



**STATE NON-PROFIT ENTERPRISE
«TESTING BOARD FOR PROFESSIONAL COMPETENCE ASSESSMENT OF
HIGHER EDUCATION TRAINEES IN MEDICINE AND PHARMACY AT THE
MINISTRY OF HEALTH OF UKRAINE»**

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**TEST ITEMS
FOR THE UNIFIED STATE QUALIFICATION EXAM**

STAGE 1

ENGLISH LANGUAGE PROFICIENCY TEST

Specialty «MEDICINE»

I. Read the text and answer 10 questions to it.**Monoclonal antibodies**

Monoclonal antibodies (mAbs) are unlimited identical copies of the same antibody that are produced artificially. They were first made in 1975 by two immunologists, Cesar Milstein from Argentina and Georges Kohler from Germany, and although research is ongoing, they have already proved useful in many areas of medicine. They make up a high proportion of new drugs and diagnostic tests, from innovative treatments for cancers to identifying blood types. Antibodies are proteins the body uses to target alien cells such as germs. There are millions of kinds, each matching a different alien protein (or antigen), and they latch on to their specific antigen either to neutralize it or to identify it as a target for the body's immune cells. Paul Ehrlich coined the term "antibodies" in 1891, and went on to describe how they interact with antigens like lock and key. By the 1960s, scientists knew they are made by white blood cells called B-cells, or B-lymphocytes, each primed with its own antibody. When triggered by its matching antigen, a B-cell clones itself, producing multiple copies of plasma cells, which release floods of antibodies. As plasma cells produce more than one kind of antibody, the process is described as "polyclonal". Milstein and Kohler's breakthrough was to create limitless copies of identical "monoclonal" antibodies using cells made in the lab called hybridomas. These are artificial fusions of plasma cells and myeloma cells (abnormal plasma cells that cause cancer) primed to produce the desired antibody. Plasma cells are short-lived, whereas myeloma cells reproduce indefinitely. By fusing them, Milstein and Kohler created an endlessly multiplying source of their chosen antibody. Milstein's original intention was to find a way to make antibodies for research. But he and Kohler quickly realized that mAbs might also be a "magic bullet", offering tailor-made antibodies to target any disease. Although monoclonal antibodies have not yet proved to be a magic cure-all, they are finding new uses all the time. They can even be used to detect biological weapons. In pregnancy tests, mAbs detect the hormone HCG, and in tissue typing, they help prevent a donor organ from being rejected by blocking the immune response. They can identify blood clots and rogue cells and are used in cancer treatment to carry drugs or radiation to targeted cells. Monoclonal antibodies are also used to fight autoimmune diseases including rheumatoid arthritis, and new mAb drugs are in the pipeline for malaria, influenza, and HIV. In 2020, scientists found several mAbs that appear to neutralize the COVID-19 virus in cell cultures.

1. Polyclonal antibodies are produced by white blood cells called B-cells when triggered by their matching antigen.

- A. Not given
- ☒ B. True
- C. False

2. Monoclonal antibodies are currently used in the treatment of disease - rheumatoid arthritis.

- A. Not given
- B. True
- C. False

3. Who were the immunologists responsible for creating the first monoclonal antibodies (mAbs)?

- A. Paul Ehrlich and Georges Kohler
- B. Georges Kohler and Paul Ehrlich
- C. Cesar Milstein and Georges Kohler
- D. Paul Ehrlich and Robert Edwards
- E. Cesar Milstein and Paul Ehrlich

4. What is the main advantage of hybridomas in the production of monoclonal antibodies?

- A. They cause cancer
- B. They contain only plasma cells
- C. They reproduce indefinitely
- D. They are used in pregnancy tests
- E. They are short-lived

5. How did Cesar Milstein and Georges Kohler create limitless copies of identical monoclonal antibodies?

- A. By using myeloma cells only
- B. By using artificial fusions of plasma cells and myeloma cells
- C. By replicating antibodies in vitro
- D. By isolating plasma cells from patients
- E. By using white blood cells only

6. What is the primary function of antibodies in the body?

- A. To clone B-cells
- B. To target alien cells such as germs
- C. To trigger immune responses
- D. To cause diseases
- E. To create hybridomas

7. What is the process of producing multiple copies of plasma cells when triggered by their matching antigen referred to as?

- A. Cloning
- B. Monoclonal
- C. Polyclonal
- D. In vitro
- E. Hybridoma

8. Which of the following is not mentioned as a potential future use of monoclonal antibodies in the text?

- A. Influenza treatment
- B. Rheumatoid arthritis treatment
- C. COVID-19 vaccine
- D. Malaria treatment
- E. HIV treatment

9. What was the original purpose of Cesar Milstein's research on monoclonal antibodies?

- A. To create tailor-made antibodies for disease treatment
- B. To cure cancer
- C. To detect biological weapons
- D. To find a way to make antibodies for research
- E. To neutralize the COVID-19 virus

10. According to the text, what is the potential use of monoclonal antibodies in the fight against COVID-19?

- A. To neutralize the virus in cell cultures
- B. To diagnose the disease
- C. To treat autoimmune diseases
- D. To serve as a vaccine
- E. To carry drugs to targeted cells

II. Choose the right answer.

11. Six hours have passed since the development of an acute myocardial infarction in the patient. During autopsy of the body, staining was used to identify the area of infarction. What was used to detect the area of necrosis?

- A. Picrofuchsin
- B. Methyl violet
- C. Congo red
- D. Toluidine blue
- E. Tetrazolium salts

12. Transcription is the reaction of mRNA matrix synthesis on DNA matrix. Name the stages of transcription.

- A. Initiation, elongation, termination
- B. Processing, splicing, termination
- C. Initiation, translation, elongation
- D. Initiation, processing, splicing
- E. Initiation, elongation, translation

13. A worker was hospitalized with the bleeding, caused by an injury to the shoulder. Five days later, an increased concentration of certain blood cells will be observed in the patient's blood. Name these cells.

- A. Lymphoblasts
- B. Erythroblasts
- C. Megalocytes
- D. Megaloblasts
- E. Reticulocytes

14. During the surgery for a femoral hernia, the doctor operates within the borders of the femoral triangle. What structure forms its upper border?

- A. *Fascia lata*
- B. *Lig. lacunare*
- C. *Lig. inguinale*
- D. *Lig. pectinale*
- E. *Arcus iliopectineus*

15. Autopsy of the body of a 72-year-old woman with rheumatoid arthritis, who died of uremia, revealed enlarged, dense, pale gray kidneys with a shiny sebaceous surface on section. What pathology can be suspected, based on the revealed changes?

- A. Atherosclerotic nephrosclerosis
- B. Chronic pyelonephritis
- C. Chronic glomerulonephritis
- D. Primary contracted kidneys
- E. Renal amyloidosis

16. Acute herpetic gingivostomatitis is the most common primary infection caused by herpes simplex virus, type 1. What material should a dentist obtain for the laboratory testing to confirm this diagnosis?

- A. Saliva
- B. Sputum
- C. Fluid from the vesicles
- D. Blood
- E. Urine

17. A 56-year-old man has type II diabetes mellitus and hypertension that are managed pharmaceutically. He constantly takes metformin, aspirin (acetylsalicylic acid), rosuvastatin, captopril, and furosemide. Laboratory tests show that his glycated hemoglobin (Hb A1c) is 8,0%, while fasting glucose is 12 mmol/L. The doctor decided to prescribe the patient glibenclamide. What is the mechanism of action of glibenclamide?

- A. Inhibition of insulin release
- B. Stimulation of glucose absorption within the cells
- C. Facilitation of glucose absorption in the intestine
- D. —
- E. Stimulation of insulin release

18. What will be observed in a 23-year-old man with untreated type 1 diabetes mellitus?

- A. Acidosis, hyperkalemia
- B. Alkalosis, hypokalemia
- C. Alkalosis, hyperkalemia
- D. Acidosis, hypokalemia
- E. Acidosis, normokalemia

19. A histological specimen of an eyeball shows a biconvex structure, connected to the ciliary body with the fibrous strands of the ciliary zonule and covered on top with a transparent capsule. What structure is it?

- A. Crystalline lens
- B. Vitreous body
- C. Cornea
- D. Sclera
- E. Ciliary body

20. During smoking, cigarette smoke exits out of the patient's auricle. What structure of the auditory organ is damaged?

- A. Organ of Corti
- B. Bone labyrinth
- C. External acoustic meatus
- D. Membranous labyrinth
- E. Tympanic membrane

21. Because of a cerebral hemorrhage, a patient developed impaired speech perception (sensory aphasia). What brain structure is likely to be damaged in this case?

- A. Inferior temporal gyrus
- B. Superior temporal gyrus
- C. Superior frontal gyrus
- D. Inferior frontal gyrus
- E. Postcentral gyrus

22. *S. aureus* can cause various infections — from purulent complications of wounds to pneumonia and sepsis. Why is penicillin therapy of staphylococcal infections not very effective?

- A. No penicillin receptors in the cell envelope of *S. aureus*
- B. Penicillin's inability to penetrate the membrane of *S. aureus*
- C. Acetylase production by *S. aureus*
- D. Penicillinase production by *S. aureus*
- E. Allergic response to staphylococcal proteins

23. A woman, who was undergoing treatment for insomnia, was found unconscious. Her respiration is inhibited, she is in a collaptoid state and presents with muscle hypotonia and absence of reflexes. Empty medicine packages were found at the site of the accident. What medicine could have caused such a condition in the patient?

- A. Picamilon
- B. Nialamide
- C. Phenobarbital
- D. Eleutherococcus tincture
- E. Promedol (Trimeperidine)

24. A geneticist examined a pregnant woman and determined that she has monozygotic twins. What process has resulted in the development of twins?

- A. Polyembryony
- B. Fragmentation
- C. Endogony
- D. Schizogony
- E. Budding

25. A patient with scurvy presents with disturbed processes of proline and lysine hydroxylation in the collagen. What biochemical process is inhibited in this case, causing this disorder?

- A. Lipid peroxidation
- B. Tissue respiration
- C. Peroxidase oxidation of fats
- D. Microsomal oxidation
- E. Oxidative phosphorylation

26. Brain MRI shows a local dilation (aneurysm) of an artery in the lateral sulcus. What vessel has pathological changes in this case?

- A. *A. cerebri media*
- B. *A. cerebri posterior*
- C. *A. cerebri anterior*
- D. *A. communicans posterior*
- E. *A. communicans anterior*

27. Monoamine oxidase inhibitors are widely used as psychotropic drugs. In the synapses, they change the levels of all the neurotransmitters listed below, except:

- A. Acetylcholine
- B. Adrenaline
- C. Serotonin
- D. Noradrenaline
- E. Dopamine

28. Examination of a patient detected accumulation of sphingomyelins in the cell lysosomes of the patient's liver, spleen, lungs, bone marrow, and brain, caused by the lack of sphingomyelinase enzyme. What pathology is most likely in this patient?

- A. Gaucher disease
- B. Tay-Sachs disease
- C. Krabbe disease
- D. Niemann-Pick disease
- E. Sandhoff disease

29. The molecule of immature mRNA (pro-mRNA) contains more triplets than there are amino acids in the synthesized protein, because translation is normally preceded by:

- A. Mutation
- B. Replication
- C. Processing
- D. Repair
- E. Initiation

30. In some diseases of the nervous system, damage with chromatolysis phenomena can be observed in the neurocytes. What intracellular metabolic processes become disturbed in the neurons?

- A. Synthesis of lipids
- B. Keratohyalin folding
- C. Synthesis of protein
- D. Synthesis of carbohydrates
- E. Synthesis of glycolipids

31. What happens, when blood pressure and stimulation of baroreceptors and atrial volume receptors are decreased?

- A. Reduced production of aldosterone
- B. Vasodilation of the systemic resistance vessels
- C. Increased production of atrial natriuretic peptide
- D. Activation of the hypothalamic supraoptic nuclei and production of vasopressin
- E. Reduced production of renin in juxtaglomerular cells

32. A 29-year-old woman has a fever of 38,3°C and intense pain in her lower abdomen, observed

for the last several days. What substances mediate the synaptic transmission between the pain fibers that go from the pelvic organs and spinal cord neurons?

- A. Glutamate, substance P
- B. Acetylcholine, nitrogen monoxide
- C. Endorphins, GABA
- D. Serotonin, vasoactive intestinal polypeptide (VIP)
- E. Noradrenaline, ATP

33. A 56-year-old woman complains of pain in the small joints of her hands and feet. She has been experiencing these symptoms for the last 12 years. Examination of her hands detects a subluxation of the metacarpophalangeal joints with her fingers bent outwards ("walrus flippers"). There are high molecular weight immune complexes in the patient's blood. What diagnosis can be made in this case?

- A. Rheumatoid arthritis
- B. Systemic lupus erythematosus
- C. Rheumatic polyarthritis
- D. Dermatomyositis
- E. Gouty arthritis

34. A 55-year-old woman has mitral valve insufficiency and had myocarditis 10 years ago. Currently she has no complaints. Her hemodynamics is within the normal range. What general nosology concept corresponds with this situation?

- A. Pathological process
- B. Compensatory reaction
- C. Typical pathological process
- D. Pathological reaction
- E. Pathological condition

35. A patient with hyperthyroidism has high body temperature. What

energy metabolism disorder is the leading one in the rise of the body temperature in this case?

- A. Increased lipolysis
- B. Increased glycogen breakdown
- C. Separation of oxidation and oxidative phosphorylation
- D. Enzyme activation in the respiratory chain
- E. Enzyme activation in the Krebs cycle

36. A 58-year-old woman with essential hypertension was prescribed amlodipine by her doctor. What group of drugs does it belong to?

- A. Potassium channel activators
- B. Sodium channel blockers
- C. Beta blockers
- D. Potassium channel blockers
- E. Calcium channel blockers

37. Histones are small basic proteins, bound to DNA in chromatin. They contain numerous positively charged amino acid residues, which ensures their strong bond with the acidic groups of DNA. Name the most common amino acids in histones.

- A. Serine, methionine
- B. Glutamic acid, glutamine
- C. Aspartic acid, asparagine
- D. Lysine, arginine
- E. Cystine, cysteine

38. During the first year of life, children easily develop seizures that can be associated with incomplete myelination of nerve fibers. What neuroglial cells are associated with this condition the most?

- A. Ependymocytes
- B. Protoplasmic astrocytes
- C. Oligodendrocytes
- D. Microglial cells
- E. Fibrous astrocytes

39. During a pathological childbirth, separation of the pubic bones occurred in the woman. What type of bone junction was damaged in this case?

- A. Synchronosis
- B. Synostosis
- C. Symphysis
- D. Syndesmosis
- E. Diarthrosis

40. A patient with liver cirrhosis has persistent arterial hypotension (blood pressure — 90/50 mm Hg). What causes the decrease in blood pressure in such a liver pathology?

- A. Increased natriuretic hormone synthesis
- B. Excessive vasopressin inactivation
- C. Activation of the kinin-kallikrein system
- D. Increased reflex effect of the receptor zone in the aortic arch
- E. Decreased angiotensinogen synthesis

41. A 75-year-old patient was diagnosed with rectal cancer. Into what regional lymph nodes can the metastases spread in this case?

- A. Into the perivesical lymph nodes
- B. Into the superior mesenteric lymph nodes
- C. Into the lumbar lymph nodes
- D. Into the inferior mesenteric lymph nodes
- E. Into the thoracic lymphatic duct

42. During the treatment of ciliary arrhythmia, the patient developed bronchoobstructive syndrome —

problematic breathing and cough. What antiarrhythmic drug can cause such a complication?

- A. Ajmaline
- B. Verapamil
- C. Nifedipine
- D. Anaprilin (Propranolol)
- E. Novocainamide (Procainamide)

43. A 42-year-old man with verified HIV infection developed a fever, generalized lymphadenopathy, diarrhea, and slight weight loss. What period of HIV infection corresponds with these symptoms?

- A. AIDS-related complex
- B. Incubation period
- C. Period of persistent generalized lymphadenopathy
- D. HIV encephalomyelitis
- E. Period of acquired immunodeficiency syndrome

44. A patient with type 1 diabetes mellitus has been prescribed insulin as a substitution therapy. What is the mechanism of action of this drug?

- A. Stimulation of α -cells of pancreatic islets
- B. Blockade of H1-histamine receptors
- C. Increase of the glucose permeability of cell plasma membranes
- D. COX-2 inhibition
- E. Intensification of anaerobic glycolysis

45. Pathologies of lipid metabolism include sphingolipidoses that can be characterized by the accumulation of excess phospholipids and sphingolipids, mainly in the nervous tissue. What disease is associated with accumulation of GM2 ganglioside in the body?

- A. Niemann-Pick disease
- B. Krabbe disease
- C. Fabry disease
- D. Tay-Sachs disease
- E. Gaucher disease

46. A 50-year-old man suddenly developed intense palpitations, pain in the heart, acute weakness, increased blood pressure, and an irregular pulse with pulse deficit. ECG shows f-waves instead of a P wave; RR intervals are irregular. What heart rhythm disorder is observed in the patient?

- A. Ciliary arrhythmia
- B. Sinus extrasystole
- C. Respiratory sinus arrhythmia
- D. Paroxysmal tachycardia
- E. Transverse heart block

47. A 50-year-old patient has been hospitalized with signs of a hypertensive crisis. What is associated with a sharp increase in the blood pressure?

- A. Endothelial desquamation
- B. Spasm of arterioles
- C. Necrosis of arterioles
- D. Endothelial dystrophy
- E. Hyalinosis of arterioles

48. Examination of a patient with a hearing impairment shows that the pathological process is localized at the level of the lateral lemniscus formation. At what level does it normally form in the brain?

- A. Cervical spinal cord
- B. Mesencephalon
- C. Metencephalon (pons)
- D. Thoracic spinal cord
- E. Medulla oblongata

49. A patient with signs of jaundice has been hospitalized into the surgical department. Normally, bile does not enter the blood stream from the bile capillaries. What ultrastructural features of the hepatocyte structure contribute to this phenomenon?

- A. Biliary surface in hepatocytes
- B. Close contacts between hepatocytes
- C. Microvilli on the surface of the capillaries
- D. Polygonal shape of hepatocytes
- E. No proper wall in bile capillaries

50. When stimulation frequency of an isolated heart of a rabbit increases, incomplete relaxation of the ventricles of the heart can be observed because of:

- A. Increased potassium levels in cardiomyocytes
- B. Inhibition of the sodium-potassium pump
- C. Increased sodium levels in cardiomyocytes
- D. Accumulation of calcium in cardiomyocytes
- E. Increased potassium levels in the interstitium