

2nd Year English Module, 2011/2012

PHYSIOLOGY LECTURES: Monday 8:00 - 11:00 - Amphitheatre in the University Hospital (SUUB)

FIRST SEMESTER:

Nervous system physiology

1. Organization of the Nervous system. Physiology of neurons and glial cells.
2. Excitability and ionic transport
3. Synaptic transmission in the nervous system. Neurotransmitters.
4. Physiology of the neuro-muscular system
5. Sensory transduction. Physiology of sight. Physiology of hearing.
6. Physiology of the autonomic nervous system.

Cardiovascular physiology

- 1: The structure and function of the cardiovascular system. Function and characteristics of the myocardium: excitability, automatism, conductivity
2. Cardiac cycle. Peripheral manifestations of cardiac activity: phonocardiogram, sphygmogram/carotidogram, phlebogram/jugulogram.
- 3: Function and characteristics of the myocardium: contractility, relaxation. Cardiac dynamics: the heart as a pump, cardiac performance
- 4: Electrocardiogram I: basic concepts in electrocardiography
- 5: Electrocardiogram II: interpretation of normal ECG; main physio-pathological aspects in electrocardiography
- 6: Systemic and pulmonary circulation. Physical laws that rule the circulation. Arterial circulation. Arterial pressure.
- 7: Microcirculation, regional characteristics. Venous circulation. Central venous blood pressure. The mechanism of venous return. Special circulations.
- 8: Regulation of cardiovascular function.

SECOND SEMESTER:

Blood and Immune system

- 1- Functions of blood. Composition and physico-chemical properties of blood. Blood volume. Hematocrit.
- 2- Hematopoiesis. Erythrocytes.
- 3- Function of respiratory gases transportation. Blood groups.
- 4- Function of specific defense. Physiology of immune system. Lymphocytes. Function of nonspecific (cellular) defense. Leukocytes.
- 5 -Function of maintaining the fluid- coagulant balance. Hemostasis. Fibrinolysis. Therapeutic uses of blood.

Respiratory System

- 1- Pulmonary ventilation. Pulmonary volumes and capacities. Mechanics of ventilation. Pulmonary compliance. Flow- volume loop. Distribution of ventilation
- 2- Pulmonary perfusion. Ventilation/perfusion ratio. Diffusion of gases through the respiratory membrane.
- 3- Nervous and humoral regulation of respiration. Respiratory reflexes. Peripheral and central chemoreceptors.

Renal excretion and acid-base equilibrium

- 1- Functions of the kidneys. Mechanisms of urine formation. Glomerular filtration. Renal clearance. Tubuloglomerular feed- back
- 2- Physiology of the nephron. Reabsorption. Secretion. Renal clearing mechanisms. Excretion of metabolic end products.
- 3- The mechanism of dilution and concentration. Diuresis. Regulation of renal function. Micturition
- 4- Acid –base balance. Physical and chemical mechanisms. Biological mechanisms. Acid-base disorders. Acidosis and alkalosis. Regulation of intracellular pH. Acid-base equilibrium parameters. The anion gap.

Recommended bibliography:

Guyton & Hall – Textbook of Medical Physiology
Boron & Boulpaep – Medical Physiology

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PRACTICAL LABORATORIES – FIRST SEMESTER SCHEDULE:

Thursday, 10:00-13:00 for groups: 87, 88, 89, 90

Thursday, 13:00-16:00 for groups: 91, 92

Thursday, 17:00-20:00 for groups: 96, 97, 98, 99, 100

Friday, 12:00–15:00 for groups: 93, 94, 95, 101

Practical laboratories: Labs from the Physiology Dept. II, first floor.

Note that lab coat is mandatory during the practical lab. No delay after the start of the practical is allowed.

PRACTICAL LABORATORIES – FIRST SEMESTER:

1. Nervous system functions: excitability, nervous impulse conduction (measurement of ulnar nerve conduction with Biopac System BSL), reflex arch, investigation of reflex activity (Biopac System, BSL) - muscle stretch reflex.
2. Physiology of neuro-muscular system: the muscle twitch, skeletal muscle tetany, muscle fatigue
3. EEG, evoked potentials. Visual system physiology – visual acuity, fields of vision - perimetry, EOG.
4. The automatism of the heart. Stannius ligatures on the frog heart.
5. Action potential in the heart. The law of periodic inexcitability of the heart.
6. The influence of ions and mediators on heart activity. Effect of vagal stimulation on heart activity. Vagal escape. Law of the heart.
7. Cardiac cycle. Peripheral manifestations of cardiac activity: Carotidogram. Jugulogram. Apexcardiogram. Heart sounds - The phonocardiogram
8. ECG I – basic concepts in electrocardiography;
9. ECG II - interpretation of normal ECG;
10. ECG III - main physio-pathological aspects in electrocardiography. Integrative analysis of electrical and mechanical activity of the heart - the Polygram.
11. Blood pressure. Arterial and venous circulation.

PRACTICAL LABORATORIES – SECOND SEMESTER:

12. Full blood count (FBC), hemoleukogram.
13. Hematocrit. Hemoglobin –measurement, identification, crystallographic method (Teichman crystals).
14. Erythrocyte sedimentation rate. Hemolysis.
15. Blood groups. Rh System
16. Hemostasis (primary, secondary). Capillary fragility test (Rumpel – Leede test).
17. Pneumogram, pulmonary volumes (spirometry) and pulmonary capacities, forced ventilatory flows
18. Ventilatory flows (flow-volume loop), respiratory gases analysis in blood and expiratory air
19. Physical and chemical properties of the urine. Measurement of glucose, Dilution-concentration test.
20. Renal clearance for urea and creatinin (Kowarski method), evaluation of acid-base equilibrium.

Practical laboratories will also include 1 recovery session/semester and 2 tests /semester.

Any change to this schedule will be announced in advance.

Dr. Ana-Maria Zagrean
Lecturer, Dept. of Physiology
Coordinator, English Module 2nd Year

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