

SCHEDULE FOR PHYSIOLOGY LECTURES
2020/2021 Fall Semester
EP_2-3

INTRODUCTION

Historic overview, concepts of physiological control, homeostasis. Cell membrane.
By Zoltán Benyó 2020. 09. 07.

CELLULAR PHYSIOLOGY. PHYSIOLOGY OF NERVE & MUSCLE CELLS

Basics in cell physiology.

Cell membrane permeability and transmembrane transport mechanisms. Ion channels and gates.
Ionic equilibria and resting membrane potentials.
Action potentials.
By Zoltán Benyó 2020. 09. 10.

Cell-to-cell interactions. Signal transduction pathways, secondary messenger mechanisms.
Synaptic transmission. Simple neural networks, inhibition and facilitation. Synaptic plasticity.
Muscle physiology.
Contractile mechanism. Skeletal and cardiac muscles: morphology, biomechanics, electrical properties, metabolism.
By Zoltán Benyó 2020. 09. 14-17-21.

Smooth muscle physiology. Contractile mechanism, typical signal transduction pathways.
By Zoltán Benyó 2020. 09. 24.

Structure and general functional characteristics of the autonomic nervous system. Autonomic neurotransmitters.
By Ákos Zsembery 2020. 09.28.

CIRCULATION

Physiology of blood circulation. Introduction.

Functional organization of the cardiovascular system, basic principles and conditions of its healthy functioning. Body fluid compartments. General composition of blood.
By Mátyás Szentiványi 2020. 10. 01.

Dynamics of blood flow:

Physiological functions of the blood vessels, their functional significance.
Biomechanical properties of the vessel wall. Significance of vessel geometry.
Pressure & flow in large vessels. Circulatory resistance.
Measurement of pressure, flow and cardiac output.
Factors influencing blood pressure.

Principles of hemodynamics. Rheology of blood.
By Éva Margittai, 2020. 10. 05.

Physiology of the venous system: mechanisms supporting venous return, orthostatic tolerance.
By Éva Margittai, 2020. 10. 08.

Microcirculation. Control of lymphatic flow and interstitial fluid volume.
By Tamás Ivanics, 2020. 10. 12.

Cardiac functions.

Biomechanical basis of cardiac functions. Cardiac pump.

Signal transduction in the cardiomyocyte.
Cardiac cycle.
Electrical activity of the heart. Regulation of cardiac rhythmicity.
Electrocardiography. Cardiac arrhythmias.
By Zsuzsanna Miklós 2020. 10. 15-19-22.

Cardiovascular control mechanisms.
Local control mechanisms.
Systemic control mechanisms.
Control of cardiac output.
By Tamás Ivanics, 2020. 10. 26-29. – 2020. 11. 02.

Circulation through organs and special regions.
Coronary circulation.
Circulation of blood and cerebrospinal fluid in the brain.
Splanchnic circulation.
Circulation through skeletal muscles.
Circulation of the skin.
By Éva Ruisanchez 2020. 11. 05-09.

RESPIRATION

Structure and function of the respiratory system, pulmonary mechanics.
Pulmonary circulation.
Gas transport between the lungs and the tissues. Types of hypoxia.
Regulation of respiration: neural and chemical control.
By Zsuzsanna Miklós 2020. 11. 12-16-19.

INTEGRATIVE LECTURE

Adaptation of cardiorespiratory system and skeletal muscle to physical exercise; aspects of primary prevention.
By Zsuzsanna Miklós 2020. 11. 23.

FORMATION & EXCRETION OF URINE

Physiological functions, their significance in the maintenance of the internal milieu and in healthy functioning of the organism.
Renal circulation. Glomerular filtration.
Tubular functions. Mechanisms adjusting the composition of urine. Fluid compartments. Regulation of extracellular fluid composition and volume. Role of the kidneys in the control of blood pressure.
Micturition
By Éva Margittai 2020. 11. 26-30. – 2020. 12. 03-07.

INTEGRATIVE LECTURE

Physiological aspects of different forms of circulatory shock.
By Zoltán Benyó 2020. 12. 10.