AUSTRALIAN INSTITUTE OF MEDICAL SCIENTISTS

FELLOWSHIP EXAMINATION

July 2005

ANATOMICAL PATHOLOGY

Candidate Name

Compulsory Module AP1

Laboratory Histology

ESSAY QUESTIONS (20 minutes/question)

All questions must be answered. Each question is worth 20 marks.

1. Discuss the fixation of tissues using aldehyde fixatives. Include in your answer the chemistry of fixation and the factors favouring the most effective tissue preservation.

2. Discuss the solvents used in a routine histology laboratory and comment on their individual hazards. Are there less toxic alternatives to any of the solvents you have mentioned that can be used as replacements?

3. Discuss how, in your laboratory, you can trace the specimen through the laboratory from specimen reception to final report and what quality control mechanisms are in place in the process to ensure accuracy.

4. Discuss the use of control sections in staining (excluding immunohistochemistry)

5. Discuss the use of resin embedding for light microscopy, including processing, cutting and staining and when and why resin embedding is used in preference to paraffin wax.

SHORT ANSWER QUESTIONS (5 minutes per question)

All questions must be answered. Each question is worth 10 marks.

1. With the aid of diagrams, list the epithelia, the function of each and one site in the human body where each can be found.

2. Discuss the chemistry of the Perls' Prussian Blue reaction for Ferric Iron.

3. What is meant by the terms argentaffin and argyrophilic in relation to tissue components? What difference is there in the staining techniques between an argentaffin and argyrophil stain?

4. Comment on the reasons for including the following substances in stains or staining sequences:
   a. Celestine blue-haemalum staining prior to the Masson Trichrome stain
   b. The sodium thiosulphate wash in the Masson-Fontana silver reduction technique for melanin
   c. The wash with iodine in 70% alcohol of slides of tissues that had been fixed with mercuric solutions

5. Which staining method is most commonly used to routinely visualize the following cell and tissue structures? Where possible give an alternative staining method that could be used.
   a. to distinguish between muscle and collagen
   b. to demonstrate lipids
   c. to demonstrate reticulin
   d. to demonstrate muscle striations
   e. to demonstrate basement membranes
   f. to demonstrate melanin
   g. to demonstrate amyloid
   h. to demonstrate cryptococci
   i. to demonstrate glycogen
   j. to demonstrate elastic tissue

6. Briefly discuss what laboratory performance indicators are used in the management of the histopathology laboratory in which you work and where improvements might be made.

7. How is the phenomenon of metachromasia explained? Give examples of metachromatic staining methods.

8. Briefly discuss the use of cryoprotectants in the preparation of frozen tissue for cutting on the cryostat.

9. Describe the histological features of the pancreas.

10. Briefly discuss how brain tissue from a case of Creutzfeldt-Jakob Disease is handled in your laboratory and how does this compare with World Health Organisation recommendations.