Anatomy: Bones

Skeleton

Axial Skeleton

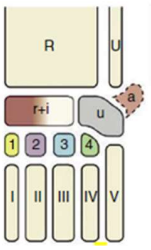
- **Vertebral Column**
- **Skull**
  - ❖ Skull + mandible + hypoid apparatus
  - ❖ Brachycephalic (short) ➔ mesaticephalic ➔ dolichocephalic (long)
- **Ribs + Sternum**

Appendicular Skeleton

	Manus	Pes
Carpals Tarsals	• 3 proximal – r + intermediate + u • Accessory carpal • 4 distal	• 2 proximal – talus + calcaneus • 1 middle – central tarsal • 4 distal
Metacarpals Metatarsals	• Numbered I-V medial to lateral • Pes – 1st sometimes fuses with the 1st tarsal: rudimentary	
Phalanges	• I = proximal + distal • II-V = proximal + middle + distal • **Ungual –** distalmost phalanx	

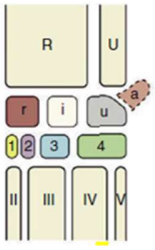
Manus

Cat / Dog



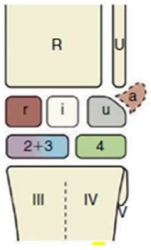
C = radial + intermediate
MC = I-V

Pig



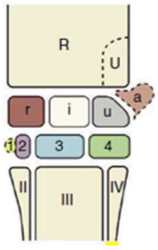
MC = II-V
P = III & IV touch the ground

Cow



C = no 1, 2+3
MC = III-V
P = III & IV touch the ground

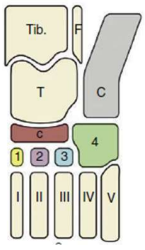
Horse



MC = II-IV
P = III touches the ground,
II & IV are splint bones

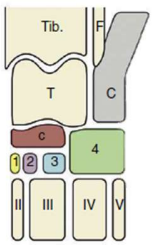
Pes

Cat / Dog



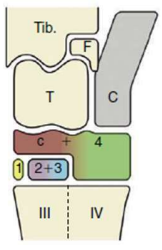
MT = I-V

Pig



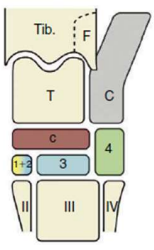
MT = II-V
P = III & IV touch the ground

Cow



T = 2+3 and C+4
MT / P = III+IV

Horse



T = 1+2
MT / P = like manus

Structure

Classification: Shape

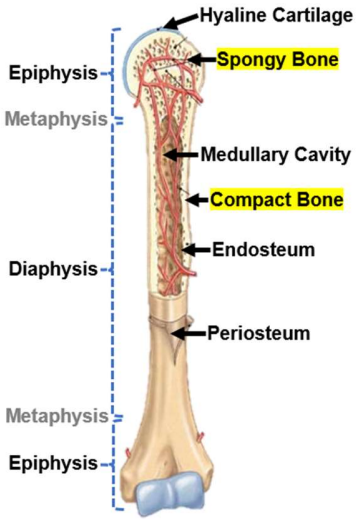
- **Long –** levers: *humerus*
- **Short –** outer compact + spongy bone: *carpals*
- **Flat –** outer compact in close apposition + spongy bone: *scapula*
- **Irregular –** *vertebrae*
- Specialised
  - ❖ **Pneumatic –** air-filled cavity: *skull*
  - ❖ **Sesamoid –** within tendons: *patella*
  - ❖ **Splanchnic –** within soft tissue organs: *os penis*

Classification: Type

- **Compact**
  - ❖ 70% mineral hydroxyapatite
  - ❖ 30% organic matrix – collagen (I = 90%, V = 10%) + H_2O + ground substance
  - ❖ CT membranes
    - Periosteum
      - Outer fibrous – attachments / entheses
      - Inner cellular – osteogenic
    - Endosteum – lines the MC
- **Spongy –** trabeculae: spaces filled with marrow

Long Bones

- Articular surfaces are covered in hyaline cartilage
- **Epiphyses –** thin compact bone surrounding spongy bone
- **Diaphysis**
  - ❖ Thick compact bone surrounding a MC filled with marrow
  - ❖ Marrow
    - Red – active: produces RBC & WBC
    - Yellow – inactive: fat infiltrates as the animals ages
- **Metaphysis –** epiphyseal plate during growth



Modelling / Remodelling

Modelling

- **Modelling –** bone growth and reshaping in response to altered biomechanical forces
- Activation-formation or activation-resorption
- Effect – changes shape, curvature or thickness
- Occurs on or in existing bone tissue during growth and healing

Remodelling

- **Remodelling – damage** initiates bone removal and replacement to preserve strength
- Activation-resorption-formation
- Effect – bone maintenance or net loss
- Main mechanism altering adult bones