

# Cell and Molecular Biology Midterm Test

For Premed Year 2018/2019

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1- Which of the following represent matched polymer and monomer:

- a-Starch-glucose.
- b-Cellulose-nucleotides.
- c-Glycogen-galactose.
- d-Proteins-fatty acids.

2-What is the meaning of amphipathic molecule?

- a-It is a polar molecule.
- b- It has a polar side and a nonpolar side.
- c- It is a nonpolar molecule.
- d-It has a positive charged and a negative charged end.

3-We have 2 containers, one containing lysosome and the other containing peroxisome. What enzyme would you assay to confirm that the second container has peroxisomes?

- a-Protease.
- b-Phosphatase.
- c-Catalase.
- d-  $\beta$ -glucuronidase.

4-Disulfide bonds strengthen which of the following structures?

- a-Primary structure.
- b-Secondary structure.
- c-Tertiary structure.
- d- Primary, secondary and tertiary structure.

5-Which of the following molecules isn't synthesized by peroxisomes?

- a-Bile acid.
- b-Lysine.
- c-Plasmalogen.
- d-Dolichol.
- e-Cardiolipin.

6-What is NOT a common characteristic of lipid rafts?

- a-They can vary in number and move as a single unit.
- b-They contain high concentration of myristoylated peripheral proteins.
- c-They aid in viral infections.
- d-They contain high concentration of sphingolipids.

7-Why is the "selective permeability" important in the plasma membrane:

- a-It's a good barrier that separates the inner and outer cellular components.
- b- It prevents the passage of proteins.
- c-It can hold twice its weight off cholesterol.
- d-It doesn't allow cell-cell contact.

**8-Why is the cytosolic side of the membrane negatively charged?**

**a-It contains higher concentration of phosphatidylcholine, sphingomyelin and sphingolipids in the inner leaflet than the outer leaflet.**

**b-Presence of GPI anchored proteins.**

**c-High concentration of phosphatidylserine and phosphatidylethanolamine in the inner leaflet.**

**d-Free protein movement in the inner side.**

**9-Which of these processes don't occur in Golgi?**

**a-Vesicle budding from golgi cisternae from cis to trans face.**

**b-O-linked glycosylation.**

**c-Modification of N-linked glycosylation.**

**d-Protein sorting.**

**10-If there was a deficiency in COPII what direction of transport will be affected?**

**a-Transport from ER to cis golgi.**

**b-Retain of proteins back to golgi.**

**c-Transport from ERGIC to golgi.**

**d-Transport from golgi to the plasma membrane.**

**11- What is the function of oxatranslocase?**

**a-It inserts beta-sheets into the outer mitochondrial membrane.**

**b-It inserts proteins that are coded by mitochondrial DNA into the inner mitochondrial membrane.**

**c-It transports proteins into the intermembrane space.**

**d-Inserts proteins to the peroxisomal membrane.**

12-Which of these isn't a function of glycocalyx?

- a-Cell-cell interactions.
- b-Protection of cell surface from ionic stress.
- c-Protection of cell surface from mechanical stress.
- d-Barrier for microorganisms.
- e-Decrease concentration of cholesterol in the plasma membrane.

13-Where's importin found?

- a-Nucleus.
- b-Mitochondria.
- c-Peroxisomes.
- d-ER.

14-If we changed the NLS sequence of a protein to NES, what will happen?

- a-The protein will remain in the cytosol and can't enter the nucleus.
- b-The protein will be secreted out of the cell.
- c-The protein will be imported to the nucleus.
- d-The protein will remain in the nucleus and can't exit to the cytoplasm.

15-What's the secretory pathway of a protein destined to be secreted out of the cell?

- a-ER-secretory vesicles-golgi-ER vesicles.
- b-ER-ER vesicles-Golgi-secretory vesicles.
- c-Rough ER-ER vesicles-Golgi-Smooth ER.
- d-Smooth ER-Rough ER-Golgi-Secretory vesicles.

16- In I-cell disease, lysosomal enzymes are secreted from ER out of the cell, what could be the reason behind it?

- a-Lysosomal enzymes not phosphorylated in ER.
- b-Mannose not phosphorylated in Golgi.
- c-Enzymes not folded properly in the ER.
- d-A problem in the plasma membrane receptor.

17- The ligand binding domain of a protein must be inserted in:

- a-Golgi membrane facing the lumen.
- b-Golgi membrane facing the cytosol.
- c-ER membrane facing the lumen.
- d-ER membrane facing the cytosol.
- e-Plasma membrane facing the cytosol.

18-A cell biologist discovered a new protein and named it Smile. Smile has mutated Asparagine. Which of the following can't be done on Smile?

- a- O-linked glycosylation.
- b-N-linked glycosylation.
- c-GPI-anchoring.
- d-Farnesylation.

19-Which of these is NOT synthesized in smooth ER?

- a-Sphingomyelin.
- b-Phosphatidic acid.
- c-Ceramide.
- d-Phosphatidylcholine.

20- One of these is NOT a function of cytoskeleton?

- a-Determine cell shape.
- b-Mechanical support.
- c-Passive transport.
- d- Internal movement of organelles.

21-Which of these don't form adhesion between two cells or between a cell and the extracellular matrix?

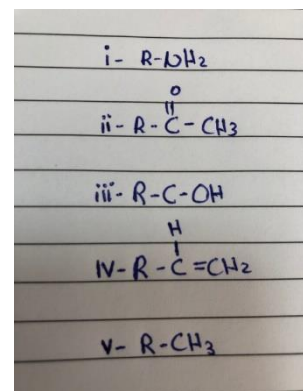
- a-Connexin.
- b-Cadherin.
- c-Desmosomes.
- d-Hemidesmosomes
- e-Occluden.

22-Which of these molecules isn't part of vesicular fusion (Snare model)?

- a-T-snare.
- b-V-snare.
- c-GTP-binding-Rab.
- d-Tethering complex.
- e-Signal recognition particle (SRP).

23-Which pair of these can form a hydrogen bond?

- a- ii,iii.
- b-i,iv.
- c-iv,v.
- d-i,v.



**24-What maintains lysosomal pH?**

- a-ATP-dependent proton pump.**
- b-Importomers.**
- c-Lysosomal membrane.**
- d-Acid hydrolases.**

**25-What's the advantage of lysosomes having acidic environment?**

- a-Inactivate acid hydrolases.**
- b-Prevent degradation of polysaccharides, proteins, DNA and RNA.**
- c-To help denature proteins.**
- d-Protein folding.**

**26-What is true regarding mitochondrial DNA?**

- a-Most mitochondrial proteins are coded by mitochondrial genome.**
- b-It is larger than nuclear DNA.**
- c-Mutations of mitochondrial DNA don't cause diseases.**
- d-Different genetic code by tRNA.**

**27-What process is activated to segregate damaged mitochondria?**

- a-Mitochondrial fusion.**
- b-Mitochondrial fission.**
- c-Insertion of proteins into the outer mitochondrial membrane.**
- d-Synthesis of phospholipids.**

28- A new hybrid motor protein was made by the fusion of kinesin's head and dynein's base, what movement can it carry out?

- a-Movement of golgi away from the center of the cell.
- b-Movement of mitochondria into the center of the cell.
- c-Movement of lysosomes into the center of the cell.
- d-Movement of vesicles to the minus end of microtubules.

29-In which of these structures Actin is not found?

- a-Filopodia.
- b-Nuclear lamina.
- c-Contractile ring.
- d-Stress fibers.

30-What is true about chromosomal territories?

- a-RNA processing and transport occur in the territory.
- b-Translation is inactivated in the interchromosomal domain.
- c-Heterochromatin is found in the middle of the territory.
- d-Euchromatin is found between the territories.
- e-Each territory contains more than one chromosome.

31-You were presented with two containers. One contains a portion of the plasma membrane and the other contains a portion of inner mitochondrial membrane, what could tell you that the second container contains IMM?

- a-High lipid to protein ratio.
- b-High protein to lipid ratio.
- c-High cholesterol to phospholipid ratio.
- d-High polysaccharide ratio in glycolipids.



32-Which r-RNA is associated with the small ribosomal unit?

- a-18S.
- b-28S.
- c-5S.
- d-5S and 5.8S.

33-How are intermediate filaments different from actin filaments and microtubules?

- a-Principle component of cytoskeleton in the cell.
- b-It has the largest diameter.
- c-It connects microtubules to actin filaments.
- d- It is highly polarized.

34-The dynamic instability in microtubules is described as:

- a-Catastrophe occurs when the rate of GTP-tubulin binding is higher than GTP-hydrolysis.
- b-Rescue occurs when the rate of GTP-hydrolysis is slower than binding of GTP-tubulin.
- c-Rescue occurs when the rate of GTP hydrolysis is faster than binding of GTP tubulin.
- d-Growth and shrinkage occur at the minus end.

35-Human epidermolysis bullosa involves mutated keratin that causes some effects. Which of the following structures are abnormal?

- a-Neurofilaments.
- b-Vimentin.
- c-Desmin.
- d-Type I and II intermediate filaments.

36-In cartilage, proteoglycans are connected to which of these to form a large complex?

- a-Fibronectin.
- b-Hyaluronan.

**c-Laminin.**

**d-Aggrecan.**

37-What does selectin do:

**a-Mediates the invasion of leukocytes to blood vessels.**

**b-Attach the cytoskeleton to the ECM.**

**c-Attach intermediate filaments to each other.**

**d-Connects actin filaments in muscle cells.**

38-Emphysema is due to high activity of elastase and that's due to the \_\_\_\_\_ which causes \_\_\_\_\_?

**a-Inactivation of  $\alpha$ -1 antitrypsin-abnormal bone structure.**

**b-Inactivation of  $\alpha$ -1 antitrypsin-abnormal lung sac structure.**

**c-Inactivation of elastin-abnormal muscle structure.**

**d-Activation of elastin-abnormal lung sac structure.**

39-Scurvy is due to a deficiency in vitamin C, which of these does it affect?

**a-Hydroxylation of proline in collagen.**

**b-Hydroxylation of proline in Elastin.**

**c-Glycosylation of hydroxylysine in collagen.**

**d-Hydroxylation of lysine in Elastin.**

**e-Hydroxylation of lysine in collagen.**

40-In the invasion of leukocyte to a cell. Which protein would you expect to find in lower concentration on the leading edge of the cell?

**a-Profilin.**

**b-Integrins.**

**c-Cofilin.**

**d- ATP-actin.**

41-What's true about lysosome?

a-Its proteins are transported directly to it via an importomer.

b-It can mature from late endosomes.

c-Its enzymes are synthesized in the active form.

d-They can't digest nucleic acids.

42-Which of the following pairs of cytoskeleton-junction match?

a-Desmosomes-actin filaments.

b-Hemidesmosomes-Intermediate filaments.

c-Gap junction-vimentin.

d-Adherens junction-microtubule.

43-If there was a deficiency in procollagen peptidase, which of these steps will be affected?

a-Extracellular assembly.

b-Secretion.

c-Hydroxylation of proline.

d-Synthesis.

44-Depolymerization of tubulin in microtubules happen only in the plus end because the minus end is connected to?

a-Nucleus.

b-Actin filaments.

c-ECM.

d-Microtubule organizing centre.

## ANSWER KEY

<b>1</b>	a	<b>23</b>	a
<b>2</b>	b	<b>24</b>	a
<b>3</b>	c	<b>25</b>	c
<b>4</b>	c	<b>26</b>	d
<b>5</b>	e	<b>27</b>	b
<b>6</b>	b	<b>28</b>	a
<b>7</b>	a	<b>29</b>	b
<b>8</b>	c	<b>30</b>	c
<b>9</b>	a	<b>31</b>	b
<b>10</b>	a	<b>32</b>	a
<b>11</b>	b	<b>33</b>	c
<b>12</b>	e	<b>34</b>	b
<b>13</b>	a	<b>35</b>	d
<b>14</b>	a	<b>36</b>	b
<b>15</b>	b	<b>37</b>	a
<b>16</b>	b	<b>38</b>	b
<b>17</b>	c	<b>39</b>	a
<b>18</b>	b	<b>40</b>	c
<b>19</b>	a	<b>41</b>	b
<b>20</b>	c	<b>42</b>	b
<b>21</b>	a	<b>43</b>	a
<b>22</b>	e	<b>44</b>	d

*GOOD LUCK*