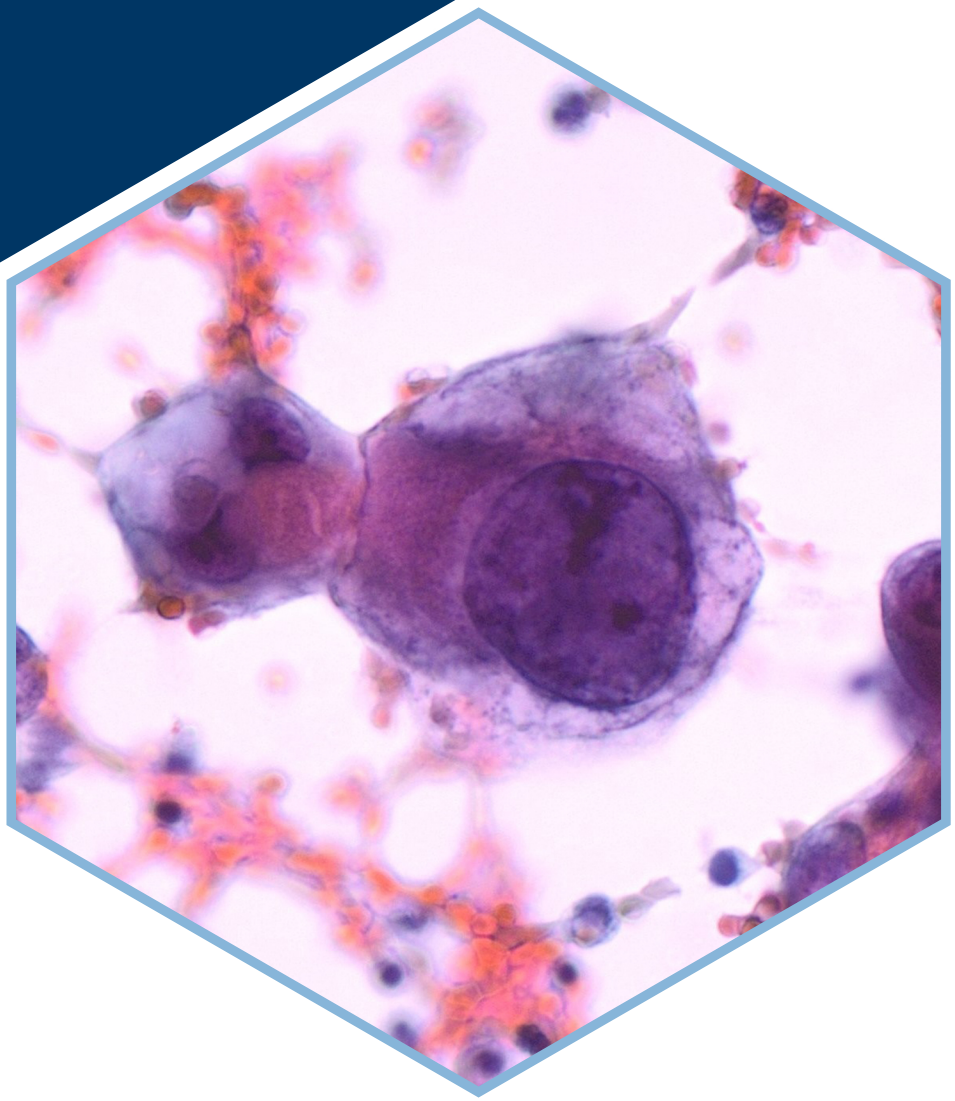
DIAGNOSTIC CYTOPATHOLOGY DIGITAL SPECIALIST PORTFOLIO MODULES

IBMS Institute of Biomedical Science



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Diagnostic Cytopathology Digital Specialist Portfolio Modules

- Quality (separate booklet)
- Principles and Practice of Diagnostic Cytology
- Diagnostic Cytology Sample Preparation
- Cancer, Stratified Medicine, and the Role of Ancillary Testing
- Respiratory Tract
- Urinary Tract
- Serous Cavities

Optional Module

- Synovial Fluids

Please note:

All learning outcomes (LOs) are met through two pieces of evidence, Q&A as agreed with a training officer and an additional piece of work as selected by the candidate.

A statement of work and reflective statement on each module will be required which will include sign off by the trainer stating that the candidate works in accordance with laboratory procedures, the competence for which should be evidenced in-house and is not part of the portfolio submission.

Indicative Content outlines background knowledge that may be required to meet the LOs and/or knowledge and competences expected to be demonstrated across multiple modules. Knowledge of areas highlighted in the indicative content may be examined during the viva.

All specialist portfolios include the quality module.

Module Title	Principles and Practice of Diagnostic Cytology
Module code	7280
Rationale/ Aims	This module enables candidates to gain the theoretical knowledge and understanding of the role cytology plays in the diagnosis of disease and to be able to apply this practically in the laboratory. The candidate will be able to use a light microscope correctly to visualise a variety of cell types and will be able to assess the quality of both the sample preparations and the staining to enable the correct diagnosis.
Learning outcomes	1. Demonstrate how to set up, use and troubleshoot issues with a light microscope. 2. Identify normal cell populations from various diagnostic cytology samples. 3. Demonstrate staining and assessment of cytology preparations using internal quality control material and discuss diagnostic pitfalls of poor-quality preparations. 4. Discuss the principles of diagnostic cytology using examples from your own practice. 5. Discuss the role of diagnostic cytology in the diagnosis of neoplasia and its limitations. 6. Demonstrate preparation of cell blocks and discuss the application to diagnosis, prognosis and patient management. 7. Describe the nomenclature and classification systems for neoplastic conditions and discuss their importance. 8. Discuss the role of cancer multidisciplinary teams in patient management.
Indicative Content	Candidates require knowledge and understanding of: The relationship between cell structure and function and the benign processes affecting cellular morphology and the mechanisms of tumour genesis and metastasis. Normal cytological features of abraded, aspirated and exfoliated material from tissues or epithelia, the general cytological features of reactive and malignant cells and how to correlate cytological features with histology and further ancillary testing. General principles of diagnostic samples and the difference from screening programme specimens. Current government recommendations on cancer waiting times and the nomenclature and classification systems for neoplastic conditions.

Module Title	Diagnostic Cytology Sample Preparation
Module code	7283
Rationale/ Aims	The candidate will gain understanding of the importance of using appropriate preparation methods for sample type and collection method enabling cytodiagnosis using the correct fixation and staining techniques. Candidates will understand the basis of FNA and the cytologists' role within a clinic setting for ROSE. Candidates will be able to prepare and stain a range of cytology samples.
Learning outcomes	1. Describe macroscopic appearances for a range of sample types and discuss the importance of accurate descriptions. 2. Demonstrate preparation of a range of diagnostic cytology samples in accordance with recommended guidance. 3. Discuss problems encountered in specimen preparation both within and external to the laboratory and describe different solutions that can be implemented. 4. Describe the advantages and disadvantages of ROSE and discuss the importance of communication to obtain adequate and sufficient material for ancillary testing. 5. Demonstrate staining diagnostic cytology preparations using routine stains and common special stain methods as applicable to your laboratory. 6. Discuss the advantages and disadvantages of different cytology sample preparations to enable ancillary testing. 7. Evaluate and verify stained preparations using appropriate control measures as applicable to your laboratory. 8. Discuss the importance of validating equipment, consumables and reagents prior to implementation in accordance with quality assurance requirements. 9. Discuss, with specific examples, the importance of communicating pre-analytical sample issues to supervisory biomedical scientists and reporting staff.
Indicative Content	Candidates require knowledge and understanding of: Different types of sampling methods available and the importance of correct sampling. Correct presentation and requirements for all types of diagnostic cytology samples. Theory and practice of preparation techniques for all types of diagnostic cytology samples i.e. using various concentration methods, air drying or fixation as appropriate and from fine-needle aspiration

	(FNA) from both superficial and deep-seated sites utilising imaging techniques. The importance of correct sample preparation and sample collection for diagnostic, prognostic and biomarker testing. Theory and practice of fixation and importance of how processing affects the microscopical interpretation of the sample, including the theory and practice of routinely used demonstration techniques i.e. Papanicolaou stain and Romanowsky along with common special staining techniques used to demonstrate a variety of cellular and extracellular components and infective agents such as mucins, lipids, pigments and minerals. The principles of the validation and verification of sample examination processes to relevant standards. Risks and hazards associated with fixed and unfixed samples and the ethical, safe use, storage and disposal of residual samples and stained preparations.

Module Title	Cancer, Stratified Medicine and the Role of Ancillary Testing
Module code	7281
Rationale/ Aims	Candidates will gain knowledge and understanding of the pathogenesis of cancer and the role of immunocytochemical techniques for aiding cytodiagnosis. Candidates will gain an understanding of the importance of sample requirements and will be able to recognise staining patterns using core antibodies. Immunocytochemistry and biomarker testing is a daily part of diagnostic cytopathology and therefore knowledge of this is integral to working in cytology. Candidates will gain knowledge and understanding of molecular pathology for aiding cytodiagnosis and prognosis and its impact on the patient pathway.
Learning outcomes	1. Describe invasion and metastasis, explain the mechanisms involved and how they relate to staging and prognosis. 2. Explain the application of pre-treatment and immunocytochemistry staining on cytology preparations including cell blocks. 3. Describe the internal quality checks required for immunocytochemistry staining and discuss the diagnostic implications that may arise from suboptimal preparations. 4. Discuss the application, benefits, limitations, and diagnostic pitfalls associated with immunocytochemistry performed on a range of cytology preparations. 5. Recognise staining patterns using core repertoire antibodies for malignancies seen in serous effusions and respiratory samples using examples from your laboratory. 6. Describe how genomic information may be integrated into cancer pathways using biomarker testing. 7. Discuss the clinical significance of molecular testing on respiratory cytology samples. 8. Discuss, with specific examples the importance of cytology sample suitability, preservation and fixation and the impacts these may have of molecular testing. 9. Discuss national strategies and key performance indicators for cancer reporting focusing on turn-around times, audit standards, and the impact delays can have to patient care.
Indicative Content	Candidates require knowledge and understanding of: Hallmarks of Cancer. Classification of different types of cancer. Molecular processes involved in cancer development, growth and metastasis and staging.

	The implications of stratified medicine on patient pathways. Specific types of common fixatives, characteristics and their compatibility with subsequent immunocytochemical staining procedures. Appropriate antigen retrieval methodologies, including proteolytic enzyme digestion, heat mediated methods and their mechanisms, as far as they are known. Patterns and localisation in normal and abnormal cells to interpret immunocytochemistry preparations for routine diagnostic use. Practice and problems associated with the production of samples suitable for immunocytochemical staining from cytological specimens, to include direct smears, cytocentrifuge and liquid-based preparations, fine-needle aspirates (FNAs), clots and cell blocks. Methods for validation and verification of primary antibodies before introduction into a diagnostic procedure and the requirement for assessment of batch-to-batch variation when in use. Concepts of sensitivity, specificity, avidity and affinity and their significance to the quality of immunocytochemical staining. Appropriate dilution of primary antibody reagents and the effects on subsequent immunocytochemical staining results. Necessity of including appropriate run controls and maintaining audit trails. Candidates must be able to: Identify and investigate substandard immunocytochemical staining and problems of non-specific and inappropriate staining, their causes and methods for their reduction or elimination. Identify potential problems associated with prolonged storage, fixation and loss of tissue antigenicity.

Module Title	Respiratory Tract
Module code	7277
Rationale/ Aims	Candidates will gain the knowledge and skills to prepare samples from the respiratory tract to provide optimal preparations. Candidates will be able to recognise normal and abnormal cell types from the respiratory tract and optimise cytology preparations to ensure accurate cytodiagnosis and relevance to clinical practice. This module enables the candidate to have knowledge of the basis for respiratory cytology and is integral to working in diagnostic cytology.
Learning outcomes	1. Explain the anatomy of the respiratory tract and discuss how this relates to the pathophysiology. 2. Describe the methods for collection of respiratory samples and discuss the requirements for the laboratory. 3. Demonstrate how to optimise specimen preparation utilising the range of techniques available to prepare, stain and evaluate cytology samples from the respiratory tract. 4. Identify common artefacts, contaminants, and infective agents in respiratory samples and discuss the relevance to the clinical setting. 5. Identify the difference between normal, reactive, and malignant cells and discuss these characteristics in relation to their histology. 6. Describe staging EBUS and diagnostic EBUS, including the importance of accurate labelling of sample sites and discuss the patient treatment options in relation to lung cancer staging. 7. Discuss the value of additional preparations i.e. special stains, immunocytochemistry and molecular tests performed on respiratory specimens. 8. Discuss the benefits of using the WHO reporting system for respiratory cytopathology.
Indicative Content	Candidates require knowledge and understanding of: Anatomy, histology and pathophysiology of the respiratory tract. Different collection methods for respiratory samples and the importance of optimising preparatory techniques in these samples. Cytological features of contaminants and artefacts including those related to treatment of disease. The role of cytology in non-neoplastic pulmonary disease including the use of differential cell counts in interstitial lung disease. Commonly used special stains and commonly used antibodies for immunocytochemistry in respiratory samples and the expected staining pattern for positive versus negative cellular components of preparations and control material.

	Candidates must be able to: Assess the adequacy of samples and identify normal cell populations, cytological features associated with reactive changes and the cytomorphological features of metastatic malignancy in the respiratory tract.

Module Title	Urinary Tract
Module code	Allocated on Brightspace
Rationale/ Aims	The aim of this module is to ensure candidates have the knowledge and skills to prepare samples from urinary tract to provide optimal preparations. The candidate will recognise normal and abnormal cell contents of urinary tract samples and optimise cytology preparations to ensure accurate cytodiagnosis. This module provides the basis for urine cytology and is integral to working in diagnostic cytology.
Learning outcomes	1. Describe the anatomy of the urinary tract and discuss how this relates this to the pathophysiology. 2. Describe the methods for collection of urine and discuss the impact of this on the interpretation of samples. 3. Demonstrate how to optimise specimen preparation utilising a range of techniques available in your laboratory to prepare and stain urines. 4. Compare the advantages and disadvantages of different preparation techniques. 5. Identify the differences between normal, reactive and malignant cells and discuss these characteristics in relation to their histology. 6. Describe the value of additional preparations such as cell blocks in the diagnosis of urine cytology. 7. Discuss the value of ancillary testing such as ISH or molecular tests performed on urine samples. 8. Describe the reporting system in use for urine cytology and the advantages and disadvantages of this reporting system.
Indicative Content	Candidates require knowledge and understanding of: Anatomy, histology and pathophysiology of the urinary tract and the investigative methods used in diagnosing urinary tract disease. Methods of sample collection and the effects on sample presentation and the relevance and importance of optimising preparatory techniques in samples from urinary tract cytology. The role of ancillary techniques in the reporting of urine cytology. Paris classification for reporting and management of malignancies of the urinary tract. Candidates must be able to:

	Identify normal cell populations in urine samples, cytological features associated with reactive changes and the cytomorphological features of malignancy. Recognise the appearance and significance of the presence of crystals and casts in urine, the appearance and/or cytopathic effects of urinary tract infections and iatrogenic changes in the urinary tract, including the diagnostic cytology pitfalls.

Module Title	Serous Cavities
Module code	7276
Rationale/ Aims	This module enables candidates to gain the knowledge and skills to prepare samples from serous cavities to provide optimal preparations. This module provides the basis for serous fluid cytology and is integral to working in diagnostic cytology. Candidates will be able to recognise normal and abnormal cell contents of serous fluids and optimise cytology preparations to ensure accurate cytodiagnosis. Candidates will understand the value of additional preparations and the reporting systems in use for serous fluids.
Learning outcomes	1. Explain the anatomy of serous cavities and relate this to the pathophysiology. 2. Describe the methods for collection of serous fluids and the requirements for the laboratory. 3. Demonstrate how to optimise specimen preparation utilising a range of techniques available in your laboratory to prepare and stain serous fluids and peritoneal washings from serous cavities. 4. Identify the differences between normal, reactive and malignant cells and discuss these characteristics in relation to their histology. 5. Discuss the importance of reporting primary versus metastatic diseases in serous fluid. 6. Describe the value of additional preparations such as cell blocks in the diagnosis of serous fluids. 7. Discuss the value of additional preparations i.e. special stains, immunocytochemistry and molecular tests performed on serous samples. 8. Describe the reporting system in use for serous fluid and the advantages and disadvantages of this reporting system.
Indicative Content	Candidates require knowledge and understanding of: Anatomy, histology and processes of serous effusion formation and associated clinical conditions. Different collection methods for effusions and the importance of optimising preparatory techniques in these samples. Commonly used special stains and commonly used antibodies for immunocytochemistry in serous effusion samples and the expected staining pattern for positive versus negative cellular components of preparations and control material. The rationale for the collection and assessment of peritoneal washing samples and the common cytological features seen in these specimens Candidates must be able to:

	Identify normal cell populations in effusion specimens, cytological features associated with reactive changes and the cytomorphological features of metastatic malignancy. Recognise the significant features associated with malignant mesothelioma and methods of confirmation using ancillary testing.

Optional Module- This module can be selected if performed at candidates workplace

Module Title	Synovial Fluids
Module code	7279
Rationale/ Aims	Candidates will gain the knowledge and ability to prepare and screen samples from the synovium. Candidates will gain insight into the implications of results and how this relates to patient pathways. Candidates will understand the application of specialised microscopy and the role of quality assurance. This module provides the basis for crystal cytology.
Learning outcomes	1. Describe the anatomy of the different types of synovial joint, relate this to the pathophysiology and urgency in the patient pathway. 2. Describe the pre-examination requirements of synovial fluid cytodiagnosis and discuss the importance of adhering to these requirements. 3. Describe how to select and use appropriate control materials and discuss the importance of maintaining appropriate audit trails. 4. Demonstrate identification of crystals and artefacts using the appropriate microscopy technique and discuss the principles of this microscopy technique. 5. Discuss the relevance of differential cell counts and demonstrate this if appropriate to candidates laboratory practice. 6. Describe the recommended disposal of these sample types and the reasons for this. 7. Compare the advantages and disadvantages of different approaches to quality assurance in crystal analysis.
Indicative Content	Candidates require knowledge and understanding of: Anatomy and physiology of synovial joints Presentations of synovial fluid and arthrocentesis The diagnostic significance of cell counts ± crystals and microbiology correlation. Risks and hazards associated with the preparation and disposal of samples and reagents used in synovial fluid preparation. Candidates must be able to: Identify normal cell populations in joint fluids in both wet and stained preparations. Recognise the appearance and significance of the presence of pseudogout and gout crystals using internal quality control material, including the diagnostic cytology pitfalls.

About this version

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