

## QUESTIONS

### 1.4 Cartilage and Bone

106. Perichondrium is found:
- (a) covering all cartilage
  - (b) in synovial joints
  - (c) in fibrocartilage
  - (d) in fetuses only
  - (e) in intervertebral disks.
107. Perichondrium:
- (a) contains undifferentiated connective tissue cells
  - (b) surrounds hyaline cartilage
  - (c) lines articular cartilage
  - (d) covers elastic cartilage.
  - (e) contains blood vessels.
108. Perichondrium is essential for :
- (a) interstitial growth of cartilage
  - (b) appositional growth of cartilage
  - (c) regeneration of cartilage
  - (d) development of chondroblast
  - (e) development of elastic cartilage
109. The interstitial matrix of hyaline cartilage contains:
- (a) blood capillaries
  - (b) nerves
  - (c) collagen
  - (d) keratin sulfate
  - (e) chondroitin-4-sulfate.
110. The matrix of hyaline cartilage
- (a) is basophilic
  - (b) stains well with periodic acid-schiff reagent (PAS)
  - (c) contains sulfated proteoglycans
  - (d) contains sulfated proteoglycans
  - (e) contains collagen fibrils with a 64nm transverse periodicity.
111. Functions of cartilage include:
- (a) provision of an embryonic model prior to development of long bones
  - (b) provision of rigidity to soft tissue requiring support
  - (c) allowing long bones to increase in length
  - (d) provision of a smooth surface for epiphyses of articulating joints
  - (e) maintenance of tubular shape of structure in the respiratory tract

112. Interstitial growth in cartilage involves:
- (a) mitoses
  - (b) growth of cells from the perichondrium
  - (c) growth of daughter cells deep in the matrix
  - (d) formation of isogenous cells
  - (e) formation of territorial matrix.
113. Articular cartilage:
- (a) is covered by perichondrium
  - (b) belongs to the category of elastic cartilage
  - (c) receives its nutrients by direct diffusion from the blood
  - (d) has its cells orderly-arranged in columns
  - (e) can easily regenerate following injury.
114. Elastic cartilage is:
- (a) the most widespread and typical sort cartilage
  - (b) a yellowish color when fresh
  - (c) stain with orcein
  - (d) found in the epiglottis
  - (e) found in the intervertebral disks.
115. In elastic cartilage the intercellular matrix contains:
- (a) chondroitin sulfate
  - (b) elastic fibers
  - (c) collagen fibers
  - (d) reticular fibers
  - (e) keratin.
116. Capsular of territorial matrix:
- (a) is typically present in the perichondrium
  - (b) is identical in chemical composition to interterritorial matrix
  - (c) contains more proteoglycans than interterritorial matrix
  - (d) surrounds isogenous or 'nest' cells
  - (e) stains more intensely with metachromatic dyes than the interterritorial matrix.
117. Chondroitin-4-sulfate is :
- (a) a proteoglycan
  - (b) produced by chondroblasts
  - (c) found in elastic cartilage
  - (d) found in bone matrix
  - (e) a component of collagen fibers.

118. Fibrocartilage is typical found in the :
- (a) epiglottis
  - (b) public symphysis
  - (c) temporomandibular joint
  - (d) ligamentum teres femoris
  - (e) intervertebral disks.
119. Fibrocartilage has a matrix with large amounts of:
- (a) collagen fibers
  - (b) elastic fibers
  - (c) lipids
  - (d) amorphous ground substance
  - (e) reticular fibers.
120. The intervertebral cartilaginous disks possess:
- (a) hyaline cartilage
  - (b) fibrocartilage
  - (c) elastic cartilage
  - (d) an annulus fibrosus
  - (e) a nucleus pulposus.
121. Secondary cartilage:
- (a) originates from mesenchymal cells
  - (b) develops during endochondral ossification
  - (c) is associated with bones formed by intramembranous ossification
  - (d) develops before the bone with which it is associated
  - (e) has a widespread distribution in the body.
122. Woven bone is:
- (a) common in adults
  - (b) typical of all spongy bone
  - (c) synonymous with primary or immature bone
  - (d) synonymous with secondary bone
  - (e) found in secondary centers of ossification.
123. Which of the following techniques permit bone to be examined by light microscopy?
- (a) ground sections
  - (b) microtomy using hardened knives made of tungsten carbide
  - (c) decalcification using a chelating agent such as EDTA prior to microtomy
  - (d) decalcification in 5% nitric acid
  - (e) pretreatment with absolute alcohol.

124. Flat bones ('membrane bones'):
- (a) develop by endochondral ossification
  - (b) develop by intramembranous ossification
  - (c) are composed of both spongy and compact bone
  - (d) grow as a result of epiphyseal plate activity
  - (e) contain bone marrow.
125. Diploe is:
- (a) found in long bones
  - (b) found in flat bones
  - (c) found in irregular bones
  - (d) an area of spongy bone
  - (e) an area of compact bone.
126. The osteon (Haversian system) is:
- (a) the morphofunctional unit of compact bone
  - (b) found in spongy bone
  - (c) constant in form and not subject to structural Change
  - (d) delimited from adjacent osteons by a cement line
  - (e) involved in the formation of the outer circumferential lamellae.
127. The osteon:
- (a) is composed of woven bone
  - (b) is found in flat bones
  - (c) develops as a result of periosteal cell activity
  - (d) contains Sharpey's fibers
  - (e) is composed of concentric lamellae.
128. The collagen fibers in the osteon are:
- (a) with no specific order within lamellae
  - (b) orderly – arranged
  - (c) helically arranged within a single lamella
  - (d) organized to that the direction differs in adjacent lamellae.
  - (e) organized to that the direction is identical in Adjacent lamellae.
129. The lamellae of bone:
- (a) are built primarily of intercellular matrix
  - (b) contain material that is calcified
  - (c) are penetrated by canaliculi
  - (d) permit diffusion through the matrix
  - (e) are composed of fine orderd collagen fibrils

130. Lamellae are found in the intercellular matrix of:
- (a) hyaline cartilage
  - (b) fibrocartilage
  - (c) embryonic bone
  - (d) adult compact bone
  - (e) adult spongy bone.
131. The process of bone remodeling:
- (a) is found only in fetuses
  - (b) continues throughout life even into old age
  - (c) results in the formation of new osteons
  - (d) allows the growing bone to respond to mechanical forces
  - (e) allows the release of calcium to the blood.
132. Osteogenic tissue in embryonic bones can develop into:
- (a) bone tissue
  - (b) bone marrow
  - (c) cartilage
  - (d) muscle
  - (e) tendon.
133. Osteogenic tissue is found in:
- (a) hyaline cartilage
  - (b) bone marrow
  - (c) periosteum
  - (d) endosteum
  - (e) tendon
134. Osteoclasts:
- (a) have a single nucleus
  - (b) stain strongly acidophilic
  - (c) produce intercellular matrix
  - (d) are often situated in Howship's lacunae.
  - (e) are believed to develop from monocytes.
135. A 'ruffled border' consisting of multiple invaginations of the plasma membrane is present in active:
- (a) osteoprogenitor cells
  - (b) osteoblasts
  - (c) osteocytes
  - (d) osteoclasts
  - (e) monocytes

136. Which cells are typically found in Howship's lacunae?
- (a) chondrocytes
  - (b) osteocytes
  - (c) osteoclasts
  - (d) osteoblasts
  - (e) cementocytes.
137. Hydroxyapatite:
- (a) is amorphous
  - (b) is crystalline
  - (c) contains phosphate
  - (d) can develop in cartilage matrix
  - (e) develops within osteocytes.
138. Hydroxyapatite is :
- (a) characteristic of labile, unstable calcium salts
  - (b) the only form of calcium salts found in bone tissue
  - (c) a store of minerals, which can be dissolved and released to the blood according to physiological demand
  - (d) a stable form of calcium salts
  - (e) present in the cement line surrounding osteons.
139. Volkmann's canals are:
- (a) identical to Haversian canals
  - (b) present in woven bone
  - (c) present in lamellar bone
  - (d) surrounded by concentric lamellae
  - (e) vascular (containing blood vessels).
140. Sharpey's fibers are:
- (a) synonymous with perforating fibers
  - (b) present in lamellar bone
  - (c) composed of collagen fibers
  - (d) the source of attachment of the periosteum to the outermost lamellae
  - (e) especially prominent in areas of tendon attachment to bones.
141. Endochondral ossification is:
- (a) typical of the development of all the bone of the body
  - (b) a process of bone formation involving the replacement of cartilage
  - (c) occurring at the same time as intramembranous ossification
  - (d) found in the epiphyses of long bones
  - (e) found in long bones after the closure of the epiphyses.

142. During endochondral ossification of long bones calcified cartilage is found in the:
- (a) diaphyseal (periosteal) collar
  - (b) epiphyseal plate
  - (c) bone marrow
  - (d) synovial membranes
  - (e) secondary centers of ossification
143. Long bones grow in length due to the :
- (a) periosteal activity
  - (b) proliferation of cells in the epiphyseal plate
  - (c) activity of articular cartilage
  - (d) growth of the bone marrow cavity
  - (e) influence of growth hormone.
144. Long bones grow in diameter due to :
- (a) endochondral ossification
  - (b) intramembranous ossification
  - (c) both endochondral and intramembranous ossification
  - (d) bone resorption
  - (e) periosteal activity.
145. The primary center of ossification in long bones develops:
- (a) epiphyses
  - (b) metaphyses
  - (c) diaphyses
  - (d) hyaline cartilage models
  - (e) articular cartilage
146. Secondary centers of ossification in long bones develop in:
- (a) diaphyses
  - (b) metaphyses
  - (c) epiphyses
  - (d) synovial joints
  - (e) bone marrow.
147. The process of bone resorption is:
- (a) performed by osteoclasts alone
  - (b) performed by both osteoclasts and osteoblasts
  - (c) found only in mature bones
  - (d) enhanced by parathyroid hormone activity
  - (e) enhanced by calcitonin activity.

148. Osteoblasts:
- (a) have many nuclei
  - (b) stain strongly acidophilic
  - (c) develop from precursor cells of the periosteum
  - (d) show pronounced alkaline phosphatase activity
  - (e) are situated on the surface of developing bone tissue.
149. Closure of the epiphyses of long bone
- (a) occurs before birth
  - (b) occurs after puberty
  - (c) prevents further elongation of bones
  - (d) can be influenced by hormones
  - (e) diaphysis with that of the epiphysis.
150. Calcification of cartilage:
- (a) occurs in the periosteal collar
  - (b) involves collagen fibers
  - (c) involves the formation of crystals of hydroxyapatite.
  - (d) involves matrix vesicles secreted by chondrocytes
  - (e) occurs in the zone of hypertrophic chondrocytes.
151. Resorption cavities are found in:
- (a) woven bone
  - (b) secondary bone
  - (c) diseased teeth
  - (d) thyroid follicles
  - (e) bone marrow
152. Rickets is a bone disorder due to:
- (a) excess calcitonin production
  - (b) lack of vitamin D metabolites
  - (c) excess parathyroid hormones secretion
  - (d) a faulty calcification process
  - (e) a faulty diet.
153. Epiphyseal plate dysfunction may occur due to disturbance in:
- (a) growth hormone secretion
  - (b) vitamin D metabolism
  - (c) corticosteroid secretion
  - (d) post-menopausal estrogen secretion
  - (e) parathyroid hormone secretion.



154. Matrix vesicles in endochondral ossification
- (a) are of more than one sort
  - (b) are membrane-bound
  - (c) may contain alkaline phosphatase activity
  - (d) are secreted by chondrocytes
  - (e) are the sites of initial mineralization
155. The synovial membrane has cells.
- (a) similar to macrophages
  - (b) similar to fibroblasts
  - (c) that secrete hydrochloric acid
  - (d) that are phagocytic
  - (e) that secrete collagen
156. Synovial fluid:
- (a) contains fats
  - (b) contains hyaluronic acid
  - (c) is secreted by the synovial membrane
  - (d) is secreted by articular cartilage
  - (e) provides nutrients for articular cartilage
157. Hyaluronic acid is found in relatively large amounts in:
- (a) skin
  - (b) synovial fluid
  - (c) bone
  - (d) cartilage
  - (e) umbilical cord