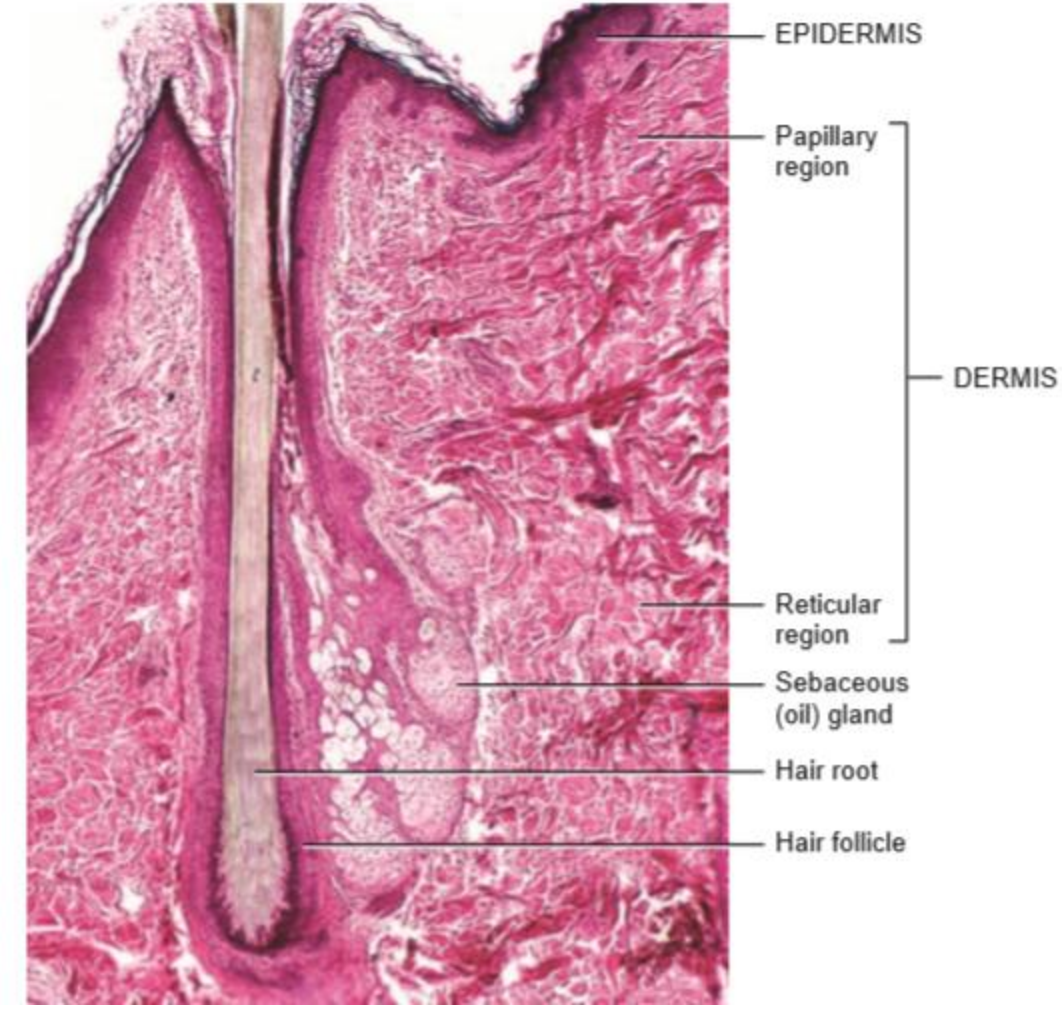
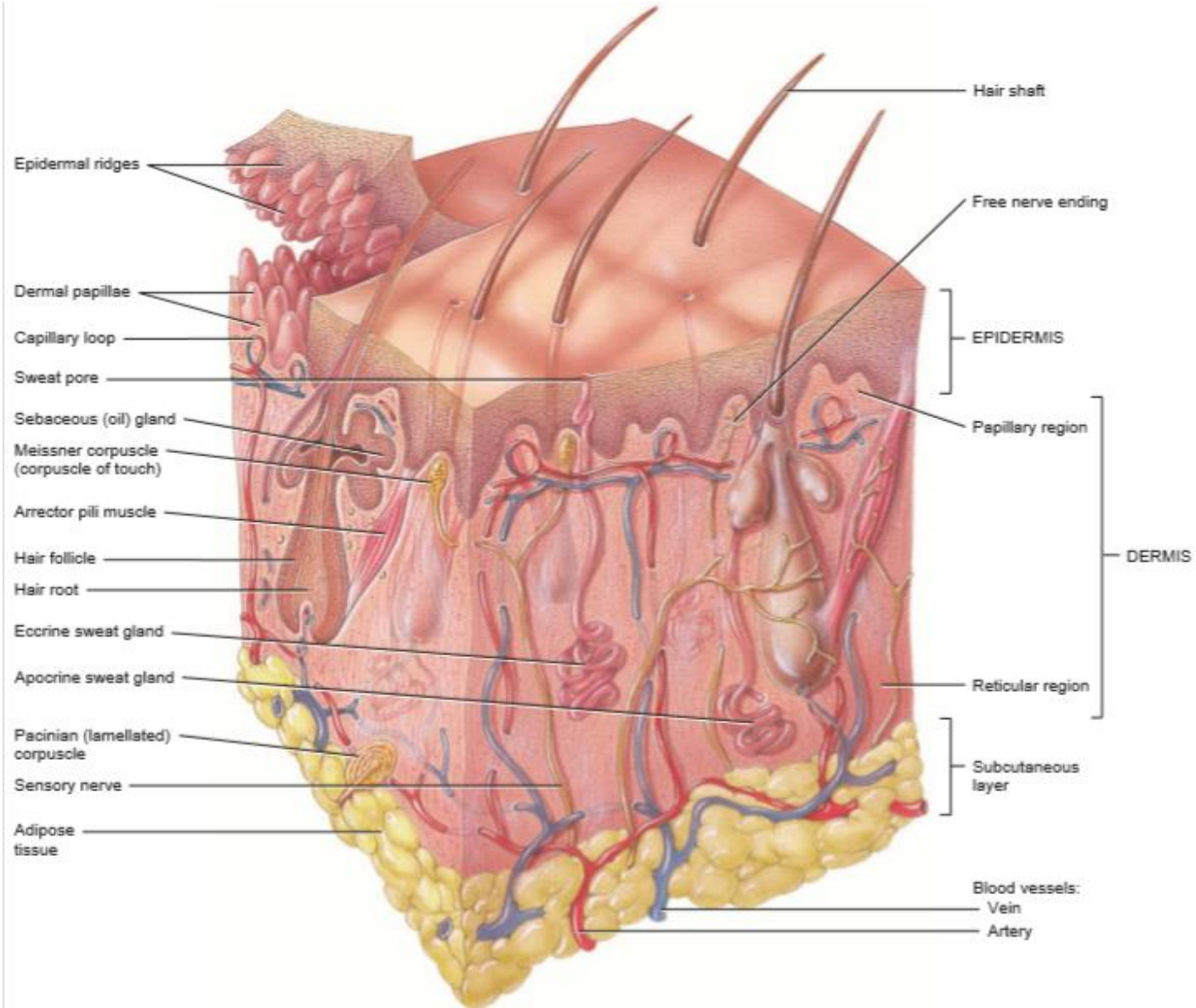
ZOPCLT2: REGULATORY MAMMALIAN PHYSIOLOGY

- **Study of skin with the help of chart and models**
- **Study of muscle with the help of chart and models**
- **Study of appendicular skeleton system with the help of model**
- **Study of axial skeleton system with the help of model**
- **Total and differential leucocytes counting in blood**
- **Study of histological slides**
- **Study of brain by model/chart**
- **To study functioning of brain by rotarod**
- **To study functioning of brain by light and dark chamber**

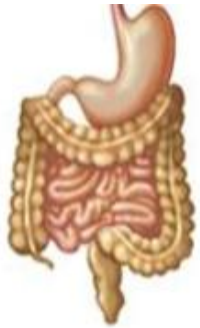
Study of skin with the help of chart and models

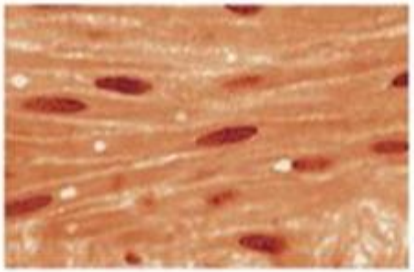


Study of skin with the help of chart and models



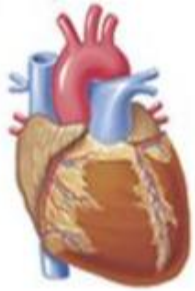
Study of muscle with the help of chart and models

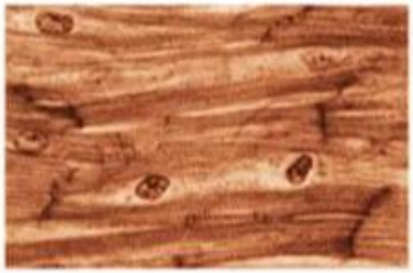


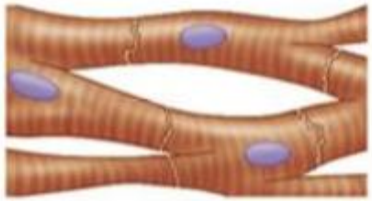


Smooth muscle

- has narrow, tapered cylindrical-shaped cells.
- has nonstriated, uninucleated fibers.
- occurs in walls of internal organs and blood vessels.
- is involuntary.

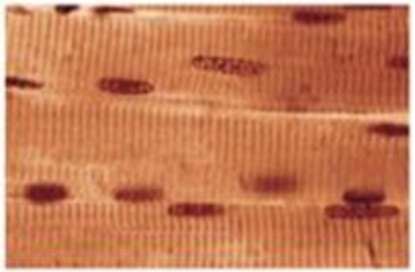


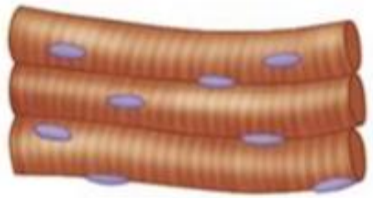




Cardiac muscle

- has striated, cylindrical, branched, uninucleated fibers.
- occurs in walls of heart.
- is involuntary.

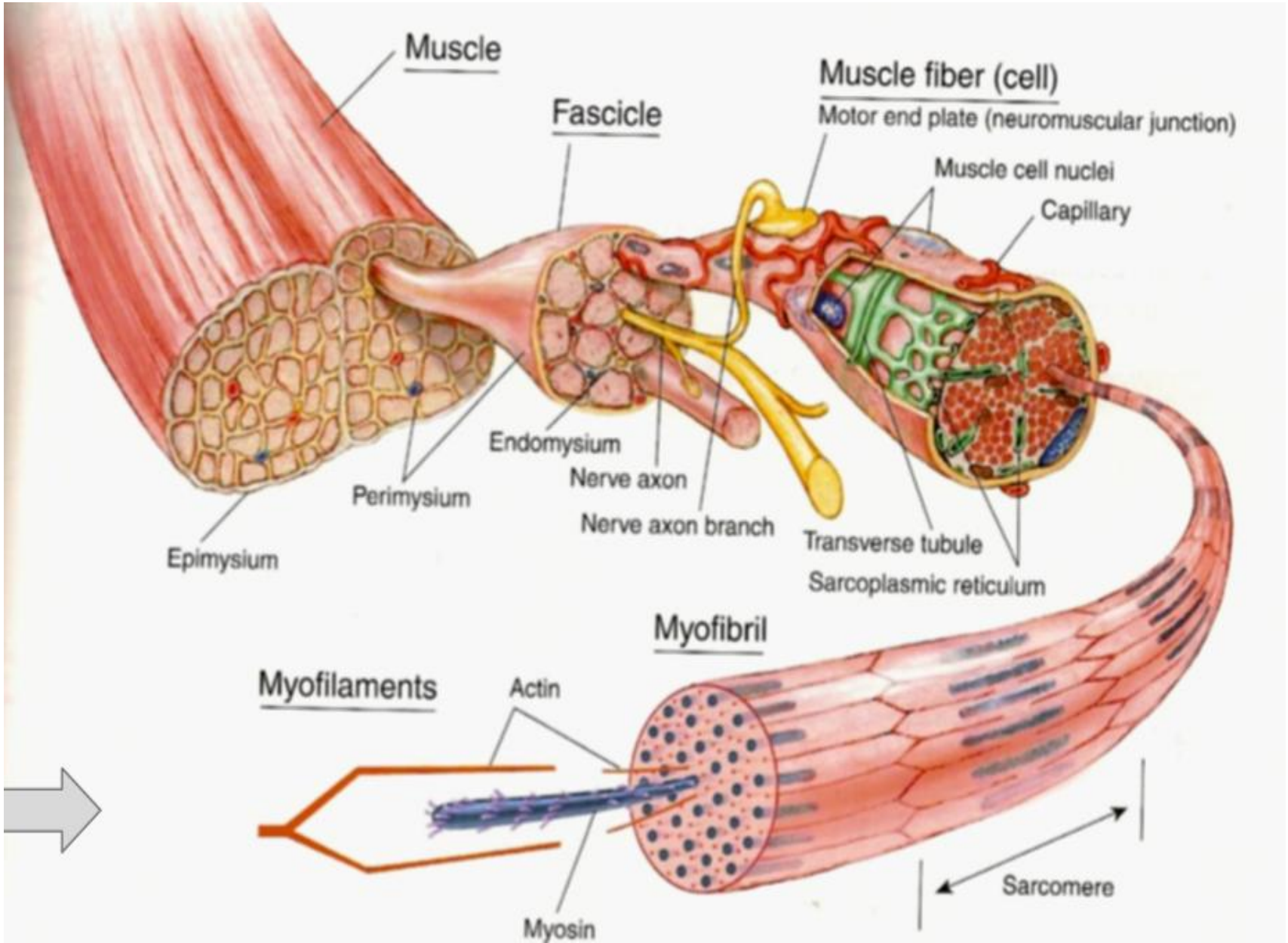




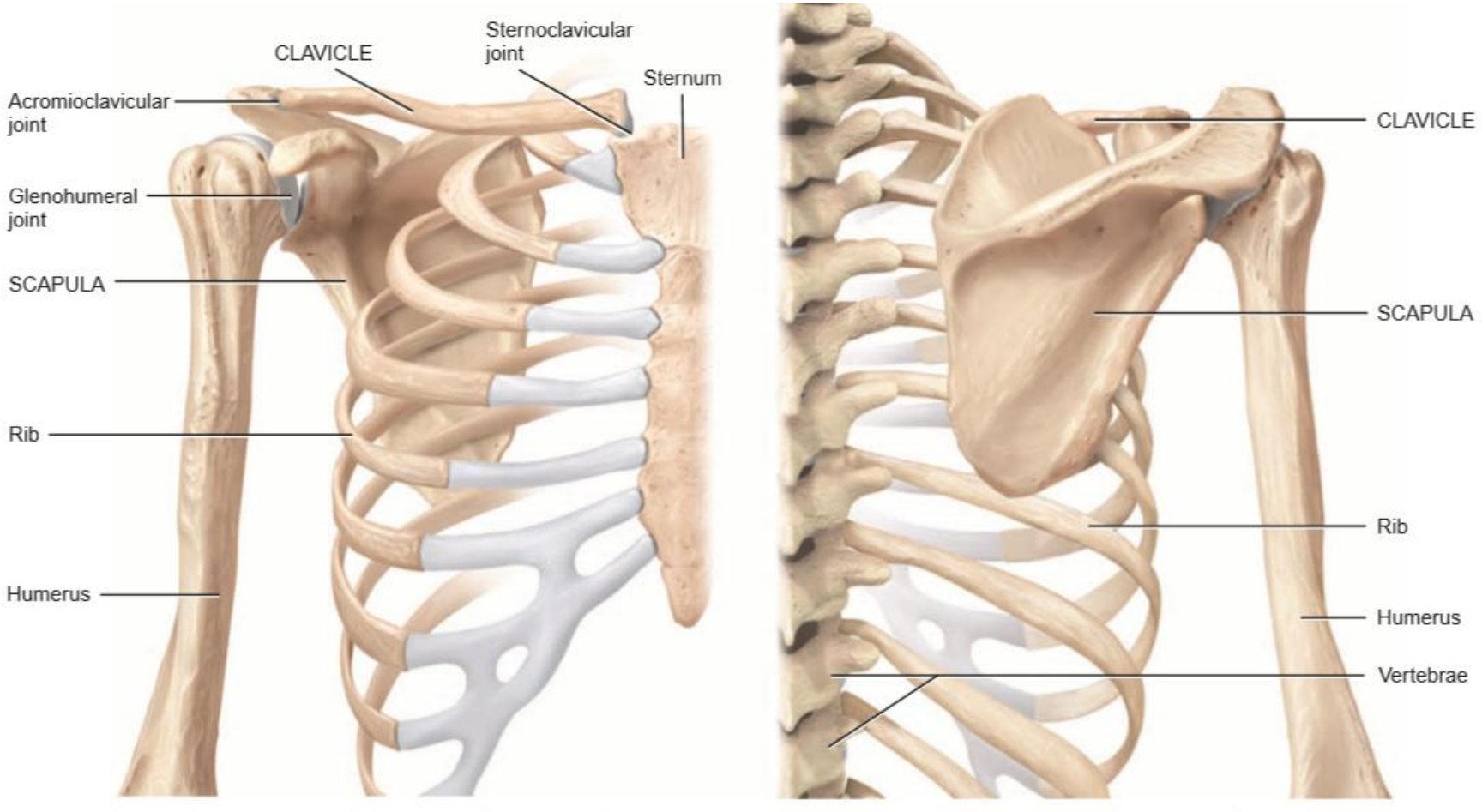
Skeletal muscle

- has striated, cylindrical, multinucleated fibers.
- is usually attached to skeleton.
- is voluntary.

Study of muscle with the help of chart and models



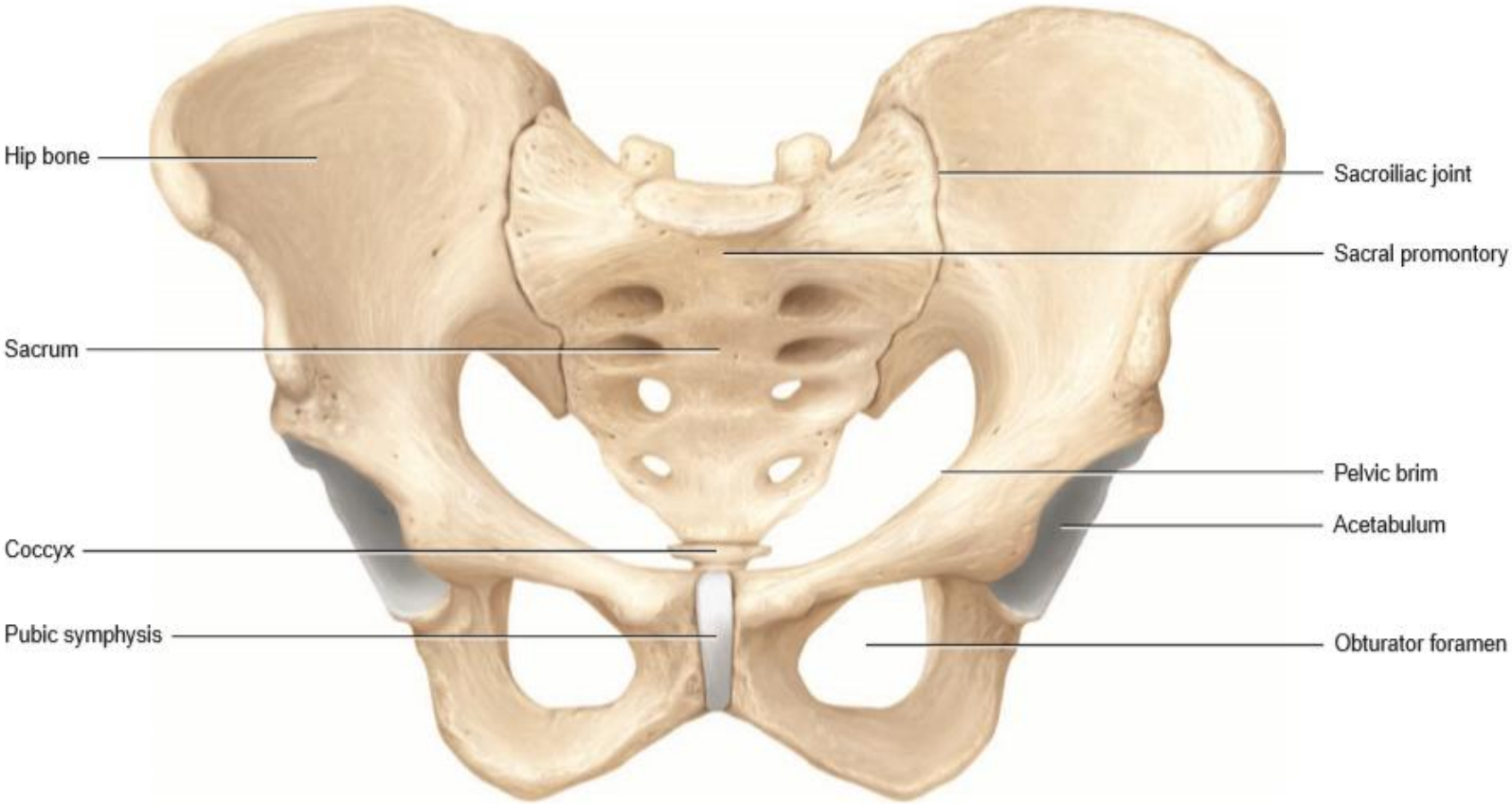
Study of appendicular skeleton system: Pectoral (shoulder) girdle



(a) Anterior view of pectoral girdle

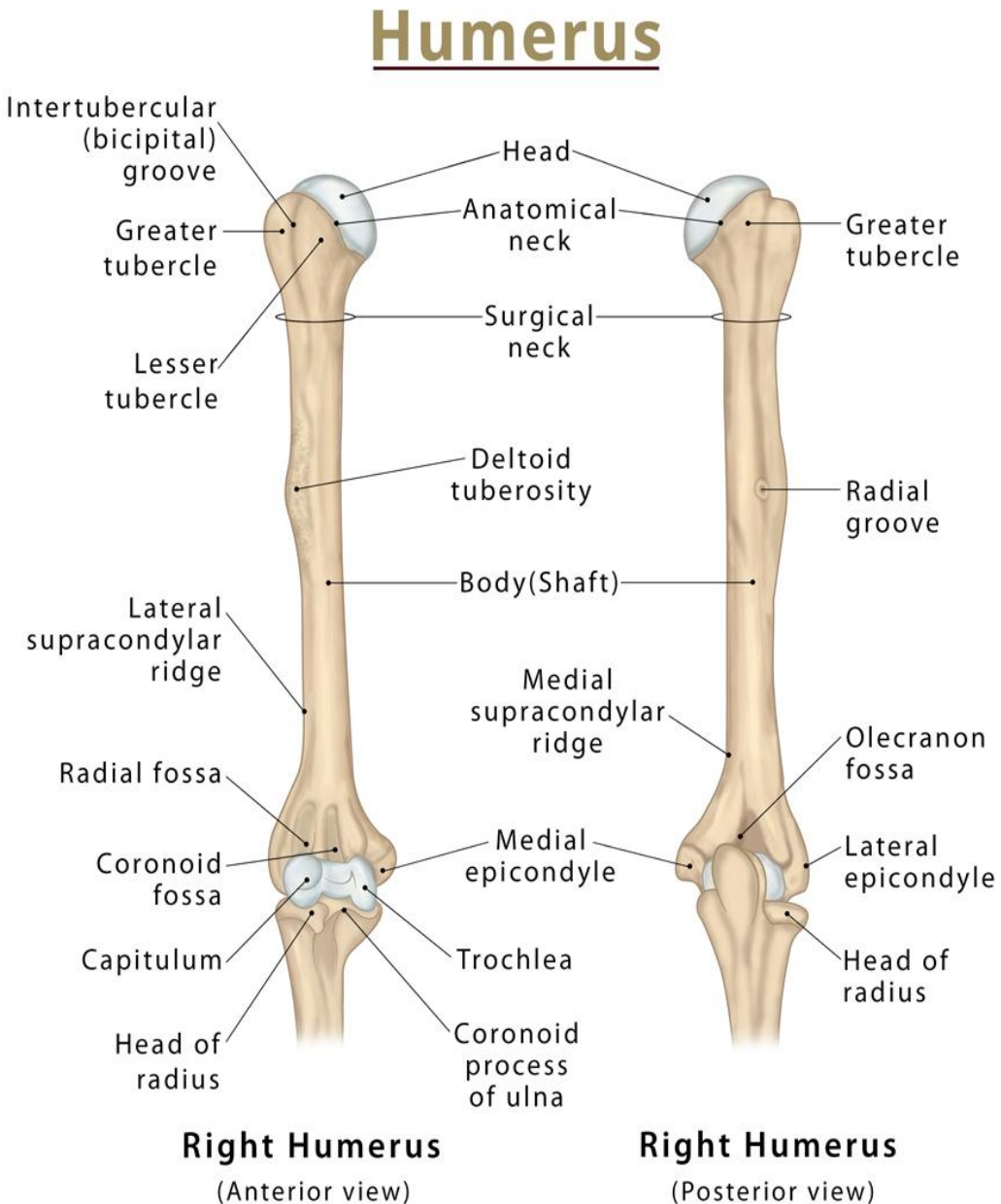
(b) Posterior view of pectoral girdle

Study of appendicular skeleton system: Pelvic girdle

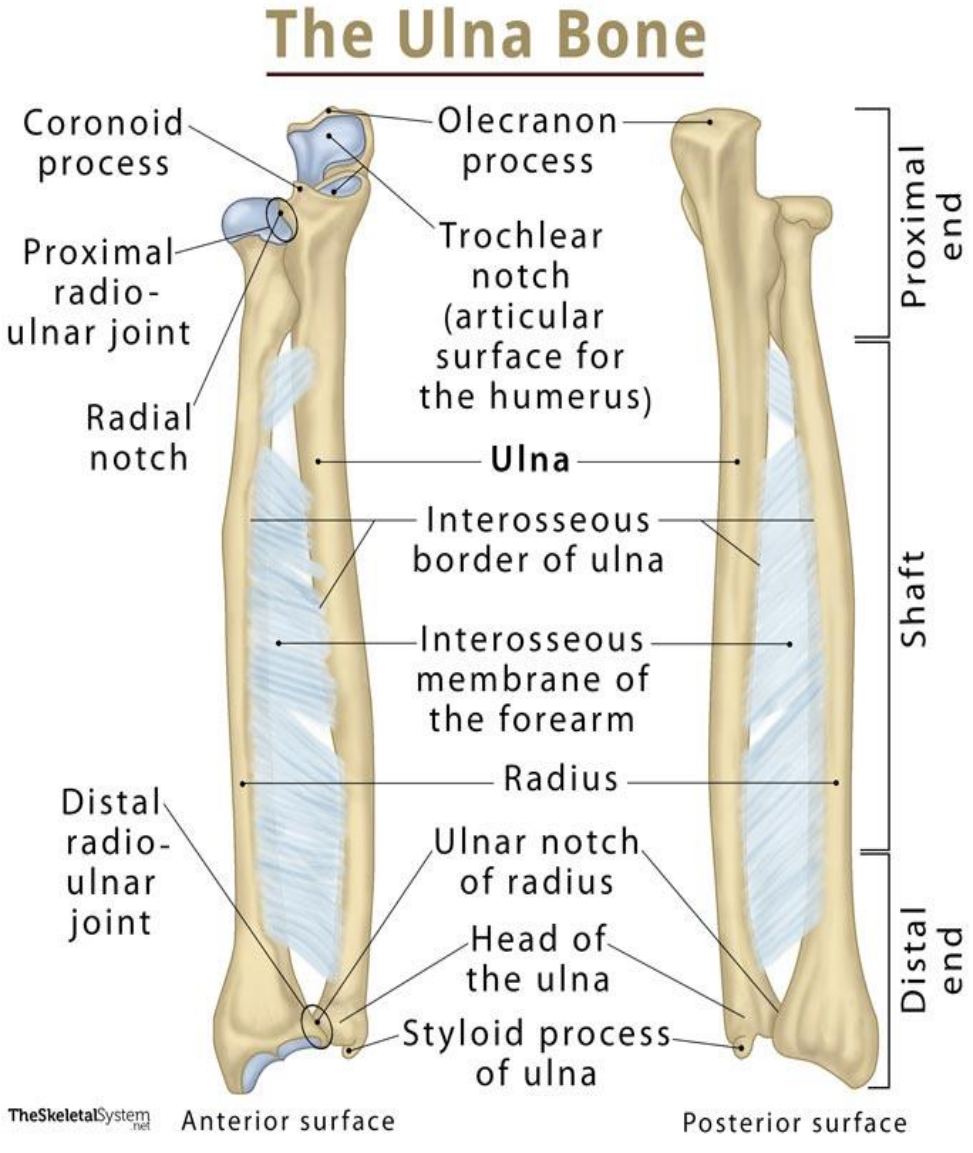


Anterosuperior view of pelvic girdle

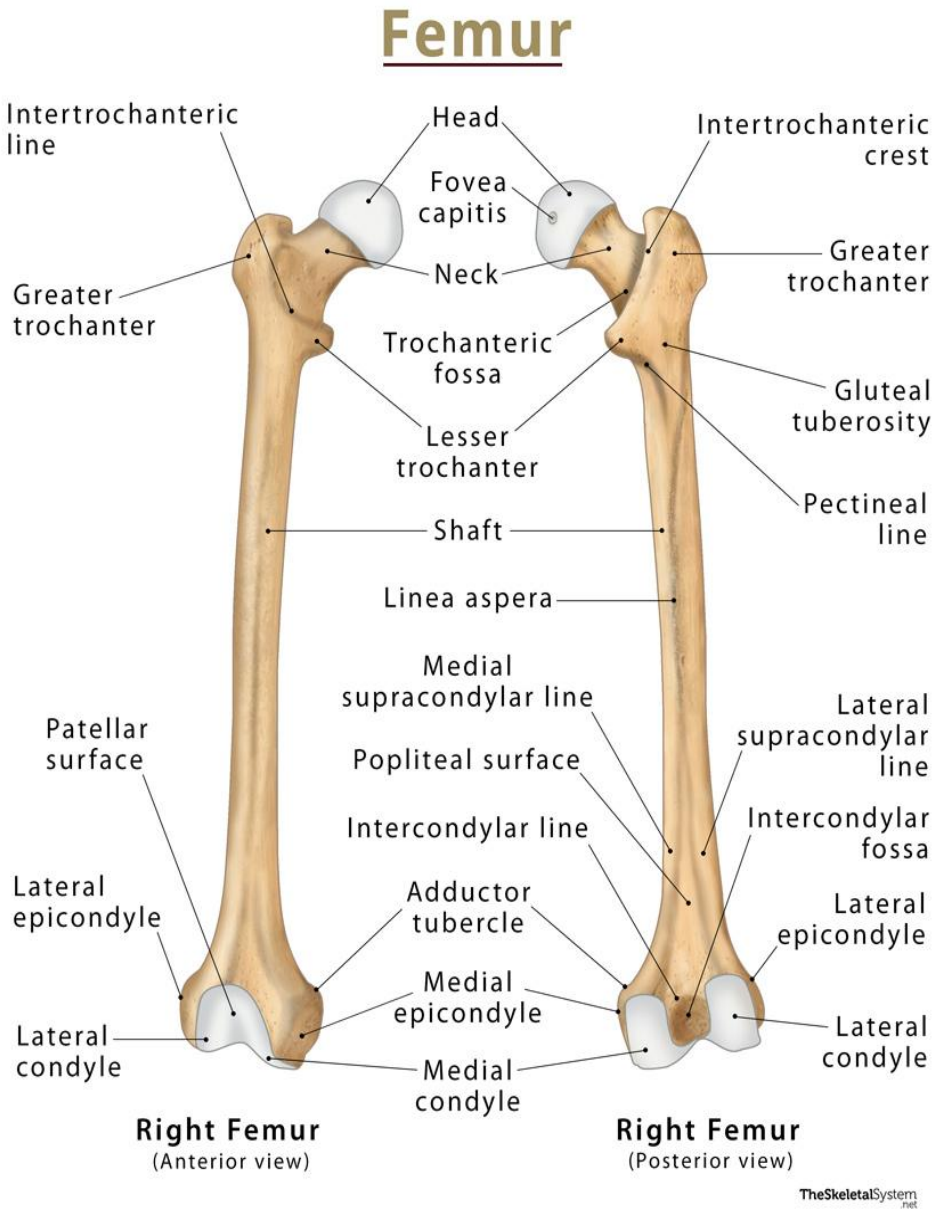
Study of appendicular skeleton system: Humerus



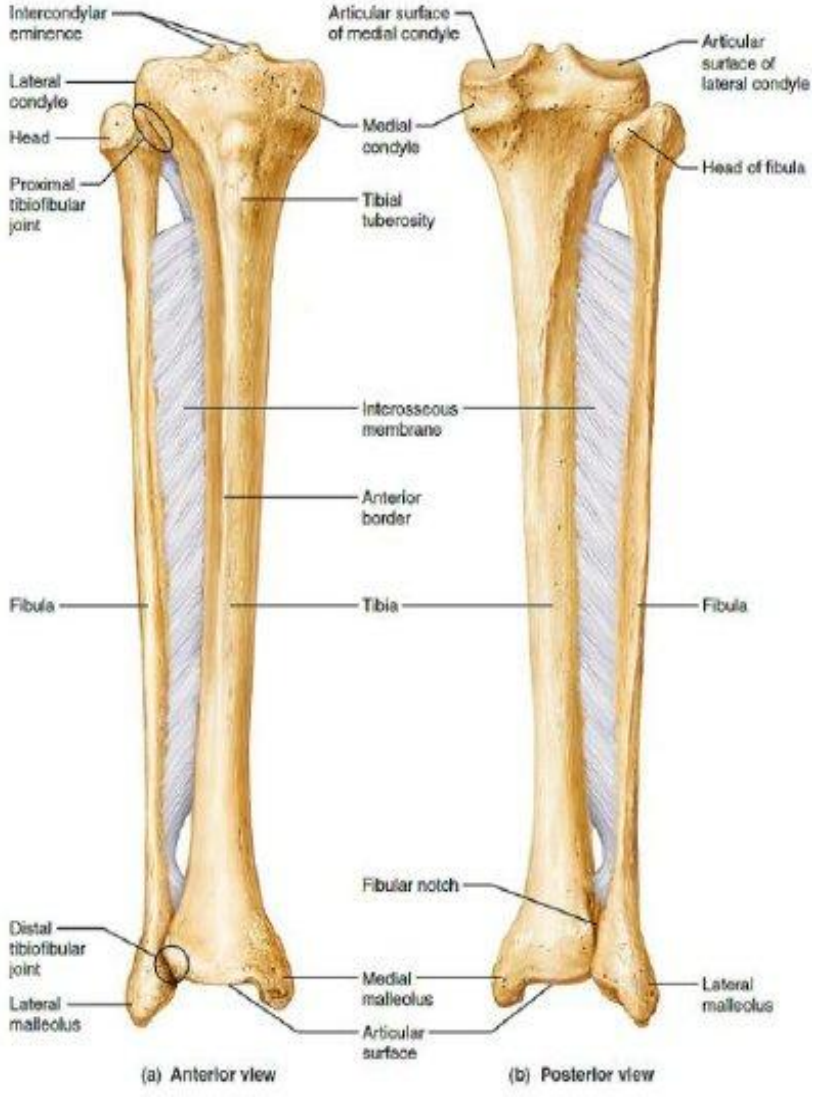
Study of appendicular skeleton system: ulna and radius



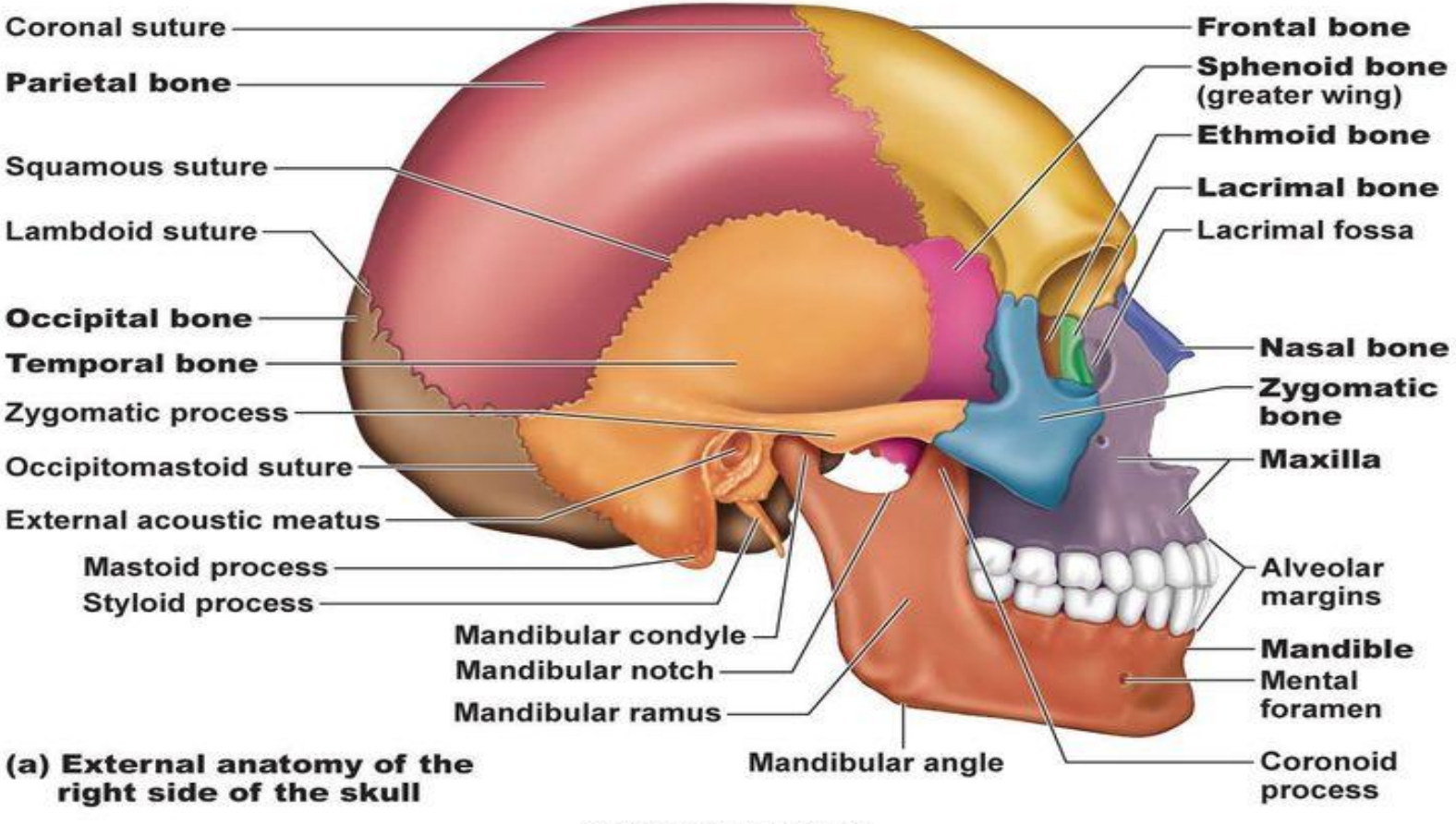
Study of appendicular skeleton system: Femur



Study of appendicular skeleton system: tibia and fibula

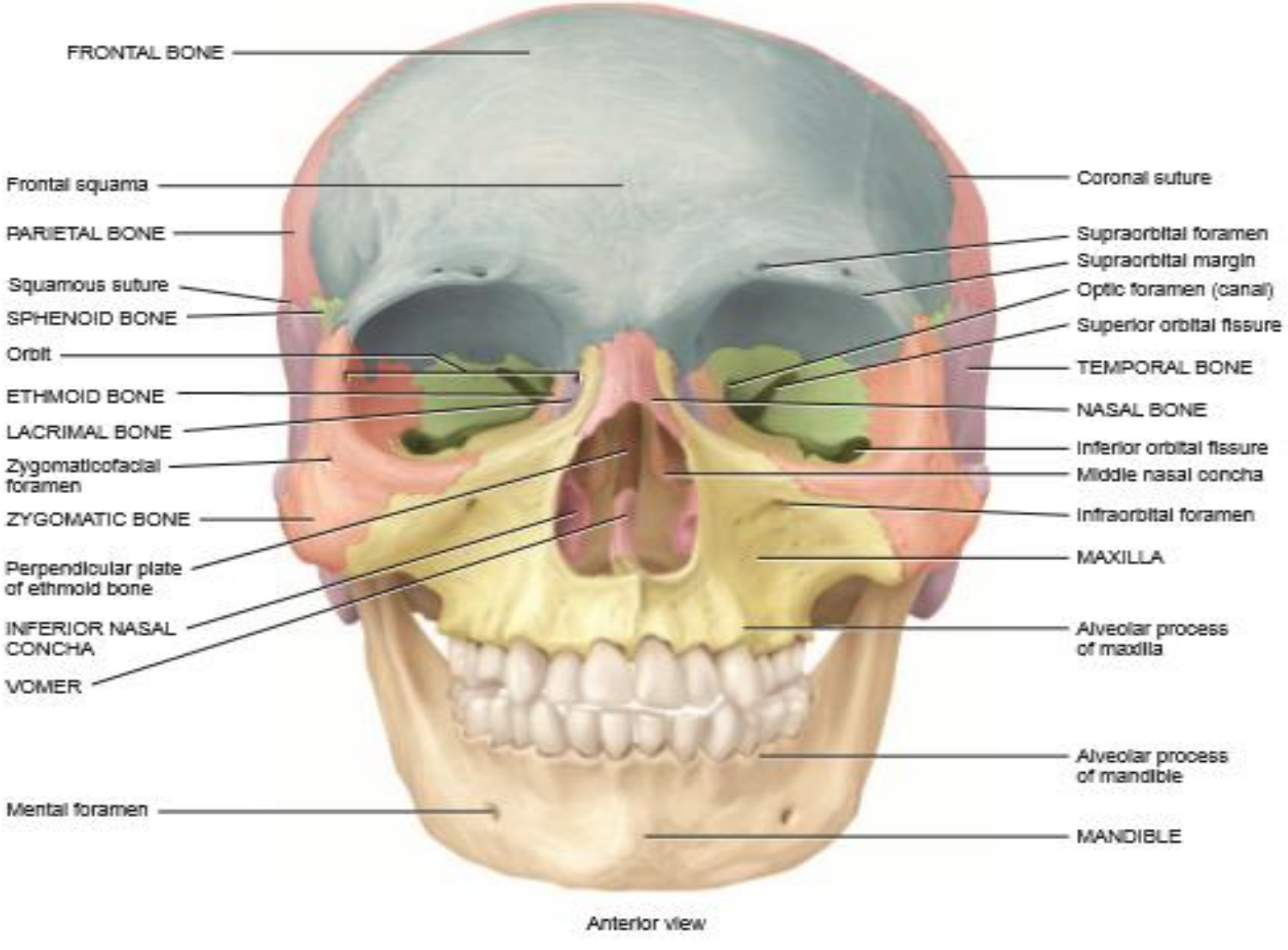


Study of axial skeleton system: side view of skull

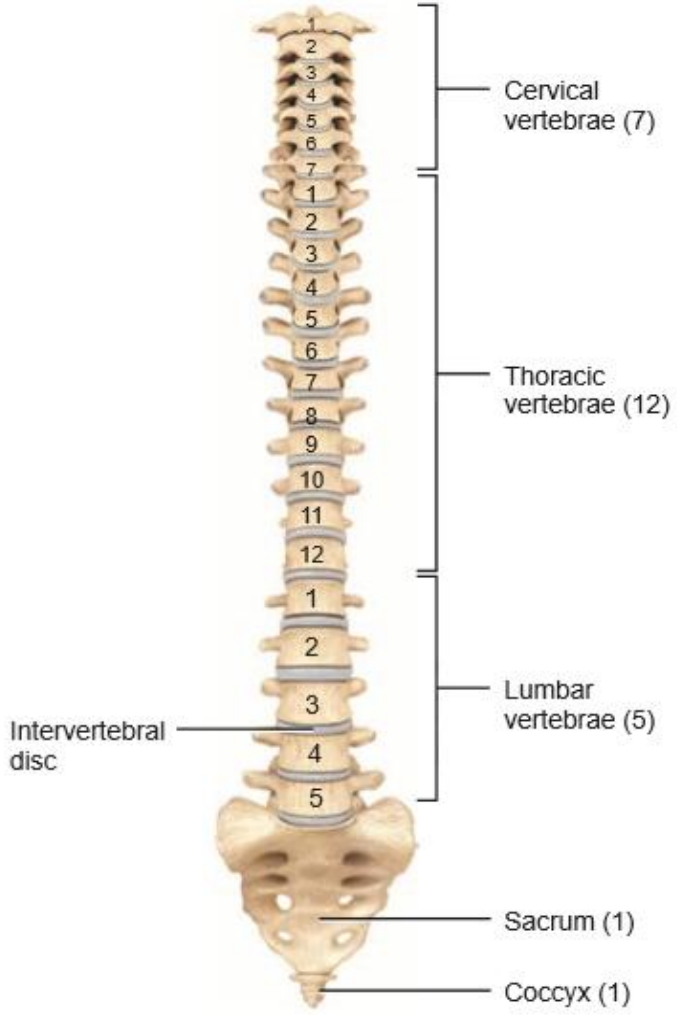


(a) External anatomy of the right side of the skull

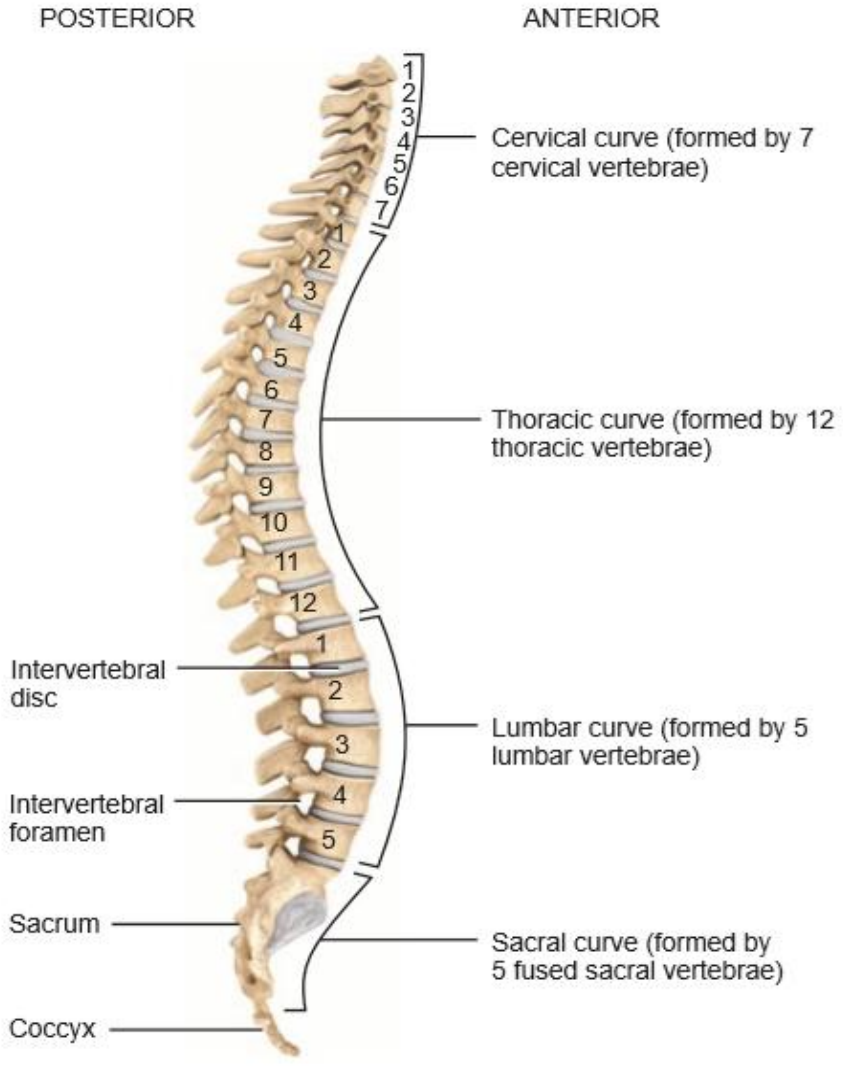
Study of axial skeleton system: Anterior view of skull



Study of axial skeleton system: adult vertebral column

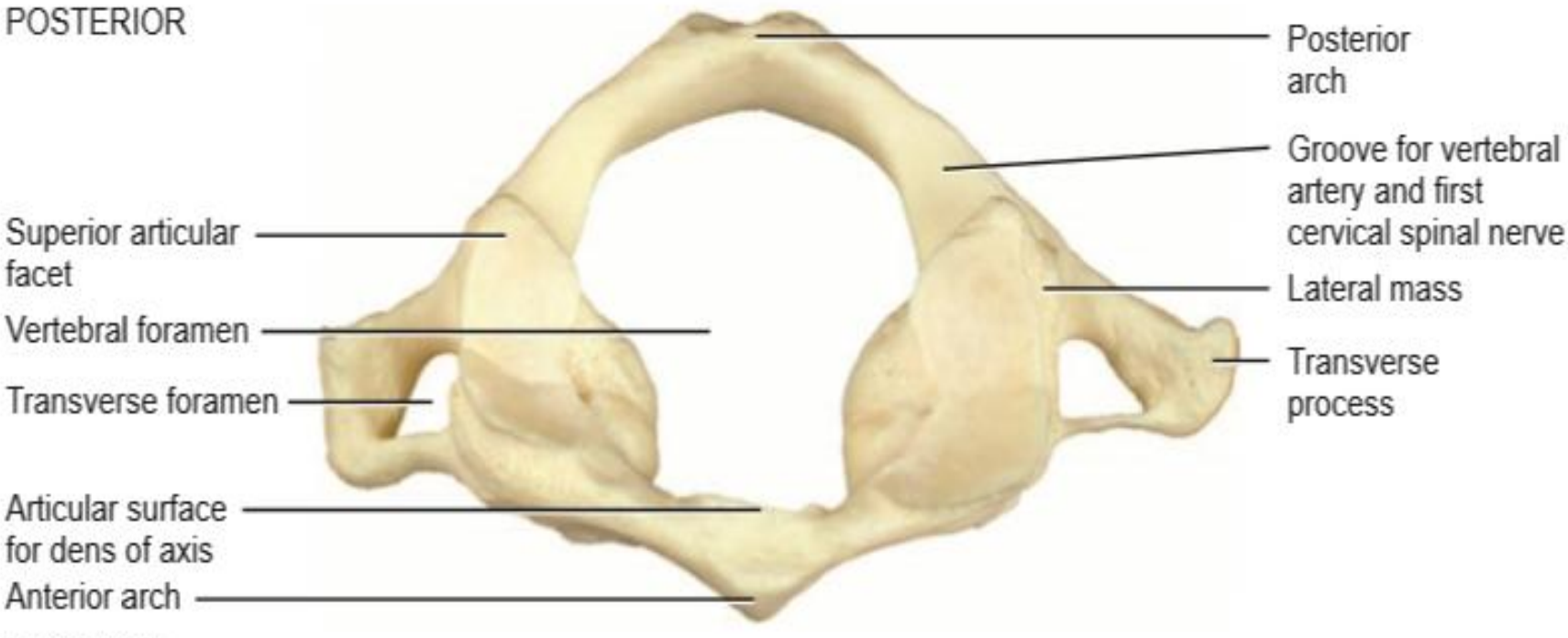


(a) Anterior view showing regions of the vertebral column



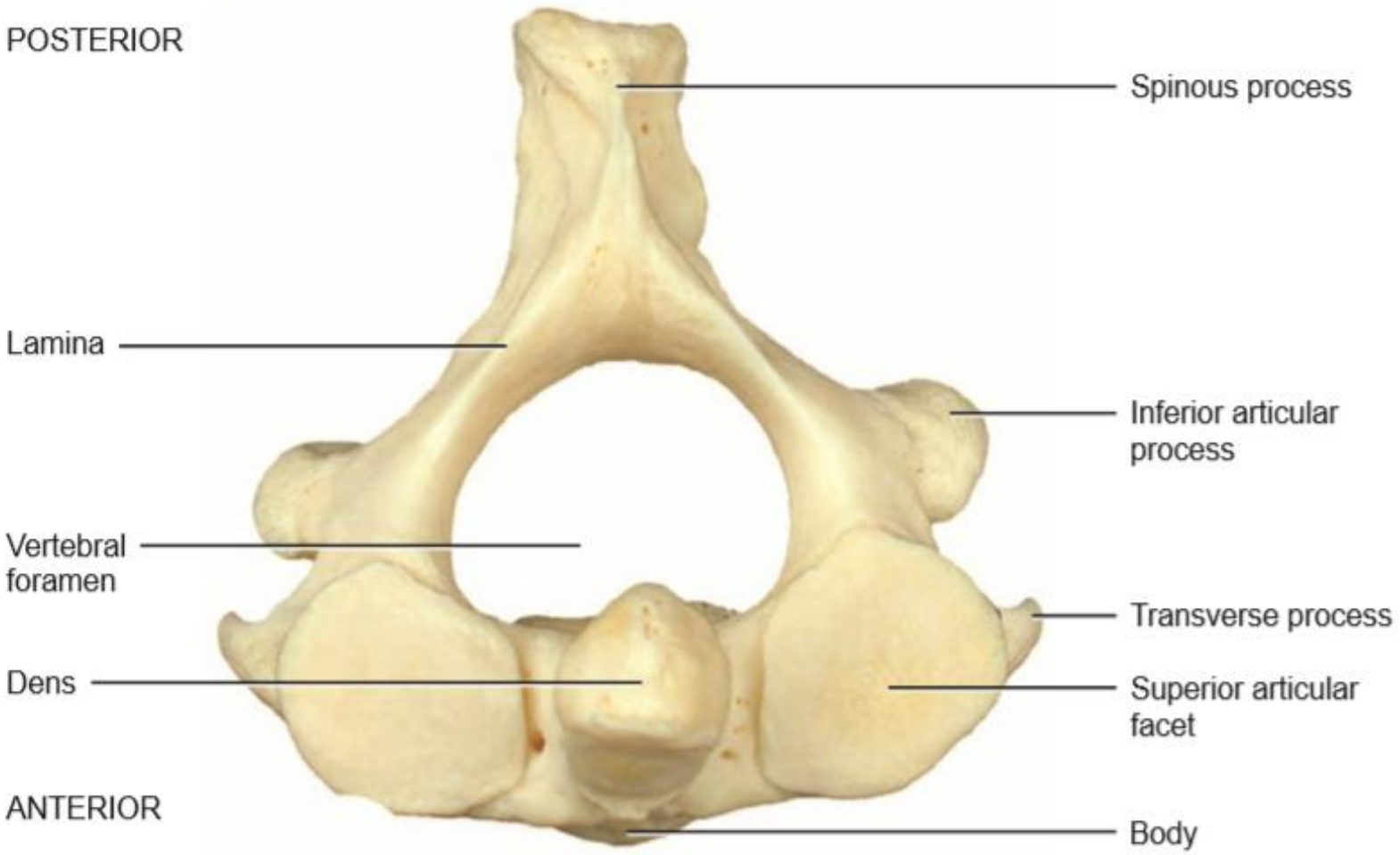
(b) Right lateral view showing four normal curves

Study of axial skeleton system: atlas vertebrae



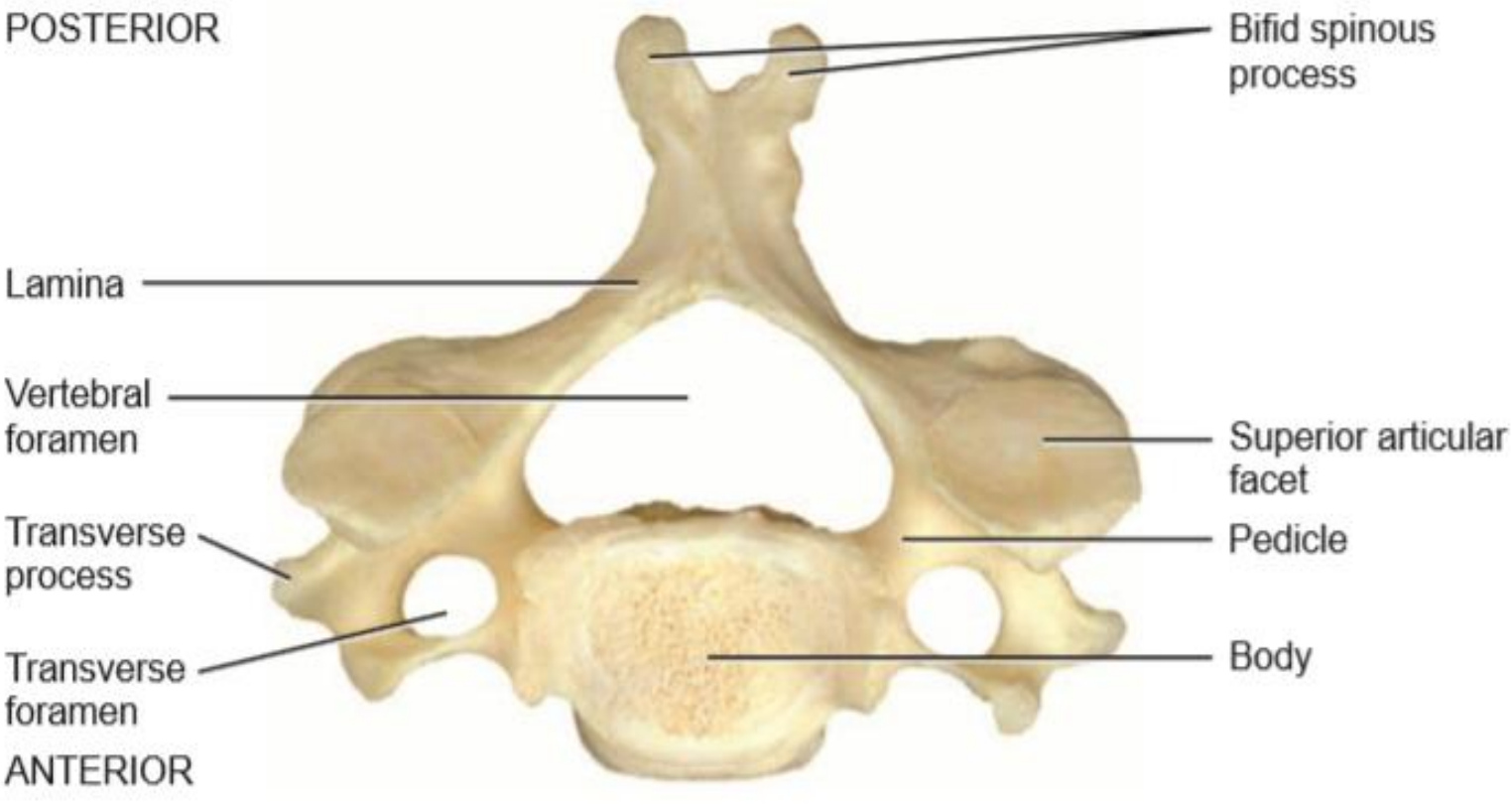
(b) Superior view of atlas (C1)

Study of axial skeleton system: axis vertebrae



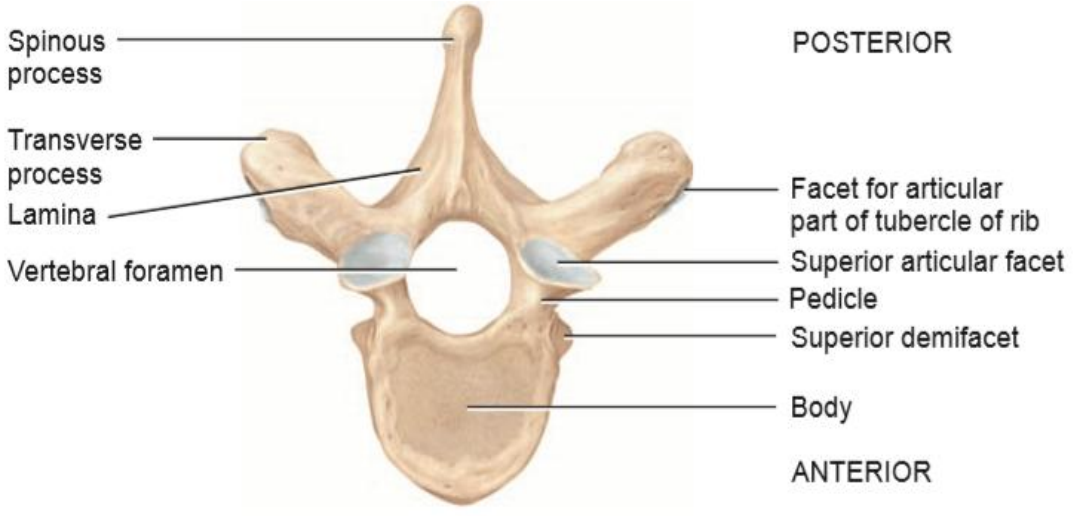
(c) Superior view of axis (C2)

Study of axial skeleton system: typical cervical vertebrae

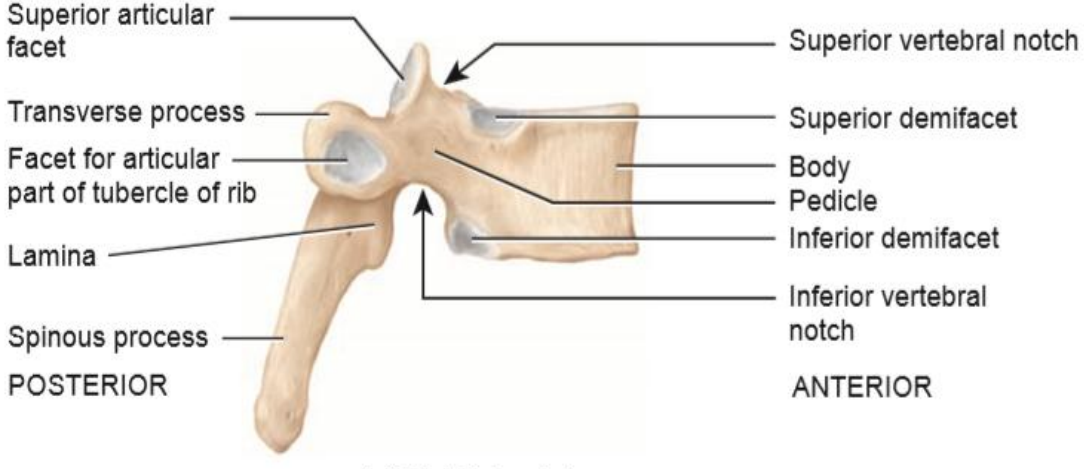


(d) Superior view of a typical cervical vertebra

Study of axial skeleton system: thoracic vertebrae

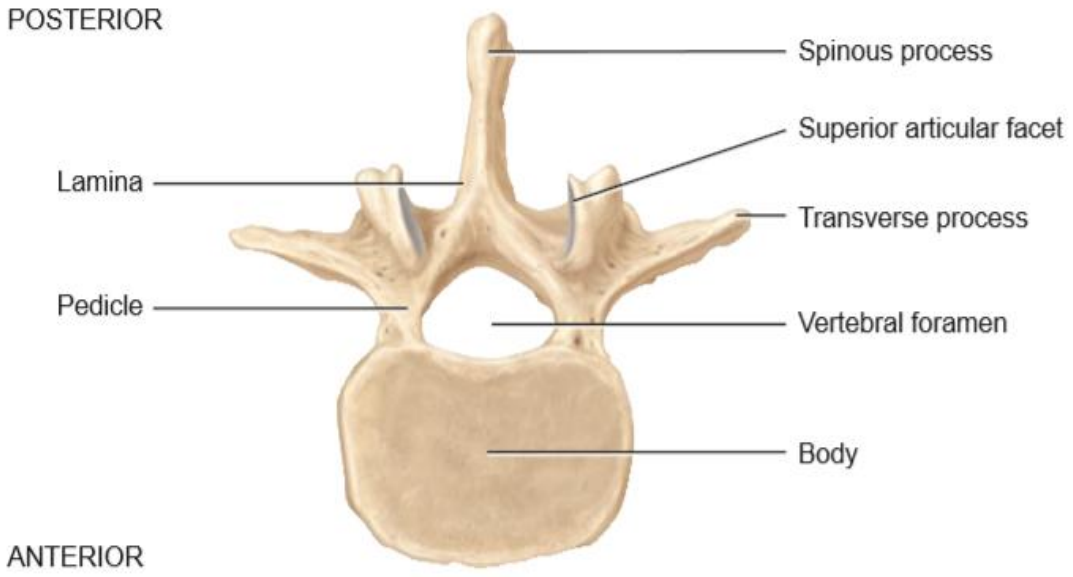


(b) Superior view

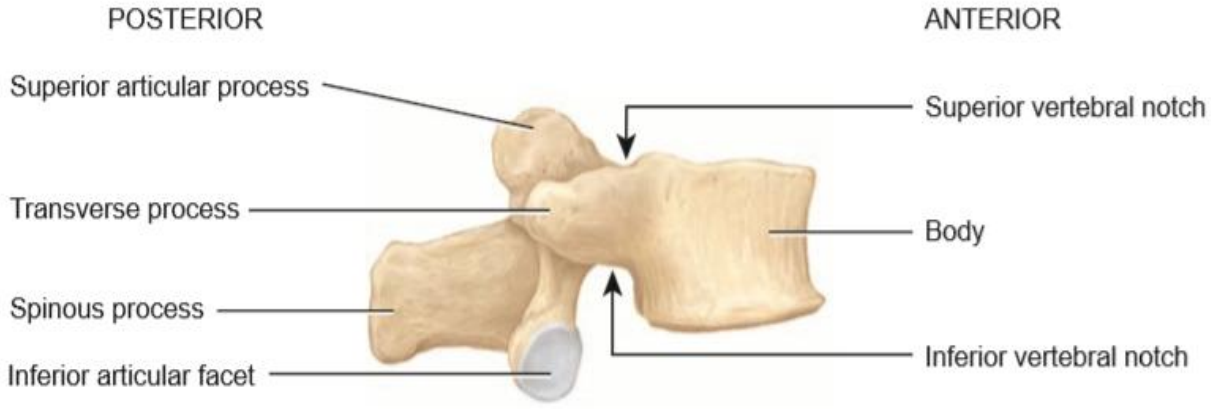


(c) Right lateral view

Study of axial skeleton system: lumber vertebrae

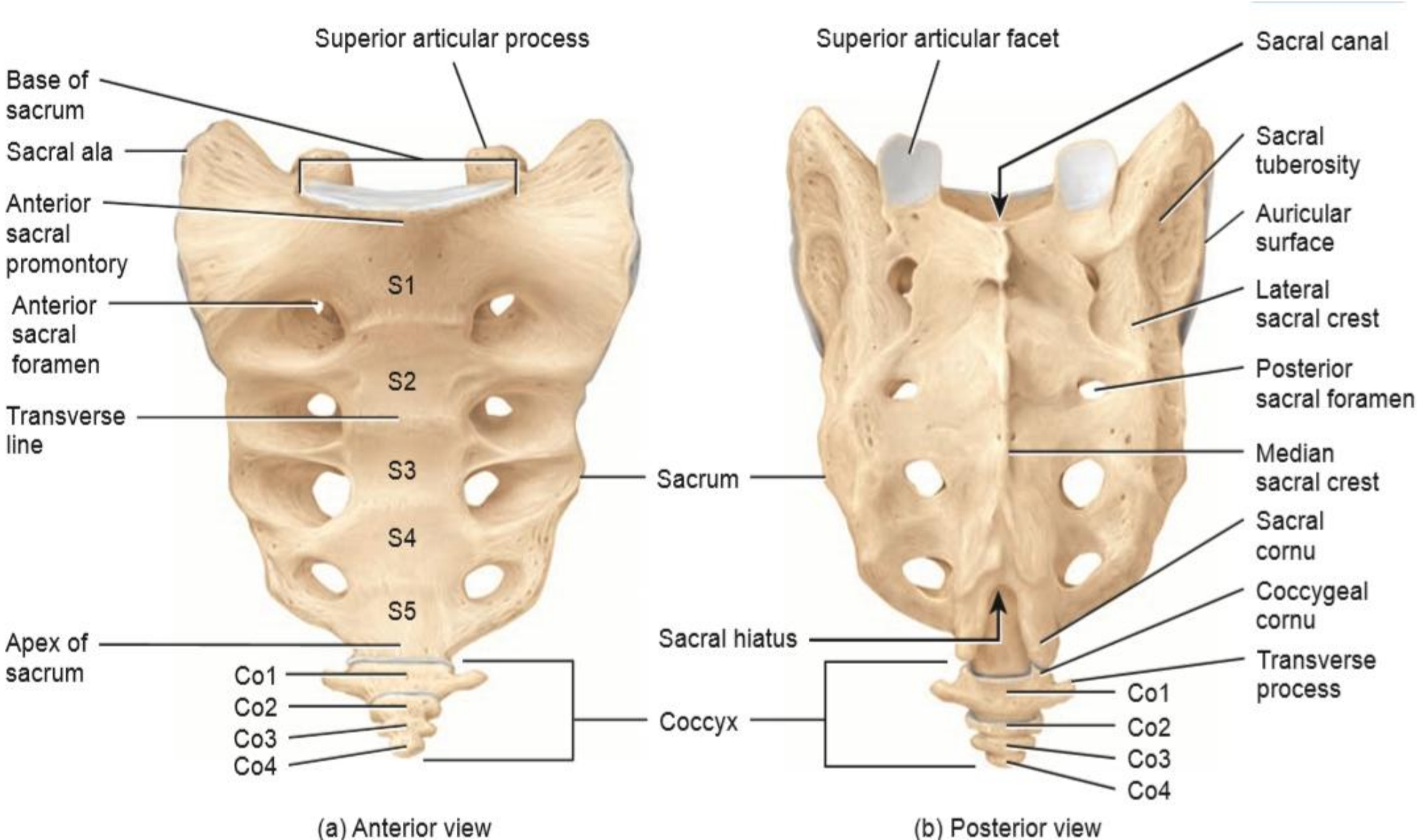


(b) Superior view



(c) Right lateral view

Study of axial skeleton system: Sacrum and coccyx



Differential leucocytes counting in blood

Procedure of manual method:

1- Preparing the blood film by using Giemza or Leishman stain.
2- Choosing the field of test so that it is monolayer.
3- Microscopic examination (40X then by oil lens) and record the number of all WBC types that observed.

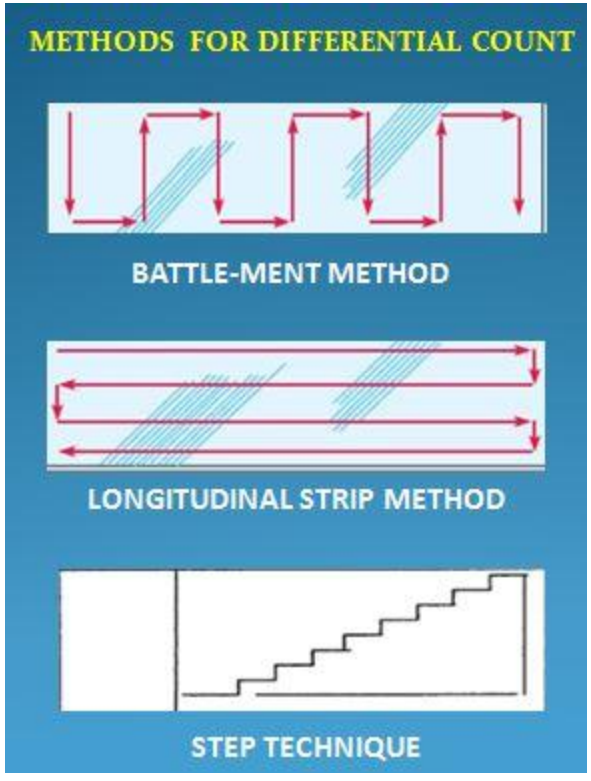
Procedures of Leishman's method:

1- Place drop of blood on dried slide.
2- Spreading it with another slide (blood film method).
3- Allow to stain for 2-3 min.
4- Wash gently in a stream of buffered water until it has acquired a pinkish tinge (up to 2 min).
5- Clean under side of the slide and leave to dry upright.
6- Slide is ready to study under microscope.

Differential leucocytes counting in blood

Count on the table design, and calculate 100 different white blood cells, then calculate percentage (relative count) for each type of cell.

After that calculate the (absolute count) based on the equation:

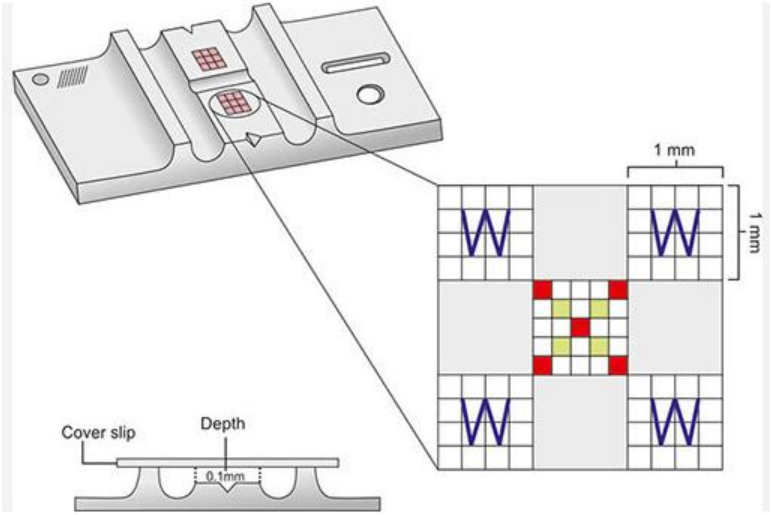


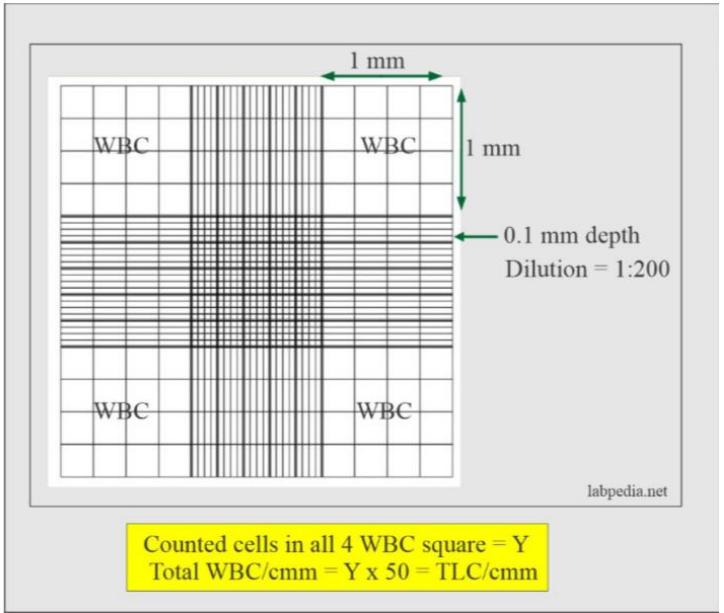
$$\textbf{Absolute count of any leukocyte type} = \frac{\textbf{Relative count of this type} \times \textit{total WBC count}}{100}$$

Total leucocytes counting in blood

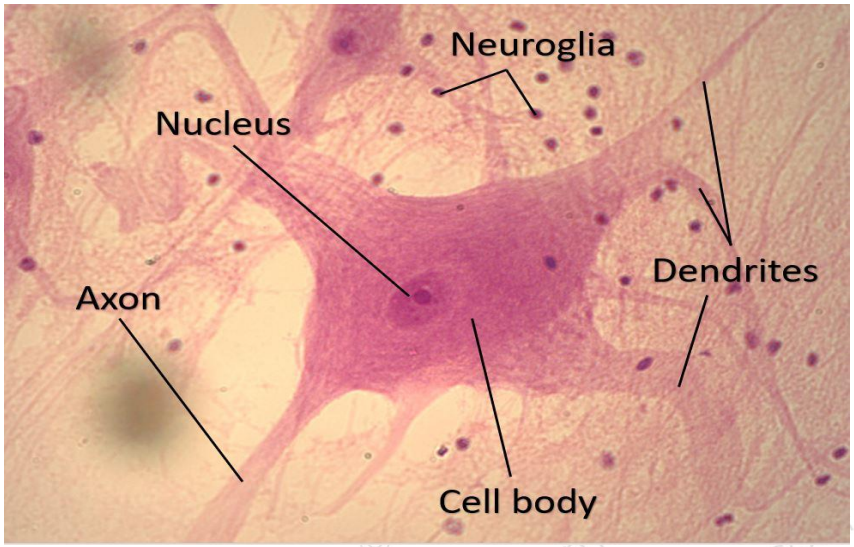
Procedure:

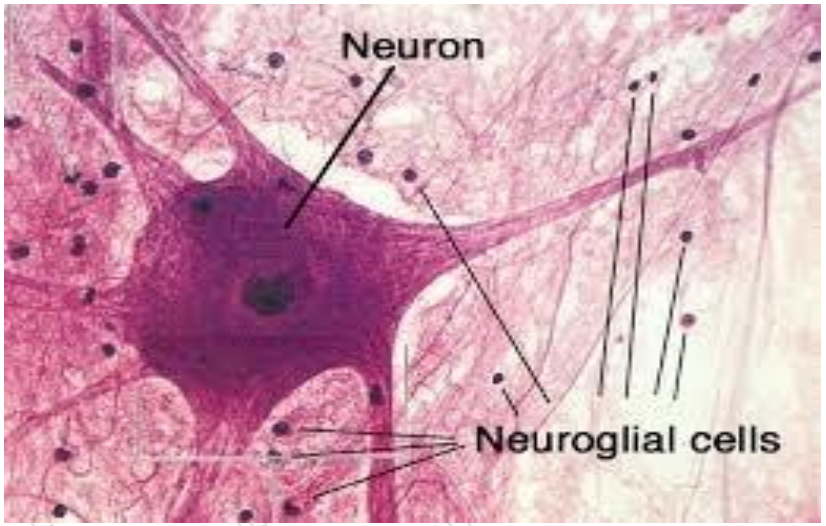
Fill the blood into the 0.5 marks and then add the TLC solution.
Fill the pipette with the TLC solution to point 11.
Remove the rubber tubing.
Seal both ends or hold in between two fingers.
Shake for 1 minute or preferably for 2 minutes.
After thorough mixing, discard the first few drops and then gently fill the chamber until the platform is filled.
Allow the chamber on the microscope stage for 2 to 3 minutes till the cells are settled.

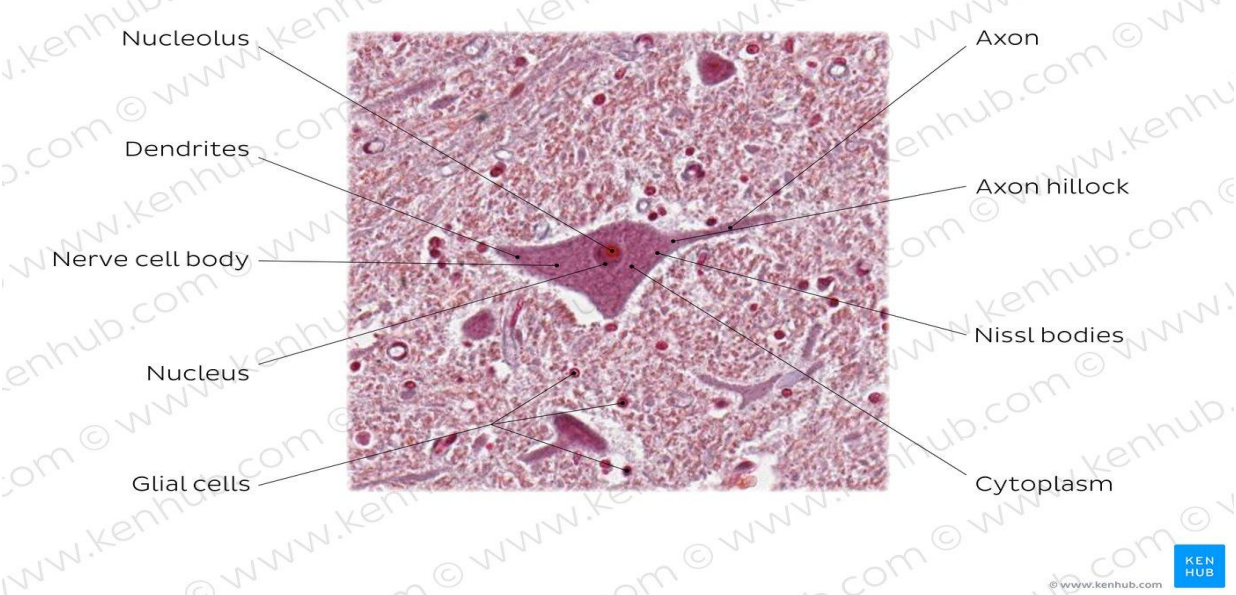




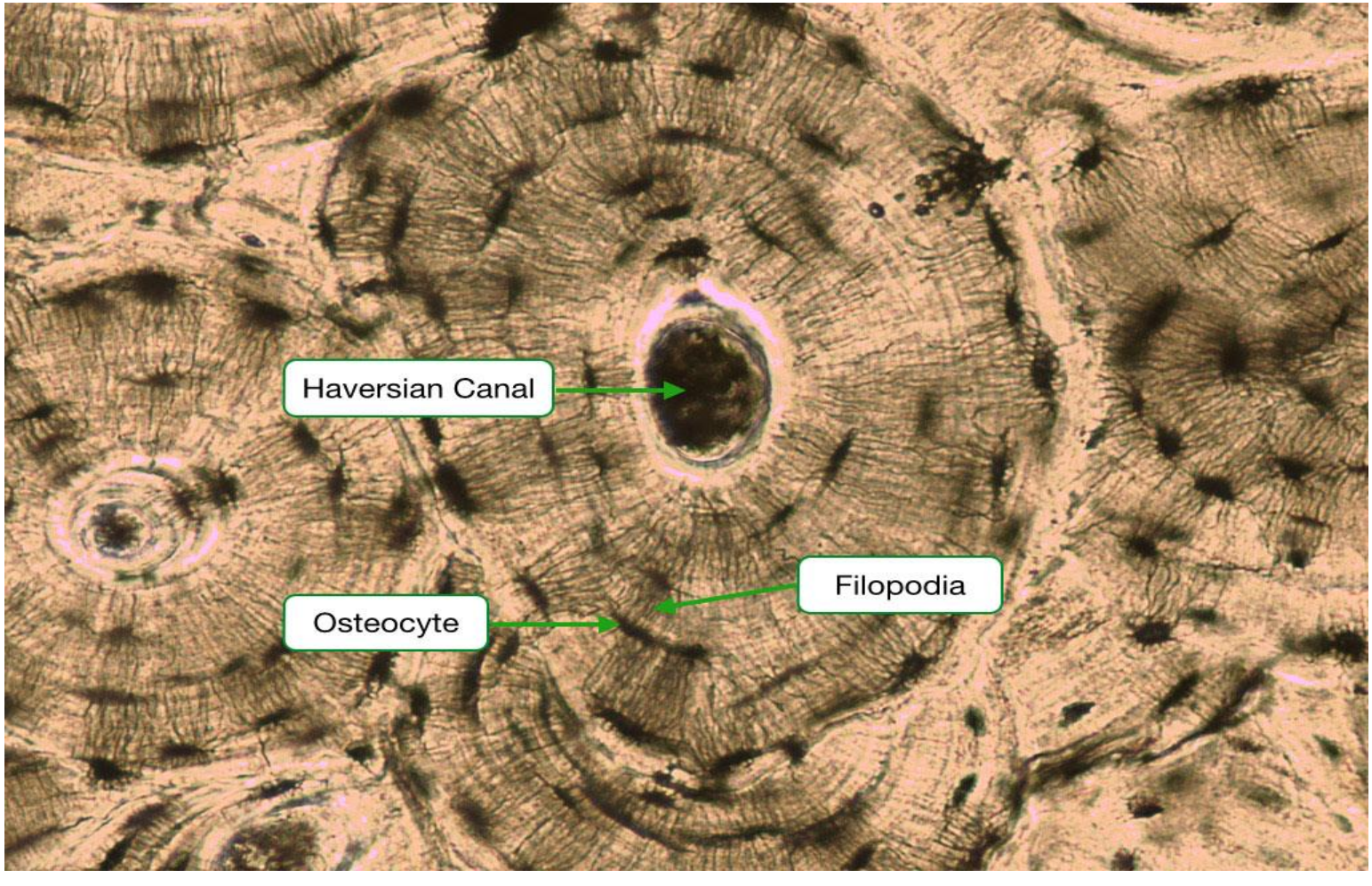
Study of histological slides: nervous tissue



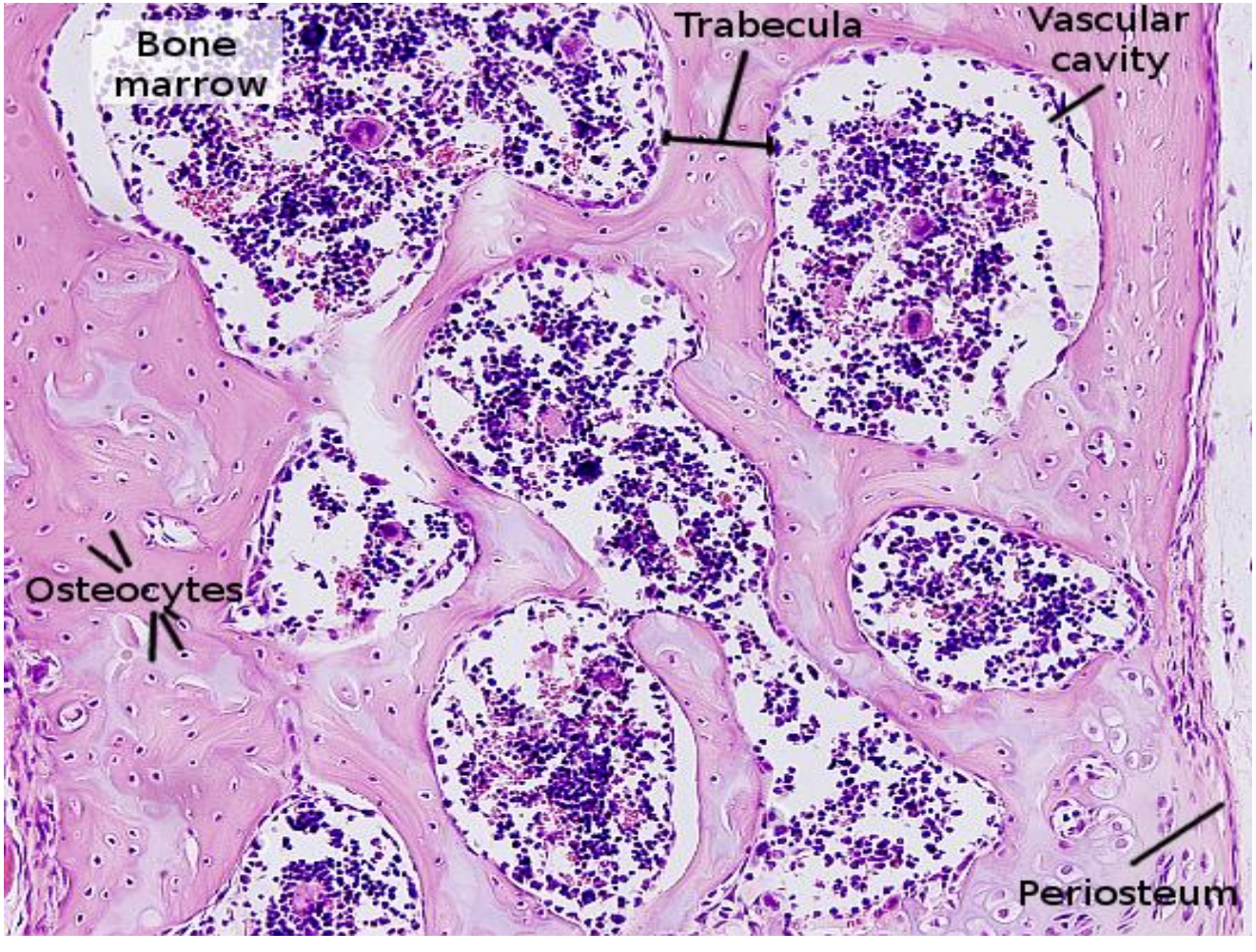




Study of histological slides: Structure of compact bone

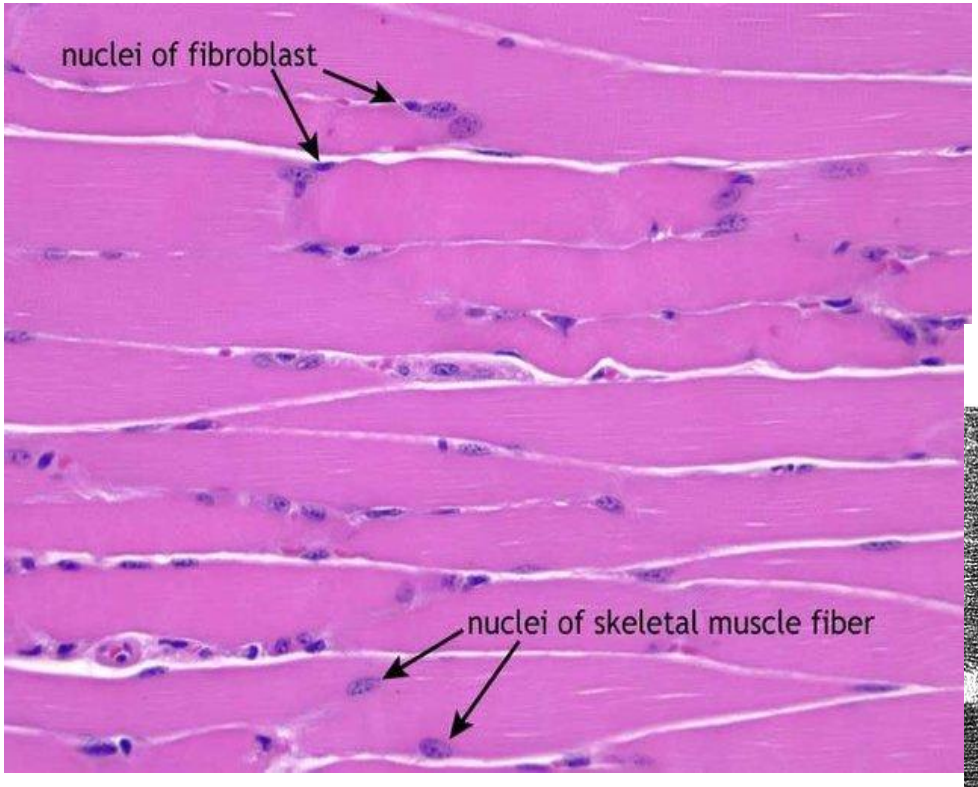


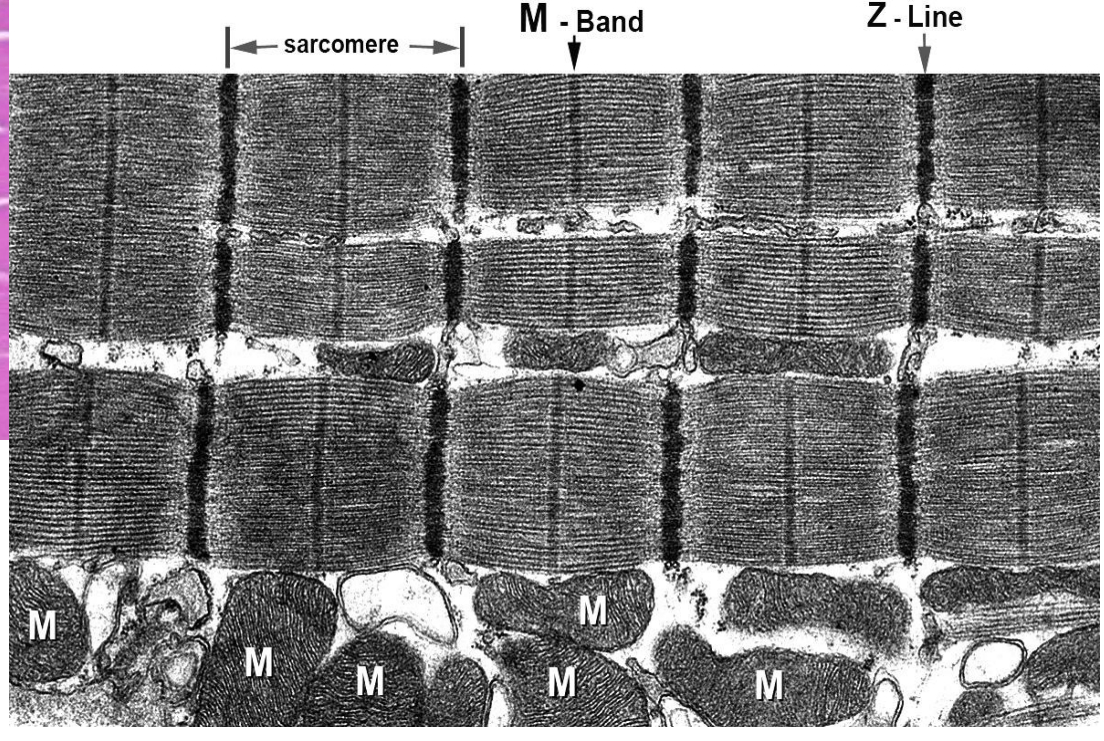
Study of histological slides: TS of spongy bone with bone marrow



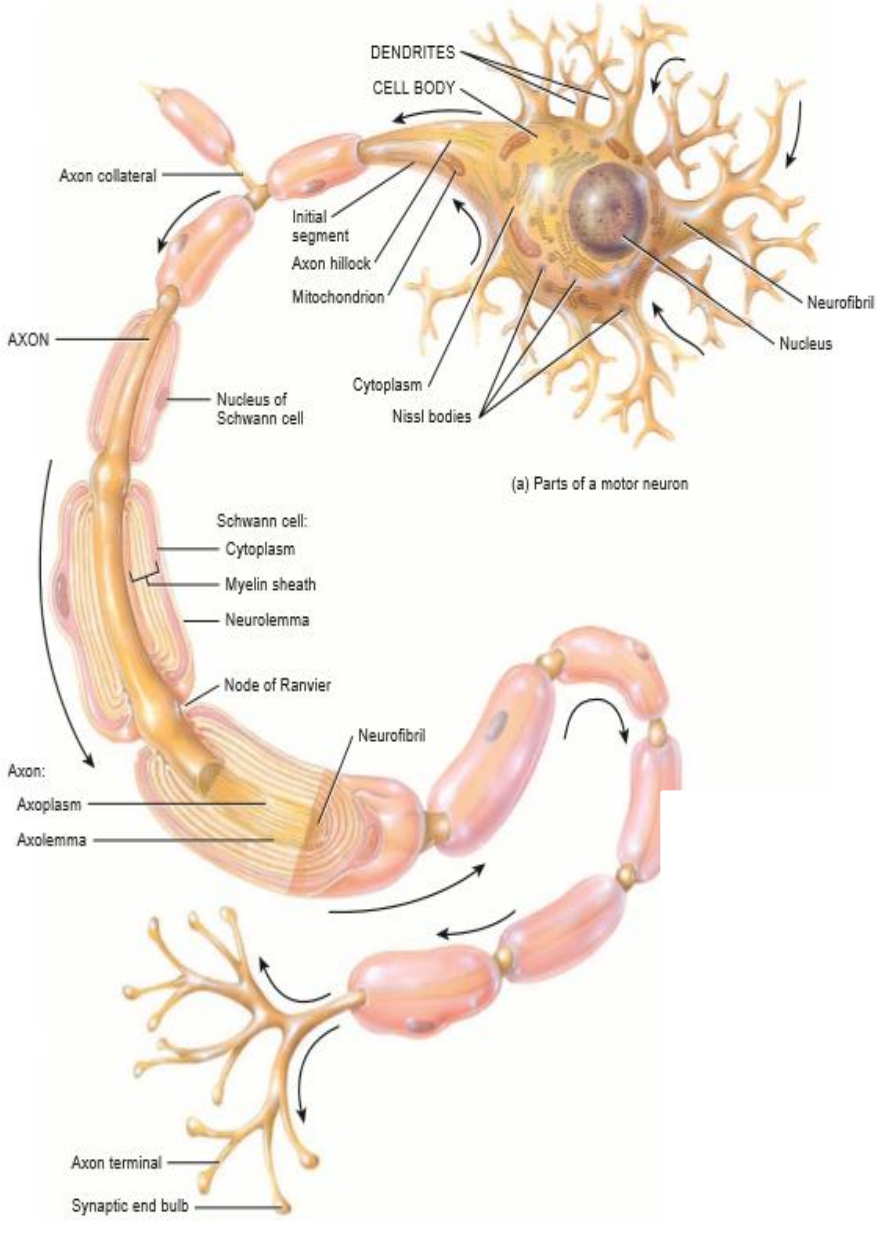
Study of histological slides:

Light and electron microscopic structure of skeletal muscle

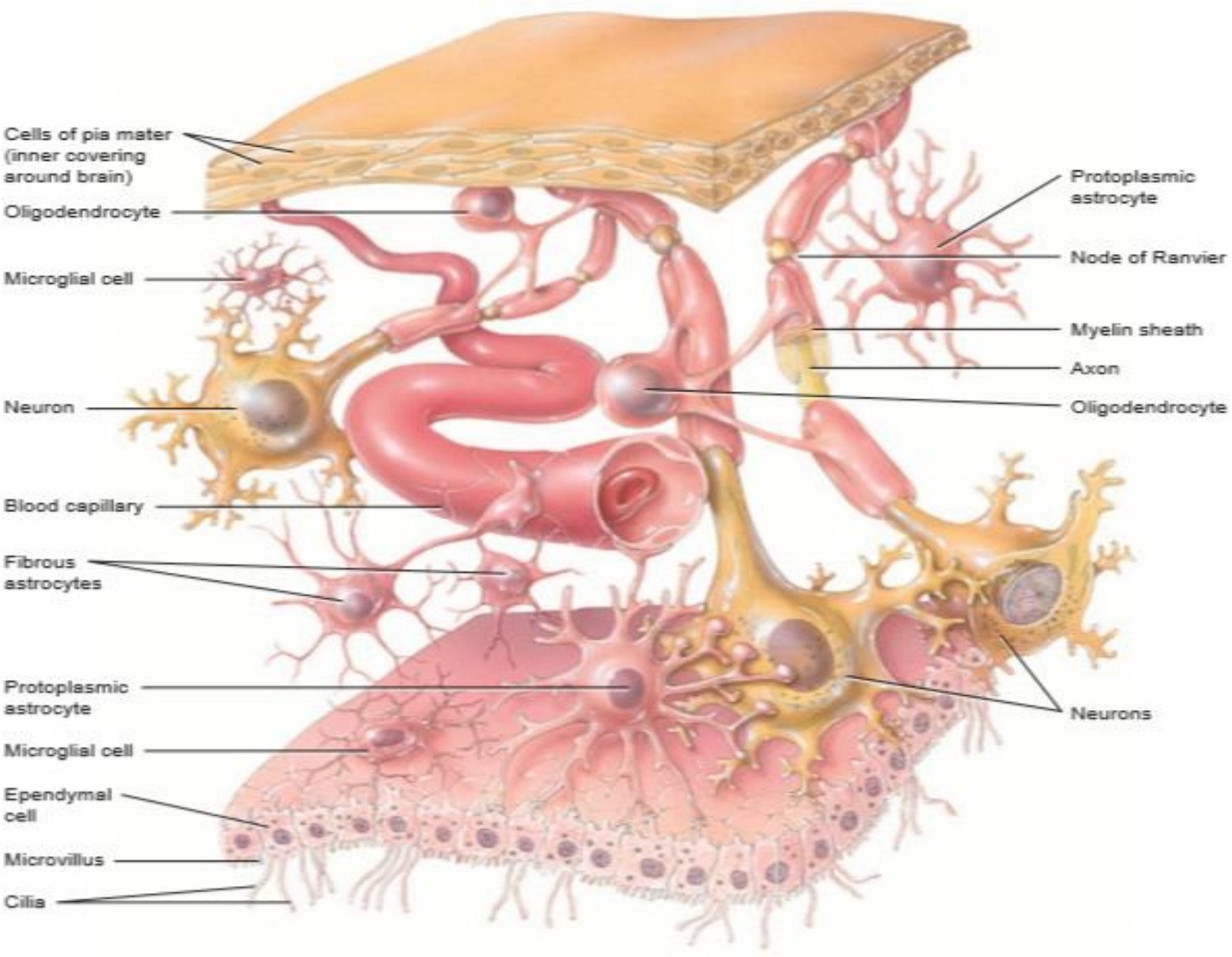




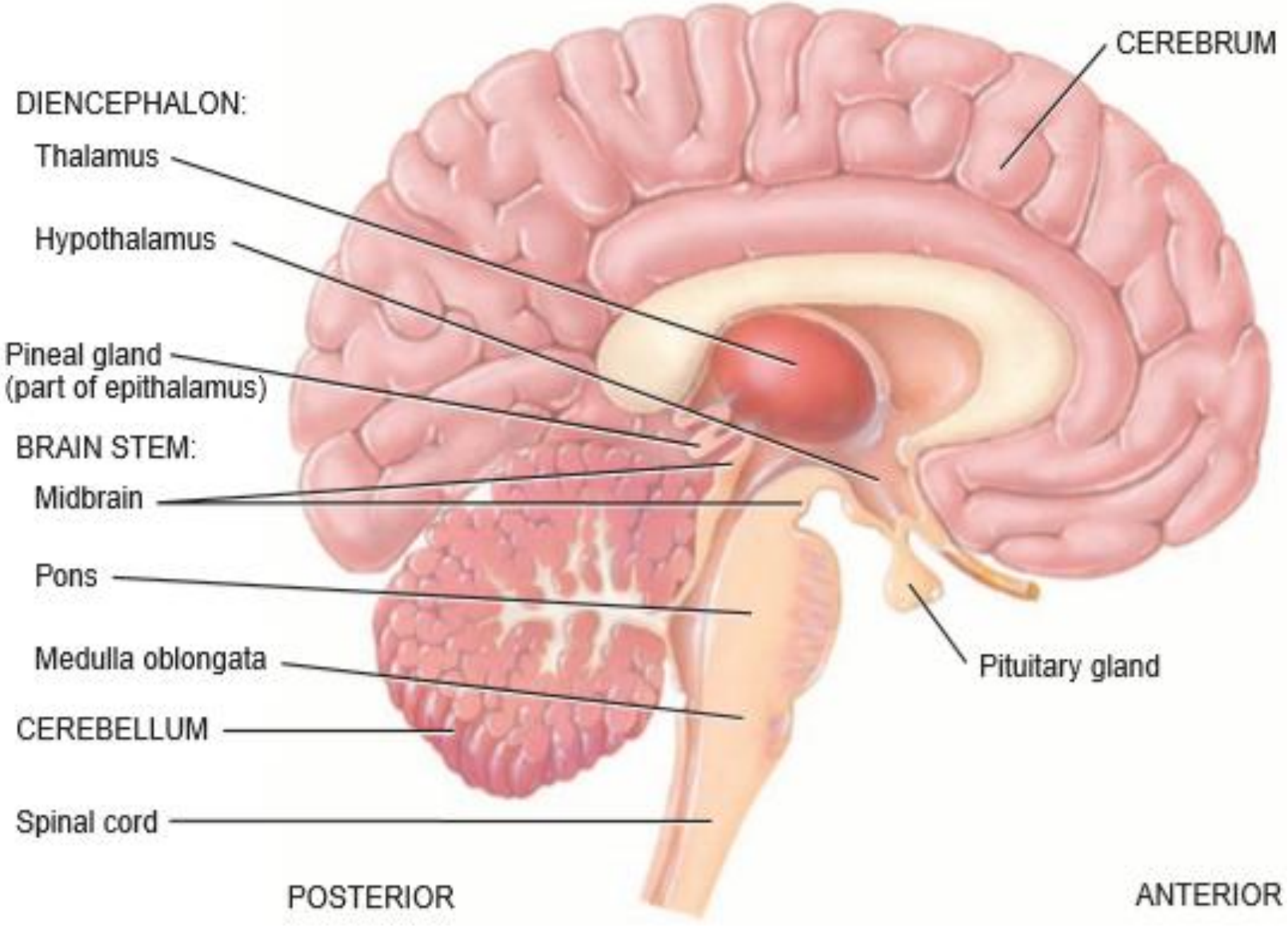
Structure of neuron



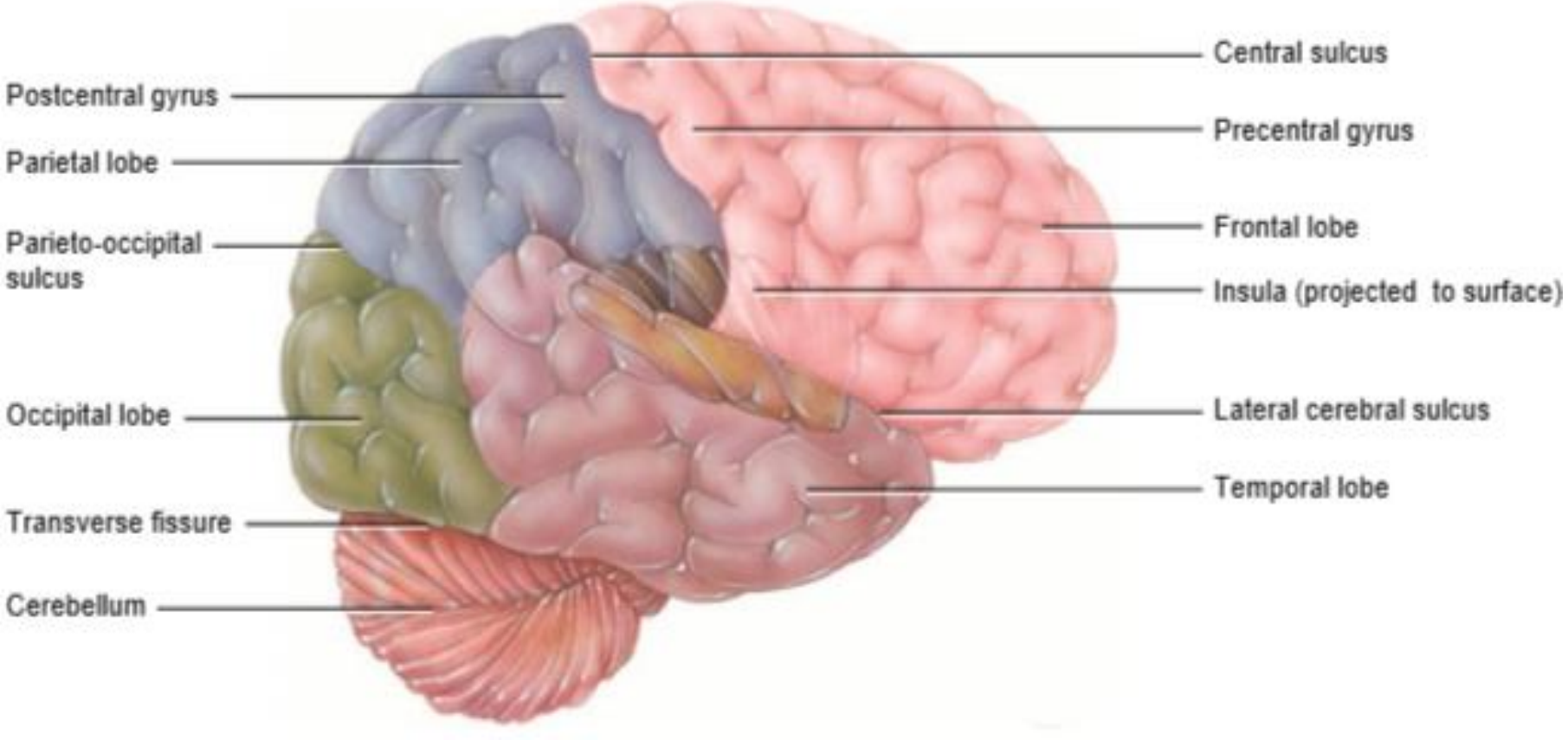
Structure of neuroglia



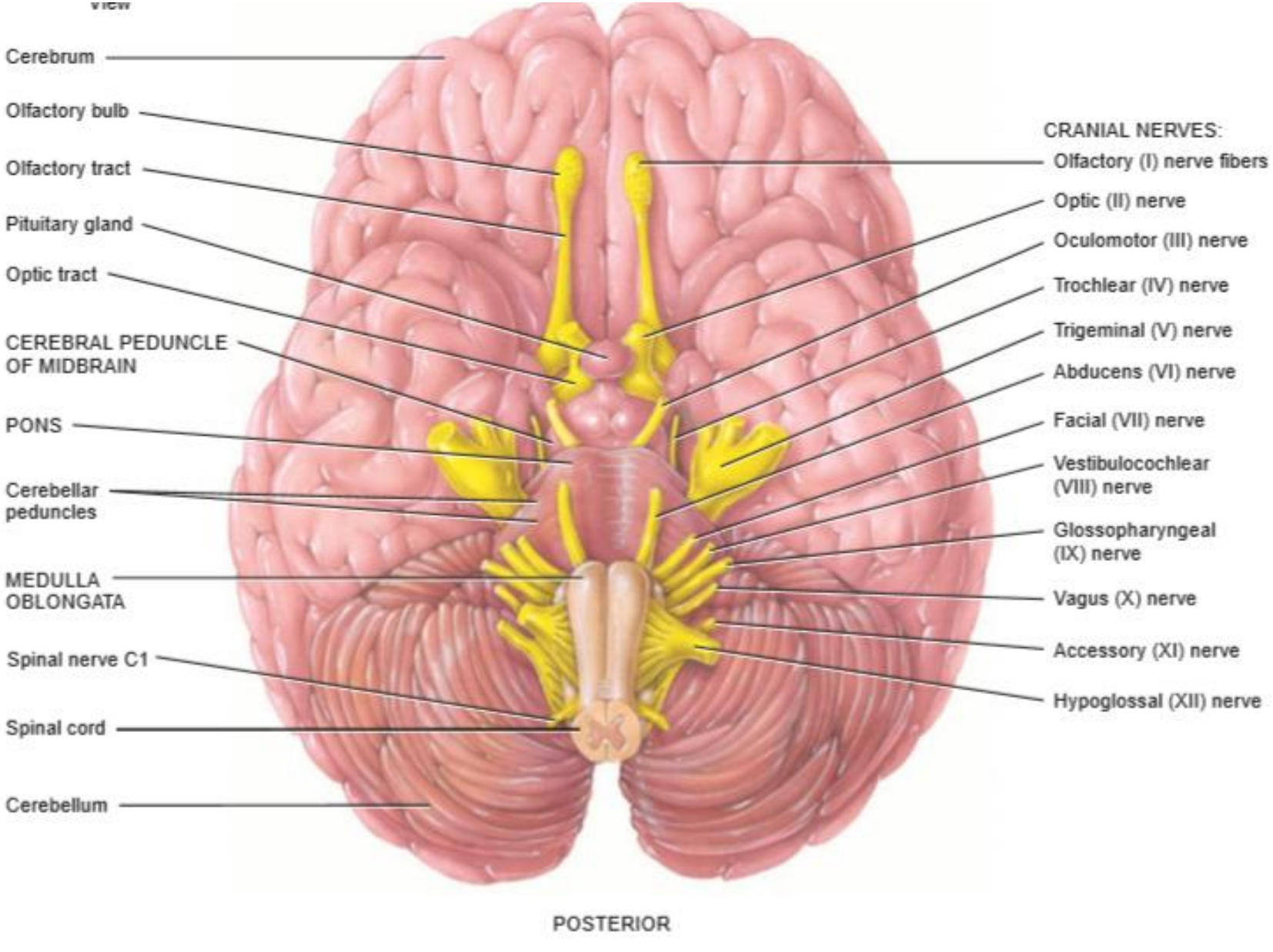
Internal structure of brain



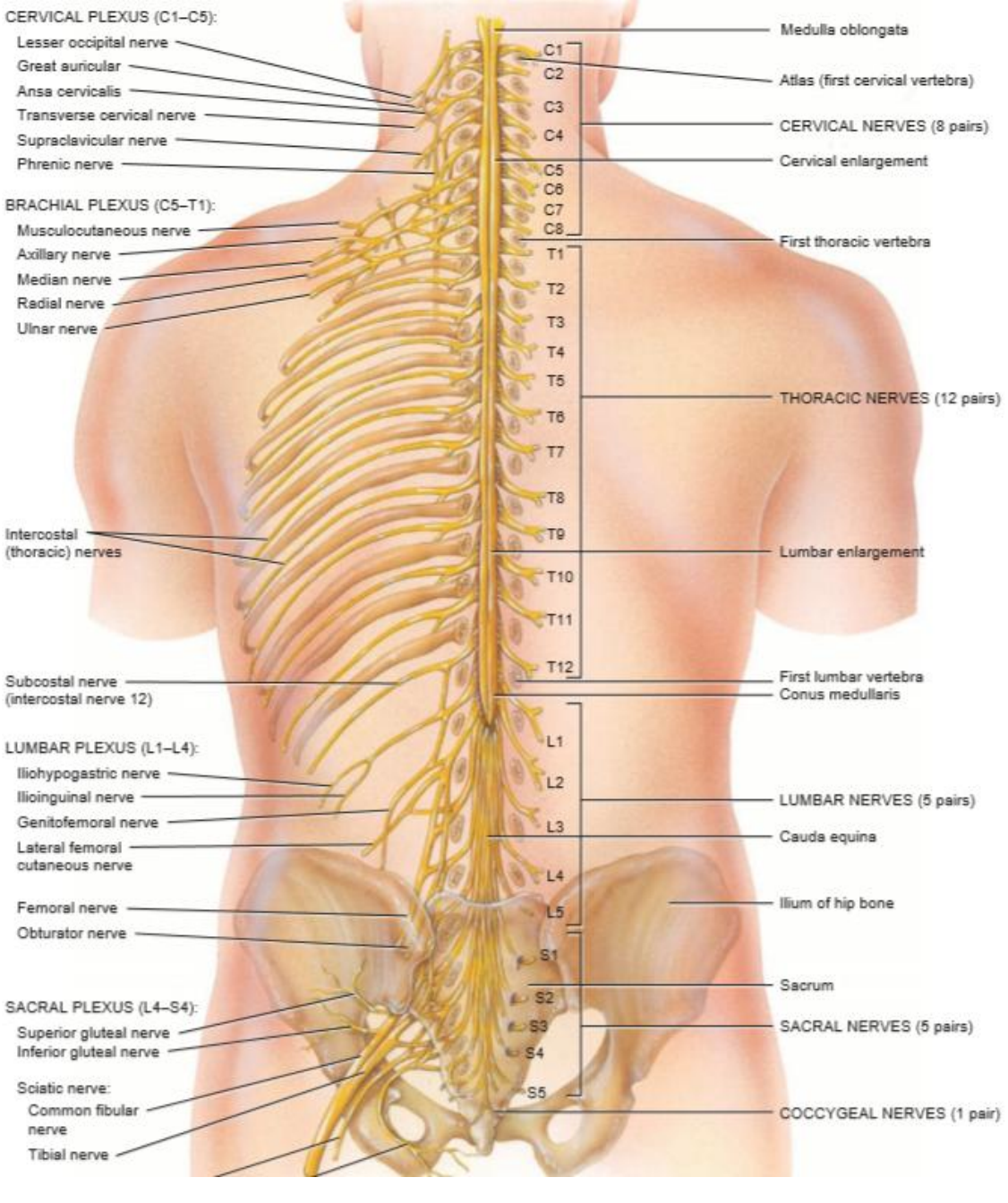
External structure of brain



Cranial nerves



Spinal nerves



To study functioning of brain by rotarod

Rotarod test is a common procedure used in neuroscience and behavioural research to assess motor coordination and balance in rodents.

Familiarization:
Allow the rodents (typically mice or rats) to acclimate to the testing environment for a certain period before the actual experiment.
This helps reduce stress and anxiety.
Place the rodents on the Rotarod apparatus at a stationary position for a short duration to familiarize them with the equipment.

To study functioning of brain by rotarod

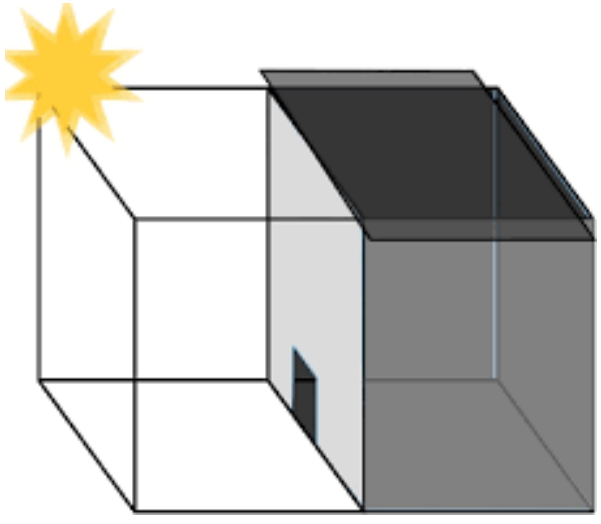
Training Session:
Conduct a training session to teach the rodents how to walk on the rotating rod.
Start the rod at a low speed (e.g., 4-6 revolutions per minute) and gradually increase the speed over the course of the training session.
Allow the rodents to walk on the rotating rod until they become proficient in maintaining their balance.

Pre-Test Handling:
Randomly assign the rodents to different experimental groups if applicable, and record relevant information such as age, weight, and any pre-existing conditions.

Test Session:
Set the Rotarod to the desired speed or use a protocol appropriate for your specific experimental design.
Place the rodents on the rotating rod one at a time and record the time each animal is able to stay on the rod before falling or rotating off.
Repeat the test multiple times with sufficient resting periods between trials to prevent fatigue.

Data Analysis:
Analyze the collected data, which typically includes the latency to fall (the time the rodent remains on the rotating rod) for each trial. Remember to follow ethical guidelines and institutional regulations for the care and use of animals in research.

To study functioning of brain by light and dark chamber



Light-dark box or light-dark chamber test is commonly used in behavioural research to assess anxiety-like behaviour and exploratory activity in rodents.

Apparatus Setup:

Set up the light-dark chamber apparatus, which consists of two compartments - one brightly illuminated (light compartment) and the other darkened (dark compartment).

The compartments are usually connected by an opening or doorway that allows the rodent to move between them.

To study functioning of brain by light and dark chamber

Habituation:
Allow rodents to habituate to experimental room for a sufficient period before the test to reduce stress.
Place rodent in the centre of apparatus with access to both the light and dark compartments.
Allow rodent to freely explore entire apparatus for a short period (5-10 minutes) to become familiar with environment.

Pre-Test Handling:
Handle the rodents gently and consistently to minimize stress and ensure uniform testing conditions.
Randomly assign rodents to different experimental groups if applicable, and record relevant information such as age, weight, and any pre-existing conditions.

Test Session:
Place the rodent in the light compartment and record the time it spends in the light and dark compartments.
The time spent in the light compartment is considered an index of exploratory behaviour, while the time spent in the dark compartment reflects anxiety-like behaviour.
The number of transitions between the light and dark compartments can also be recorded as a measure of exploratory activity.

Data Analysis:
Analyze the collected data, typically comparing the time spent in the light compartment, time spent in the dark compartment, and the number of transitions between compartments between different groups or individual animals.