The Royal College of Pathologists of Australasia

Faculty of Science
Sample Anatomical Pathology Examination Questions and Model Answers

Anatomical Pathology Part I Written Examination

Question

You have recently been appointed as the Managing Senior Scientist of a Department of Anatomical Pathology located in a busy teaching hospital. Various staff within the department come to you with the following questions:

a) A technician from the Immunohistochemistry (IHC) laboratory asks "we are out of buffer tablets - how do I prepare a PBS buffer solution?" List three critical parameters of the final PBS working solution. Suggest a possible alternative buffer should some of the reagents needed to make PBS not be available.

b) A pathologist asks "How do I set up Kohler illumination on this microscope?" Explain the procedural steps you would take to achieve instrument alignment.

c) A Technician informs you that the cassette writer in Histology is broken and that they will have to hand write embedding cassettes. What are two essential points of cassette hand labelling that must be carried out?

d) A newly appointed technician in the IHC laboratory has asked "what is the significance of HER2 and Ki67 testing for breast cancer?" Briefly explain:
   (i) Where in/on the breast tumour cell would HER2 labeling be seen?
   (ii) Significance of HER2 to clinical management?
   (iii) Where in/on the breast tumour cell would Ki67 labeling be seen?
   (iv) Significance of Ki67 to clinical management?

Answer

a)

The final pH should be 7.4 (or 7.2 if desired), final concentration (molarity) 0.137M (0.1M is also acceptable) and the final volume measured exactly to, for example: 1 Litre or 100 mL if a smaller volume is required. Alternative buffers include: PB, HBSS, TBS, HEPES, MOPS, sodium cacodylate.

b) At least 5 of the following should be identified and explained with reasonable detail.

i. Focus the specimen and correct eye pieces for your personal vision.
ii. Decrease size of field diaphragm to see its edges
iii. Focus edge of field diaphragm by raising or lowering the condenser

iv. Centre the condenser using the image of the field diaphragm
v. Open the field diaphragm until edges are just outside field of view
vi. Adjust condenser aperture to adjust image contrast
vii. Adjust light intensity with light power supply

c)

i. Use a permanent marker that can withstand the solvents used in the tissue processor
ii. Use two unique identifiers for each case

d)

i. HER2 is a cell membrane receptor tyrosine kinase found in a proportion of breast and other adenocarcinomas.
ii. High expression of HER2 is associated with poor prognosis
iii. Ki67 is a nuclear protein expressed in proliferating cells. It is an independent prognostic indicator.
iv. High percentage (%) of Ki67 positive cells (>45%) is associated with a lower rate of disease free survival.

Anatomical Pathology Part I Oral Examination

Question

Financial analysts in your organisation have suggested that by allowing scientists and technicians to perform non-complex cut up, increased revenue for the laboratory may be generated.

a) List the regulations and guidelines that cover the introduction of a work practice such as this in an Anatomical Pathology laboratory.

b) Describe the factors to consider in implementing such a change to the laboratory.

c) Explain any extra procedures you would put into place or other aspects you would investigate before putting an initiative such as this into practice.

Answer

a) At least two of the following regulatory documents must be identified:
   i. NPAAC Standards and Technical Publications. E.g. Requirements for the Performance of Anatomical Pathology Cut-up (Fourth Edition 2013)
   ii. NATA (IANZ) accreditation and laboratory competence standards such as ISO 15189
   iii. RCPA Guidelines
   iv. Commonwealth and State regulations relating to Medicare and Health Insurance

b)

i. Qualifications required (Diploma, Degree, Fellowship)
ii. Scope of practice
iii. Medico-legal issues (such as medical indemnity insurance)
iv. Work Health and Safety issues
v. Training and competency documentation required
vi. Internal QC
vii. External QAP requirements
viii. Accreditation requirements (NATA)
ix. Continuing education (RCPA)

c)

i. Any training courses available for staff to attend?
ii. The training competencies required for different levels of complexity
iii. Level of responsibility for scientific versus technical staff
iv. How to monitor complexity of cut-up and triage specimens to the correct bench
v. Change management in both scientific and pathologist workforce
vi. Pay issues for staff taking on more duties and responsibility