Australian Government

MSL975013 Perform tissue and cell culture techniques

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

MSL975013 Perform tissue and cell culture techniques

Modification History

Release 1. Supersedes and is equivalent to MSL975013A Perform tissue and cell culture techniques

Application

This unit of competency covers the ability to prepare, maintain and preserve cells and cell lines for a variety of applications, such as large scale culture, production of monoclonal antibodies, production of viral vaccines and amniocentesis studies. Personnel are required to optimise equipment set-up, media and growth techniques. They are required to detect and investigate contamination and take preventative and/or corrective actions under supervision.

This unit of competency is applicable to laboratory technicians and technical officers working in laboratories in the biomedical, environmental, biotechnology and education industry sectors.

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

MSL973004 Perform aseptic techniques

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	**Interpret and schedule production requirements**	1.1	Review client request and confirm quantity and nature of cells, tissue or products
		1.2	Select appropriate media, materials, equipment and methods
		1.3	Plan parallel work sequences to optimise production
		1.4	Maintain a chain of custody, traceable to the worker, for all cells and tissues
2	**Work safely according to the legal and regulatory framework**	2.1	Ensure work practices and personal actions conform to regulations, codes, guidelines and workplace quality assurance procedures
		2.2	Identify hazards and workplace control measures associated with the sample, preparation methods, reagents and equipment
		2.3	Select, fit and use personal protective equipment (PPE)
		2.4	Address hazards and incidents as they arise
		2.5	Ensure the safe disposal of biohazardous materials and other laboratory waste
3	**Assemble and maintain tissue culture equipment**	3.1	Assemble, sterilise or decontaminate equipment according to workplace procedures
		3.2	Perform pre-use and safety checks in accordance with relevant workplace and operating procedures
		3.3	Identify faulty or unsafe components and equipment and report to appropriate personnel
		3.4	Decontaminate area and equipment after use

4	**Prepare and test cell and tissue culture media**	4.1	Confirm media specifications and processes/methods
		4.2	Prepare culture media to suit client request
		4.3	Sterilise culture media and check for sterility
		4.4	Perform quality control checks to ensure that culture media is fit for purpose
		4.5	Store culture media in accordance with specifications
5	**Obtain, monitor and maintain tissue and cell lines**	5.1	Retrieve/obtain the cell lines or tissue sample from fresh or preserved sources and prepare a culture
		5.2	Select specified culture media and add any necessary growth agents or nutrients
		5.3	Incubate cells/tissue in specified conditions
		5.4	Inoculate the media with the specified amount of sample
		5.5	Monitor growth of tissue and cell lines and products
		5.6	Detect contamination and troubleshoot materials, equipment and techniques
		5.7	Passage samples by subculturing to preserve or grow the line
		5.8	Harvest cells or cell products to optimise yields
6	**Preserve cells and tissues**	6.1	Select the appropriate preservation method
		6.2	Preserve the cell lines or tissue in accordance with the method
		6.3	Check preserved cell lines regularly to ensure viability is maintained
7	**Maintain records**	7.1	Maintain records of batches of media and test data
		7.2	Maintain records of active and stored tissue and cell lines

7.3 Ensure records are retrievable, legible and accurate

7.4 Ensure records conform to the information management, records, quality system and legal requirements

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 covering the requirements for the competence of testing and calibration laboratories, laboratory safety, and quality and environmental management
- Australian standards covering the requirements for cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities
- national work health and safety (WHS) standards and codes of practice, national environmental protection measures, and national measurement regulations and guidelines
- specific codes, guidelines and procedures, such as National Association of Testing Authorities (NATA) accreditation requirements, principles of good laboratory practice (GLP), Australia New Zealand Food Standards (ANZFS) Code, Australian code of good manufacturing practice for medicinal products (GMP), Therapeutic Goods Regulations, Australian Dangerous Goods Code, gene technology regulations, and Guide to physical containment levels and facility types
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; material, client and product specifications; production and laboratory schedules; workplace recording and reporting procedures; and waste minimisation and safe disposal procedures
- procedures and standard methods for preparing culture media, operation and maintenance manuals for automated media preparation equipment, and verified test methods

Cells and tissues

Cells and tissues include, but are not limited to, one or more of:

- animal cell lines, such as hybridoma, liver, epidermal, lymphoblastic and fibroblastic
- plant cell line,s such as tobacco, arabidopsis, soya bean, tomato, roses and meristomatic tissue
- yeasts
- fungi
- sperm, ova and embryos

- adherent and suspension cultures

Pre-use checks

Pre-use checks include:

- performing routine maintenance
- checks on raw materials and consumables, including use-by-date, and possible contamination and storage conditions

Preparing primary cultures

Preparing primary cultures includes, but is not limited to, one or more of:

- thawing of cryopreserved cells and monitoring of cell recovery
- enzymatic disaggregation from tissue
- mechanical disaggregation from tissue
- primary explant technique
- pre-treatment
- selection techniques, such as cloning, micromanipulation, use of selective media, density gradient centrifugation, selective adhesion techniques and selective detachment

Monitoring growth of tissue and cell lines

Monitoring growth of tissue and cell lines includes, but is not limited to, one or more of:

- identification of normal and abnormal cells viewed using an inverted stereo microscope
- recognition of contamination by cytopathic changes to cells, biochemical tests, gene detection and microbiological culture
- testing for products, such as insulin
- checking growth rates
- performing viable cell counts, such as the dye exclusion test, and Trypan Blue viability stain to determine percentage viability and total cell concentration
- staining and assessment of morphology (e.g. by Giemsa)
- karyotype analysis

Workplace safety procedures

Workplace safety procedures 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, gowns, body suits and respirators
- using containment facilities (PCII, PCIII and PCIV physical containment laboratories), containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets) and containment procedures
- reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/wastewater, gases, smoke, vapour, fumes, odour and particulates, to appropriate personnel

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

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Links

MSA Training Package Implementation Guides - http://mskills.org.au/training-packages/info/