

# 2020 Cytology Exam

1) Actin filaments are not associated with

- a. hemidesmosomes
- b. focal adhesions
- c. stress fibers
- d. adherens junctions
- e. contractile ring

answer A

2) What is is not true about intermediate filaments?

- a. Distinguished into 6 different classes based on tissue distribution.
- b. Monomer has 3 structural domains
- c. Can be found in all living cells
- d. Have diameter about 10 nm
- e. Vimentin filaments are dissociated by phosphorylation

ANSWER C

3) The movement of vesicular-tubular carriers (VTCS) farther away from the ER and toward the Golgi complex occurs along tracks composed of what material?

- a. intermediate filaments
- b. DNA
- c. microtubules
- d. RNA
- e. microfilaments

ANSWER C

4) One of the following is inhibited due to cAMP signal

- a. Protein kinase A (PKA)
- b. Glycogen synthase
- c. Glycogen phosphorylase
- d. Glycogen breakdown
- e. Glycogen phosphorylase kinase

ANSWER B

## 5) People who have the O blood type possess ?

- a. an enzyme that adds a galactose to the end of the oligosaccharide chain on membrane glycolipids
- b. no enzymes capable of attaching galactose or N- acetylgalactosamine to the end of the oligosaccharide chain on RBC membrane glycolipids
- c. an enzyme that adds phospholipids to the end of the oligosaccharide chain on RBC membrane glycolipids

ANSWER B

## 6) What characteristics distinguish prokaryotic and eukaryotic cells?

- a. Eukaryotes have membrane-bound organelles; prokaryotes do not
- b. Prokaryotes have relatively little DNA; eukaryotes generally have much more
- c. All choices are correct.
- d. Prokaryotic DNA is naked or nearly naked; eukaryotic DNA is usually heavily associated with protein.
- e. Eukaryotic chromosomes are linear; prokaryotic chromosomes are circular.

ANSWER C

7) Diffusion during which the substance to be transported binds selectively to a membrane- spanning protein, which helps the process along, is called

- a. simple diffusion
- b. facilitated diffusion
- C. facilitated osmosis
- d. active transport
- e. osmosis

ANSWER B

8) Which disease is an inherited blistering disease that can occur in patients with genetic alterations in any one of a number of hemidesmosomal proteins, including the  $\alpha 6$  or  $\beta 4$  integrin subunit, collagen VII or laminin-5?

- a. plisterosis
- b. eczema
- C. bullous pemphigoid
- d. hemidesmosomosis
- e. epidermolysis bullosa

ANSWER E

9) What is not true about assembly of microfilaments?

- a. requires ATP-G-actin molecules.
- b. faster at its – end.
- c. faster at its + end.
- d. Inhibited by the protein thymosin -beta-4
- e. enhanced by actin polymerizing proteins

ANSWER B

10) SH2 domain is found in

- a. Ras protein
- b. GBCR
- c. Sos
- d. RTK- linked adaptor proteins
- e. RTK

ANSWER D

11) Mitochondria are sites of the

- a. synthesis of heme groups
- b. uptake of  $\text{Ca}^{2+}$  ions
- c. release of  $\text{Ca}^{2+}$  ions
- d. synthesis of certain amino acids
- e. all choices are correct

ANSWER E

12) The degradation of the extracellular matrix, along with cell surface proteins, is accomplished mostly by a-----  
-----containing enzyme family called -----

- a. magnesium, matrix metalloproteinases
- b. manganese, matrix metalloproteinases
- c. copper, matrix metalloproteinases
- d. ferrous, matrix metalloproteinases
- e. zinc, matrix metalloproteinase

ANSWER E

13) By which mechanism glucose is absorbed in the small intestine ?

- a. ATP-driven active transport
- b. Symported with Na
- c . Cotransported with H<sup>+</sup>
- d. simple diffusion
- e. facilitated diffusion

ANSWER B

14) Based on what is known about the involvement of calcium ions in exocytosis, what should happen if Ca<sup>+2</sup> ions are injected into a cell

- a. Secretion stops.
- B. Wholesale exocytosis of nuclear contents occurs.
- C. Wholesale exocytosis of secretory product occurs.
- d. Wholesale endocytosis of secretory product occurs.
- E. Endocytosis rates are accelerated.

ANSWER C

15) What is not true about intermediate filaments ?

- a. Are tissue specific
- b. They are polarized with plus and minus ends
- c. They bear tension
- d. Glial acidic protein is an example of intermediate filaments
- e. They are unbranched filaments

ANSWER B

16) Which part of the Golgi complex is thought to function primarily as a sorting station that distinguishes between proteins to be shipped back to the ER and those that are allowed to proceed to the next Golgi station?

- a. the cis cisternae
- b. the medial cisternae
- c. the trans-Golgi network
- d. the trans cisternae
- e. the CGN

ANSWER E



17) What kind of membrane protein is found entirely outside the bilayer either the extracellular or cytoplasmic surface? These proteins are covalently linked to

- a. membrane lipid situated within the bilayer. integral protein
- b. transmembrane
- c. lipid-anchored protein
- d. peripheral proteins
- e. carbohydrate-anchored protein

ANSWER C

18) What is the molecular tag of lysosomal enzymes?

- a. Glucose-N-acetyl-P
- b. RGD
- c. Glucose -6-P
- d. Mannose-6-P
- e. KDEL

ANSWER D

19) Which of the following characteristics is(are) a basic property of cells?

- a. Cells are highly complex and organized
- b. Cells are capable of producing more of themselves.
- c. All choices are correct.
- d. Cells possess a genetic program and the means to use it.
- e. Cells acquire and utilize energy.

ANSWER C

20) A transport receptor that moves molecules from the nucleus to the cytoplasm is called a(n)

- a. receptin
- b. exportin
- c. importin
- d. transportin
- e. exhalin

ANSWER B

21) In vivo, what anchors cells to substratum?

- a. hemidesmosome
- b. gap junction
- c. adherens junction
- d. tight junction
- e. desmosome

ANSWER A

22) Once an organelle to be destroyed, like a mitochondrion, has been surrounded with a double membrane, what is the name of the structure that has been produced?

- a. phagolysosome
- b. phagosome
- c. autophagosome
- d. autophagolysosome
- e. bacteriophage

ANSWER D

### 23) The IF lamins , except

- a. are intermediate filaments
- b. line nucleoplasmic side of inner nuclear membrane
- C. not involved in import of nuclear proteins
- d. are filaments of 25 nm in diameters
- e .dissociation is mediated by their phosphorylation

ANSWER D

### 24) Which of the proteins below is(are) not made on the membrane-bound ribosomes of the RER?

- a. soluble lysosomal proteins
- b. peripheral proteins of the inner surface of the plasma membrane
- c. proteins of the extracellular matrix
- D. vacuolar enzymes

ANSWER B

25) Which of the following is a function of cellular membranes?

- a. selectively permeable barrier
- b. mediate intercellular interactions
- c. compartmentalization
- d. all choices are correct
- e. help cells respond to external stimuli

ANSWER D

26) In axonal transport, except

- A .dynein moves retrograde
- b. MT &MF work as rails
- c. kinisin moves vesicles anterograde
- d. dynein moves vesicles toward cell body
- e . kinisin moves vesicles toward cell body

ANSWER E

27) What is not correct about mitochondrion ?.

- a. Electron transport chain is located in its inner membrane
- b. Inner membrane has 3:1 protein to lipid ratio
- c. Is self replicative
- d. Can synthesize all of its proteins
- e. Its outer membrane contains porins

ANSWER D

28) The thin filamentous meshwork within the nucleus that is bound by integral membrane proteins of the inner surface of the nuclear envelope in animal cells is called the

- a. nucleon
- b. nuclear lamina
- C. basal lamina
- d. basement lamina
- e. nuclear limulus

ANSWER B

## 29) Focal adhesions

- a. all choices are correct
- b. transmit information to the cell interior that may lead to changes in cell adhesion
- C. collect information about the physical properties of the extracellular environment
- d. collect information about the chemical properties of the extracellular environment
- e .may act as a type of sensory structure

ANSWER A

30) A channel that opens in response to the binding of a specific molecule, which is usually not the solute that passes through the channel is called a

- a. ligand-gated channel
- b. voltage-gated channel
- C. positive-gated channel
- d. charge-gated channel
- e. electric-gated channel

ANSWER A

31) The best-studied adaptors that participate in the formation of the coated pits and coated vesicles of clathrin-mediated endocytosis are the adaptors.

- a. COPI
- b. Clathrin
- c. AP2
- d. COPII
- e. GGA

ANSWER C

32) Selectins mediate interactions between which of the following?

- a. skin cells in different skin layers
- b. intestinal epithelial cells with neighboring cells
- c. leukocytes and blood vessel endothelial cells
- d. muscle cells and ECM
- e. nerve cells and other nerve cells



ANSWER C

33) Which answer shows the correct order of the flow of information during cell signaling?

- a. Change in gene expression, signal transduction, receptor-ligand binding, cellular response
- b. Cellular response, change in gene expression, signal transduction, receptor-ligand binding
- c. Receptor-ligand binding, cellular response, signal transduction, change in gene expression
- d. Receptor-ligand binding, signal transduction, cellular response, change in gene expression 47
- e. Signal transduction, cellular response, change in gene expression, receptor-ligand binding

ANSWER D

34) What is not true about programmed cell death?

- a. Necroptosis ends by cell lysis and inflammation of surrounding tissue
- b. Macrophages engulf and clear apoptotic cells
- c. Intrinsic apoptotic pathway involves mitochondria and activation of caspase 9

- d. Apoptosis needed during embryonic development and during adult
- E. Extrinsic apoptotic pathway involves activation of caspase 9

ANSWER E

35) What happens if histone H1 is selectively extracted from compacted chromatin (30 nm fibers)?

- a. 30-nm fibers uncoil to form a thinner, more extended beaded filament.
- b. 30-nm fibers break into small fragments.
- C. 30-nm fibers break up into large fragments,
- d. 30-nm fibers coil to form a thicker, less extended cylindrical filament.
- e 30-nm fibers completely disassemble to their component nucleotides

ANSWER A

36) Sodium/ potassium pump.

- A.is found in all eukaryotic cells
- b. is not an electrogenic pump
- c. influxes 3 Na<sup>+</sup> and effluxes 2 K<sup>+</sup> per cycle

- d. utilizes 2 ATP molecules per cycle
- e. effluxes 3 Na<sup>+</sup> and influxes 2 K<sup>+</sup> per cycle

ANSWER E

37) They are more gelated and highly ordered than the surrounding more fluid and disordered regions in artificial membranes that consist primarily of phosphoglycerides. They contain higher concentrations of sphingolipids and cholesterol and certain proteins become concentrated within them. What are they?

- A. lipid domains
- b. dense bilayers
- C collections
- d. lipid islands
- e. lipid rafts

ANSWER E

38) Which of the following can not be seen by light microscope?

- a. chromosomes
- b. Golgi apparatus
- c. cell nucleus
- d. ribosome
- e. bacterial cell

ANSWER D

39) What effect does the binding of the SRP to the growing polypeptide chain and the ribosome have on protein synthesis?

- A .Protein synthesis accelerates.
- b. Protein synthesis ceases temporarily.
- c. The ribosome dissociates.
- D. Protein synthesis is terminated.
- e. Protein synthesis ceases permanently

ANSWER B

40) During "treadmilling", actin filament OF

- a. in equilibrium state
- b. shortening
- C. increasing in diameter
- d. contracting
- e. elongation

ANSWER A

41) What causes catastrophic MT disassembly?

- a. GTP hydrolysis at + end
- b. GTP hydrolysis at - end
- c. Free GDP tau
- d. Taxol
- e. GDP tubulin dimers in the middle of MT

ANSWER A

42) Which of the following enzymes are typically found in lysosomes?

- a. oxidoreductases
- b. hydrolytic enzymes (acid hydrolases)
- C. catalase
- D. ligases
- e. transferases

ANSWER B

43) What are the building blocks of a phosphoglyceride, namely phosphatidic acid?

- A. glycerol + 2 phosphate groups +1 fatty acid
- b. glycerol + 3 fatty acids
- C. glycerol + 1 phosphate group + 3 fatty acids
- d. glycerol +1 phosphate group + 2 fatty acids
- e. glycerol + 1 phosphate group

ANSWER D

44) The activation of phospholipase *CB* results in

- a. All choices are correct
- b.  $\text{Ca}^{+2}$  influx increase in cytosolic  $\text{Ca}^{+2}$
- C. Activation of PKC
- d. generation of DAG
- e. generation of  $\text{IP}_3$

ANSWER A

45) What happened to COPI-coated vesicles within the cell when the cell was treated with GTP analogues that could not be hydrolyzed?

- a. They decrease substantially in number in the cytoplasm.
- b. They accumulate in the nucleus.
- c. They fuse into one giant vesicle that was seen in the cytoplasm.
- d. They decrease substantially in number in the nucleus.
- e. They accumulate in the cytoplasm.

ANSWER E

46) Which of the followings is not considered to be a component or associated with the cytoskeleton ?

- a. Laminin
- b. Tau protein
- C. Gamma tubulin
- d. Filamin
- e. Gelsolin

ANSWER A

47) What components below are selected for transport by vesicles originating in the Golgi complex?

- a. All of the options are correct.
- b. secretory proteins
- c. proteins required to dock the vesicle to an acceptor membrane
- d. lysosomal proteins
- e. proteins required to target the vesicle to an acceptor membrane

ANSWER A



48) What integral membrane protein family made of two membrane-spanning chains (alpha and beta) is involved in attaching cells to their extracellular microenvironment?

- a. myosins
- b. integrins
- c. glycoporphins
- d. laminins
- e. fibronectin

ANSWER B

49) Bacteria will often pass a piece of DNA from a donor bacterial cell to a recipient bacterial cell presumably through a structure called a pilus. What is this process called?

- a. confirmation
- b. fission
- c. transduction
- d. conjugation
- e. transformation

ANSWER D

50) Which of the proteins below is(are) not made on the membrane-bound ribosomes of the RER?

- a. soluble lysosomal proteins
- b. peripheral proteins of the inner surface of the plasma membrane
- C. Proteins of the extracellular matrix
- d. proteins of the extracellular matrix vacuolar enzymes

ANSWER B

51) What is not correct about peroxisomes?

- a. involved in toxins detoxification
- b. Contain the enzyme catalase
- c. involved in metabolism of long chain fatty acids
- d. Can synthesize some of their proteins
- e. Are site of oxidative catabolism

ANSWER D

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