



Australian Government

MSL975003 Perform histological tests

Release: 1

MSL975003 Perform histological tests

Modification History

Release 1. Supersedes and is equivalent to MSL975003A Perform histological tests

Application

This unit of competency covers the ability to perform tests and procedures associated with processing and staining tissues for examination of tissue structure and abnormalities by pathologists and scientists to assist with disease diagnosis. The unit covers tests and procedures that are associated with anatomical pathology and may involve the use of automated processors and staining machines.

This unit of competency is applicable to laboratory technicians and technical officers in the biomedical sector. The unit principally refers to techniques performed on human tissues, but many aspects may be relevant to animal and plant tissues. This unit of competency assumes that the technical officer would perform tests and procedures under the close supervision of scientific and/or medical staff. Although a supervisor may not always be present, the technician will follow standard operating procedures (SOPs) that will clearly describe the scope of permitted practice in modifying testing procedures, quality control procedures, interpretation of data, and for communicating test results to people outside the laboratory. Technical workers may need to interrupt their routine work in order to assist with or perform procedures to facilitate rapid diagnosis of specimens from patients in the operating theatre. The involvement of the technical officer in mortuary work will be determined by the workplace. Work of this nature will always be closely supervised by scientific/medical staff.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

MSL973007 Perform microscopic examination

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the Performance criteria describe the performance needed to

essential outcomes.		demonstrate achievement of the element.	
1	Process specimens and associated request forms	1.1	Check and match specimens and request forms before they are accepted
		1.2	Identify specimens and request forms that do not comply with requirements, record any discrepancies and indicate what action is required
		1.3	Log acceptable specimens into a laboratory information management system (LIMS) accurately and efficiently, applying required document tracking mechanisms
		1.4	Store specimens appropriately until required for testing
2	Prepare specimens for cut-up	2.1	Arrange tissues and request forms in cut-up area
		2.2	Label tissue cassettes as required to maintain identity during subsequent procedures
		2.3	Select tissue fixative to prepare tissue for subsequent procedures
		2.4	Weigh organs and count tissue chips and shavings
3	Process tissue	3.1	Select processor program and reagents
		3.2	Perform equipment pre-use checks on the tissue processor to ensure sample integrity is maintained
		3.3	Follow processing requirements for non-routine techniques, including histochemistry
4	Embed tissue	4.1	Check that temperature of embedding medium is suitable for embedding process
		4.2	Check that volume of embedding medium is sufficient for uninterrupted embedding of processor load
		4.3	Embed tissue types in correct orientation and characteristics that minimise tissue loss during microtomy
		4.4	Apply procedures to prevent cross-contamination

- between tissues
- 4.5 Inspect blocks, reject and re-embed items that do not meet quality control standards
- 5 **Cut tissue sections**
- 5.1 Check that flotation bath is ready and satisfactory for use
- 5.2 Prepare and adjust all external parts of a microtome and associated equipment to accommodate requirements of tissue batch
- 5.3 Secure block in microtome following specified safety directions
- 5.4 Orientate the block correctly for each specific tissue to ensure tissue conservation and maintain sample integrity
- 5.5 Label required number of microscope slides in accordance with workplace traceability requirements
- 5.6 Cut thin tissue sections (4-5µm), according to needs of subsequent procedures, maintaining sample integrity and conserving tissue for further testing
- 5.7 Float sections onto water bath to flatten tissues
- 5.8 Pick up sections onto microscope slides ensuring patient identification on slides matches that on block
- 5.9 Apply procedures to prevent cross-contamination between patient tissues
- 5.10 Maintain tissue sections in conditions compatible with intended subsequent procedures
- 5.11 Compare the blocks and sections ensuring the tissue on slides matches that in the blocks
- 5.12 Inspect sections and reject any that do not meet quality control standards
- 5.13 Identify, troubleshoot and resolve common section quality control issues
- 6 **Stain tissue sections**
- 6.1 Apply staining procedures to demonstrate required morphological features

- 6.2 Prepare labile reagents for immediate use
 - 6.3 Select reagents for specified technique, ensuring reagent sequence matches standard procedure
 - 6.4 Stain sections according to method using the required quality control section and accommodating any authorised variations
 - 6.5 Mount slides using medium compatible with staining technique
 - 6.6 Examine control sections microscopically to ensure expected staining outcomes are achieved and procedural artefacts are detected
 - 6.7 Confirm macroscopically or microscopically that tissues on all slides conform with the expected characteristics of that case
 - 6.8 Participate in final check to establish that the number of slides tallies with the worksheet
 - 6.9 Attach permanent label giving specimen details as required by workplace
 - 6.10 Confirm microscopically that the type/disease is appropriate and still present in the control sections for each stain
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- 7 **Maintain a safe environment**
 - 7.1 Use established safe work practices and personal protective equipment (PPE) to ensure personal safety and that of other laboratory personnel
 - 7.2 Handle non-fixed tissues safely to minimise cross-infection and contamination of personnel and environment
 - 7.3 Store fixed tissues as specified to minimise exposure of personnel to dangerous fumes and vapours
 - 7.4 Clean up spills using appropriate techniques to protect personnel, work area and environment from contamination
 - 7.5 Minimise the generation of wastes

		7.6	Ensure the safe disposal of biohazardous materials and other laboratory wastes in accordance with workplace procedures
8	Maintain laboratory records	8.1	Make entries on report forms or into computer systems, accurately calculating, recording or transcribing data as required
		8.2	Complete control stain quality assessment forms to report quality control outcomes
		8.3	File and store tissue sections to facilitate efficient retrieval as required
		8.4	Maintain instrument logs as required by accreditation checks
		8.5	Maintain confidentiality and security of all clinical information, and laboratory data and records

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards, guidelines and codes covering laboratory safety, competence of testing and calibration laboratories, laboratory design and construction, occupational protective equipment; labelling of workplace substances, storage and handling of dangerous goods, physical containment levels and facility types, safety cabinets, quality and environmental management
- national work health and safety (WHS) standards and codes of

practice

- specific codes, guidelines and methods, such as medico-legal and laboratory accreditation requirements for traceability of specimens and records
- workplace documents, such as SOPs; quality procedures; equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; laboratory schedules; workplace recording and reporting procedures; waste minimisation, containment, processing and safe disposal procedures; cleaning, hygiene and personal hygiene requirements
- instructions to comply with new legislation, standards, guidelines and codes
- sampling procedures (labelling, preparation, storage, transport and disposal)
- test procedures (validated and authorised)
- schematics, work flows, and laboratory stock records and inventory

Communication

Communication involves interactions with one or more of:

- supervisors and managers (laboratory, quality and customer service)
- clients, including other laboratory or clinical personnel (pathologists, nursing staff, pathology registrars, other medical staff and clerical staff)

Safe work practices

Safe work practices include, but are not limited to, one or more of:

- ensuring access to service shut-off points
- recognising and observing hazard warnings and safety signs
- labelling of samples, reagents, aliquoted samples and hazardous materials
- handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer instructions
- identifying and reporting operating problems or equipment malfunctions
- cleaning and decontaminating equipment and work areas regularly using workplace procedures
- using PPE, such as gloves, safety glasses, coveralls and gowns
- using containment facilities (e.g. PCII, PCIII and PCIV physical containment laboratories), containment equipment (e.g. biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets) and containment procedures

WHS and environmental management requirements

WHS and environmental management requirements include:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time
- applying standard precautions relating to the potentially hazardous nature of samples
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSL975003A Perform histological tests

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL975003 Perform histological tests

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- performing tests and procedures associated with processing and staining tissues for examination of tissue structure to assist with disease diagnosis
- registering at least fifteen (15) samples into a laboratory information management system (LIMS), (or simulated to reflect an actual LIMS) with 100 % accuracy identifying specimens and requesting forms that do not comply with minimum industry requirements for labelling, identification and test requests
- entering each sample to the LIMS within five minutes
- recording discrepancies and indicating what level of action is required, i.e. record only, contact submitter, continue testing or halt testing or return sample to their source with reasons for non-acceptance
- performing manual and automated histological tests and procedures
- preparing, safely storing and disposing of stains and reagents
- embedding tissue types to meet quality control standards with correct orientation and characteristics that minimise tissue loss in microtomy
- embedding at least six (6) tissue types, including:
 - large tissues
 - small tissues
 - multiple core biopsies in a single block
 - epithelial tissue such as skin or tongue
 - trachea
 - bone
- inspecting and re-embedding blocks that do not meet quality control standards
- cutting at least forty (40) paraffin embedded sections, from at least five (5) different tissue types free of wrinkles, scores and folds, at the specified thickness to demonstrate tissue and cellular structures, granules, inclusions and organelles. The complete surface of the tissue must be present on all slides with the remaining tissue in the block conserved for future testing
- staining at least five (5) routine paraffin embedded sections from at least five (5) different tissue types to demonstrate tissue structure using a regressive Haematoxylin and Eosin stain over at least three (3) separate occasions. All stained sections must pass industry quality control standards that would allow for diagnosis and results to be issued

- using at least four (4) different specialised stains over at least two (2) occasions using positive control tissues, for example, to demonstrate connective tissue, muscle striations, central nervous system, glands, basement membrane, microorganisms, pigments and deposits
- using at least two (2) different histochemical stains over at least two (2) occasions using positive control tissues, stains, for example to demonstrate carbohydrates, amyloid and mucins
- performing specialised techniques, including polarising microscopy and use of microwave ovens in histopathology
- cover slipping slides, ensuring that no air bubbles are formed and material is preserved for the life of the slide
- labelling slides clearly with case, specimen and stain details
- approving or preventing the release of patient stained slides to pathologists based on an assessment of quality control sections
- recognising problems whilst performing procedures and troubleshooting under direction
- using the workplace LIMS efficiently
- reviewing workplace documentation to identify errors or procedural gaps and suggesting improvements
- preparing documentation that is accurate, concise and in accordance with workplace requirements
- managing tasks and organising work to ensure the timely completion of tasks
- using samples, reagents and materials economically and disposing of wastes safely
- using equipment safely.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- terminology used to describe tissue components being stained, these may be anatomical, physiological, biochemical or immunological, depending on the expected staining outcomes
- the relationship between strict adherence to workplace procedures during each step and the maintenance of specimen integrity
- workplace and legal traceability requirements
- purpose of and processes involved in surgical cut-up and the factors involved that directly impact on ability to perform histology work
- requirements for ensuring uninterrupted efficient operation of a cut-up area
- importance of recognising the uniqueness of patient histological tissues (a non-renewable resource)
- purpose of and processes for frozen sections
- functions of the components of a rotary microtome
- relationship of the anatomy and morphology of tissue types and the macroscopic and microscopic appearance of stained sections
- types of fixatives and their role in retaining size and spatial relationships in tissues and in preventing autolysis and putrefaction

- relationship between the tissue types and components to be demonstrated and the choice of fixation procedures, processing schedules and staining techniques
- relationship between correct orientation of the tissue during embedding and microtomy and ability to cut quality sections and conserve the tissue
- correlation between poorly maintained processing reagents and resultant tissue blocks being difficult to cut or unsuitable for cutting
- properties of embedding mediums
- labile nature and chemistry of stains and the importance of correct preparation and storage to ensure required staining outcome
- effects of the presence of artefacts in sections on microscopic examination of tissues
- purpose of and processes involved in tissue processing and routine Haematoxylin and Eosin staining methods
- purpose of staining procedures implemented, including histochemical and immunohistochemical procedures (why they are used and what components they demonstrate)
- basic biological principles and concepts behind the steps involved in immunohistochemical staining procedures
- relationship between correct differentiation, and the ability to produce quality stained slides and troubleshoot staining issues
- equipment maintenance requirements and consequences if maintenance is not done
- work health and safety (WHS) and environment requirements, particularly those related to labelling, handling, storing and spill clean-up of irritating, volatile, flammable and potentially carcinogenic substances.

Assessment Conditions

- Judgment of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL934002 Apply quality systems and continuous improvement processes
- Holistic assessment methods include:
 - inspection of stained tissue sections/slides prepared by the candidate

- feedback from supervisors
- observation of candidate performing tests and procedures, such as:
 - preparation of microtome for cutting, cutting blemish free sections, successful flotation and pick-up of section
 - staining tissues to demonstrate tissue structures and cell components as required
 - morphological identification of tissues, such as epithelial, muscle, central nervous and glandular
- oral and/or written tests to assess required knowledge.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - a standard histology laboratory with relevant equipment, samples and reagents; and computer information systems, databases, record and filing systems, including specimen accessioning
 - workplace procedures, test methods and equipment manuals.
- Under duty of care requirements, off-the-job training providers will only use samples and organisms of a risk category compatible with their laboratory as defined in *AS/NZS 2243.3 Set:2006 Safety in laboratories*.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience.

Currency can be demonstrated through:

- performing the competency being assessed as part of current employment OR
- having consulted with a laboratory about performing the competency being assessed within the last twelve months.
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