

FUNCTIONAL AND PATHOLOGICAL ANATOMY (FAPA)

1. year, Master study, obligatory subject, 2-0-3, 6 credits summer semester 2021

Educational period: 15.2.2021 – 14.5.2021
Credits granting: 10.5.2021 – 14.5.2021
Examination period: 17.5.2021 – 30.6.2021
Summer holiday: 1.7.2021 – 31.8.2021

Lectures: Monday at 10.15 – 12.00 a.m., Odbojárov 10, O 101

*Practical training according to the schedule: Wednesday, at 7.30 – 10.10 a.m.,
Odbojárov 10, No. O 160*

Distance form of education will require communication media: Teams for Microsoft, Moodle. Lectures and practices are carried out in an on-line presence form and materials will be available at Moodle.

Technical support: PharmDr. S. Kosírová, PharmDr. L. Bies Piváčková

Teachers responsible for preparing individual topics are listed in the syllabus .

Teachers responsible for practical parts are listed on the timetable.

Technical staff: Mgr. A. Chalányiová, V. Haššová, E. Vilémová, S. Kolembusová

1st LECTURE **15.2.2021** **Dr. Kosírová**

Anatomy, physiology and pathology, Definition and role in the system of Sciences, Human body – Structural Organization, anatomical terminology. The levels of structural organization of human body – tissues, organs, systems. System organ topography, specific areas, relationship to function.

Body composition - water and composition of body fluids, chemical compounds (water, glucose), inorganic (acids, alkalis, salts...), organic (carbohydrates, proteins, lipids, nucleic acids) and their role in the human body. Breaking the dynamic balance between physiological variables leads to pathological changes in the composition and structure of the organism

1. Practical training **17.2.2021** **Dr. Kosírová**

Theoretical part:

Epithelial tissue – structural and functional characteristics, localization, glandular epithelia, special sensory tissue

Connective and supporting tissue - the basic structure of organs, common characteristics (ground substance, fibers, cells, vascularity), location, types, tissue repair:

- Connective tissue proper – fibres (elastic, collagen, reticular), extracellular matrix (1, loose connective tissue - adipose, areolar, reticular, fibrous, 2, dense connective tissue – regular, irregular) characteristics, function
- Blood, lymph,

- Cartilage – hyaline, elastic, fibrocartilage, structure (description, function, location), growth, formation, remodeling repair. Pathological alteration – inflammation, degeneration, repair
- Bone (Osseous tissue) – compact, spongy bone, basic structural unit – osteone, pathological changes – injuries, osteoporosis, osteomalation.

Practical tasks: technician: p. Haššová

Histological preparations – Overview of tissues

Musculoskeletal system - bones (skeleton), joints and muscular system (connections and mechanics, topography of muscle groups)

Topography of organ systems in particular body regions

2nd LECTURE

22.2.2021

Dr. Foltánová

Etiopathomechanisms of Cell Damage – exogenous factors (physical, chemical, nutritional, inflammatory, hypoxia, ischemia, radical damage), endogenous factors (genetic and familial disturbances), aging,

Genetic disease, molecular basis, mutations, autosomal dominant and recessive disorders gene expression, gonosomal, multifactorial. Developmental and differential process disorders - teratology, congenital defects (CNS)

2. Practical training

24.2.2021

Dr. Foltánová

Theoretical part:

Cellular reaction to damage –

- regression (reversible changes in older term degenerative)
 - reversible - hydropathic, stiff (steatosis – drops, lipomatosis – tissue); Haylin changes, mucoid changes;
 - metabolic changes – dystrophy – accumulation of fats, proteins (amyloidosis), sugars, stone formation, pigmentation.
 - irreversible - necrosis, apoptosis, necroptosis, gangrene.
- progressive change (adaptation) – atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.
- healing – reaction to damage, regeneration, reparation.
- neoplasia (cancer, tumor) – nomenclature, molecular base, image, growth (direct and remote spread) of tumors, carcinogenic substances.... precanceroses

Practical tasks: technician: p. Vilémová

Identification of histological preparations-overview of basic pathological processes

3rd LECTURE

1.3. 2021

doc. Paul Hrabovská

Functional anatomy of the nervous system NS – central NS. Structure of the of the spine, spinal cord and brain, cerebral and spinal meninges and ventricles. Blood supply, blood-brain barrier, cerebrospinal fluid

Functional anatomy of the main brain divisions: cerebrum, diencephalon (thalamus and hypothalamus), brainstem (consist of midbrain, pons, medulla oblongate), and cerebellum. Structure and function of spinal cord.

5th LECTURE**15.3.2021****Dr. Kiliánová**

Inflammation – causes, progression (acute, chronic), local changes (rubor, calor, tumor, dolor, functio laesa), global changes (temperature/fever, vascular changes). Inflammatory cells, mediators, types of inflammatory response, circulatory changes, oedema. Components of immune system and reactivity changes – hypersensitive and allergic reactions, immunodeficiency.

Pain - etiology, importance, characterization, somatic and visceral pain. Ascending and descending pathways, autoregulation.

5th Practical training**17.3.2021****Dr. Buzgóová****Theoretical part:**

Autonomic nervous system - basic structural and functional characteristics. Examples of activation and inactivation of autonomic nervous system..

Peripheral Nerves. and reflex activities,

Practical tasks: technician: P. Haššová

Reflexes, somatic and visceral reflex arc.

Pathological changes of NS in histology

6th LECTURE**22.3.2021****Dr. Kráľová**

Haematopoiesis, stem and progenitor cells and their potential significance in therapy. Composition and function of blood, blood elements and blood plasma. Transfusion. The construction and function of the lymphatic system, the main blood vessels, the lymph, organs, the reticular-endothelial system.

Qualitative and quantitative disturbances of blood elements, congenital and acquired vascular wall disorders. Local disorders of blood circulation and lymph-hyperaemia, ischemia, haemorrhage, bleeding, thrombosis, embolism.

6th Practical training**24.3.2021****Dr. Kráľová****Theoretical part:**

Blood groups, clotting, haemocoagulation disorder, anaemias, leukaemias

Practical tasks: technicians: p. Haššová, Chalányiová

Blood elements – blood counts.

Determination of a blood group.

Bleeding time and precipitation time.

Pulse Oximetry

1st Pretest

7th LECTURE**29.3.2021****doc. Stankovičová**

Functional anatomy of the cardio-vascular system – structure of heart, cytoskelet – valves, coronary arteries - the blood supply of the myocardium. Electrical and functional changes in the heart. Frank-Starlings law, Energetics. Cardiac cycle. Preload, afterload. Developmental aspects of the heart – septal defects, valves, stenosis of the arteries, aneurysm.

7th Practical training**31.3.2021****Dr. Kulcsár****Theoretical part:****doc. Stankovičová**

Control and regulation of the heart function. The electrocardiogram, the description of waves and intervals.

Practical tasks: technician: p. Vilémová

Ultrastructure and morphometry of the left ventricular wall

Recording of ECG before and after physical exercise.

8th LECTURE**5.4.2021****doc. Stankovičová**

Structure and comparison of the blood vessels – arteries, arterioles, capillaries, veins, and lymphatic vessels. An overview of the main blood vessels. Blood circulation. Physical principles in the circulation – blood pressure, blood flow, the resistance of the vascular bed. The specifics of the microcirculation, internal (metabolic (endotel, NO) and myogenic control), and extrinsic (neural and hormonal) control mechanisms of arteriolar smooth muscle. The exchange of nutrients, metabolites, fluid.

8th Practical training**7.4.2021****Dr. Sprušanský****Theoretical part:****doc. Stankovičová**

Blood pressure and its changes, pulsation.

Practical tasks: technician: p. Vilémová

Histological structure and morphometry of the vascular wall.

Monitoring of blood pressure changes due to external conditions.

9th LECTURE**12.4.2021****Dr. Kráľová**

Structure of the urinary system. Functional anatomy of kidneys (glomeruli, tubules) and urinary tract. Basic anatomical and functional unit - nephron, structure and relation of individual tubular parts with transport processes, concentration mechanism, endocrine and metabolic activities and disorders. Regulation of kidney function. Micturition, incontinence. Overview on basic pathological processes affecting kidney.

9th Practical training**14.4.2021****Dr. Kráľová****Theoretical part:**

Homeostasis - positive and negative feedback, local control, thirst mechanism for water intake. disturbances in the composition and distribution of body fluids, electrolytes, carbonic anhydrase and buffer systems. acid-base balance. (in blood, urine).

Acid-base balance, importance for body function – role of kidneys and lungs, pH regulation and changes – respiratory, metabolic acidosis, alkalosis
Urine production, composition and abnormalities

Practical tasks: technician: p. Kolembusová

Nephron histology.

Indicative test for the presence of unwanted substances in the urine.

Functional kidney tests.

The influence of physical work on the kidney activity

10th LECTURE

19.4.2021

Dr. Rajtík

Functional anatomy of respiratory system. Structure of upper and lower airways, pulmonary parenchyma. Functional anatomy of the respiratory system - pulmonary ventilation, diffusion, perfusion, mechanics of breathing, respiratory control of gas exchange, the role of carbonic anhydrase.

Pleura and pleural space - pathology (hydrothorax ..).

10th Practical training

21.4.2021

Dr. Rajtík

Theoretical part:

Functional lung tests. Basic pathological processes in pulmonary parenchyma – overview: inflammation, bronchitis, pneumonia, obstructive pulmonary disease, changes in circulation

Practical tasks: technician: p. Vilémová

Histology of the airway wall, pulmonary parenchyma.

Measurement of vital capacity of the lungs spirometrically.

11th LECTURE

26.4.2021

Dr. Kiliánová

Functional anatomy of the endocrine system. Hormones, division into hydrophilic and hydrophobic, control of production and release of hormones and their feedback control system, hypothalamic-pituitary axis, basic characteristics of hormones of individual glands, including sex hormones, blood transport, metabolism, excretion. Characteristics of endo- and exocrine glands, paracrine diffusion system. HPA-portal circulation.

Overview of basic pathological processes affecting the glands. Endocrine pancreas - Langerhans islets. Exocrine pancreas - pathological disturbances.

11th Practical training

28.4.2021

Dr. Kráľová

Theoretical part:

Regulation of glucose metabolism, diabetes mellitus, metabolic and endocrine activity of adipose tissue – structure, subtypes, localization, distribution, storage function, metabolic activity, endocrine function – adipokines, disturbances in lipid metabolism, metabolic syndrome

Practical tasks: technicians: p. Haššová, Chalányiová
Histological structure of the pancreas
Determination of random glycemia and oral glucose tolerance test (OGT test).
Determination of cholesterol blood

12th LECTURE **2.5.2021** **Dr. Sprušanský**

Functional anatomy of the digestive system. Role of glandular tissue in the mucose. Tubular part - comparison to other tubular structures (e.g. trachea, intestine, vessel). Glandular and endocrine parts. Stomach, intestine - production of digestive juices, gastrointestinal functions and disorders as a result of basic pathological processes. Liver (basic anatomical and functional unit - liver lobe, hepatobiliary and portal space), most often disorders caused by pathological changes.

12th Practical training **4.5.2021** **Dr. Sprušanský**

Theoretical part:

Rational nutrition and nutritional disorders. Selected diets.

Practical tasks: Technician: p. Kolembusová
Functional morphology of intestinal wall. Body weight and determination of body composition, measurement of neck circumference, measurement of waist circumference. Food composition - food pyramids, proposal of rational nutrition.

2nd Pretest

13th LECTURE **10.5.2021** **Mgr. Bies-Piváčková**

Functional anatomy of the skin, subcutaneous tissue and cutaneous adnexes. Protective function, body temperature regulation, skin senses, blood reservoir, metabolic function, excretion.

Impaired homeostatic equilibrium – burns, tumors.

Skin lesions, eflorescence, and Teleangiectases. Itching

13th Practical training **12.5.2021** **Mgr. Bies-Piváčková**

Theoretical part:

Sensory Organs: somatic sensitivity – touch, pressure, movement, posture, temperature, Vision – Anatomy, optics, visual pathways, colour vision, eye movement, visual changes, cataract, glaucoma, coloured vision problems, retinopathy

Hearing – anatomy, sound transmission, nervous pathways, Vestibular system-anatomy, transmission of information, nerve pathways, disorders

Chemical senses – taste, smell - anatomy, signal transmission, nerve pathways, disorders

Practical tasks: technician: p. Kolembusová
Examination of senses function - visual acuity and color blindness. Hearing, smell, taste, fingerness.

Assessment of education, substitute tests

Ongoing tests are written from the topics taken up by the date of the test. The granting of completion of the subject after meeting the conditions, will be entered in the AIS in the last teaching week (May 11, 2020 - May 15, 2020) by an assistant listed on the schedule for the group

Recommended Literature:

Vander`s Human Physiology 12th Ed, McGraw/Hill, Ed., NY, by EP Widmaier, H Raff, KT Strang, 2011, ISBN 978/0/07/122215/0

Introduction to Human Anatomy and Physiology, 2nd edition, Saunders Elsevier, St. Louis, by EP Solomon, 2009, ISBN 072160045X/9780721600451

Human Anatomy and Physiology, Pearson Benjamin Cummings, San Francisco, by EN Marieb, K Hoehn, 2007, ISBN 032137294-8

Human Anatomy and Physiology, McGraw-Hill, NY, by R Carola, JP Harley, CR Noback, 1990, ISBN 0075579375

Essentials of Pathophysiology, 3rd edition, by C.M. Porth. Ed. Lippincott and Wilkins: Philadelphia, 2011, ISBN 0781770874

General and Systemic Pathology, 4th edition, by J.C.E. Underwood. Ed. Churchill Livingstone: NY, 2000, ISBN 0443073341/9780443073342

Textbook of pathology, 6th edition, by H. Mohan: Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India, 2010, ISBN 978-81-8448-702-2

Human Anatomy, Physiology, and Pathophysiology. by Thewes G., Mutschler E., Vaupel P., Ed. Elsevier, Amsterdam, 1985. 812pp.

In Bratislava, 28.1.2021

Prof. PharmD. J. Klimas, PhD., MPH

Head of the department

Assoc. Prof. MD. T. Stankovičová, PhD.

Guarantor