

## Medical University of Gdańsk - Interview – Topics for Review

### 1. Cells and their function –

- a. Cell structure – name and function of cellular organelles (e.g. nucleus, ER, mitochondria, lysosomes, cell membrane/plasmalemma, Golgi apparatus, cytoplasm, ribosomes)
- b. Protein synthesis and degradation – Transcription and translation, cellular localization, function of DNA and RNA in the protein synthesis, mechanism of protein degradation – lysosomes and proteasomes
- c. Cell division (mitosis, meiosis) –
- d. Movement of materials across the cell membrane – diffusion, osmosis, filtration, active transport, phagocytosis and pinocytosis
- e. Cells and cancer – mutations and major risk factors of cancer

### 2. Heredity and Hereditary diseases

- a. Genes and Chromosomes – structure, karyotype, localization and distribution to offspring
- b. Functions of genes –
  - Recessive and dominant genes
  - Sex-linked traits
  - Sex determination
  - Factors influencing gene expression
- c. Chromosome/gene mutations and genetic diseases – e.g. Down syndrome, Turner syndrome, Klinefelter syndrome, Color blindness, Hemophilia
- d. Mitochondrial Inheritance

### 3. Direct and indirect causes of disease

- a. Basis of infection and inflammation (examples of the most common diseases)
- b. Methods of destroying pathogens or of inhibiting their growth
- c. Vitamin deficiency and Malnutrition
- d. Addictions – their consequences and preventing methods

### 4. Integumentary system - structure of the skin, its appendages, function, diseases

### 5. Skeletal system

- a. Bones – their cells, formation, structure and function
- b. Axial vs. appendicular skeleton – e.g. bones of the upper limb, lower limb, thorax
- c. Joints - classification and structure
- d. Effects of aging on skeletal system – e.g. osteoporosis

### 6. Muscular system

- a. General characteristics of skeletal muscles, cardiac muscle and smooth muscle
- b. The mechanism of skeletal muscle contraction
- c. Muscle metabolism

### 7. Nervous system

- a. Nervous tissue – cells, nerves, synapses, conduction of the nerve impulse, reflex arc
- b. Division of the nervous system – characteristic features of central, peripheral, somatic and autonomic nervous system

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- Brain and spinal cord – structure, function, coverings (including CSF), diseases e.g. Alzheimer disease, Parkinson disease
- Cranial nerves (CN I-XII) and spinal nerves
- Sympathetic and parasympathetic nervous system – parts and function in body
- c. Homeostasis

### 8. Sensory system

- a. Eye – its protective structures (incl. lacrimal apparatus), coats of the eyeball, muscles and nerves, the most common disorders and defects (e.g. myopia, astigmatism, glaucoma)

Ray of light pathway – refracting parts and sensory receptors

- b. Ear – division, function (hearing and equilibrium) and disorders
- c. Taste and smell – receptors and organs
- d. General senses – touch, position, pressure, temperature, pain

### 9. Hormones and endocrine system

- a. Hormones – chemical categories, methods of action, regulation, involvement in stress response
- b. Endocrine glands (pituitary, thyroid, parathyroid, adrenal, pancreas, sex glands, thymus and pineal) and their hormones – control role of hypothalamus and endocrine system disorders e.g. diabetes, normal value of the blood sugar
- c. Other hormone producing organs (kidney, stomach, placenta)

### 10. Blood

- a. General characteristic and purposes of blood
- b. Blood plasma and its function
- c. Formed elements of blood – RBC, WBC, platelets - their structure and function, normal value of the blood cells in the blood. Origin of blood cells
- d. Problems of transfusions – blood typing (AB antigens, Rh factor)
- e. Hemostasis and blood clotting (factors and process)

### 11. Cardiovascular system

- a. General structure of the heart wall and its coverings
  - Anatomy of the heart, coronary vessels
  - Conduction system of the heart
  - Cardiac cycle
- b. Blood vessels – arteries and veins structure and function
  - Pulmonary and systemic circulations
  - Hepatic portal system
  - Normal value and measurement units of heart rate (pulse) and blood pressure

### 12. Lymphatic system, body defenses

- a. Anatomy and function of lymphatic system - vessels and structures containing lymphoid tissue
- b. Role of the mononuclear phagocyte system

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- c. Nonspecific and specific defenses against invasion
- d. Vaccines and immunization
- e. Disorders involving the immune system
  - Allergy
  - Transplant and rejection syndrome
  - Immune deficiency – AIDS

### 13. Respiratory system

- a. Anatomy and functions of the respiratory system elements
- b. Pulmonary ventilation – stages, principals of inhalation and exhalation
- c. Oxygen and carbon dioxide transport
- d. External and internal respiration – general features and regulatory mechanisms

### 14. Digestive system, Nutrition, Metabolism, Body temperature

- a. Anatomy and functions of digestive tract elements
- b. Accessory organs and their functions
- c. Digestion – enzymes and other substances needed (place of production and their chemical characteristic)  
Hormonal and nervous control of digestion
- d. Absorption
- e. Disorders of digestive system – e.g. stomach ulcers
- f. Anabolism vs. catabolism
- g. Principals of nutrition – minerals and vitamins, essential amino- and fatty acids
- h. Body temperature – normal range and control function of hypothalamus

### 15. Urinary system

- a. Anatomy and functions of urinary system elements
- b. Function of the kidney
  - Structure of nephron – glomerular filtration, tubular reabsorption and secretion
  - Urine – normal constituents, urine concentration (ADH role)
  - Renin-Angiotensin- Aldosterone (RAA) system; Erythropoietin (EPO)
- c. Regulation of body fluids
  - Electrolytes- major ions (anions and cations) Na, K, Ca, Mg, bicarbonate, Cl, phosphate
  - Acid-base balance, pH measurement

### 16. Reproductive system

- a. Gonads and formation of male and female germ cells
- b. Anatomy and function of female reproductive tract
  - Menstrual cycle – hormones, phases
- c. Anatomy and function of male reproductive tract
- d. Pregnancy – fertilization, embryogenesis, function of placenta