

Lecture no. 7 – Cartilage and bone

Elaboration of questions is voluntary, and you needn't to hand them in. But they can help you for better understanding and orientation. Use the presentation uploaded into the Study materials folder in the IS, recommended literature or electronic atlases available in the webpages of the Department. You can also use any information resource from the internet, but in that case, please use in the same time your critical thinking. If you have questions to the topic, please use the Discussion groups in the IS.

1. Dominant extracellular matrix is typical for cartilages and bones. What is the difference between cartilage and bone matrix? Compare fibrous and amorphous component.
2. Compare biomechanical properties of hyaline, elastic and fibrous cartilage. Consider the functional anatomical context – are the individual histological types of cartilage located specifically?
3. What is the difference between collagen type I, II and III? Which type is specific for connective tissue proper, hyaline, elastic and fibrous cartilage and bone?
4. What is the role of glycosaminoglycans (GAGs) in cartilage? Which types of GAGs are the most important?
5. How does a cartilage grow? Compare the mechanisms.
6. Why does a cartilage regenerate poorly? Provide an explanation that reflects the histological structure. Why can an exercise contribute to cartilage nutrition and regeneration?
7. Using any information resource try to explain what is the composition of synovial fluid, what is its source, and if there is any link to autoimmune diseases.
8. What are the common ultrastructural features of fibroblasts, chondroblasts and osteoblasts?
9. Why is perichondrium essential for cartilage function?
10. What do the terms „periosteum“ and „endosteum“ mean? What is their function?
11. Using any information resource try to explain the principle of bone age determination in children. Why do we stop growing after the puberty?
12. Using any information resource consider the relationship between osteoporosis, osteoclasts, osteoblasts and menopause.
13. Valerij Poljakov holds a record of the longest stay in space (438 days). What are the possible effects of such long stay in microgravity on bone density, and what happens after landing on Earth? Where does the calcium disappear? How would you solve such problems? Is there any similarity to patients immobilized for a long time?
14. Human fetus is adapted to passage through narrow birth canal by flexible bones of the skull. How are the flat bones of calva joined together to allow such flexibility?