Advanced Public Health and Human Physiology

Public Health · Answer Key · 25 Questions

1. Which specific protein is the primary component of the structural matrix of the extracellular space in connective tissues, providing tensile strength?

A) Elastin
B) Collagen
C) Fibrillin
D) Keratin

2. What is the primary physiological function of the hormone erythropoietin?

A) Regulation of blood glucose
B) Stimulation of erythropoiesis in bone marrow
C) Regulation of circadian rhythms
D) Vasoconstriction of peripheral arterioles

3. In immunology, which cell type is primarily responsible for the production of immunoglobulin A (IgA) in mucosal secretions?

A) Plasma cells
B) Cytotoxic T-cells
C) Natural Killer cells
D) Basophils

4. What is the term for the number of new cases of a disease during a specified period in a population at risk?

A) Prevalence
B) Incidence
C) Attack rate
D) Case fatality rate

5. Which cranial nerve is responsible for the parasympathetic innervation of the viscera, including the heart and the digestive tract?

A) Trigeminal nerve
B) Vagus nerve
C) Glossopharyngeal nerve
D) Accessory nerve

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6. Which vitamin is an essential cofactor in the carboxylation of glutamic acid residues in coagulation factors II, VII, IX, and X?

A) Vitamin A
B) Vitamin B12
C) Vitamin K
D) Vitamin E

7. What physiological process describes the passive movement of water across a semipermeable membrane down its concentration gradient?

A) Active transport
B) Facilitated diffusion
C) Osmosis
D) Pinocytosis

8. Which endocrine gland secretes the hormone calcitonin, which lowers blood calcium levels by inhibiting osteoclast activity?

A) Parathyroid gland
B) Adrenal cortex
C) Thyroid gland
D) Pituitary gland

9. In the human circulatory system, which vessels possess the lowest total cross-sectional area and the highest resistance to blood flow?

A) Arteries
B) Capillaries
C) Arterioles
D) Venules

10. Which enzyme is the rate-limiting step in the biosynthesis of cholesterol in the liver?

A) HMG-CoA reductase
B) Lipoprotein lipase
C) Acetyl-CoA carboxylase
D) Pyruvate kinase

11. What is the primary site of hematopoiesis in a healthy adult human?

A) Liver
B) Spleen
C) Red bone marrow
D) Thymus

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12. Which specific immunoglobulin class is the first to be produced by the neonatal immune system and is the largest in molecular structure?

A) IgG
B) IgM
C) IgE
D) IgD

13. The 'Frank-Starling law of the heart' describes the relationship between which two physiological parameters?

A) Heart rate and stroke volume
B) End-diastolic volume and stroke volume
C) Afterload and cardiac output
D) Blood pressure and systemic resistance

14. Which chemical mediator is primarily released by mast cells during an immediate hypersensitivity reaction?

A) Acetylcholine
B) Histamine
C) Serotonin
D) Dopamine

15. What is the name of the functional unit of the kidney responsible for the filtration of blood and the formation of urine?

A) Glomerulus
B) Nephron
C) Ureter
D) Renal pelvis

16. Which cell organelles are the primary site of oxidative phosphorylation and ATP synthesis in the cell?

A) Lysosomes
B) Golgi apparatus
C) Mitochondria
D) Endoplasmic reticulum

17. Which amino acid is the direct precursor for the synthesis of the neurotransmitter serotonin in the brain?

A) Tyrosine
B) Tryptophan
C) Phenylalanine
D) Glutamine

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18. In epidemiology, what does the 'Basic Reproduction Number' (R0) represent?

A) The duration of infectiousness

B) The average number of secondary cases produced by a single infection in a completely susceptible population

C) The probability of mortality from a pathogen

D) The total number of vaccinated individuals in a population

19. Which layer of the digestive tract contains the Meissner's plexus, which regulates secretions and local blood flow?

A) Mucosa

B) Submucosa

C) Muscularis externa

D) Serosa

20. What is the primary role of surfactant in the human lungs?

A) To filter pathogens from inhaled air

B) To reduce surface tension in the alveoli, preventing collapse

C) To stimulate the cough reflex

D) To regulate the pH of the respiratory epithelium

21. Which protein is the most abundant in human blood plasma and is responsible for maintaining oncotic pressure?

A) Globulin

B) Fibrinogen

C) Albumin

D) Hemoglobin

22. What is the physiological term for the reduction in blood flow to a tissue or organ?

A) Hyperemia

B) Ischemia

C) Hypoxia

D) Infarction

23. Which hormone is synthesized by the hypothalamus and stored in the posterior pituitary gland to regulate water retention?

A) Aldosterone

B) Cortisol

C) Vasopressin

D) Angiotensin II

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24. Which segment of the small intestine is primarily responsible for the absorption of Vitamin B12 and bile salts?

A) Duodenum
B) Jejunum
C) Ileum
D) Cecum

25. What is the process by which a cell engulfs large particles or microorganisms, such as in the activity of macrophages?

A) Exocytosis
B) Phagocytosis
C) Osmosis
D) Diffusion

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