



**Diploma of Expert Practice in Immunocytochemistry**

**Examination 2023**

**Paper 1**

Short-answer questions

120 minutes

1. Attempt **6 out of 9** questions – **choose 2 from each section**
2. Each question is worth 20 marks
3. You must transfer your answers directly into the answer booklet

**The question paper is not to be removed from the examination room**

## **Pre-Analysis**

1. Discuss the effects and relevance of cold ischemia in immunocytochemical (ICC) staining procedures and steps the laboratory can take to prevent this.
2. Discuss the methods available for the preparation of cytological samples for immunocytochemical analysis.
3. Discuss the artefacts encountered in the preparation of sections for immunocytochemistry analysis.

## **Analytical**

4. What procedures would you undertake to determine the usefulness of proposed positive control tissue for diagnostic immunocytochemical investigations?
5. Discuss the importance of pH for ALL reagents used within immunocytochemistry from fixation, antigen retrieval and buffer systems.
6. With the aid of diagrams, describe a polymer-based immuno-detection system and discuss the advantages and disadvantages of using these detection systems in ICC staining techniques.

## **Post-Analytical**

7. Discuss the uses of digital imaging in the field of immunocytochemistry.
8. Discuss the root cause (RC) steps you would follow to investigate a repeatable automated immunocytochemical failure.
9. Discuss the purpose of External Quality Assurance schemes in immunocytochemistry.



## **Diploma of Expert Practice in Immunocytochemistry**

**Examination 2023**

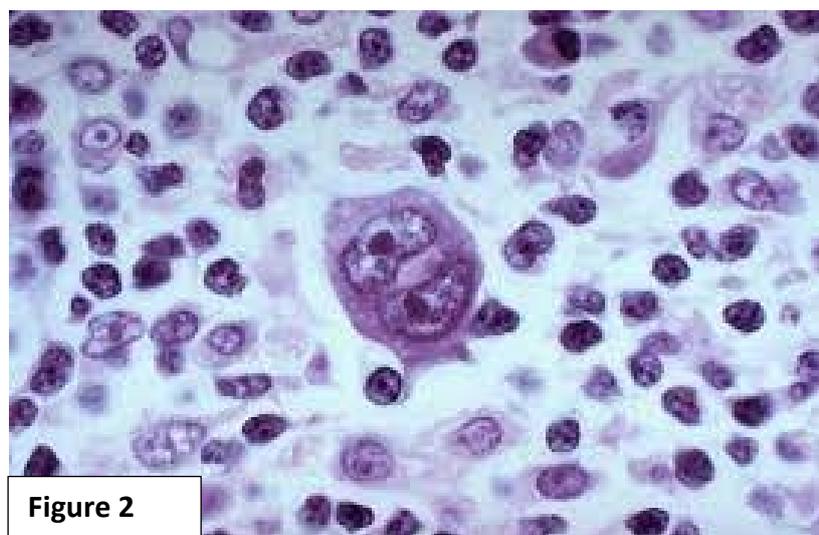
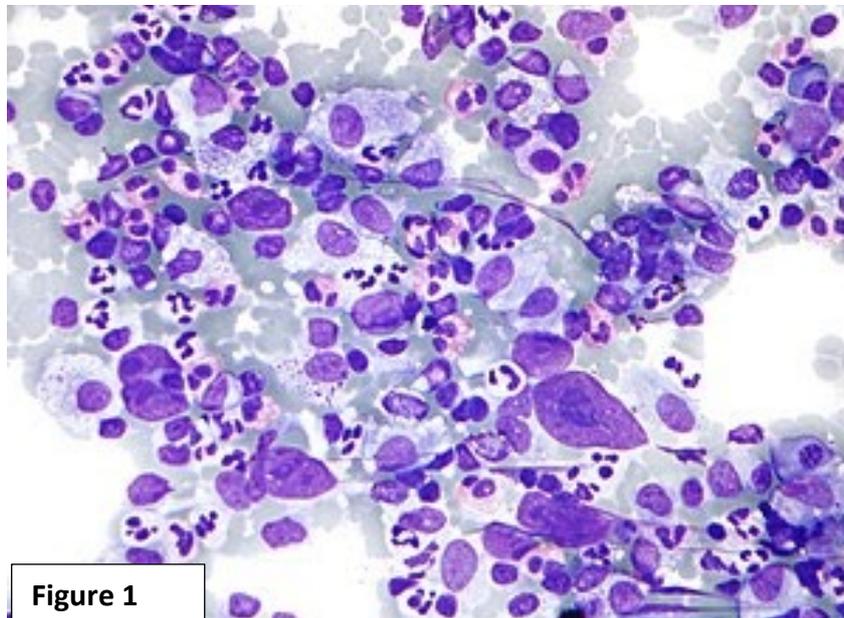
**Paper 2**

Interpretive Questions

120 minutes

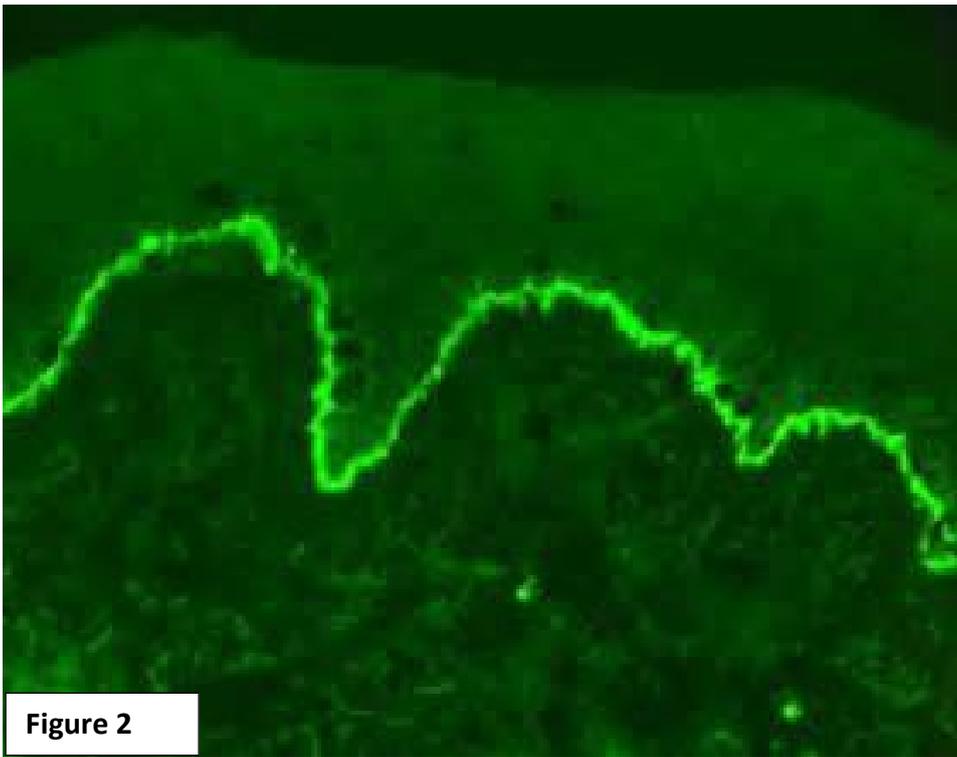
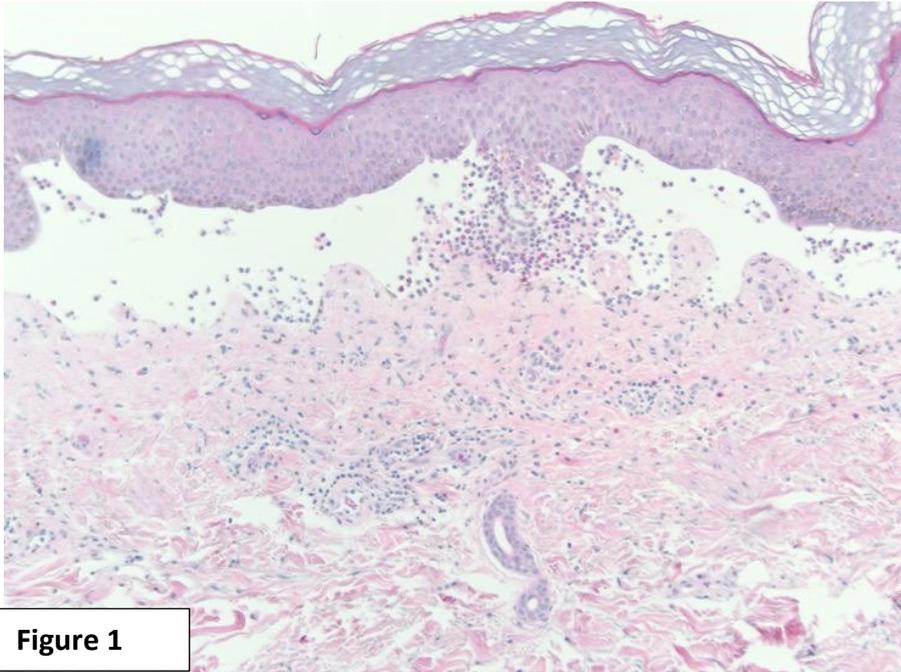
1. Attempt **3 out of 5** questions
2. Each question is worth 100 marks
3. You must transfer your answers directly into the answer booklet
4. Begin each new answer on a new page

- 1a. Discuss and give an overview of immunocytochemistry in the investigation of undifferentiated malignancies. (50 marks)
- 1b. If an undifferentiated tumour was confirmed as a carcinoma describe, with justification for your choices, the markers you would employ to determine the site origin of this tumour. (50 marks)
2. A white Caucasian male aged 17years old, presented with lymphadenopathy, fever, night sweats, weight loss, enlarged lymph nodes within the armpit and groin areas, splenomegaly and hepatomegaly. A biopsy was performed of a lymph node swelling in the neck from a cervical node (neck), plus a cytological FNA. The below May Grunwald Giemsa stain and HE figures show the appearance of atypical cells.



- a. Describe the features seen within the atypical cell population. (20 marks)
- b. Who described these findings originally? (10 marks)
- c. What IHC markers would be most likely employed as a panel to investigate the nature of the atypical cell population? (20 marks)
- d. Name the two main subtypes of this condition and describe the prevalence of each. (10 marks)
- e. This condition is associated with a known virus in approximately 50% of cases. What is this virus and explain how this can be demonstrated (20 marks)
- f. Describe the difference between IHC techniques and In-Situ hybridisation techniques. (20 marks)
3. A 70-year-old Caucasian man presented at a dermatology clinic with painful skin blisters on his arms and legs. The blisters wept, were crusty and eventually peeled off the skin surface resulting in ulcerated skin. The disease was thought to be an autoimmune disorder.
- a. Discuss and describe the optimal specimen type and subsequent fixation or transport medium required to enable a reliable assessment of the patient's condition. (25 marks)
- b. Describe the panel of antibodies employed to evaluate the immune complex deposition seen within the skin biopsy taken and explain the immunofluorescent technique employed in this case. (25 marks)
- c. Figures 1 and 2 show HE and IMF IgG demonstrations of the skin biopsy. Describe the nature of the lesion microscopically. (20 marks)

**...continued on next page**



e. Compare and contrast the benefits and draw backs of the use of IHC over IMF (20 marks)

e. From Figure 2 - What is the probable diagnosis here? (10 marks)

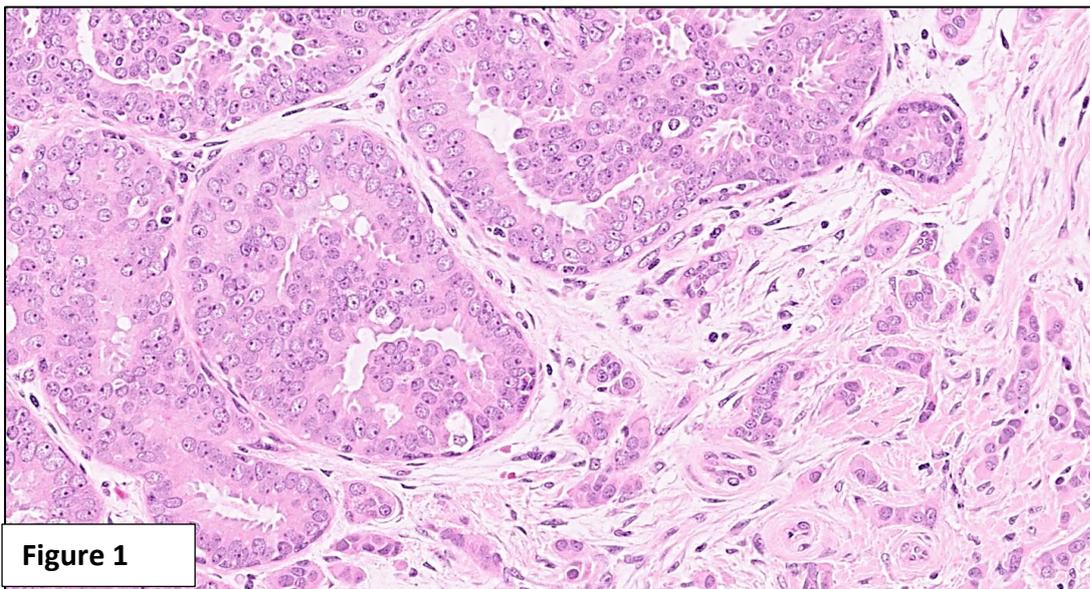
4. A 43 year old female patient was referred to the breast clinic presenting with a left breast lump. This was described as palpable, not mobile, and painful when touched. There was no puckering of the skin, nor discharge, and no lumps found in the axilla. Imaging was carried out, which confirmed an ill-defined solid lesion, measuring 20mm x 15mm x 15mm in the breast. Another suspicious lesion in the axilla was also identified. Biopsies were then taken from the breast and the axilla sites. The histopathology results included the following findings:

Breast Core Biopsy: Appearances in keeping with invasive ductal carcinoma (M4, U5) with in-situ carcinoma also identified.

Axilla: Appearances in keeping with malignancy.

- a. What do you understand by the abbreviations M4 and U5? (10 marks)

The H&E image below Figure 1 shows features in keeping with the diagnosis of invasive ductal carcinoma of the breast with in-situ carcinoma component.



- b. Describe the features that define the invasive and in-situ carcinoma of the breast, as shown in Figure 1. (20 marks)
- c (i). What type of immunohistochemical markers are used to evaluate stromal invasion to aid the diagnosis of ductal carcinoma in-situ?
- c (ii). Provide examples of these immunohistochemical antibody markers and the staining localisation.
- c (iii). What other cell type may some of these markers express in breast tissue? Discuss the importance of this when interpreting the staining results.

(c (i) to c (iii) Total of 30 marks)

**...continued on next page**

- d. (i) What immunocytochemical stain is routinely used in the differential diagnosis between ductal versus lobular carcinoma?  
d. (ii) Describe the localisation of this stain.

(d (i) and d (ii) – Total of 10 marks)

The patient's breast sample was sent for further IHC tests to help the clinicians with a treatment plan. Discuss what further IHC and/or other tests may have been requested to provide the clinicians with results to guide them with a treatment plan for the patient.

- e. Describe the staining pattern of the IHC tests, and where applicable, include information on the scoring methods of these tests. (30 marks)

5. A 72-year-old female with a previous history of breast cancer, attends her GP surgery with the following symptoms: persistent cough, dyspnea, fatigue and unexplained weight loss. The patient is referred to the local hospital for a chest x-ray which reveals a grey-white mass (suspected tumour) in the patient's thoracic cavity. Biopsies are taken from the mass and sent to the lab for histological investigation which confirms a malignant neoplasm.

- a. What tumour types would you consider in this case? (20 marks)
- b. What antibodies could be used in the differential diagnosis and tumour classification in this case? (50 marks)
- c. If the tumour was confirmed as a lung primary, what additional tests would be required and why? (30 marks)