

QUESTIONS

1.1 Methods in Histology

1. Fixatives:
 - (a) Stop the dynamic processes of cells
 - (b) Render cell components insoluble
 - (c) Denature proteins
 - (d) Prevent autolysis
 - (e) Preserve cell structure.

2. Histological stains are used to:
 - (a) provide contrast in sections
 - (b) localize specific enzymes
 - (c) distinguish between different tissues
 - (d) identify specific cellular components
 - (e) fix tissues.

3. Hematoxylin:
 - (a) is a basic dye
 - (b) stains collagen blue
 - (c) stains nuclei blue
 - (d) is an histochemical stain
 - (e) stains basic components of cytoplasmic proteins.

4. Typical basic dyes include:
 - (a) hematoxylin
 - (b) eosin
 - (c) methylene blue
 - (d) toluidine blue
 - (e) thionin.

5. Vital dyes are:
 - (a) used in fixed material
 - (b) used on living cells
 - (c) used to stain sections
 - (d) particulate and colored
 - (e) toxic to cells.

6. Examples of vital dyes are:
 - (a) hematoxylin
 - (b) eosin
 - (c) natural red
 - (d) janus green
 - (e) trypan blue.

7. Increasing contrast in histological preparations can be achieved using:
- (a) phase contrast microscopy
 - (b) interference microscopy
 - (c) filters
 - (d) stains
 - (e) polarizing microscopy.
8. Which if the following microscopical techniques are regularly used to examine living cell?
- (a) phase contrast microscopy
 - (b) interference microscopy
 - (c) fluorescence microscopy
 - (d) transmission electron microscopy.
 - (e) Scanning electron microscopy.
9. Which of the following techniques can be used successfully without initial fixation?
- (a) phase contrast microscopy
 - (b) polarizing microscopy
 - (c) frozen sectioning
 - (d) freeze fracture and replication
 - (e) fluorescence microscopy.
10. Fluorescence microscopy:
- (a) can be performed using normal light
Microscopes
 - (b) requires the use of special microscopes
 - (c) usually uses ultraviolet light as the illuminating source
 - (d) requires a darkened room
 - (e) requires special components or precautions to protect the eyes, skins and hands.
11. Fluorescence microscopy is commonly used in laboratory diagnosis to detect:
- (a) special antigens
 - (b) special antibodies
 - (c) malignant cells
 - (d) tubercle bacilli
 - (e) rate of bone growth following tetracycline Administration.
12. Total preparations:
- (a) are prepared with the aid of a microtome
 - (b) must be thin and transparent
 - (c) can only be made in a very limited number of cases
 - (d) contain components that retain their spatial relationships one to the other
 - (e) requires continuous refocusing to visualize the components.

13. Histological preparations not needing embedding include:
- (a) total preparation
 - (b) frozen sections
 - (c) smears
 - (d) squashes
 - (e) exfoliative cytology
14. The advantages of frozen sections include:
- (a) rapid processing
 - (b) no need for embedding
 - (c) minimal destruction of enzymatic activity
 - (d) minimal extraction of lipids
 - (e) minimal diffusion of small molecules
15. Wax-embedded sections for normal light micro- scopy are usually cut on the microtome at the following thickness:
- (a) 0.5 – 1.0 mm
 - (b) 0.5 – 0.1mm
 - (c) 0.5 – 1.0 μm
 - (d) 5.0 – 10.0 μm
 - (e) 5.0 – 10.0 μm
16. The effective resolution obtainable by light micro-scscopy is approximately:
- (a) 25 μm
 - (b) 2.5 μm
 - (c) 0.25 μm
 - (d) 25 nm
 - (e) 0.25 nm
17. Which of the following cell structures can be resolved by microscopy?
- (a) mitochondria
 - (b) plasma membrane
 - (c) nucleoli
 - (d) ribosomes
 - (e) lipid droplets
18. The greatest microscopical resolution of components of living cells is obtained using:
- (a) dark ground illumination
 - (b) polarizing microscopy
 - (c) interference microscopy
 - (d) phase contrast microscopy
 - (e) fluorescence microscopy

19. In phase contrast microscopes which of the following are essential?
- (a) annuli in the condenser
 - (b) zernike phase plates
 - (c) polarizing filters
 - (d) ultraviolet light source
20. The numerical aperture of the objective lens:
- (a) is important in determining its resolving power
 - (b) depends on the refractive index of the
 - (c) is greater in oil immersion lenses than those of dry lenses
 - (d) should be matched by a similar numerical aperture of the condenser lenses if optimum resolution is to be achieved
 - (e) in electron microcopies is extremely small (about 0.01)
21. The resolution of the light (optical) microscope is:
- (a) limited by the wavelength of light used
 - (b) limited and fixed regardless of the wavelength of light used
 - (c) improved when oil immersion lenses are used
 - (d) linked to the degree of magnification of the ocular lens
 - (e) linked to the numerical aperture of the objective lens.
22. If the light passing through a light (optical) microscope that is correctly adjusted is too intense for comfortable viewing it can be reduced satisfactorily without impairing resolution by:
- (a) closing down the iris diaphragm
 - (b) defocusing the condenser downwards
 - (c) using a lower wattage light source
 - (d) using a neutral density filter
 - (e) squinting.
23. In studying or photographing a wax section stained predominantly blue in a light (optical) microscope, which color filter will increase the contrast of the specimen to the greatest degree?
- (a) red
 - (b) yellow
 - (c) green
 - (d) blue
 - (e) violet.
24. In order to preserve sufficient activity to determine the histochemical localization of enzymes, fixation:
- (a) may not be at all
 - (b) is restricted to certain fixatives only
 - (c) should be performed at low temperature (4°C)
 - (d) should be restricted to minimal times
 - (e) should be performed in well –buffered solutions.

25. The products of histochemical localization of enzymes:
- (a) can be determined in frozen sections
 - (b) can be determined in some instances wax – embedded sections
 - (c) should not diffuse from the site of the original enzyme activity
 - (d) should be coloured
 - (e) should be insoluble.
26. The cytochemical localization of specific enzyme activity can be determined if the following factors are strictly controlled:
- (a) use of non – coagulating fixatives
 - (b) incubation media with specific substrates
 - (c) limited pH range
 - (d) temperature, time and osmolality of the incubation media
 - (e) use of controls that lack substrate.
27. Lysosomes can be identified histochemically because they contain specific marker enzymes, which include:
- (a) alkaline phosphatase
 - (b) acid phosphatase
 - (c) peroxidase
 - (d) succinic dehydrogenase
 - (e) aryl sulfatase.
28. SI units of measurement in histology include the nanometer (nm) which is equivalent to:
- (a) 10^{-3}m
 - (b) 10^{-6}m
 - (c) 10^{-9}m
 - (d) 10^{-12}m
 - (e) 10^{-15}m
29. SI units of measurement in histology include the micrometer (μm) which is equivalent to:
- (a) 10^{-3}m
 - (b) 10^{-6}m
 - (c) 10^{-9}m
 - (d) 10^{-12}m
 - (e) 10^{-15}m
30. Van Gieson's trichrome stain:
- (a) is widely used because it differentiates between connective tissue and muscle
 - (b) stains nuclei well
 - (c) does not reveal cellular detail well
 - (d) employs iron hematoxylin
 - (e) employs picrofuchsin

31. Who was responsible for the important hypothesis that every cell is derived from a pre-existing cell ("*omnis cellula e cellula*")?
- (a) Virchow
 - (b) Schwann
 - (c) Robert Hooke
 - (d) Schlieden
 - (e) Robert Brown
32. Which of the following are regarded as cellular 'inclusion'?
- (a) crystals
 - (b) mitochondria
 - (c) pigment
 - (d) glycogen
 - (e) chromosomes
33. Lysosomes are
- (a) cytoplasmic organelles
 - (b) membrane-bound
 - (c) structures that contain acid hydrolytic enzymes
 - (d) typically found to contain alkaline phosphates activity
 - (e) active in intracellular digestive processes
35. Epon sections cut for examination by light micro-scopy are usually:
- (a) cut on the ultramicrotome
 - (b) able to provide more information than comparable wax sections
 - (c) about 5 -10 μm thick
 - (d) about 0.5 – 1.0 μm thick
 - (e) stained effectively with alkaline toluidine blue.
36. Section prepared for viewing by standard transmission electron microscopy may be:
- (a) 1.0mm thick
 - (b) 50 – 100nm thick
 - (c) unstained
 - (d) cut from block larger than 2 mm
 - (e) cut with diamond knives.
37. Effective stains that provide contrast to ultrathin section to be viewed in transmission electron microscopes include:
- (a) hematoxylin
 - (b) eosin
 - (c) lead citrate
 - (d) osmium tetroxide
 - (e) uranyl acetate

38. Lipofuscin is:
- (a) a basic stain
 - (b) visible by light microscopy
 - (c) a cytoplasmic inclusion
 - (d) in the form of granules
 - (e) coloured brown.
39. Lipofuscin is:
- (a) common in skeletal muscle of adults
 - (b) common in cardiac muscle of adults
 - (c) common in neurons
 - (d) present in larger amounts in aged cells
 - (e) a form of secondary lysosome.