

# Histology MCQs/Histological Technique

1 All statements below are less or more related to the **autolysis**. Which of them is the best?

- ☐ Autolysis is decay of tissues caused mainly by bacteria
- ☐ Autolysis is decay of tissues caused mainly by action of the immune system
- ☐ Autolysis is decay of tissues caused mainly by enzymes produced inside the tissue
- ☐ Autolysis is decay of tissues caused by chemical compounds into which is the sample placed after harvesting

2 **Azokoupling reaction** (azocoupling method) is a proof of enzymatic activity. Which enzyme is usually detected?

- ☐ Alkaline phosphatase
- ☐ Alcoholdehydrogenase
- ☐ Non-specific esterase
- ☐ Horseradish peroxidase

3 Degradation of a biological material caused by bacteria is called:

- ☐ Apoptosis
- ☐ Autolysis
- ☐ Liquefaction
- ☐ Putrefaction

4 How is removed the water out of tissues during common histological processing?

- ☐ We use baths with xylene of subsequently higher and higher concentration
- ☐ We use baths with ethanol of subsequently higher and higher concentration
- ☐ We use baths with acetone of subsequently higher and higher concentration
- ☐ We use baths with benzene of subsequently higher and higher concentration

5 Which compound is proven by **Feulgen's method** (Feulgen's staining)?

- ☐ DNA
- ☐ RNA
- ☐ Proteins
- ☐ Polysaccharides

6 How is called harvesting (collecting) of biological material from deceased?

- ☐ Necropsy
- ☐ Necromancy
- ☐ Necrocomion
- ☐ Material from deceased is not called "biological material"

7 How is called harvesting (collecting) of biological material?

- ☐ Fine needle aspirational biopsy
- ☐ Core cut biopsy
- ☐ Trepanobiopsy
- ☐ Biopsy

8 How thick are usually slices of the sample which are being glued on the underlying slide? (*note: Assume light microscopy only.*)

- ☐ 1 - 10 nm
- ☐ 1 - 2  $\mu\text{m}$
- ☐ 4 - 10  $\mu\text{m}$
- ☐ 50 - 100  $\mu\text{m}$



Today's histological laboratories are usually automated, but main principles are often old.

**9** Which type of a microscope has to use laser as a source of light?

- ☐ Confocal microscope
- ☐ Polarisation microscope
- ☐ Phase contrast microscope
- ☐ Scanning electron microscope

**10** Which structure is demonstrated (stained) by **luxol blue**?

- ☐ Mucopolysaccharides
- ☐ Phospholipids
- ☐ Glycogen
- ☐ Lipids

**11** What is main principle of visualization of **PAS reaction**? (i.e., "*How it works in a nutshell?*")

- ☐ Purple and insoluble product of reaction of Schiff's reagent with an aldehyde
- ☐ Green and insoluble product of reaction of Schiff's reagent with an aldehyde
- ☐ Purple and insoluble product of reaction of Lugol's reagent with an aldehyde
- ☐ Green and insoluble product of reaction of Lugol's reagent with an aldehyde

**12** Which type of chemical interaction is main principle of basic (overview) staining methods?

- ☐ Van der Waals interactions between charged biomolecules and charged molecules of dyes
- ☐ Electrostatic interaction between charged biomolecules and charged molecules of dyes
- ☐ Covalent bonds between charged biomolecules and charged molecules of dyes
- ☐ It depends on the staining technique, different principles can be dominant

**13** Among following dyes, only one **is not acidic**. Which one?

- ☐ Eosin
- ☐ Orange G
- ☐ Anilin blue
- ☐ Hematoxylin

**14** Which of following dyes **is not** basic?

- ☐ Hematein
- ☐ Orange G
- ☐ Hematoxylin
- ☐ Methylen blue

**15** Which macromolecules are proven by **PAS reaction**?

- ☐ RNA
- ☐ DNA
- ☐ Proteins
- ☐ Polysaccharides

**16** How is called the technique which is able to detect specific sequence of nucleic acid on the tissue section?

- ☐ In situ hybridization
- ☐ Lectin histochemistry
- ☐ Immunohistochemistry
- ☐ Feulgen's method

**17** Which structure is highlighted using **silver impregnation**?

- ☐ Mucopolysaccharides
- ☐ Reticular fibers
- ☐ Elastic fibers
- ☐ Mucus

**18** Which compound is stained by **alcian blue**?

- ☐ Mucopolysaccharides
- ☐ Phospholipids
- ☐ Glycogen

- ☐ Lipids

**19** Which cellular structure is stained by **aldehyde fuchsin**?

- ☐ Reticular fibers
- ☐ Polysaccharides
- ☐ Elastic fibers
- ☐ Mucus

**20** What stains **orcein**?

- ☐ Reticular fibers
- ☐ Polysaccharides
- ☐ Elastic fibers
- ☐ Mucus

**21** **Dyes of Sudan group** are usually used as a staining for:

- ☐ Polysaccharides
- ☐ Nucleid acids
- ☐ Proteins
- ☐ Lipids

**22** Which basic (overview) staining technique is used the most often?

- ☐ Weigert - Van Gieson
- ☐ Mallory's trichrome
- ☐ Hematoxylin - eosin
- ☐ Masson's trichrome

**23** Trichromatic methods (trichromes) are used for visualization of collagen. On which property of collagen is based this staining?

- ☐ Collagen fibers are basophilic
- ☐ Collagen fibers are eosinophilic
- ☐ Collagen fibers are amphiphilic
- ☐ Trichromes cannot be used for this purpose

**24** What is main purpose of a cryotome?

- ☐ Slicing of frozen samples
- ☐ Slicing of desiccated samples
- ☐ Slicing of samples embedded into water soluble media
- ☐ Slicing of samples embedded into water insoluble media

**25** What is it a metachromasia? (i.e., *What does it means a metachromatic staining?*)

- ☐ Metachromatic structure actively repulses molecules of the dye
- ☐ Stained structure has different color than the color of the dye
- ☐ Metachromatic structure actively accumulates molecules of the dye
- ☐ Stained structure reacts chemically with the dye and this reaction changes substantially the chemical nature of the dye

**26** What does it mean an **excision**?

- ☐ Surgical removing of part of organ
- ☐ Surgical removing of several organs
- ☐ Brush away free cells from the surface
- ☐ Harvesting of small cylinder of the tissue using a needle

**27** What does it mean **mounting of the slide**?

- ☐ Final gluing of the covering slide
- ☐ Gluing of the slice on the underlying slide
- ☐ Covering the block of tissue by the paraffin
- ☐ Labeling of final slide by a bar- or QR code

**28** What is it a **diastase reaction**?

- ☐ Modification of PAS reaction based on two slides. One of these slides is pretreated by an enzyme which digest a DNA
- ☐ Modification of PAS reaction based on two slides. One of these slides is pretreated by an enzyme which digest a glycogen
- ☐ Modification of Feulgen's reaction based on two slides. One of these slides is pretreated by an enzyme which digest a DNA
- ☐ Modification of Feulgen's reaction based on two slides. One of these slides is pretreated by an enzyme which digest a glycogen

**29** What is it an **indirect methods** of immunohistochemistry?

- ☐ Label is used indirectly
- ☐ Label is bound to the primary antibody
- ☐ Label is bound to the secondary antibody
- ☐ Label is not bound to the primary antibody

**30** What is it a **negative control** if the enzyme histochemistry is performed?

- ☐ Result of second staining which is again negative
- ☐ Sample in the workflow which surely lacks the analyzed structure
- ☐ Sample in the workflow which surely contains the analyzed structure
- ☐ Result of second staining which is negative, in contrast to the result of first staining

**31** What is it a **positive control** if the enzyme histochemistry is performed?

- ☐ Result of second staining which is again positive
- ☐ Sample in the workflow which surely lacks the analyzed structure
- ☐ Sample in the workflow which surely contains the analyzed structure
- ☐ Result of second staining which is positive, in contrast to the result of first staining

**32** What is it a **direct method** in immunohistochemistry?

- ☐ Label is bound to the primary antibody
- ☐ Label is bound to the secondary antibody
- ☐ Label is bound directly to the active site of the antibody
- ☐ Label is bound directly to the structure which should be demonstrated

**33** Which structure is the best example of a **basophilic structure**?

- ☐ Ribosomes
- ☐ Mitochondria
- ☐ Lipid droplets
- ☐ Golgi apparatus

**34** Which structure is the best example of an **eosinophilic structure**?

- ☐ Ribosomes
- ☐ Cell nucleus
- ☐ Collagen fibers
- ☐ Rough endoplasmic reticulum

**35** Which chemical compound is usually main part of **chemical fixatives**?

- ☐ Acetone
- ☐ Formic acid
- ☐ Formaldehyde
- ☐ Osmium tetroxide

**36** Which definition of a **fixation** is the best?

- ☐ Freezing of the sample
- ☐ Intense and careful drying up of the tissue
- ☐ Submersion the sample into the fixative fluid
- ☐ Fixation stops gently and quickly activity of enzymes inside the tissue

**37** Which embedding medium is the most common?

- ☐ Agar

- ☐ Resin
- ☐ Gelatin
- ☐ Paraffin

**38** Which is common color of nuclei after staining with **hematoxylin eosin**?

- ☐ Cherry-like red
- ☐ Blue to magenta
- ☐ Pink to red
- ☐ Pale pink

**39** Which is color of the collagen if the **green Masson's trichrome** is used?

- ☐ Yellow
- ☐ Green
- ☐ Blue
- ☐ Red

**40** Which is color of the collagen if the **AZAN** is used?

- ☐ Red
- ☐ Blue
- ☐ Green
- ☐ Yellow

**41** Which label is the most widely used in immunohistochemistry for the electron microscopy?

- ☐ Hematoxylin
- ☐ Metal particles
- ☐ Enzyme labeling
- ☐ Fluorescent dye

**42** Which label is the most widely used in immunohistochemistry for the light microscopy?

- ☐ Enzyme labeling
- ☐ Fluorescent dye
- ☐ Metal particles
- ☐ Hematoxylin

**43** Which statement about a histochemistry is the most accurate? (i.e., *"Select the best definition!"*)

- ☐ Histochemistry is an identification and visualization of chemical compounds inside cells and tissues
- ☐ Histochemistry is a measurement of concentration of chemical compounds inside tissues
- ☐ Histochemistry is an analysis of chemical reaction inside cells
- ☐ Histochemistry is a research method only

**44** Which statement about the chemical fixation describes it the best? (i.e., *"Which statement is the most accurate?"*)

- ☐ Chemical fixation can be based on either induction of cross-linking or denaturation
- ☐ Chemical fixation can be performed only if the solution has room temperature
- ☐ Chemical fixation is based on acting of formaldehyde on protein
- ☐ Chemical fixation is used only exceptionally

**45** Which statement about the physical fixation describes it the best?

- ☐ Physical fixation is based on cessation of transporting function of water
- ☐ Physical fixation is based on effects of microwave radiation
- ☐ Physical fixation is based on effects of high temperature
- ☐ Physical fixation is based on effects of low temperature

**46** Which of following statements describes the **curettage**?

- ☐ Brush away free cells from the the surface of a mucosa
- ☐ Scrape of the tissue using a special tool
- ☐ Surgical removing of whole organ
- ☐ Surgical removing of whole organ

**47** Why are histological samples stained?

- ☐ Tissues are colored to chaotically, we have to reduce the number of colors
- ☐ In fact, do dye is used, the term "staining" is a historical mistake
- ☐ Reason is purely aesthetic, true colors of tissues are too ugly
- ☐ Tissues are usually colorless, we have to add some colors

**48** Why are trichromatic methods called "trichromatic"?

- ☐ True reason is hidden in history, now it makes no sense
- ☐ There are used three dyes, one basic and two acidic
- ☐ There are used three dyes, all three acidic
- ☐ There are used three dyes

**49** Why is AZAN called AZAN?

- ☐ AZAN is an abbreviation of main principule - **AZ**ocoupling **A**nthracite **N**eutralization
- ☐ AZAN is an abbreviation of two main dyes - **AZ**ocarmine and **AN**iline blue
- ☐ AZAN is an abbreviation (from German) - **A**lle **Z**ellen **A**zurblau **N**ichfarbige
- ☐ AZAN is a cool trade name only

**50** Why is embedding of fixed sample important? (all statements are correct, select the best one)

- ☐ Embedding increases hardness without increasing the fragility
- ☐ Embedding increases durability of the sample
- ☐ Embedded samples can be easily stored
- ☐ Embedding is a tradition

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