



Australian Government

MSL975061 Perform molecular biology tests and procedures

Release: 1

MSL975061 Perform molecular biology tests and procedures

Modification History

Release 1. Supersedes and equivalent to MSL975034 Perform molecular biology tests and procedures. Changed title in prerequisite unit. Other minor changes in Performance Criteria, Performance Evidence and Knowledge Evidence.

Application

This unit of competency describes the skills and knowledge to isolate, purify, verify and manipulate biomolecules and their products. This work requires close attention to working with small volumes, multiple-step procedures and prevention of contamination. Personnel are required to apply a wide range of molecular biology tests and procedures.

This unit applies to technical officers working in manufacturing (e.g. macro, micro, nanotechnology, pharmaceutical and blood products), food, biomedical (e.g. forensics, pathology and veterinary) and environmental industry sectors. Results are generally interpreted and reported to supervising scientists, medical, veterinary or other responsible officers of a workplace, regulatory authority or legal agency.

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

MSL973027 Perform techniques that prevent cross-contamination

MSL974034 Perform biological procedures

Competency Field

Testing

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Interpret and schedule test requirements	1.1 Review test request to identify samples to be tested, test method and equipment/instruments involved 1.2 Identify hazards and workplace control measures associated with the sample, preparation methods, reagents and/or equipment

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
2. Receive and handle samples	2.1 Register samples in accordance with workplace procedures, recording details that allow accurate tracking and chain of custody traceable to employee 2.2 Match sample provided to accompanying documentation and report any discrepancies in accordance with workplace procedures 2.3 Store samples in accordance with workplace and test method requirements
3. Prepare equipment and reagents	3.1 Set up equipment/instrumentation in accordance with workplace procedures and perform pre-use and safety checks 3.2 Select and collect reagents in accordance with test method requirements 3.3 Prepare and label reagents in accordance with test method requirements
4. Extract, verify and manipulate biomolecules	4.1 Produce/extract biomolecules from samples using appropriate methods 4.2 Prevent contamination of samples by unwanted biomolecules 4.3 Recognise the presence of common inhibitors of biomolecular reactions and take corrective action 4.4 Quantify and qualify biomolecular yields from purified extractions 4.5 Use appropriate techniques to prepare and test a range of biomolecular samples 4.6 Use controls and reference standards to confirm the integrity of biomolecular sample preparation and procedures 4.7 Troubleshoot basic procedure, reagent or equipment problems which have led to atypical data or results
5. Report and communicate results	5.1 Record and/or check data in accordance with workplace procedures 5.2 Follow procedures to ensure traceability of sample from receipt to reporting of results

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

Supersedes and equivalent to MSL975034 Perform molecular biology tests and procedures.

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 MSL975061 Perform molecular biology tests and procedures

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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:

- applied the following molecular biology procedures to biomolecules using small volumes, including:
 - extraction
 - isolation
 - purification
 - verification
 - manipulation
- amplified nucleic acids using PCR based technology
- applied at least 2 molecular biology multiple-step, small volume tests with appropriate controls to provide valid, reliable results from at least one of the following list:
 - tested samples for the presence of microorganisms
 - tested samples for the presence of biomolecules
 - cloning
 - sequencing
 - hybridisation
- followed work practices that prevent DNA/RNA contamination.
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Knowledge Evidence

There must be evidence the candidate has knowledge of:

- common molecular biology terms
- molecular biology principles and concepts underpinning tests and procedures, including:
 - DNA and RNA structure and function
 - protein structure and function
 - the relationship between chemical and physical properties of nucleic acids and proteins and the techniques used for sampling, preparation and testing
 - replication, transcription, translation

- relationship between structure, organisation and function of biomolecules to the storage of information in cells, chromatin, circular and linear chromosomes, RNA, genes and plasmids
- molecular genetics (molecular nature, organisation, function and regulation of genes)
- molecular mechanisms of DNA mutation and variation
- DNA transfer in prokaryotes (transformation, conjugation and transduction) and the use of plasmids
- restriction enzyme and ligase structure, nomenclature, function, specificity and stability, and cohesive versus blunt ends
- molecular biology procedures, including common:
 - extractions techniques
 - isolation techniques
 - purification techniques
 - verification and visualisation techniques
 - manipulation techniques
- different types of PCR assays
- preservation and storage of samples (e.g. freezing)
- purpose of tests and procedures implemented (why they are used and basic principle)
- use of enzymes in molecular procedures
- analysis of nucleic acids and proteins
- basic principles of cloning and sequencing
- general applications of molecular biology including:
 - testing DNA for sequence variation that is either causative of, or associated with, genetic disease
 - testing samples for the presence of microorganisms
 - identification of species
 - generating data for taxonomic and ecological investigations
 - genetic engineering
- importance of preventing and minimising DNA/RNA contamination
- handling of unstable or hazardous chemicals or samples and/or the fragile/labile nature of biological material
- importance and appropriate use of validated methods, controls and certified reference materials
- actions required when atypical data or results are identified
- basic ethical issues associated with biotechnology
- awareness of environmental sustainability issues as they relate to the work task
- legal and work health and safety (WHS) requirements specific to the work task including traceability, 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 molecular biology laboratory equipped with appropriate test equipment, analytical instruments and reagents
 - workplace procedures, standard methods, manuals and supplier documentation, test results and documentation.

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

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