

# Histology MCQs/Cell

1 Where inside the cell takes place the **ATP synthase**?

- ☐ In the cell membrane
- ☐ In the the cytoplasm
- ☐ In the inner mitochondrial membrane
- ☐ In the outer mitochondrial membrane

2 Which is common number of chromosomes (diploid count) in the non-mitotic cell?

- ☐ 21 pairs
- ☐ 22 pairs
- ☐ 23 pairs
- ☐ 24 pairs

3 Which cytoskeletal structure is associated with **dyneins**?

- ☐ Vimentin
- ☐ Microtubules
- ☐ Actin filaments
- ☐ Intermediate filaments

4 Where takes place final sorting ("addressing") of proteins?

- ☐ Peroxisomes
- ☐ Golgi apparatus
- ☐ Rough endoplasmic reticulum
- ☐ Smooth endoplasmic reticulum

5 For which molecules is a simple diffusion main mechanism of transportation through the cell membrane?

- ☐ Aminoacids
- ☐ Monosaccharides
- ☐ Lipophilic molecules
- ☐ Positively charged proteins

6 How are called enzymes which are responsible for fragmentation of cellular structures during apoptosis?

- ☐ Caspases
- ☐ Phosphatases
- ☐ Phosphokinases
- ☐ Adenylatcyclases

7 How are transported natrium ions through the cell membrane?

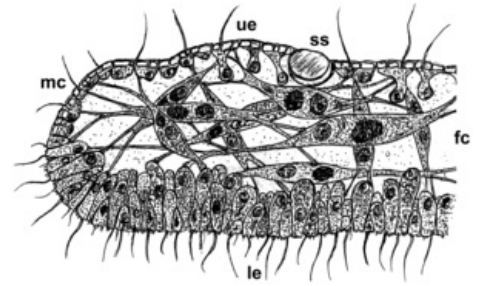
- ☐ Diffusion through the phospholipid bilayer
- ☐ Diffusion through the membrane rafts
- ☐ Through the specific channels
- ☐ Through the aquaporins

8 How is called the phase of the cycle in which is the cell in the rest and does not proliferate?

- ☐ G0 phase
- ☐ G1 phase
- ☐ G2 phase
- ☐ G3 phase

9 How is stored the **glycogen**?

- ☐ Glycogen is stored freely dissolved in the cytoplasm
- ☐ Glycogen is stored as granules in the cytoplasm



Because of few cell types only, med students at the end of first year like Placozoa.

- ☐ Glycogen is stored inside membranous vacuoles
- ☐ Glycogen is stored as nuclear inclusions

**10** How many membranes (biomembranes) form the nuclear envelope?

- ☐ One membrane
- ☐ Two membranes
- ☐ Three membranes
- ☐ There are no membranes in the nuclear envelope

**11** Which of the following statements describes **lipofuscin** the best?

- ☐ Material waiting for secretion out of the cell
- ☐ End-product of digestion in lysosomes
- ☐ Storage of molecules for further use
- ☐ Protection of the nucleus

**12** Inner layer of the nuclear envelope is called lamina fibrosa. What is its chemical nature? (i.e., "*Which molecules form the lamina fibrosa?*")

- ☐ Proteins which belong to the intermediate filaments
- ☐ Proteins which belong to the microfilaments
- ☐ Polysaccharides related to the glycocalyx
- ☐ Lipoprotein particles

**13** Which type of cytoskeleton is associated with **kinesins**?

- ☐ Intermediate filaments
- ☐ Actin filaments
- ☐ Microtubules
- ☐ Vimentin

**14** What are **lamins**? (i.e., "*Which structures are called lamins?*")

- ☐ Intermediate filaments inside the cell nucleolus
- ☐ Intermediate filaments inside the cell nucleus
- ☐ Microfilaments inside the cell nucleolus
- ☐ Microfilaments inside cell nucleus

**15** Which type of enzymes is inside lysosomes?

- ☐ Alkaline phosphatase
- ☐ Hydrolytic enzymes
- ☐ Phosphokinases
- ☐ Dehydrogenases

**16** What is the basic chemical structure of biological membrane?

- ☐ Phospholipid bilayer
- ☐ Cholesterol bilayer
- ☐ Protein-based web
- ☐ Polysaccharides

**17** Which type of cytoskeleton is associated with myosin motors?

- ☐ Intermediate filaments
- ☐ Actin filaments
- ☐ Microtubules
- ☐ Vimentin

**18** How is called well stainable (i.e. "darker") nuclear chromatin?

- ☐ Euchromatin
- ☐ Pars fibrosa
- ☐ Pars granulosa
- ☐ Heterochromatin

**19** Nuclear envelope continues (i.e., is in association with, can be assumed as a part of) as other cell organelle. Which one?

- ☐ Nuclear envelope is completely separated, there are no similar organelles
- ☐ Rough endoplasmic reticulum
- ☐ Smooth endoplasmic reticulum
- ☐ Golgi apparatus

**20** Which type of enzymes are usually present in **peroxisomes**?

- ☐ Peroxidase and alkaline phosphatase
- ☐ Phosphokinase and calatase
- ☐ Peroxidase and catalase
- ☐ Alcoholdehydrogenase

**21** Which proteins are main proteins of the nucleosome?

- ☐ Cytokeratines
- ☐ Phosphatases
- ☐ Integrins
- ☐ Histones

**22** Smooth endoplasmic reticulum has several functions, but one of following functions is not the function of the smooth endoplasmic reticulum. Which one?

- ☐ Metabolisms of some toxic compounds
- ☐ Synthesis of phospholipids
- ☐ Storage of calcium ions
- ☐ Synthesis of proteins

**23** **Vimentin** (vimentin intermediate filaments) is marker of one cell population (i.e., it is present in huge amount). Which one?

- ☐ Cells of nerve tissue
- ☐ Cells of epithelial origin
- ☐ Cells of mesenchymal origin
- ☐ Cells originating in the neural crest

**24** What is main function of **histones**?

- ☐ Histones are nuclear proteins which are involved mainly in arrangement of DNA
- ☐ Histones are nuclear proteins which are involved mainly in direct regulation of gene expression
- ☐ Histones are cytoplasmic proteins which are involved mainly in further processing of mRNA
- ☐ Histones are cytoplasmic proteins which are responsible mainly for regulation of life-span of mRNA

**25** What does it mean that mitosis of stem cell is asymmetric?

- ☐ Daughter cells are different according to their genetics. Amount of genetic information in one if them is obviously smaller than in the second
- ☐ Daughter cells are different according to their function. One of them remains the stem cell whereas the second differentiates to mature cell
- ☐ Daughter cells are different according to their energetic. After cytokinesis, majority of mitochondria is in one daughter cell only
- ☐ Daughter cells are different according to their morphology. One of them is obviously smaller than the second

**26** What is it a **glycocalyx**?

- ☐ Group of integral proteins serving as a support for membrane-associated polysaccharides
- ☐ Layer of peripheral proteins associated with outer side of the cell membrane
- ☐ Layer of peripheral proteins associated with inner side of the cell membrane
- ☐ Layer of saccharides bind on the the cell membrane

**27** What is it an **ubiquitin**?

- ☐ Small protein which labels proteins targeted to degradation in proteasomes
- ☐ Small protein which labels proteins targeted to degradation in lysosomes
- ☐ Oligosaccharide which labels proteins targeted to degradation in proteasomes
- ☐ Oligosaccharide which labels proteins targeted to degradation in lysosomes

**28** What is main function of **cyclin-dependent kinases**?

- ☐ Phosphorylation of other important protein and keeping the cell cycle in progress
- ☐ After binding of cyclins, these enzymes modify DNA
- ☐ After binding of cyclins, these enzymes replicate DNA
- ☐ Removing of used cyclines

**29** What is main function of **nucleolus**?

- ☐ Synthesis of lipids
- ☐ Synthesis of sugars
- ☐ Synthesis of rRNA
- ☐ Synthesis of mRNA

**30** What is main function of **rough endoplasmic reticulum**?

- ☐ Synthesis of sterols (derivatives of cholesterol)
- ☐ Metabolic transformation of toxic substances
- ☐ Synthesis of phospholipids
- ☐ Synthesis of proteins

**31** What is **not** common for apoptosis?

- ☐ Spontaneous course of whole process
- ☐ Degradation of membrane proteins
- ☐ Fragmentation of DNA
- ☐ Consumption of energy

**32** What is it a **pinocytosis**?

- ☐ Ingestion of big particles, for example death cells
- ☐ Passing of water and ions through membrane channels
- ☐ Ingestion of small volumes of fluid into the cell
- ☐ Excretion of material out of the cell

**33** Where takes place checking of quality of packing of the proteins (quality of conformation)?

- ☐ Smooth endoplasmic reticulum
- ☐ Rough endoplasmic reticulum
- ☐ Golgi apparatus
- ☐ Lysosomes

**34** Which of following cell junctions is usually responsible for mechanical cohesivity?

- ☐ Desmosome (macula adhaerens)
- ☐ Gap junction (nexus)
- ☐ Zonula adhaerens
- ☐ Focal adhesion

**35** Which of following statements describes an **active transport** the best?

- ☐ Active transport is important for maintenance of activity of cell receptors
- ☐ Carrier proteins select molecules for the transport actively
- ☐ Active transport is a sign of metabolic activity of the cell
- ☐ Carrier proteins consume energy for main transport

**36** Which of following statements describes an **autophagy** the best?

- ☐ Cell surrounds part of its own cytoplasm with organelles by a membrane which later on fuses with proteasomes. Resulting structure is called autophagosome and the content is digested.
- ☐ Cell surrounds part of its own cytoplasm with organelles by a membrane which later on fuses with lysosomes. Resulting structure is called autophagosome and the content is digested.
- ☐ Cell which is not true phagocyte ingests other labeled cell. Cell in cell is called autophagosome and its content is slowly dissolved.
- ☐ Balance of the cell metabolism is skewed from the anabolism to the catabolism, the cell seemingly slowly digest itself.

**37** Which order of steps of mitosis is correct?

- ☐ Prophase - metaphase - anaphase - telophase

- ☐ Metaphase - telophase - anaphase - prophase
- ☐ Telophase - metaphase - prophase - anaphase
- ☐ Anaphase - prophase - metaphase - telophase

**38** Which type of cytoskeleton is associated with **desmosomes** (macula adhaerens)?

- ☐ Desmosomes are not associated with the cytoskeleton
- ☐ Intermediate filaments
- ☐ Actin filaments
- ☐ Microtubules

**39** Which type of cytoskeleton is associated with **gap junctions** (nexus)?

- ☐ Gap junctions are not associated with cytoskeleton
- ☐ Vimentin filaments
- ☐ Actin filaments
- ☐ Microtubules

**40** Which type of cytoskeleton is associated with **zonulae occludentes** (tight junction)?

- ☐ Intermediate filaments
- ☐ Vimentin filaments
- ☐ Actin filaments
- ☐ Microtubules

**41** Which type of cytoskeleton supports kinocilia?

- ☐ Intermediate filaments
- ☐ Vimentin filaments
- ☐ Actin filaments
- ☐ Microtubules

**42** Which staining is appropriate tool for proof of glycogen granules?

- ☐ Silver impregnation according to Gömöri
- ☐ Azocoupling reaction
- ☐ Feulgen's reaction
- ☐ PAS reaction

**43** Which statement about the intermediate filaments is true?

- ☐ Some intermediate filaments are temporary structures, some are stable structures
- ☐ Rearrangement of intermediate filaments is performed without depolymerization
- ☐ Intermediate filaments polymerize and depolymerize quickly
- ☐ Intermediate filaments are stable structures

**44** Which statement about the **mitochondrial DNA** is true?

- ☐ There can be some DNA inside mitochondria, but these fragments do not contain genes
- ☐ Mitochondria have their own circular DNA
- ☐ Mitochondria have their own linear DNA
- ☐ There is no DNA inside mitochondria

**45** Which statement about the mitochondrial membranes is true?

- ☐ Mitochondria have three membranes - inner, middle and outer
- ☐ Mitochondria have two membranes - inner and outer
- ☐ Mitochondria have only one membrane
- ☐ Mitochondria have no membrane

**46** Which statement about microtubules is true?

- ☐ Microtubules grow from the centrosome and quickly disintegrate
- ☐ Microtubules quickly form regular network inside the cell and quickly disintegrate
- ☐ Microtubules grow from the centrosome, the star-shaped network is stable
- ☐ Microtubules form stable regular network inside the cell

**47** Which structure supports (i.e., forms their inner "skeleton") stereocilia?

- ☐ Intermediate filaments
- ☐ Vimentin filaments
- ☐ Actin filaments
- ☐ Microtubules

**48** Which technique allows us to distinguish different chromosomes?

- ☐ Lectin histochemistry using horse radish peroxidase as a label
- ☐ Immunohistochemistry labeled by fluorescent dye
- ☐ Fluorescent in situ hybridization (FISH)
- ☐ Feulgen's reaction

**49** Which type of membrane receptors **is not common** in our cells?

- ☐ Receptors associated with ion channels
- ☐ Receptors associated with ATP synthase
- ☐ Receptors with own enzymatic activity
- ☐ Receptors associated with G proteins

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