

## **Subjects for Cardiovascular Physiology**

1. Components of the cardiovascular system
2. Functions of the cardiovascular system
5. Particularities of the cardiac muscle; myocardial cell structure; myocardial properties
7. Myocardial action potentials
8. Ionic conductivity during action potentials at myocardial cell level
9. Cardiac automaticity; specialized excitatory system of the myocardium
10. Refractory periods of the myocardium and their significance
11. Calcium transport systems in myocardial fiber
12. Na<sup>+</sup>/Ca<sup>2+</sup> exchanger
13. Myocardial conductivity; excito-conductive system of the heart
14. Conduction velocity of AP in the heart
15. Autonomic effects on automatism and conduction velocity
16. Excitation-contraction coupling in cardiac muscle
17. Myocardial contractility (inotropism)
18. Cardiac cycle (CC phases, AS, AD, VS, VD)
19. Heart sounds
20. Ventricular volumes; pressures in the right and left heart
21. Work of the left ventricle
22. Preload and the Frank-Starling law of the heart
23. Afterload and contractility as parameters of the systolic function
24. Pressure-volume loop and its behavior with increased preload, afterload, contractility
25. Inotropic agents (positive, negative)
26. Coronary circulation, coronary blood flow and its regulation
27. Myocardial metabolism - particularities
28. The ECG lead systems
29. Atrial activation and P wave characteristics
30. Ventricular activation and the QRS complex
31. ECG intervals (PR, QT)
32. Atrial recovery; ventricular recovery and the T wave
33. Relationship between ventricular AP and QRS – T on ECG
34. Rhythm analysis (normal sinus rhythm parameters)
35. QRS axis
36. Blood flow in systemic circulation
37. Pressure inside de vessels – definition, pressure differences, origins of pressure
38. Vascular resistance to blood flow
39. Vascular distensibility, vascular compliance and vascular structure-function relationship
40. Pulse pressure (definition, variation, transmission, damping) and mean arterial pressure
41. Pressure profiles along systemic and pulmonary circulation
42. Systemic veins – roles

43. Central and peripheral venous pressures
44. Roles of lymphatic system; formation of lymph
45. Lymph flow (rate, lymphatic pump)
46. Microcirculation – definition, structure
47. Capillary exchange of solutes
48. Capillary exchange of water and the Starling forces
49. Hydrostatic pressures in the capillaries and interstitium
50. Colloid-osmotic pressure of plasma and interstitium
51. Capillary fluid filtration, fluid reabsorption and Starling equilibrium for capillary exchange
52. Short-term control of microcirculation – metabolic and endothelial factors
53. Autoregulation of microcirculation
54. Long-term control of microcirculation
55. Baroreceptor reflex
56. Effects of sympathetic and parasympathetic on cardiovascular system
57. Chemoreceptor control of blood pressure
58. Low-pressure baroreceptor control of blood pressure
59. Regulation of cardiac output
60. Intermediate and long-term control of the circulation