

Physiology – student presentation topics

Summer semester 2020/2021

Cell membrane function

Extracellular and intracellular environment composition, differences and their importance

Factors determining the diffusion rate, ion channels and pumps

Osmosis

Membrane potential

General principles of the cellular transport – types, their characteristic

Resting membrane potential – its setting

Mechanisms involved in the membrane potential maintenance

Action potential

Action potential process steps

Action potential specifics in various tissue types, tissue pacemakers

Its effect in various tissue types (nerves, muscles)

Heart

Test: General physiology, membrane potential

Action potential in various parts of heart

The principle of the automatic heart rhythmicity, mechanisms of heart frequency regulation.

Principals of the heart electrical activity registration

Heart – mechanic

Heart muscle fibre contraction, the excitation – contraction coupling mechanism

Heterometric and homeometric regulation of the cardiac contraction. Preload and afterload

Cardiac cycle (pressure – volume loop)

Circulation

Relationship between blood flow, vascular resistance and blood pressure

Mechanisms and regulation organ distribution on blood flow

Coronary circulation

Blood pressure and its regulation

Blood pressure in various parts of circulation

Blood pressure regulatory mechanisms

Principles of the blood pressure measurement, basic values

Blood and oxygen and carbon dioxide transport

Test: Heart and circulation

Oxygen - hemoglobin dissociation curve. Factors affecting the affinity of hemoglobin for oxygen

Types of hypoxia (hypoxic, anemic, stagnant and histotoxic). Hemoglobin dissociation curves in different states of hypoxia. A-V difference.

Interaction between CO₂ and O₂ transport

Blood II.

Regulation of blood cells production.

Hemostasis as a balance of clotting and anticlotting mechanisms

Basic hematological parameters

Respiration I.

Test: Blood

Inspiration and expiration mechanisms

Pulmonary compliance, surface tension in lungs, resistances in various parts of pulmonary system

Spirometry – principles of measurement, basic values

Respiration II.

Factors affecting the gas exchange in lungs

Pulmonary circulation specifics, postnatal changes

Regulation of the ventilation

Test: Respiration in the first week after the Christmas