



Australian Government

Department of Education, Employment and Workplace Relations

ACMATE506A Assist to collect and transfer embryos of mice

Release: 1

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Modification History

New Unit.

Unit Descriptor

This unit of competency covers the process of assisting in the collection, handling, storage and transfer of mouse embryos.

Application of the Unit

The unit has been specifically developed for animal technicians working in research and teaching facilities that require laboratory mice to be re-derived by embryo transfer for scientific purposes. Animal technicians collecting embryos and performing surgery on animals operate under and must comply with the current Australian code of practice for the care and use of animals for scientific purposes, relevant state/territory legislative requirements as well as protocols, policies and procedures set down by the Animal Ethics Committee (AEC) within their institution.

In addition to legal and ethical responsibilities, all units of competency in the Animal Care and Management Training Package have the requirement for animals to be handled gently and calmly. The individual is required to exhibit appropriate care for animals so that stress and discomfort is minimised.

Note: Scientific purposes refers to ‘all those activities that require approval from an Animal Ethics Committee and are performed to acquire, develop or demonstrate knowledge of techniques in any scientific discipline, including activities for the purposes of teaching, field trips, environmental studies, research, diagnosis, product testing, and the production of biological products’.

Licensing, legislative, regulatory or certification requirements may apply to this unit. Therefore, it will be necessary to check with the relevant State or Territory regulators for current licensing, legislative or regulatory requirements before undertaking this unit.

It is recommended that candidates who undertake this unit also complete ACMATE504 Administer anaesthesia and perform surgery on animals for scientific purposes, ACMATE505A Carry out advanced breeding procedures and MSL974011A Prepare tissue and cell cultures

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

There are no pre-requisite units for this competency standard.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for procedures and maintain documentation	1.1 Institutional protocols, policies and <i>procedures</i> as set down by the <i>Animal Ethics Committee</i> (AEC) and <i>relevant legislative requirements</i> including <i>OHS</i> are complied with at all times 1.2 Regulatory and project documentation requirements are identified 1.3 Project reproductive and <i>breeding program</i> objectives are verified 1.4 Records are maintained and updated in accordance with institutional policies and procedures
2. Assist to vasectomise males	2.1 Equipment including <i>PPE</i> and work areas is prepared 2.2 Male mice are selected for vasectomy and assessed for <i>health status</i> and suitability for surgery 2.3 Contingency plans are prepared to respond to potential emergencies during and after surgery 2.4 <i>Anaesthetics, analgesics and equipment</i> are prepared 2.5 Animal is anaesthetised under supervision and monitored to ensure surgical anaesthesia is achieved and maintained 2.6 Animal is <i>prepared for aseptic surgery</i> 2.7 Vasectomy, under supervision, is conducted and wounds closed 2.8 Animal is <i>monitored</i> during recovery 2.9 Success of vasectomy is confirmed
3. Assist to collect embryos	3.1 Females are monitored for <i>stages of oestrous cycle</i> 3.2 Suitable females are identified and health status assessed 3.3 Female is prepared for <i>super-ovulation</i> 3.4 Female is mated with an entire male 3.5 Presence or absence of vaginal plugs is confirmed 3.6 Embryos are collected under supervision from the reproductive tract of super-ovulated and mated donor females
4. Manage and manipulate embryos	4.1 Embryos are held in a suitable receptacle under optimal temperature, and atmospheric conditions to ensure viability 4.2 Embryos are graded and manipulated 4.3 Embryos are washed in an aseptic manner for the purpose of re-derivation transfer 4.4 Embryos are stored prior to transfer 4.5 Procedures, materials, equipment and techniques are monitored for quality
5. Assist to transfer embryos	5.1 Females are mated with vasectomised males and checked for the presence of vaginal plugs

ELEMENT	PERFORMANCE CRITERIA
	5.2 <i>Embryos are prepared</i> for transfer 5.3 Females are anaesthetised under supervision for embryo transfer and monitored to ensure surgical anaesthesia is achieved and maintained 5.4 Embryos are transferred under supervision
6 Monitor success of embryo transfer	6.1 Females are monitored for pregnancy 6.2 Number of pups born to embryos transferred per recipient is monitored and recorded to determine success of program 6.3 Health status of pups and recipient is assessed after birth and weaning

Required Skills and Knowledge

Required skills include:

- administer super-ovulation regimen to donor female mice
- apply animal care and ethics committee classification system to determine procedures that require approval
- calculate dosage, administer drugs including anaesthetics, analgesics, hormones and monitor response in accordance with project protocols and workplace standards.
- check animals' physical conditions and vital signs and monitor for signs of progress or deterioration in condition or health of animals
- employ safe and environmentally responsible organisational systems and procedures when handling animals, materials and equipment
- identify sex, age and reproductive status of male and female animals
- maintain the highest standards of hygiene and infection control at all times to reduce the risk of infection and cross-infection
- prepare and use equipment and materials correctly, in accordance with manufacturers' specifications
- prepare and maintain appropriate records and reports relevant to breeding and technical procedures using relevant institutional electronic and/or manual systems
- prepare, store and handle proprietary embryo media
- use bio-safety and/or laminar flow cabinets
- use literacy skills to read, interpret and apply institution policies and procedures, including OHS, infection control, containment and exclusion and waste management; critically analyse material and record information collected accurately and legibly
- use oral communication skills / language competence to fulfil the job role as specified by the institution including questioning, active listening, asking for clarification and consulting with or seeking advice from research groups team members, senior or more experienced staff or other relevant persons
- use problem-solving skills to use available information and resources including recording information and prioritise daily tasks
- use numeracy skills to estimate, calculate and record routine and more complex workplace measures
- use personal protective clothing and equipment correctly
- use safe manual handling techniques and/or equipment
- use safe and hygienic waste handling and disposal procedures.

Required knowledge includes

- anatomical and physiological features of mice related to vasectomy, embryo collection and transfer
- applicable industry quality assurance requirements and required documentation
- aseptic techniques
- biosecurity issues relating to the collection of samples from animals
- institutional policies and safe work procedures, including OHS and emergency procedures
- methods used to collect, store and manipulate embryos from mice for re-derivation purposes

- methods use to perform embryo transfer procedures in mice
- mouse oogenesis, ovulation, conception and embryonic development
- principles of constitution, storage and use of proprietary embryo flushing, holding and culture media
- principles of super-ovulation regimens for mice
- principles of surgery relevant to vasectomy, embryo collection and transfer
- relevant anaesthetics, analgesics and other medications used and methods of administration for mouse surgery
- relevant laboratory techniques and procedures
- relevant principles of animal welfare and ethics
- relevant codes of practice including the Code of Practice for the Care and Use of Animals for Scientific Purposes
- relevant common diseases, injuries and other impacts on mouse health and well-being and characteristics of healthy, sick or distressed mice
- relevant state or territory legislation and regulations relating to the practice of veterinary science, OHS and animal welfare and research including the Office of the Gene Technology Regulator
- relevant state or territory legislation covering the use of therapeutic and controlled substances
- reproductive cycles relating to mouse embryo technology
- safe mouse handling techniques including approved handling methods during the administration of substances and surgical procedures
- workplace hygiene standards, disinfectants, cleaning agents, cleaning techniques and cleaning equipment and materials and infection control protocols.

Evidence Guide

<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
Overview of assessment	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>The evidence required to demonstrate competence in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit. Assessors should ensure that candidates can:</p> <ul style="list-style-type: none"> • comply with institutional protocols, policies and procedures including Animal Ethics Committee and legislative requirements including OHS at all times • read and verify breeding program requirements • identify, verify health status and prepare suitable animals for embryo collection and embryo transfer procedures • under supervision conduct embryo collection and transfer procedures for re-derivation purposes • monitor the health and welfare of animals during and after procedures and provide appropriate care • maintain and update records in accordance with regulatory and project documentation requirements. <p>The skills and knowledge required to assist to collect and transfer embryos of mice must be transferable to a range of work environments and contexts and include the ability to deal with unplanned events.</p>
Context of and specific resources for assessment	<p>Assessment of this unit is to be practical in nature and will be most appropriately assessed in an animal research or production facility or an environment that simulates normal work conditions that has a scientific establishment licence and access to an approved Animal Ethics Committee.</p> <p>There must be access to a range of research animals and the relevant information, materials and documentation to enable one to demonstrate competence.</p>
Method of assessment	<p>To ensure consistency in one's performance, competency should be demonstrated, to industry defined standards,</p>

	<p>on at least two occasions over a period of time in order to cover a variety of circumstances and over a number of assessment activities.</p> <p>The assessment strategy must include practical skills assessment. Suggested strategies for this unit are:</p> <ul style="list-style-type: none"> • written and/or oral assessment of candidate's required knowledge • observed, documented and first-hand testimonial evidence of candidate's application of practical tasks • simulation exercises that reproduce normal work conditions • case study analysis • third-party evidence • workplace documentation • portfolio. <p>This unit may be assessed in a holistic way with other units of competency relevant to the industry sector, workplace and job role.</p>
Guidance information for assessment	Assessment methods should reflect workplace demands (e.g. literacy and numeracy demands) and the needs of particular target groups (e.g. people with disabilities, Aboriginal and Torres Strait Islander people, women, people with a language background other than English, youth and people from low socioeconomic backgrounds).

Range Statement

<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<p>Institutional standard operating <i>procedures</i> may include:</p>	<ul style="list-style-type: none"> • institution's quality assurance manual and procedures including: <ul style="list-style-type: none"> • biosecurity • OHS • recycling and re-use guidelines • restraint, handling, humane killing and disposal of animals • embryo culture • use, storage and transport of equipment and drugs during procedures • waste disposal • project objectives and production schedules.
<p>Procedures that require <i>Animal Ethics Committee (AEC)</i> approval may include:</p>	<ul style="list-style-type: none"> • anaesthetic • re-derivation • super-ovulation induction • surgical • any other procedure that may impact on the animal's health and wellbeing.
<p><i>Relevant legislative requirements</i> may include:</p>	<ul style="list-style-type: none"> • <i>Australian Code of Practice for the Care and Use of Animals for Scientific Purposes</i> • Gene Technology Act 2000 • relevant state or territory legislation and regulations such as those relating to: <ul style="list-style-type: none"> • animal research • animal welfare • prevention of cruelty to animals • quarantine • the practice of veterinary surgery • the administration and storage of therapeutic and controlled substances.
<p><i>OHS</i> risks associated with animal technician procedures may include:</p>	<ul style="list-style-type: none"> • animal bites or scratches • biological hazardous waste and sharps disposal • handling of chemicals and medicines • waste anaesthetic gas leakage • inhalation of aerosol particles

	<ul style="list-style-type: none"> • intraocular contamination • manual handling including carrying, lifting and shifting • needle pricks and cuts from other sharps • release of infective agents (animal and human) • scalds and burns from sterilising and cleaning equipment • zoonoses.
Breeding program may include:	<ul style="list-style-type: none"> • information about: <ul style="list-style-type: none"> • the number of breeders required • selection criteria for breeders and retiring breeders • breeding system to be used for example: <ul style="list-style-type: none"> • inbred • outbred • backcross • genotype • fostering requirements, identification system to be used • record system to be used e.g. computer, cards, books • data to be collected about production rates e.g. numbers born and sex ratios • weaning rate.
PPE may include:	<ul style="list-style-type: none"> • appropriate footwear • optical aids and protective eyewear • laboratory gowns, caps, masks, boots and gloves.
Health status considerations may include:	<ul style="list-style-type: none"> • animal health checks including: <ul style="list-style-type: none"> • general health and condition • behaviour • respiration • temperature • bodyweight • sentinel testing of mouse colonies.
Anaesthetic, analgesics and equipment may include:	<ul style="list-style-type: none"> • anaesthesia agents • anaesthetic equipment and supplies: <ul style="list-style-type: none"> • anaesthetic machines and trolleys • filters • gas cylinders • incubators

	<ul style="list-style-type: none"> • scavenging systems • tubes • vaporisers • surgical instruments and equipment: <ul style="list-style-type: none"> • cautery instruments • forceps • needles • needle holders • resection clamps • scalpels • scissors • sutures • wound clips.
Preparation for aseptic surgery may include:	<ul style="list-style-type: none"> • clipping • preoperative skin preparation routines <ul style="list-style-type: none"> • further preparation may extend to administration of necessary premedication including analgesics.
Monitoring during recovery may include:	<ul style="list-style-type: none"> • continued monitoring of vital signs • detection of pain and distress • positioning of patient recumbency in consideration of recovery phase and surgical site • prevention of hypothermia and hypotension.
Stages of oestrus cycle may include:	<ul style="list-style-type: none"> • induced ovulation species • dioestrus • metoestrus • oestrus • proestrus • detection of vaginal plugs in female mice.
Preparation for super-ovulation may include:	<ul style="list-style-type: none"> • selection of strain and age of donor mice • re-constitution and dilution of super-ovulatory hormones • administration of super-ovulatory hormones to mice • timing of administration of super-ovulatory hormones.
Embryo preparations for transfer may include:	<ul style="list-style-type: none"> • selection of recipient females • breeding of recipient mice with vasectomised males • checking of vaginal plugs after breeding with vasectomised males • preparing equipment including construction and treatment of embryo transfer pipettes • packing and sterilising surgical instruments

	<ul style="list-style-type: none">• preparing anaesthetic equipment• loading embryo transfer pipettes.
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Unit Sector(s)

Animal technology