

Advanced MCQs – Lecture 2: Cellular Level of Organization & Transport Processes

1. The cytoskeleton component responsible for maintaining cell shape and organelle movement is:

- A. Microfilaments
- B. Microtubules
- C. Intermediate filaments
- D. Microvilli

2. Which cytoskeletal element provides mechanical strength to cells under stress:

- A. Microfilaments
- B. Intermediate filaments
- C. Microtubules
- D. Actin fibers

3. Microfilaments are primarily composed of:

- A. Tubulin
- B. Actin and Myosin
- C. Collagen
- D. Elastin

4. The centrosome functions mainly to:

- A. Generate ATP
- B. Organize microtubules for spindle formation
- C. Digest waste
- D. Store ions

5. The structure that contains centrioles surrounded by pericentriolar material is:

- A. Nucleolus
- B. Centrosome
- C. Ribosome
- D. Lysosome

6. The main difference between cilia and flagella is:

- A. Cilia are shorter and more numerous
- B. Flagella move by beating together
- C. Cilia are non-motile
- D. Flagella are found in all cells

7. The major function of cilia in the respiratory tract is:

- A. Absorption
- B. Secretion
- C. Clearing mucus and debris
- D. Transporting ions

8. Ribosomes located on rough ER are mainly involved in synthesis of:

- A. Lipids
- B. Secretory and membrane proteins

- C. Steroids
- D. Carbohydrates

9. Smooth ER differs from rough ER because it:

- A. Has attached ribosomes
- B. Produces ATP
- C. Synthesizes lipids and detoxifies chemicals
- D. Forms glycoproteins

10. Calcium storage and release in muscle cells occurs in:

- A. Golgi complex
- B. Lysosomes
- C. Smooth ER
- D. Mitochondria

11. The Golgi complex receives proteins from:

- A. Mitochondria
- B. Rough ER
- C. Ribosomes
- D. Peroxisomes

12. The Golgi complex modifies proteins mainly to form:

- A. Lipids
- B. Glycoproteins and glycolipids
- C. Polysaccharides
- D. Steroids

13. Lysosomes are directly formed from:

- A. Ribosomes
- B. Golgi complex
- C. ER
- D. Cytosol

14. Which of the following is not a lysosomal function:

- A. Autophagy
- B. Protein synthesis
- C. Autolysis
- D. Digestion of materials

15. The enzyme catalase is found in:

- A. Lysosomes
- B. Golgi
- C. Peroxisomes
- D. Ribosomes

16. Peroxisomes are most abundant in:

- A. Muscle cells
- B. Liver cells
- C. Neurons
- D. Red blood cells

17. Proteasomes primarily function to:

- A. Store proteins
- B. Digest organelles
- C. Degrade damaged or misfolded proteins
- D. Synthesize enzymes

18. Mitochondria produce ATP through:

- A. Anaerobic respiration
- B. Aerobic respiration
- C. Glycolysis only
- D. Fermentation

19. Cells with high ATP demand (e.g. muscle) contain:

- A. Few mitochondria
- B. Many mitochondria
- C. No mitochondria
- D. Only one mitochondrion

20. The inner folds of the mitochondria are called:

- A. Thylakoids
- B. Cristae
- C. Grana
- D. Microvilli

21. The nucleus is separated from cytoplasm by:

- A. Plasma membrane
- B. Nuclear envelope with pores
- C. Rough ER
- D. Chromatin

22. Which structure is responsible for ribosome production:

- A. Nucleolus
- B. Golgi
- C. Centrosome
- D. Lysosome

23. The total genetic information of a cell is termed:

- A. Genome
- B. Chromatid
- C. Gene
- D. Transcriptome

24. A positively charged ion will move toward:

- A. A neutral area
- B. A negatively charged area
- C. A region with the same charge
- D. Any concentration gradient

25. The combined effect of concentration and electrical gradients is called:

- A. Osmotic pressure
- B. Electrochemical gradient
- C. Membrane potential
- D. Kinetic energy

26. Passive transport differs from active transport in that passive transport:

- A. Requires ATP
- B. Moves substances against gradients
- C. Uses only kinetic energy
- D. Is vesicle-dependent

27. Which factor increases the diffusion rate across a membrane:

- A. Lower temperature
- B. Smaller concentration gradient
- C. Larger surface area
- D. Increased diffusion distance

28. Simple diffusion allows passage of:

- A. Ions and polar molecules
- B. Nonpolar and small uncharged molecules
- C. Large proteins
- D. Charged particles only

29. Which process requires carrier proteins but no ATP:

- A. Simple diffusion
- B. Facilitated diffusion
- C. Primary active transport
- D. Vesicular transport

30. In channel-mediated diffusion, ion movement is regulated by:

- A. ATP pumps
- B. Gated channel proteins
- C. Ribosomes
- D. Lysosomes

31. Osmosis moves water from:

- A. Low solute to high solute concentration
- B. High solute to low solute
- C. High pressure to low pressure
- D. High ATP to low ATP

32. A cell placed in a hypotonic solution will:

- A. Shrink
- B. Swell and burst
- C. Stay the same
- D. Lose ions only

33. Crenation occurs when a cell is placed in:

- A. Isotonic

- B. Hypotonic
- C. Hypertonic
- D. Distilled water

34. The sodium–potassium pump is an example of:

- A. Primary active transport
- B. Secondary active transport
- C. Facilitated diffusion
- D. Osmosis

35. The energy source for secondary active transport is:

- A. ATP hydrolysis directly
- B. Ion concentration gradient
- C. Light
- D. Mechanical force

36. Endocytosis involves:

- A. Vesicles forming to bring materials into the cell
- B. Releasing vesicles
- C. Passive diffusion
- D. Osmosis

37. Receptor-mediated endocytosis differs because it:

- A. Requires no receptors
- B. Selectively internalizes molecules using specific receptors
- C. Occurs randomly
- D. Is passive

38. Phagocytosis primarily engulfs:

- A. Small solutes
- B. Large particles like bacteria
- C. Lipids
- D. Ions

39. The release of neurotransmitters occurs through:

- A. Pinocytosis
- B. Exocytosis
- C. Phagocytosis
- D. Diffusion only

40. Transcytosis refers to:

- A. The destruction of proteins
- B. Movement of vesicles across a cell from one side to another
- C. Vesicle formation inside nucleus
- D. Passive ion exchange

Answer Key

1. B
2. B
3. B
4. B
5. B
6. A
7. C
8. B
9. C
10. C
11. B
12. B
13. B
14. B
15. C
16. B
17. C
18. B
19. B
20. B
21. B
22. A
23. A
24. B
25. B
26. C
27. C
28. B
29. B
30. B
31. A
32. B
33. C
34. A
35. B
36. A
37. B
38. B
39. B
40. B