

I. Read the text and answer 10 questions to it.

Edward Jenner

Edward Jenner was born in 1749. He was an English physician, the discoverer of vaccination. Jenner studied medicine in London. He began his practice in 1773 when he was twenty-four years old.

Edward Jenner liked to observe and investigate ever since he was a boy. His persistent scientific work resulted in the discovery of vaccination against smallpox. Today cases of smallpox are very rare because every infant when it is about a year old is vaccinated against this disease. The vaccination is effective for a prolonged period of time.

In Jenner's days, one out of every five persons in London carried the marks of this disease on his face. But there were few people who recovered from the disease because in the 18th century smallpox was one of the main causes of death.

The disease had been common for centuries in many countries of Asia. The Turks had discovered that a person could be prevented from a serious attack of smallpox by being infected with a mild form of the disease.

One day Jenner heard a woman say: «I cannot catch smallpox, I've had cowpox». That moment led to Jenner's continuous investigations and experiments.

The first child whom Jenner introduced the substance from cowpox vesicles obtained from the wound of a diseased woman was Jimmy Phipps. It was in 1796. For the following two years, Jenner continued his experiments. In 1798 he published the report on his discovery. He called his new method of preventing smallpox «vaccination», from the Latin word vacca, that is «a COW».

At first, people paid no attention to his discovery. One doctor even said that vaccination might cause people to develop cow's faces.

But very soon there was no part of the world that had not taken up vaccination. Thousands of people were given vaccination and smallpox began to disappear as if by magic.

1. The invention of Jenner became very popular right away.

- A. False
- B. True
- C. -
- D. -
- E. -

1. Methyl groups ($-CH_3$) are used in the body for the synthesis of such important compounds as creatine, choline, adrenaline, etc. What essential amino acid is the source of these groups?

- A. Methionine
- B. Valine
- C. Leucine
- D. Isoleucine
- E. Tryptophan

2. The vaccine is based on the substance from vesicles which appeared as a result of cowpox

- A. True
- B. False
- C. -
- D. -
- E. -

2. In a patient with otitis media this condition became complicated by mastoiditis, causing a risk of purulent thrombosis in the nearest venous sinus. Name this sinus:

- A. Sigmoid sinus
- B. Transverse sinus
- C. Superior sagittal sinus
- D. Straight sinus
- E. Inferior petrosal sinus

3. A patient presents with smoothed out right nasolabial fold and dilated right palpebral fissure (it cannot be closed during squinting, because the eyelids do not close). The patient has problems with talking and eating (food sticks between the cheek and teeth). What nerve is damaged in this case?

- A.** *N. facialis dexter*
- B.** *N. abduceus dexter*
- C.** *N. glossopharyngeus sinister*
- D.** *N. vagus dexter*
- E.** *N. trigeminus dexter*

4. During the healing of a wound, a scar made of connective tissue develops in the area of the tissue defect. What cells cause this process?

- A.** Fibroblasts
- B.** Macrophages
- C.** Fibrocytes
- D.** Mast cells
- E.** Melanocytes

5. In an experiment, it was determined that excitation of flexor muscle motoneurons inhibits the motoneurons of extensor muscles. What type of inhibition underlies this phenomenon?

- A.** Reciprocal inhibition
- B.** Inhibition that follows excitation
- C.** Pessimal inhibition
- D.** Reversible inhibition
- E.** Lateral inhibition

6. The amount and sequence of amino acids in the insulin hormone molecule was established experimentally. This sequence is encoded in:

- A.** The number and sequence of nucleotides in the exon segments of the gene
- B.** The sequence of structural genes
- C.** The number and sequence of nucleotides in the gene promoter
- D.** A certain alternation of exon and intron segments
- E.** The number and sequence of nucleotides in the intron segments of the gene

7. 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.** Processing
- B.** Initiation
- C.** Repair
- D.** Mutation
- E.** Replication

8. In an experiment on an animal, the removal of a section of the cerebral cortex erased the previously developed conditioned reflexes in response to light stimulation. What section of the cortex was removed?

- A.** Occipital cortex
- B.** Precentral gyrus
- C.** Postcentral gyrus
- D.** Limbic cortex
- E.** Temporal lobe

9. If a certain part of the conductive path of the visual analyzer is damaged, it causes the loss of light sensitivity in the medial half of the retinas on the both sides. Name this part of the conductive path:

- A.** Optic chiasm
- B.** Right optic tract
- C.** Left optic tract
- D.** Right optic nerve
- E.** Left optic nerve

10. During the treatment of ciliary arrhythmia, a patient developed bronchoobstructive syndrome — problematic breathing and cough. What antiarrhythmic drug can cause

such a complication?

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

11. After a hemorrhage into the left hemisphere of the brain, the patient has lost the ability to speak. In this case, thrombosis occurred in the basin of:

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

12. Diazepam was prescribed to a person with psychoemotional disorders and disturbed sleep. The effect of diazepam is based on:

- A.** Activation of the GABA receptor system
- B.** Decrease of blood pressure
- C.** Inhibition of the limbic system
- D.** Excitation of reticular formation
- E.** Increase of reflex reaction time

13. A 68-year-old man with trembling hands and impaired movement coordination was diagnosed with Parkinson's disease. What medicine must be prescribed to the patient in this case?

- A.** Levodopa
- B.** Phenobarbital
- C.** Diphenine (Phenytoin)
- D.** Finlepsin (Carbamazepine)
- E.** Ethosuximide

14. A 40-year-old man was diagnosed with hypoparathyroidism. What findings of laboratory tests were crucial for the diagnosis-making in this case?

- A.** Hypocalcemia
- B.** Hypophosphatemia
- C.** Increased oxyproline levels in urine
- D.** Hypocalciuria
- E.** Increased sialic acid levels in blood

15. A patient has hyperglycemia, polyuria, hypersthenuria, and glucosuria. Such combination of indicators is characteristic of the following pathology:

- A.** Diabetes mellitus
- B.** Renal diabetes
- C.** Diabetes insipidus
- D.** Glycogenosis
- E.** Diencephalic obesity

16. A histological specimen demonstrates an organ with the wall that consists of mucosa, submucosa, fibrocartilaginous and adventitious membranes. The epithelium is stratified and ciliated. In the submucosa, there are mucoprotein glands. Hyaline cartilage forms large plates. What organ has such morphological features?

- A.** Large bronchus
- B.** Esophagus
- C.** Trachea
- D.** Larynx
- E.** Small bronchus

17. A histological specimen of a woman's ovary shows a round formation, consisting of large glandular cells that contain lutein pigment. In the center of this structure, there is a small scar made of connective tissue. Name this formation:

- A.** Corpus luteum
- B.** Mature follicle
- C.** Atretic body
- D.** Secondary follicle
- E.** Corpus albicans

18. The tonsils of a 4-year-old child are enlarged, hyperemic, and covered with non-removable whitish membranes. What type

of inflammation characterizes the changes in the child's tonsils?

- A. Fibrinous inflammation (diphtheritic)
- B. Caseous necrosis
- C. Fibrinoid necrosis
- D. Fibrinous inflammation (croupous)
- E. Purulent inflammation

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

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

20. A woman was hospitalized because of posterior wall myocardial infarction in the left ventricle. In this case, the circulation will be impaired in the following artery:

- A. Posterior interventricular artery
- B. Anterior interventricular artery
- C. Left coronary artery
- D. Left circumflex artery
- E. Thebesian vessels

21. Examination of a patient with signs of hypertension shows that it would be most advisable to prescribe him a medicine that changes the blood pressure via the renin-angiotensin system. Name this medicine:

- A. Lisinopril
- B. Octadine (Guanethidine)
- C. Dibazol (Bendazol)
- D. Anaprilin (Propranolol)
- E. Apressin (Hydralazine)

22. During the ascent into the mountains, a climber at the altitude of 6000 meters above the sea level developed euphoria, inadequate assessment of the situation, and

hallucinations. What is the leading cause in the development of these signs of mountain sickness?

- A. Reduced partial pressure of oxygen in the air
- B. Physical exertion
- C. Decreased atmospheric pressure
- D. Snow ophthalmia
- E. Air expansion in the frontal sinuses

23. A man died after a surgery for the perforation of the colon wall with signs of diffuse purulent peritonitis. Autopsy shows that the mucosa of the colon wall is thickened, covered in a fibrinous membrane, and has isolated ulcers that penetrate it to varying depths. Histology detects mucosal necrosis, the presence of fibrin, and leukocyte infiltration with hemorrhagic foci. What disease developed a complication in this case, causing the death of this man?

- A. Dysentery
- B. Typhoid fever
- C. Nonspecific ulcerative colitis
- D. Crohn's disease
- E. Amoebiasis

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

25. Microscopy of the biopsy material, obtained from the area of a tumor in the mucosa of the right bronchus, shows cellular and tissue atypism, as well as development of "cancer pearl" structures. What is the nature of this pathological process?

- A. Malignant tumor
- B. Benign tumor
- C. Hyperplasia
- D. Metaplasia
- E. Hypoplasia

26. A patient with suspected dysentery was admitted to the infectious diseases department. What diagnostic method can confirm this diagnosis?

- A. Bacteriological method
- B. Serological method
- C. Allergy testing
- D. Biological method
- E. Microscopy

27. A patient with pleurisy has a foul-smelling fluid, containing biogenic amines and gases, in the pleural cavity. What type of inflammation is observed in this case?

- A. Putrefactive
- B. Alterative
- C. Catarrhal
- D. Purulent
- E. Fibrinous

28. During a surgery, a patient developed signs of dithiline (suxamethonium) overdose. What will reduce the effects of intoxication in this case?

- A. Blood transfusion
- B. Anticholinesterase drugs
- C. Ganglionic blockers
- D. Muscarinic antagonists
- E. Nicotinic antagonists

29. A woman complains of runny nose. X-ray shows an accumulation of pus in her left maxillary sinus. From there, the pus discharges into the following nasal meatus:

- A. Into the left middle nasal meatus
- B. Into the right inferior nasal meatus
- C. Into the right superior nasal meatus
- D. Into the right common nasal meatus
- E. Into the right nasopharyngeal meatus

30. A 6-year-old child was diagnosed with a helminthic infestation. What changes in the child's leukogram should be expected in this case?

- A. Increased eosinophil count
- B. Increased neutrophil count
- C. Decreased eosinophil count
- D. Increased monocyte count
- E. Increased lymphocyte count

31. A student cannot be a donor because he has a marker that indicates infection with one of the hepatitis viruses. What marker was detected in this case?

- A. HBsAg
- B. BHsAb
- C. HBcAg
- D. HBcAb
- E. HBeAg

32. A patient has been fasting for 48 hours. What substances are used by muscle tissue as energy sources under these conditions?

- A. Ketone bodies
- B. Glycerin
- C. Pyruvate
- D. Lactate
- E. Amino acids

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

34. Examination of a patient revealed a reduced immunoglobulin count. What cells of the patient's immune system are likely to have an impaired function, causing this condition?

- A.** Plasma cells
- B.** T-helpers
- C.** T-killers
- D.** T-suppressors
- E.** Plasmablasts

35. RNA of human immunodeficiency virus (HIV) has penetrated the leukocyte and stimulated the cell to synthesize viral DNA using the revertase enzyme. Name this process:

- A.** Reverse transcription
- B.** Operon repression
- C.** Reverse translation
- D.** Operon depression
- E.** Convariant replication

36. A patient with frequent hemorrhages from the internal organs and mucous membranes has proline and lysine in the composition of collagen fibers. Their hydroxylation is impaired because of the following vitamin deficiency:

- A.** Vitamin C
- B.** Vitamin K
- C.** Vitamin A
- D.** Thiamine
- E.** Vitamin E

37. A person produces little amount of thick saliva; its enzymatic activity is reduced, while its mucus content is increased. What glands are most likely to be functionally impaired, causing this condition?

- A.** Parotid glands
- B.** Proper mucosal glands
- C.** Sublingual glands
- D.** Submandibular glands
- E.** —

38. 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.** Stimulates insulin release
- B.** Stimulates glucose absorption within the cells
- C.** Facilitates glucose absorption within the intestine
- D.** Inhibits insulin release
- E.** —

39. In an experiment, the processes of energy production in the epithelium of the renal tubules were blocked, as a result of which the diuresis increased 4 times. What is the most likely cause of polyuria in this case?

- A.** Decrease of sodium ion reabsorption
- B.** Decrease of glomerular filtration rate
- C.** Decrease of potassium ion secretion
- D.** Decrease of renal blood flow
- E.** Decrease of urea secretion

40. A large number of glucose oxidation metabolites are dissolved in the cytoplasm of myocytes. What metabolite can be directly converted into lactate?

- A.** Pyruvate
- B.** Oxaloacetate
- C.** Glycerophosphate
- D.** Glucose-6-phosphate
- E.** Fructose-6-phosphate

41. Histological microslide shows a vessel with the wall that consists of endothelium, basement membrane, and loose connective tissue. What type of vessel is it?

- A.** Non-muscular vein
- B.** Artery
- C.** Muscular vein
- D.** Hemocapillary
- E.** Lymphocapillary

42. A person has a knee injury with a crushed patella. In this case, damage is likely to be observed in a tendon of the following thigh muscle:

- A.** Quadriceps femoris muscle
- B.** Biceps femoris muscle
- C.** Sartorius muscle
- D.** Adductor magnus muscle
- E.** Adductor longus muscle

43. A 36-year-old man developed angina pectoris attacks after a case of staphylococcal sepsis. In the left coronary artery, coronary angiography revealed parietal thrombosis without signs of atherosclerosis. In this case, the thrombus formation started because of the damage to the vascular endothelium and the release of:

- A.** Platelet-activating factor
- B.** Adenosine diphosphate
- C.** Adenosine triphosphate
- D.** Phospholipase A2
- E.** Serotonin

44. During an urgent surgery, the patient's thickened vermiform appendix was removed. Macroscopically, the appendix is grayish-black; in its distal part there is a wall defect, through which grayish-brown masses with an unpleasant odor are being released from the lumen of the appendix. Histology shows that the wall of the appendix is necrotized and has hemorrhagic foci, while the lumen of the mesenteric artery is filled with a thrombus. What type of appendicitis is it?

- A.** Acute gangrenous
- B.** Acute phlegmonous
- C.** Acute simple
- D.** Acute superficial
- E.** Chronic

45. A 49-year-old woman developed leg edema after she had been standing for a long time. What is the likely cause of leg edema in this case?

- A.** Increased hydrostatic blood pressure in the veins
- B.** Decreased hydrostatic blood pressure in the veins
- C.** Decreased hydrostatic blood pressure in the arteries
- D.** Increased oncotic blood plasma pressure
- E.** Increased arterial blood pressure

46. A patient diagnosed with chronic bronchitis underwent a biopsy of the main bronchus. The patient has a 30-year-long history of smoking. Histology of the biopsy material revealed stratified squamous epithelium. What pathological process in the main bronchus does it indicate?

- A.** Metaplasia
- B.** Physiological regeneration
- C.** Reparative regeneration
- D.** Hyperplasia
- E.** Dysplasia

47. During a surgery with administration of an inhalation anesthetic and muscle relaxants, the anesthesiologist noticed a rapid increase in the patient's body temperature that reached 43°C . What pathology did the patient develop?

- A.** Hyperthermic syndrome
- B.** Infection-induced fever
- C.** Overheating
- D.** Physical hyperthermia
- E.** Traumatic shock

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

- A.** Renal amyloidosis
- B.** Chronic glomerulonephritis
- C.** Chronic pyelonephritis
- D.** Contracted granular kidneys
- E.** Atherosclerotic nephrosclerosis

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

50. 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 analysis to confirm this diagnosis?

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