

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. 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. Back in the 18th century it was difficult to recover from smallpox.

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

3. Jenner met the woman, who discovered vaccination from smallpox.

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

4. Smallpox is still common nowadays, but less than in the 18th century.

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

5. Jenner's vaccine helped to treat smallpox.

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

6. The vaccine was made from the blood of people who recovered from smallpox.

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

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

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

8. Jenner's vaccine had one side effect — people were developing cow's faces.

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

9. Choose the correct statement.

- A. The vaccine is effective for a long time
- B. Adult people cannot get a smallpox
- C. Children get vaccinated from smallpox in school-age
- D. —
- E. —

10. Choose the correct statement.

- A. When he was twenty-four, Edward Jenner started to work as a doctor
- B. When he was twenty-four, Edward Jenner created a vaccine
- C. When he was twenty-four, Edward Jenner had smallpox
- D. —
- E. —

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

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

12. Autopsy of a 47-year-old miner's body, who worked down in the shaft for 10 years, reveals bands of a whitish fibrous tissue and nodules 0.2-0.3 cm in diameter in his lungs. Histology detects in the nodules a small amount of brownish dust and concentric proliferation of a cell-poor connective tissue with marked hyalinosis. What type of pneumoconiosis can be suspected in this case?

- A. Silicosis
- B. Talcosis
- C. Asbestosis
- D. Siderosis
- E. Berylliosis

13. 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

14. 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

15. X-ray of the skull base bones revealed enlarged sella turcica cavity, thinned out anterior clinoid processes, and destruction of various sella turcica regions. This type of bone destruction can be caused by a tumor of the following endocrine gland:

- A. Hypophysis
- B. Thymus
- C. Epiphysis
- D. Thyroid
- E. Adrenal glands

16. 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)

17. 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*

18. A 35-year-old woman has come to her physician with chief complaint of elevated blood pressure up to 180/100 mm Hg. She currently does not take any medication. During the physical examination, her blood pressure is 140/80 mm Hg, heart rate is 65/min. and temperature is 36.8°C. She has a "moon face", hirsutism,

centripetal obesity, and striae on the skin with atrophy over the abdomen and thighs. Which of the following is the most likely cause of this patient's condition?

- A. Cortisol-secreting adrenal adenoma
- B. Hyperthyroidism
- C. Hypothyroidism
- D. Ovarian insufficiency
- E. Pancreatic islet cells hyperfunction

19. To determine the functional activity of blood corpuscles, a suspension of microorganisms was introduced into the test tube with packed white cells. In this case, the cytoplasm of some cells will contain phagocytized microorganisms. Which of the following cell types will show phagocytized microorganisms?

- A. Neutrophils and monocytes
- B. Lymphocytes and basocytes
- C. Lymphocytes and eosinophils
- D. Monocytes and lymphocytes
- E. Lymphocytes and neutrophils

20. 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

21. After bilateral adrenalectomy performed on a dog, the animal developed muscle weakness, adynamia, low body temperature, and hypoglycemia. What other sign is likely to be observed in case of adrenal insufficiency?

- A.** Arterial hypotension
B. Lymphopenia
C. Increased glycogen synthesis
D. Increased sodium and chloride levels in the blood serum
E. Increased resistance to bacteria and toxins
- 22.** 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
- 23.** A patient undergoes right-sided pneumonectomy due to lung cancer. Name the anatomical structures of the right lung root (downward order):
- A.** Bronchus, artery, veins
B. Artery, bronchus, veins
C. Artery, veins, bronchus
D. Veins, artery, bronchus
E. Veins, bronchus, artery
- 24.** 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
- 25.** 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
- 26.** A patient was hospitalized with the following diagnosis: exacerbated peptic ulcer disease of the duodenum, duodenal bulb ulcer. Gastric juice analysis shows high secretory and acid-producing function of the stomach. What drug inhibits the secretory function of the gastric glands by blocking H₂ receptors?
- A.** Famotidine
B. Atropine
C. Methacin
D. Platyphyllin
E. Belladonna dry extract
- 27.** A patient complains of solar radiation intolerance. He has burns on his skin and vision loss. He was provisionally diagnosed with albinism. What amino acid metabolism is disturbed in this patient?
- A.** Tyrosine
B. Proline
C. Lysine
D. Alanine
E. Tryptophan
- 28.** 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
- 29.** A smear prepared from the duodenal content of a patient with maldigestion contained protozoa 10-18 μm in size, with pear-shaped body, 4 pairs of flagella, and two

symmetrically positioned nuclei in the widened front part of the body. What type of protozoa is the most likely in this case?

- A. *Lamblia*
- B. *Entamoeba histolytica*
- C. *Trichomonad*
- D. *Entamoeba coli*
- E. *Balantidium*

30. A 24-year-old male decided to run a marathon after being untrained for a long period. The next day he visits his doctor with a chief complaint of severe pain in his thighs and shins. Which of the following is the most likely cause of this condition?

- A. Lactic acid accumulation in the muscles
- B. Muscle proteins breakdown
- C. Creatinine accumulation in the muscles
- D. Adenosine diphosphate accumulation in the muscles
- E. —

31. 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

32. 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. —

33. A 63-year-old man, who has been suffering from chronic fibrous-cavernous pulmonary tuberculosis for 24 years, has been delivered to a nephrology department with uremia. Intravital diagnostic test for amyloid in the kidneys was positive. What amyloidosis is it in this case?

- A. Secondary systemic
- B. Primary systemic
- C. Localized (focal)
- D. Hereditary (genetic)
- E. Senile

34. Liver diseases with insufficient bile supply to the intestine lead to worsening of hemocoagulation. How can this phenomenon be explained?

- A. Vitamin K deficiency
- B. Iron deficiency
- C. Thrombocytopenia
- D. Erythropenia
- E. Leukopenia

35. Due to blood loss the circulating blood volume of a patient decreased. How will it affect the blood pressure in this patient?

- A. Systolic and diastolic pressure will decrease
- B. Only systolic pressure will decrease
- C. Only diastolic pressure will decrease
- D. Systolic pressure will decrease, while diastolic will increase
- E. Diastolic pressure will decrease, while systolic will increase

36. During the surgery on the small intestine the surgeon revealed an area of the mucous membrane with a single longitudinal fold among the circular folds. Which portion of the small intestine is this structure typical for?

- A. *Pars descendens duodeni*
- B. *Pars horizontalis duodeni*
- C. *Pars ascendens duodeni*
- D. *jejunum*
- E. *Distal ileum*

37. 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

38. A 59-year-old man, a business manager, developed intense burning retrosternal pain with irradiation into the left arm. The pain occurred in the evening after the tax audit. 15 minutes later the patient's condition normalized. What mechanism of angina pectoris development is leading in this patient?

- A.** Increased level of blood catecholamines
- B.** Coronary atherosclerosis
- C.** Intravascular aggregation of blood cells
- D.** Coronary artery thrombosis
- E.** Functional cardiac overload

39. A 10-year-old child has painful swallowing, neck edema, temperature rise up to 39.0°C, the whole body is covered with bright-red petechial rash. Back of the throat and tonsils are hyperemic, the tongue is crimson-colored. Tonsillar surface is covered with isolated grayish-colored necrosis nidi. What disease is it?

- A.** Scarlet fever
- B.** Meningococcal nasopharyngitis
- C.** Diphtheria
- D.** Influenza
- E.** Measles

40. A specimen of a 10-day-old human embryo shows two interconnected sacs (amniotic and yolk sacs). Name the structure located in the place where these two sacs connect:

- A.** Embryonic shield
- B.** Floor of the amniotic sac
- C.** Roof of the amniotic sac
- D.** Amniotic stalk
- E.** Extraembryonic mesoderm

41. 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

42. A patient suffers from acute cardiopulmonary failure with pulmonary edema. What diuretic should be prescribed in the given case?

- A.** Furosemide
- B.** Triamterene
- C.** Spironolactone
- D.** Hydrochlorothiazide (Dichlothiazidum)
- E.** Acetazolamide (Diacarb)

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. A patient complains of acute pain attacks in the right lumbar region. During examination the nephrolithic obturation of the right ureter in the region between its abdominal and pelvic segments has been detected. What anatomical boundary exists between those two segments?

- A. Linea terminalis
- B. Linea semilunaris
- C. Linea arcuata
- D. Linea transversa
- E. Linea inguinalis

45. A group of scientists studying the properties of cardiac muscle cells *in vitro* decides to conduct an experiment. They reveal that a stimulation of sympathetic innervation of the heart has a positive inotropic effect on the myocardium (i.e., increased contractility). Which of the following modifications of ion conductance in myocardial cell is most likely responsible for such changes in contractility?

- A. Inward calcium current
- B. Outward calcium current
- C. Outward potassium current
- D. Inward potassium current
- E. —

46. 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

47. A patient is diagnosed with acute morphine hydrochloride intoxication. Prescribe an oxidizing agent for gastric lavage:

- A. Potassium permanganate
- B. Chloramine
- C. Sulfocamphocainum (Procaine + Sulfocamphoric acid)
- D. Cerigel
- E. Chlorhexidine (bi)gluconate

48. A 27-year-old man (injection drug user) for a long time has been suffering from oral candidiasis, persistent cough, and diarrhea, which gives grounds to suspect HIV infection. The patient was referred for immunological investigation. What cell count will likely be low in this patient?

- A. Helper T cells
- B. B lymphocytes
- C. Suppressor T cells
- D. Plasma cells
- E. Immunological memory cells

49. 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

50. A patient with femoral neck fracture, who for a long time had to remain in bed in a forced (supine) position, has developed dark-brown lesions along the backbone; soft tissues are swollen, in the areas of maceration there is a foul-smelling liquid. Name the clinicopathologic type of necrosis:

- A. Bedsore
- B. Infarction
- C. Sequestrum
- D. Coagulation necrosis
- E. Dry gangrene