

CARTILAGE AND BONE

The purpose of this practical session is to demonstrate cartilage and bone as specialized connective tissues to the student.

1. **Hyaline cartilage**

Slide 73
H/E

This is a cross section through the trachea to demonstrate hyaline cartilage.

Identify:

Macroscopic

- (i) The C-shaped cartilage rings in the centre of the trachea

Microscopic

- (i) Lacunae
- (ii) Chondrocytes
- (iii) Matrix
- (iv) Perichondrium

Draw and annotate:

A portion of the cartilage and perichondrium in fine detail.

Questions:

- 1. What is characteristic of the shape, size and arrangement of the lacunae?
.....
.....
- 2. What is the appearance of chondrocytes?
.....
- 3. What is the appearance of the matrix?
.....
- 4. What type of growth is found hyalin cartilage and is it visible?
.....

2. **Elastic cartilage**

Slide 9
R/F

This is a section through the pinna of the ear to demonstrate elastic cartilage.

Identify:

Macroscopic

- (i) The dark purple stained elastic cartilage in the centre of the tissue.

Microscopic

- (i) Lacunae
- (ii) Chondrocytes.
- (iii) Matrix
- (iv) Perichondrium

Draw and annotate:

A portion of the cartilage and perichondrium in fine detail.

Questions:

- 1. How do the lacunae appear with respect to their shape, size and arrangement?

.....
.....

- 2. What is characteristic of this matrix?

.....

- 3. How does elastic cartilage differ from hyaline cartilage?

.....
.....

3. **Fibrocartilage** (Fibrous)

Slide 10
H/E

This is a cross and longitudinal section of tendon just prior to its attachment to bone.

Identify:

Microscopic

- (i) Chondrocytes
- (ii) Collagen fibres
- (iii) Matrix

Draw and annotate:

A portion of fibrocartilage in detail.

Questions:

- 1. What is characteristic of the shape and arrangement of the chondrocytes?
.....
.....
- 2. How does the amorphous ground substance appear?
.....
.....
- 3. How are the collagen fibres arranged?
.....
- 4. How does this tissue differ from dense regular connective tissue?
.....
.....
- 5. How does this cartilage differ from the other two types of cartilage?
.....
.....

4. **Bone**

This is a cross section through decalcified bone.

Identify:

Macroscopic

- (i) Compact decalcified stained bone

Microscopic

- (i) Haversian and Volkmann's canals
- (ii) Lacunae
- (iii) Bone matrix
- (iv) Periosteum
- (v) Fat cells of the bone marrow

Draw and annotate:

A section of bone in which Haversian systems and periosteum are indicated.

Questions:

- 1. What is present in the Haversian canals?

.....
.....

- 2. How are the lacunae arranged and what is found in them?

.....
.....

5. **Ground bone**

Slide 13
None

This is a cross ground section of macerated bone.

Identify:

Macroscopic

- (i) The unstained white-yellow compact bone.

Microscopic

- (i) Haversian system
- (ii) Haversian and Volkmann's canals
- (iii) Lacunae and Lamellae
- (iv) Canaliculi
- (v) Interstitial lamellar systems
- (vi) Circumferential lamellar systems

Draw and annotate:

A section of bone in which all three types of lamellae and their components are indicated.

Questions:

- 1. How are the lacunae and lamellae arranged in all three systems?

.....

- 2. How are the lamellae and lacunae arranged with respect to one another?

.....

- 3. What course do the canaliculi take?

.....

6. **Ground bone**

Slide 14
None

This is a longitudinal ground section of macerated bone.

Identify:

Macroscopic

- (i) The unstained white-yellow compact bone.

Microscopic

- (i) Haversian and Volkmann's canals
- (ii) Lamellae, lacunae en canaliculi

Draw and annotate:

A section of longitudinal ground bone to show Haversian and Volkmann's canals, lamellae, lacunae and canaliculi.

Questions:

- 1. Explain why the lacunae all lie parallel to one another in the specimen?

.....
.....

- 2. How does the course of the Haversian canal differ from the Volkmann's canal?

.....
.....

7. **Bone development**

Slide 11
H/E

This specimen is a longitudinal section through the head of a rabbit's femur.

Identify:

Macroscopic

The orientation of the head of the femur, the epiphysial plate and the shaft of the femur.

Microscopic

- (i) The different zones of endochondral bone development
- (ii) Osteoblasts and osteoclasts
- (iii) Bone marrow

Draw and annotate:

Each of the different zones of bone development.

Questions:

1. What is characteristic of each of the zones?

.....
.....
.....

2. What is characteristic of osteoblasts and osteoclasts and in which zones are they found?

.....
.....
.....

3. Does your specimen have a secondary ossification centrum?

.....