



Australian Government

MSL975028 Apply advanced embedding and microtomy skills

Release: 1

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Modification History

Release	Comments
Release 1	New unit. This version was released in <i>MSL Laboratory Operations Training Package Release 2.0</i> .

Application

This unit of competency describes the skills and knowledge required to perform procedures associated with embedding tissue and performing microtomy on those tissues in preparation for staining for examination of tissue structure and abnormalities by pathologists and scientists to assist with disease diagnosis.

This unit applies 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 and quality control procedures. Technical workers may need to interrupt their routine work in order to assist with or perform procedures to facilitate rapid diagnosis of specimens.

No licensing or certification requirements exist at the time of publication. However, regulations and/or external accreditation requirements for laboratory operations exist, so local requirements should be checked. Relevant legislation, industry standards and codes of practice within Australia must also be applied.

Pre-requisite Unit

MSL975029 Perform histological tests

Competency Field

Testing

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Prepare specialised tissues	1.1	Prepare agar plugs for cytological or minute specimens
		1.2	Prepare blood clot for processing
		1.3	Prepare friable /tiny tissue in sponges and/or wrapped to ensure tissue integrity and prevent loss during processing
		1.4	Decalcify bone
2	Embed Tissue	2.1	Perform equipment pre-use check on embedding centre to ensure samples integrity and uninterrupted embedding of processor load
		2.2	Identify and prioritise specimens prior to embedding
		2.3	Check tissue for complete processing prior to embedding
		2.4	Embed tissue types in correct orientation and characteristics that minimise tissue loss and artefacts during microtomy
		2.5	Select appropriately sized mould
		2.6	Apply the use of an embedding run-sheet to check the number of pieces of tissue in each cassette and noting any discrepancies
		2.7	Apply procedures to prevent cross-contamination between tissues
		2.8	Embed tissue with embedding orientation markings
		2.9	Perform excess wax removal from blocks using manual scrapping and/or heat removal
		2.10	Inspect blocks, reject and re-embed items that do not meet quality control standards
		2.11	Apply quality control procedures to troubleshoot discrepancies between run-sheet and tissue embedded

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

3 Cut tissue sections

2.12 File and store tissue blocks to facilitate efficient retrieval as required

3.1 Check that flotation bath is ready and satisfactory for use

3.2 Prepare and adjust all external parts of a microtome and associated equipment to accommodate requirements of tissue batch

3.3 Secure block in microtome following specified safety directions

3.4 Orientate the block correctly for each specific tissue in order to maintain sample integrity and minimise artefacts

3.5 Apply microtomy techniques to trim blocks to full face without significant loss of tissue

3.6 Cut thin tissue sections according to needs of subsequent procedures, maintaining sample integrity, minimising artefacts and conserving tissue for further testing

3.7 Float ribbons onto water bath to flatten sections

3.8 Pick up sections onto microscope slides ensuring patient identification on slides matches what is on block

3.9 Apply procedures to prevent cross-contamination between patient tissues

3.10 Compare the blocks and sections ensuring the tissue on slides matches that in the blocks

3.11 Inspect sections and reject any that do not meet quality control standards

3.12 Identify, troubleshoot and resolve common section quality control issues

3.13 Apply quality control procedures to troubleshoot discrepancies between run-sheet and sections on slides

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.

Unit Mapping Information

No equivalent unit.

Links

MSL Laboratory Operations Companion Volume Implementation Guide is available from VETNet -

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

Assessment Requirements for MSL975028 Apply advanced embedding and microtomy skills

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and:

- embedded at least 15 tissue types that are flat, correctly orientated and in a single layer of wax, including at least 1 of each of the following:
 - large tissues
 - small tissues
 - multiple small biopsies in a single block
 - epithelial tissue such as skin or tongue with embedding orientation
 - tissue prone to distortion
 - bone
 - shave biopsies
 - friable/tiny tissue
 - excision biopsies
 - fatty tissue
 - bloody tissue
 - blood clot
 - agar plugs
- recorded log sheet discrepancies and indicated 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
- numerically ordered blocks for microtomy
- cut at least 50 paraffin embedded sections, with minimal wrinkles, scores and folds, at the specified thickness (the complete surface of the tissue must be present on all slides with the remaining tissue in the block conserved for future testing) to industry standard, including:
 - at least one slide from each of the special preparation blocks.
 - 1 slide each from 15 different blocks cut on the one occasion

- at least 15 different tissue types
- 1 slide containing two ribbons with at least 3 serial sections per ribbon
- 1 slide containing 3 ribbons with at least 2 serial sections per ribbon
- 2 slides with both a section of “sample” tissue and “control” tissue
- 2 slides with at least 3 levels on each.
- 1 slide with a section 2-3µm
- labelled all slides clearly with minimum legal traceability requirements
- microscopically inspected sections after haematoxylin and eosin (H&E) staining to identify microtomy quality issues and recommend solutions.
- identify tissue types by sight at embedding and microtomy.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- specialised handling requirement for cortical and trabecular bone including bone marrow trephines
- nature of and criteria for embedding a wide variety of clinically significant tissue including:
 - large tissues
 - small tissues
 - multiple small biopsies in a single block
 - epithelial tissue such as skin or tongue with embedding orientation
 - tissue prone to distortion
 - bone, both solid and trabecular
 - shave biopsies
 - excision biopsies
 - fatty tissue
 - bloody tissue
 - blood clot
 - agar plugs
- functions of the components of an embedding centre
- role of reprocessing tissue that fail processing quality control checks at embedding
- relationship between correct orientation of the tissue during embedding and ability to cut sections from surface required for subsequent microscopic examination
- implications of various quality control issues in embedding on microtomy quality control
- functions of the components of a rotary microtome
- purpose of microtome orientation mechanism
- how decalcifiers, tissue softeners, cold plates and wet ice are used in microtomy
- Royal College of Pathologists of Australasia (RCPA) recommendations for specialised cutting techniques and practices for different tissue types including renal, liver and gastric biopsies, lymph nodes and alopecia specimens.
- how section adherents are used for specialised staining techniques

- requirements and purpose of instrument logs
- workplace and/or legal traceability requirements
- protocols for drying cut sections for routine and specialised staining
- workplace safety procedures and precautions for:
 - handling potentially hazardous chemicals, such as decalcifiers, tissue softeners, slide adhesives and paraffin wax
 - embedding and microtomy
 - sharps and broken glassware
- awareness of environmental sustainability issues as they relate to the work
- legal, ethical and work health and safety (WHS) requirements specific to the work task, including confidentiality and security requirements of all clinical information, and laboratory data and records.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - a standard histology laboratory with relevant equipment, samples and reagents, filing systems
 - workplace procedures, test methods and equipment manuals.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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