وزارة التعليم العالي و البحث العلمي
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
ABBES LAGHROUR UNIVERSITY KHENCHELA
FACULTY OF MEDICINE

الجمهورية الجزائرية الديمقراطية الشعبية
PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
جامعة عباس لغرور - خنشلة
ملحقة كلية الطب

First Written Assessment of Cytology

~~16/12/2025~~ ~~Exam Duration 1h :30mn~~

Choose One correct answer

1. Which structural feature is characteristic of Gram-negative bacteria and explains their specific response to Gram staining?
A. A thick peptidoglycan layer directly exposed to the extracellular environment
B. The presence of teichoic acids associated with peptidoglycan
C. A thin peptidoglycan layer located between two membranes
D. The absence of a cell wall
E. A peptidoglycan layer representing more than 80% of the cell wall

2. What is the main functional role of the periplasmic space, particularly in Gram-negative bacteria?
A. Storage of genetic material
B. ATP synthesis
C. Protein synthesis
D. Enzymatic degradation and transport of nutrients
E. Protection against mechanical stress

3. Which statement correctly describes the bacterial chromosome?
A. It is enclosed within a nuclear membrane
B. It consists of multiple linear DNA molecules
C. It is a circular, double-stranded DNA molecule located in the cytoplasm
D. It represents only a minor fraction of the bacterial genetic material
E. It is associated with histone proteins similar to eukaryotic cells

4. Which microscopy technique is most appropriate for observing living cells without staining?
A. Transmission electron microscopy
B. Scanning electron microscopy
C. Fluorescence microscopy
D. Phase-contrast microscopy
E. Confocal microscopy

5. What mainly explains the higher resolving power of the electron microscope compared to the optical microscope?
A. The use of fluorescent dyes
B. The presence of a condenser lens
C. The use of thicker biological sections
D. The application of heavy metal staining
E. The use of shorter wavelengths associated with accelerated electrons

6. In optical microscopy, what is the theoretical limit of resolution?
A. 2 µm
B. 0.2 mm
C. 0.2 nm
D. 0.02 µm
E. 0.2 µm

7. What is the main objective of cryofracture followed by cryoetching?
A. To enhance surface relief and visualize membrane organization
B. To obtain serial ultra-thin sections for light microscopy

C. To chemically fix proteins using aldehydes
D. To selectively stain nucleic acids
E. To increase magnification without improving resolution

8. What is the main function of the plasma membrane?
A. Store genetic material
B. Control exchanges between intra- and extracellular environments
C. Synthesize proteins
D. Produce energy for the cell
E. Degrade toxic molecules

9. Under a transmission electron microscope (TEM), how does the plasma membrane appear in thin sections?
A. Single electron-dense layer
B. Two light layers separated by a dark layer
C. Tristratified with two dark layers and a light middle layer
D. Completely homogeneous
E. Only visible with staining

10. Which of the following is not a main lipid component of the plasma membrane?
A. Phospholipids
B. Cholesterol
C. Glycolipids
D. Triglycerides
E. Sphingolipids

11. Which statement correctly describes phospholipids in the plasma membrane?
A. They are fully hydrophobic
B. They are bipolar amphiphilic molecules with hydrophilic heads and hydrophobic tails
C. They form a rigid solid layer
D. They only exist in prokaryotic cells
E. They are proteins bound to carbohydrates

12. Which type of membrane protein crosses the lipid bilayer several times?
A. Peripheral proteins
B. Polytopic intrinsic proteins
C. Glycolipids
D. Cholesterol molecules
E. Single-pass extrinsic proteins

13. Which of the following best describes lipid asymmetry in the plasma membrane?
A. The same lipids are evenly distributed in both leaflets
B. Phosphatidylserine and phosphatidylethanolamine are abundant on the cytosolic side, while sphingomyelin and phosphatidylcholine are on the outer side
C. Cholesterol is only present on the outer leaflet
D. Glycolipids are only present on the cytosolic side
E. All lipids move freely across both leaflets

14. Which lipid movement is very rare and occurs slowly across the bilayer?
A. Lateral diffusion
B. Rotation
C. Flip-flop
D. Endocytosis
E. Exocytosis

15. Which type of transport does not require energy and moves molecules along their concentration gradient?
A. Primary active transport

B. Facilitated diffusion
C. Endocytosis
D. Exocytosis
E. Secondary active transport

16. Which of the following molecules primarily uses simple diffusion to cross the plasma membrane?
A. Glucose
B. Na+ ions
C. Steroid hormones
D. Amino acids
E. Proteins

17. What is the main difference between simple diffusion and facilitated diffusion?
A. Facilitated diffusion consumes ATP
B. Simple diffusion requires membrane proteins
C. Facilitated diffusion is saturable
D. Simple diffusion moves molecules against the gradient
E. Facilitated diffusion only occurs in the nucleus

18. Primary active transport is characterized by:
A. Transport along the concentration gradient without energy
B. Transport requiring ATP to move ions against the gradient
C. Transport mediated by aquaporins
D. Symport of glucose and sodium without ATP
E. Transport through ion channels only

19. The sodium-glucose symporter (SGLT1) is an example of:
A. Primary active transport
B. Facilitated diffusion
C. Secondary active transport
D. Simple diffusion
E. Endocytosis

20. Which statement about G protein-coupled receptors (GPCRs) is correct?
A. They directly phosphorylate proteins without a second messenger
B. They use a trimeric G protein to transmit signals
C. They transport glucose into cells
D. They pump Na+ ions against the gradient
E. They are a type of integrin

21. Integrins are primarily responsible for:
A. Facilitated diffusion of ions
B. Cell adhesion to the extracellular matrix
C. Transport of glucose via symport
D. Opening ligand-gated ion channels
E. Generating ATP for active transport

22. Which process allows the transport of two substances in opposite directions across the membrane?
A. Symport
B. Antiport
C. Facilitated diffusion
D. Simple diffusion
E. Primary active transport

23. What maintains the sodium gradient that powers the SGLT1 symporter?
A. Sodium/potassium ATPase (Na+/K+ pump)
B. Potassium leak channels
C. Aquaporins
D. Voltage-gated calcium channels

E. Integrins

24. Which statement best describes pinocytosis?

A. It is a selective endocytosis involving specific membrane receptors

B. It involves the uptake of large solid particles by specialized cells

C. It is a non-selective endocytosis of extracellular fluid and small particles

D. It occurs only in immune cells

25. In receptor-mediated endocytosis, which protein is mainly responsible for forming the coated pits?

A. Clathrin

B. Tubulin

C. Actin

D. Dynein

26. After LDL dissociates from its receptor in the acidic endosome, what happens to the LDL receptor?

A. It is degraded in the lysosome

B. It diffuses freely in the cytosol

C. It is recycled back to the plasma membrane

D. It is secreted outside the cell

27. Which statement correctly describes phagocytosis?

A. It occurs continuously in all cell types

B. It involves small vesicles less than 150 nm

C. It is mainly used for hormone secretion

D. It leads to the formation of phagolysosomes after lysosome fusion

From the diagram below

28. Element B is:

A. Clathrin

B. Receptor

C. LDL vesicle

D. Ligand

E. Membrane

29. Step 1 is

A. Recycling of clathrin and initiation of a new endocytosis cycle.

B. Assembly of the ligand-receptor complexes in clathrin-coated pits (clathrin-adaptin-receptor complex).

C. Separation of the clathrin coat from the vesicle

D. Detachment of the clathrin-coated vesicle from the plasma membrane.

E. Binding of the ligand to its specific membrane receptor.

30. Step 5 is

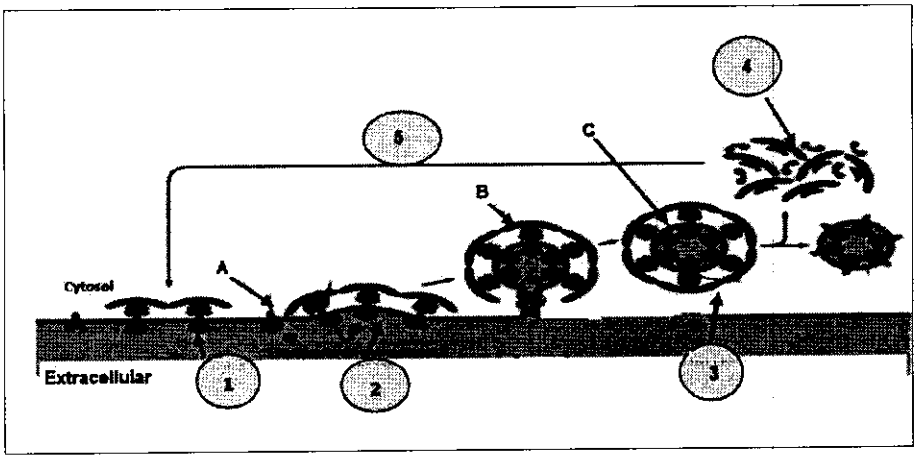
A. Recycling of clathrin and initiation of a new endocytosis cycle.

B. Assembly of the ligand-receptor complexes in clathrin-coated pits (clathrin-adaptin-receptor complex).

C. Separation of the clathrin coat from the vesicle

D. Detachment of the clathrin-coated vesicle from the plasma membrane.

E. Binding of the ligand to its specific membrane receptor.



Les bords contiennent de petits carrés noirs pour la lecture automatique. Ne pas raturer !

ABBES LAGHROUR University Khenchela - Faculty of medicine

Khenchela, le Mardi 16 Décembre 2025

EMD 1 de Cytologie (Première Année de Médecine : 2025-2026)

Nom:

Prénom:

Salle/Place / Date de naissance :

Matricule

Ce sujet contient 30 QCM

	A	B	C	D	E
1.	☐	☐	☒	☐	☐
2.	☐	☐	☐	☒	☐
3.	☐	☐	☒	☐	☐
4.	☐	☐	☐	☒	☐
5.	☐	☐	☐	☐	☒
6.	☐	☐	☐	☐	☒
7.	☒	☐	☐	☐	☐
8.	☐	☒	☐	☐	☐
9.	☐	☐	☒	☐	☐
10.	☐	☐	☐	☒	☐

	A	B	C	D	E
11.	☐	☒	☐	☐	☐
12.	☐	☒	☐	☐	☐
13.	☐	☒	☐	☐	☐
14.	☐	☐	☒	☐	☐
15.	☐	☒	☐	☐	☐
16.	☐	☐	☒	☐	☐
17.	☐	☐	☒	☐	☐
18.	☐	☒	☐	☐	☐
19.	☐	☐	☒	☐	☐
20.	☐	☒	☐	☐	☐

	A	B	C	D	E
21.	☐	☒	☐	☐	☐
22.	☐	☒	☐	☐	☐
23.	☒	☐	☐	☐	☐
24.	☐	☐	☒	☐	☐
25.	☒	☐	☐	☐	☐

	A	B	C	D	E
26.	☐	☐	☒	☐	☐
27.	☐	☐	☐	☒	☐
28.	☒	☐	☐	☐	☐
29.	☐	☐	☐	☐	☒
30.	☒	☐	☐	☐	☐