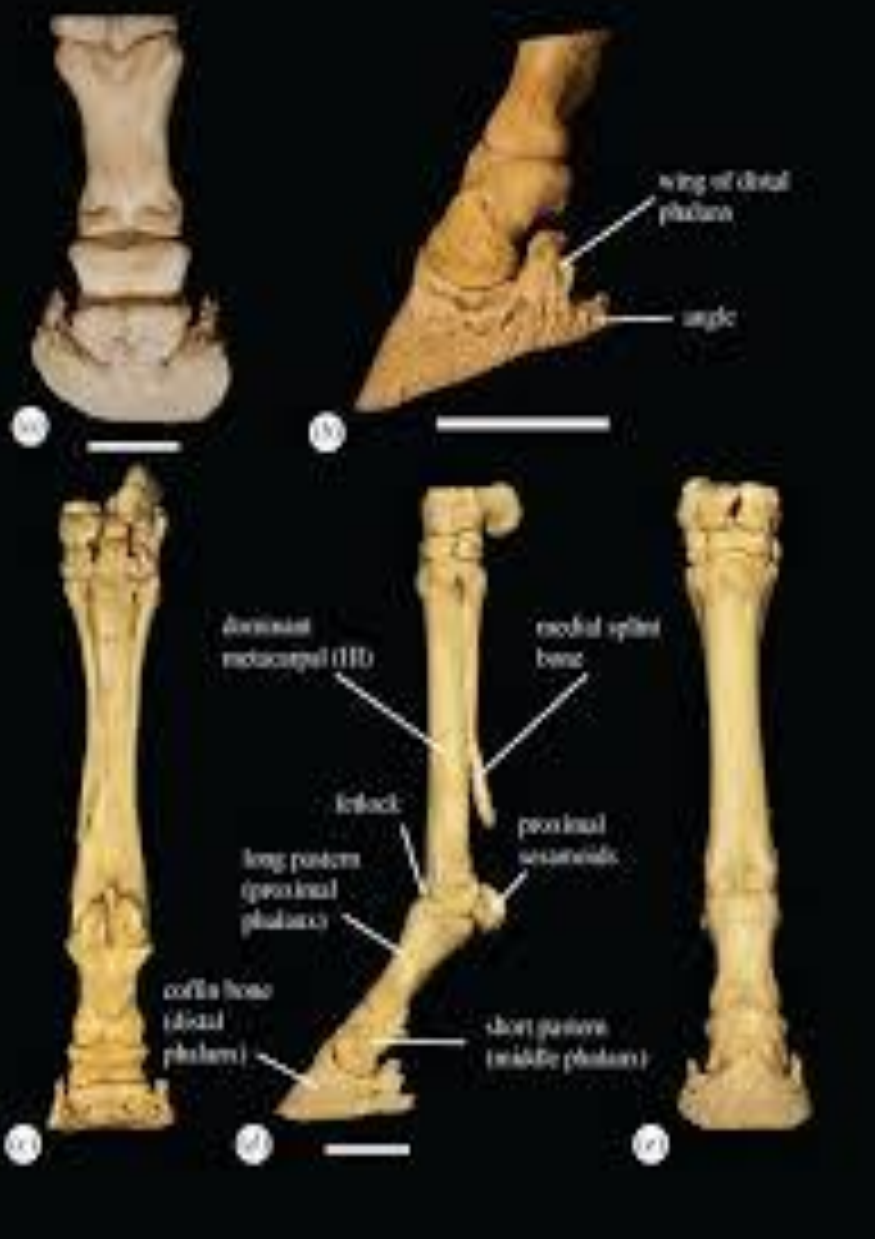
Horse













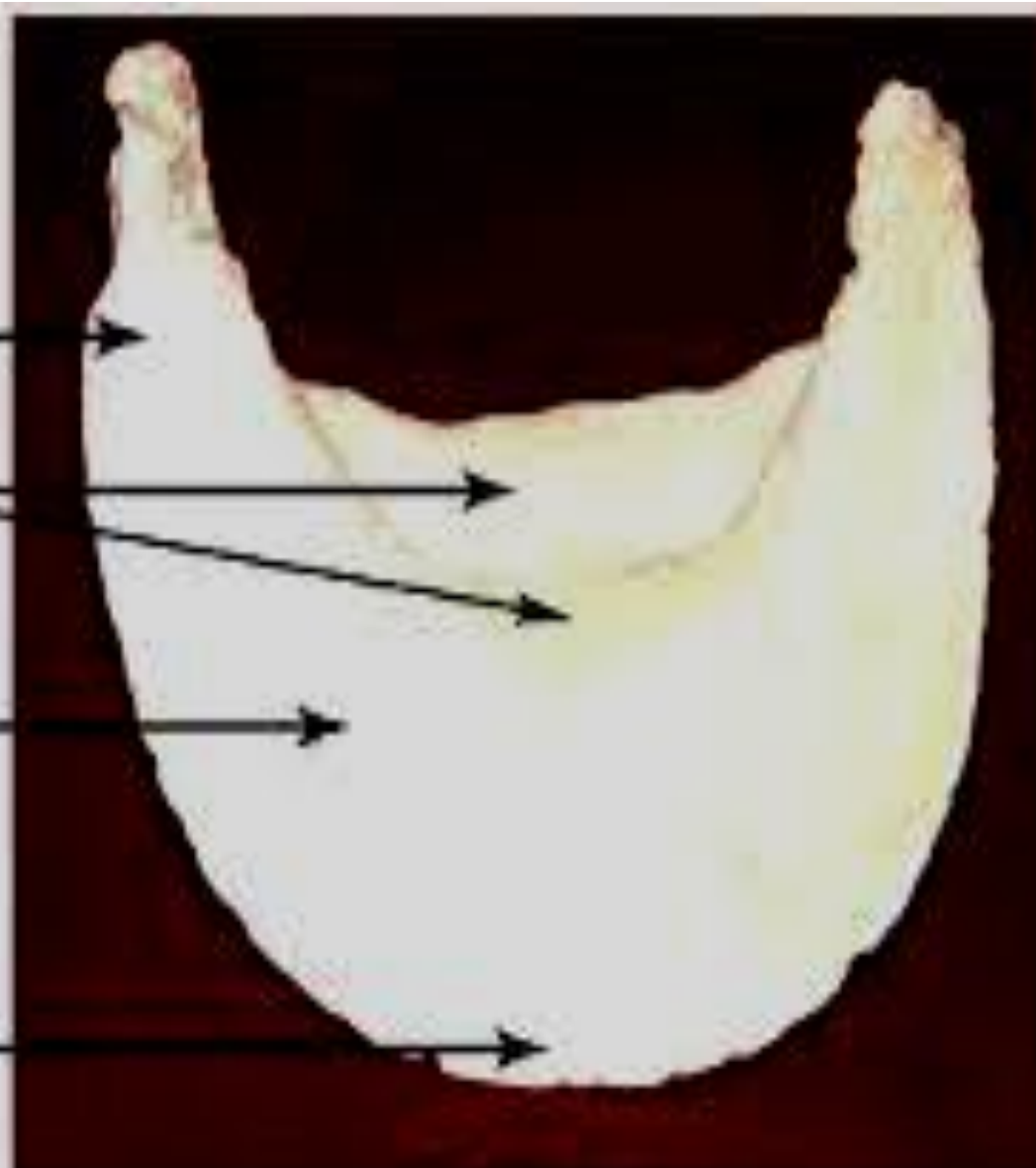


Lateral process

Insertion of the
deep digital
flexor tendon

Solar Surface

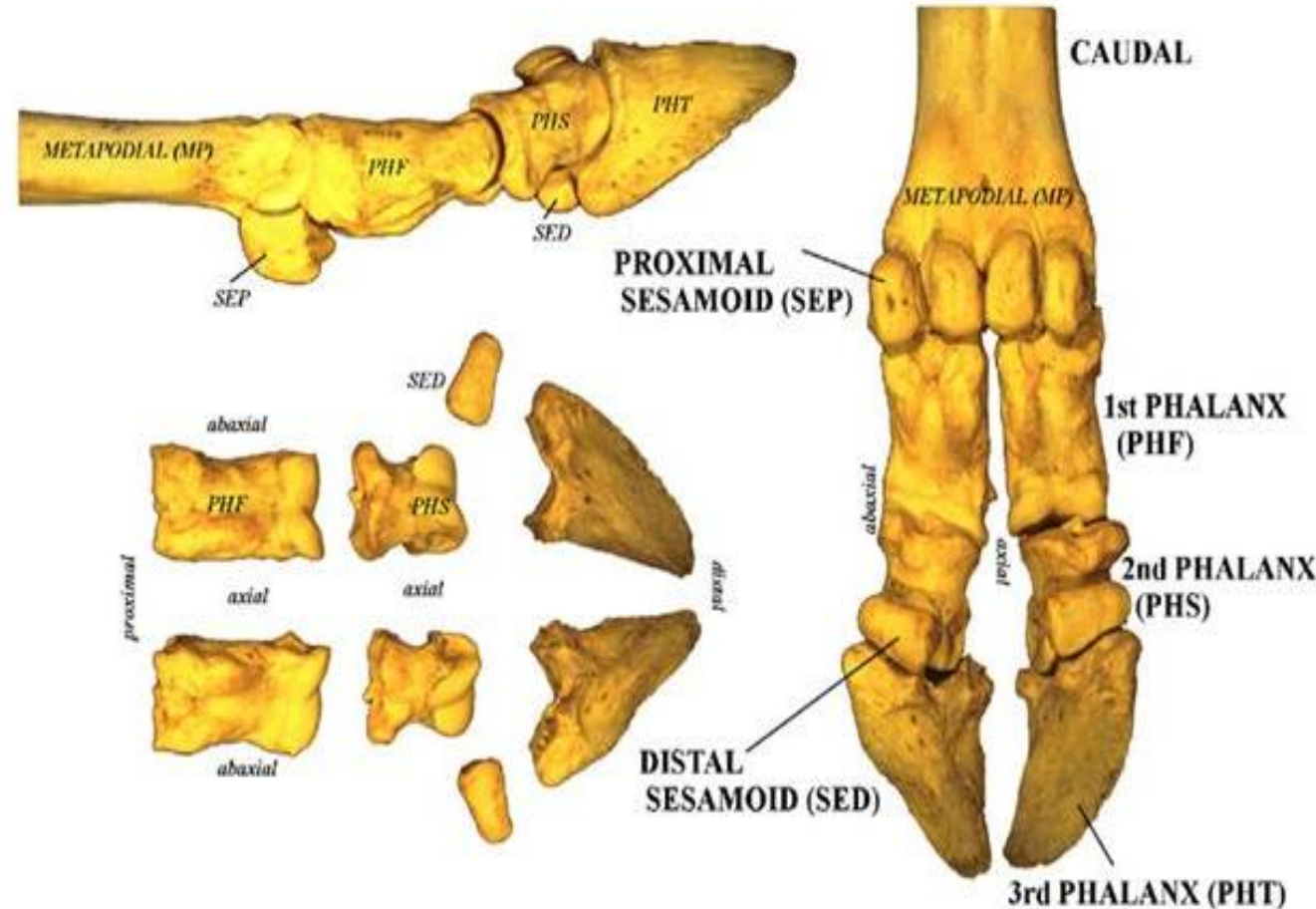
Tip of the
pedal bone



OSSA DIGITORUM MANUS - PRSTI

L.C. Todd

PHALANGES (PH) AND SESAMOIDS (SE)



PAS	5
SVINJA	4
PREŽIVARI	2
KONJ	1

KIČIČNA KOST

PHALANX PROXIMALIS

KRUNSKA KOST

PHALANX MEDIA

KOPITNA KOST

PHALANX DISTALIS

FACIES PARIETALIS

ZIDNA POVRŠINA

FACIES SOLEARIS

TABANSKA POVRŠINA

FACIES ARTICULARIS

ZGLOBNA POVRŠINA

OSSA SESAMOIDEA

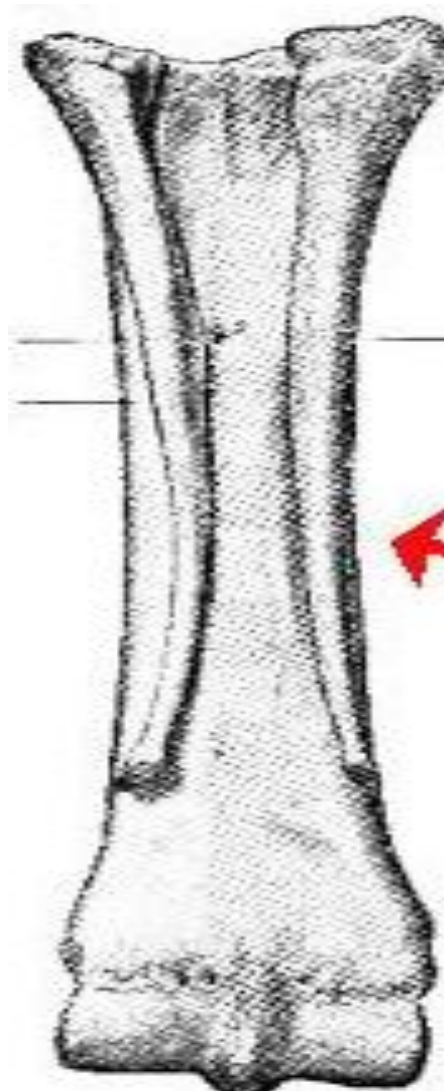
IZA SVAKOG PRSTA NALAZE SE PO TRI SEZAMOIDNE KOSTI, DVE IZA KIČIČNE KOSTI I JEDNA IZA KOSTI PAPKA (ŽABIČNA KOST)

OSSA METACARPI – CEVANICA

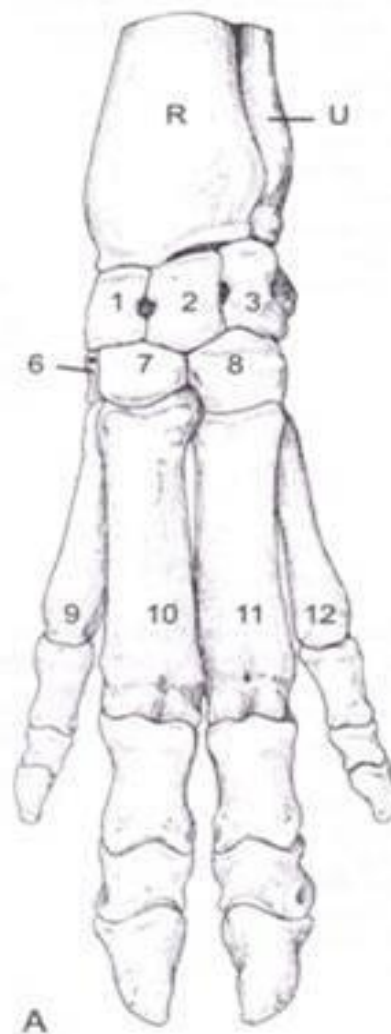
PREŽIVARI



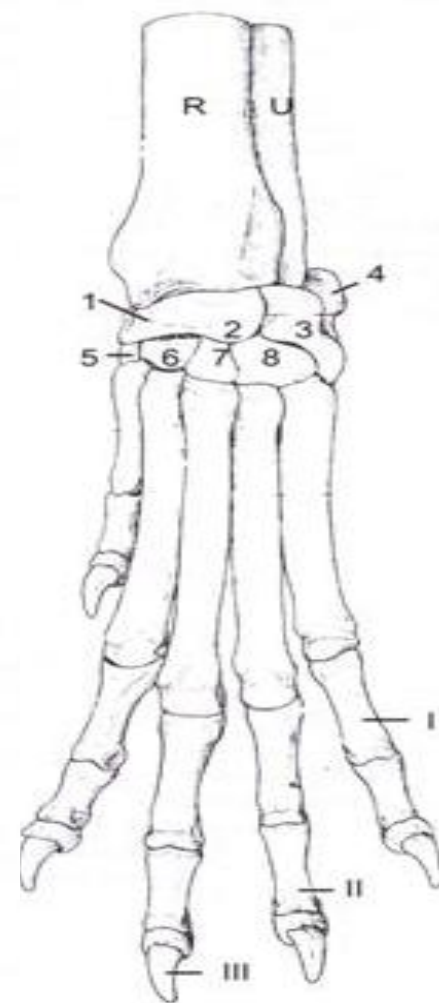
KONJ



SVINJA



PAS



- The girdles pass on the “push” produced by the limbs to the body. The shoulder girdle or **scapula** is a triangle of bone surrounded by the muscles of the back but not connected directly to the spine (see diagram 6.1). This arrangement helps it to cushion the body when landing after a leap and gives the forelimbs the flexibility to manipulate food or strike at prey. Animals that use their forelimbs for grasping, burrowing or climbing have a well-developed **clavicle** or collar bone. This connects the shoulder girdle to the sternum. Animals like sheep, horses and cows that use their forelimbs only for supporting the body and locomotion have no clavicle. The **pelvic girdle** or hipbone attaches the sacrum and the hind legs. It transmits the force of the leg-thrust in walking or jumping directly to the spine (see diagram 6.10).