

LAB_053 NMR Body Composition Analysis (Expiry: March 2026)

I. OBJECTIVE

To ensure effective and safe measurements of body fat, lean tissue mass and fluid in adult rodents using nuclear magnetic resonance (NMR).

II. COMMENTS / RECOMMENDATIONS

- This procedure is non-invasive and rapid. Rodents should be held within the measuring tubes for the minimum time required to complete the procedure (usually <1 minute). Rodents must not be held within the measuring tubes for any longer than 5 minutes.
- Use of the NMR and any variation to this SOP must be described in a relevant animal ethics application.
- This procedure has been written with specific reference to the Integrated Physiology Facility (IPF), which utilises an NMR unit comprised of both software (Bruker Minispec Plus) and hardware (Minispec LF50 NMR Analyser) components and may only be used by an IPF approved experienced operator.
- Equipment and procedures may vary somewhat in other animal facilities – these variations must be described in the individual animal ethics application, if using this SOP.
- Users should read and understand the associated Risk Assessment prior to operation: 3987 Use of NMR; 3657 UQBR Handling and restraint of laboratory animals; 3940 Handling rats and mice (available on the [UQSafe](#) website). Warning: strong magnetic field may interfere with pacemaker function.
- Equipment/software failures and animal escapes need to be reported to the animal facility manager immediately.
- All incidents/injuries should be reported via [UQSafe](#) online.
- This procedure involves mouse handling and appropriate care should be taken, refer to [LAB_006 Handling and restraint in mice and neonates](#).
- Wild type and genetically modified animals must be transported to equipment as per OGTR guidelines and [LAB_003 Transportation of Laboratory Rodents](#).
- The IPF is a shared space with unknown commensal microbial status. Once transported to a shared space it is often not possible, for biosecurity reasons, to return rodents to their original animal facility. Arrangements for transportation and ongoing care of experimental animals must be made with relevant animal facility managers when planning projects that aim to use a shared facility.

III. EQUIPMENT

- PPE.
Minimum PPE is gloves, gown, eye protection, face mask and closed in shoes. Additional PPE may be required based on additional risk e.g., working with infectious animals (P2 fitted mask and viral gown).
- Calibration tube (filled with mustard seeds)
- Restraint tube
- NMR imaging unit
- Scales
- Paper towel
- Disinfectant (1-2% Virkon), Ethanol (70%)
- Clinical waste bin

Conditions:

- Investigators named in an animal ethics application, relative to this SOP, must be competent to implement the SOP
- Any variation to this SOP must be described in the relevant animal ethics application
- If this SOP has not been reviewed and approved by a UQ AEC within the last three years it is no longer valid and cannot be used in animal ethics applications until reapproved (see "AEC Reviewed/Approved" date in this document's header).

IV. PREPARATION

- Check AEC approvals to ensure that the correct procedure, personnel and facility are approved for the planned work.
Deviations can occur between approved procedures listed versus what is planned with the animal, check that they match and that the relevant personnel are approved.
- Check booking date and time on PPMS.
- All animal arrivals/departures and euthanasia's must be recorded on the Mosaic movement sheet available in the IPF.
- The NMR is always left on. Confirm this prior to procedure by checking 2 green lights are visible on the processor unit. If for some reason the NMR is not on (e.g., loss of power), it may take up to 3 hours before it can be used.

V. PROCEDURE

- Daily calibration of the NMR is required before animals can be measured.
- Check animal identification and record animal weight.
- Enter animal details into the program and select measure prior to placing the mouse in the measuring tube (Figure 1B).
This will reduce the total time each mouse spends in the tube.
- Encourage rodent into the measurement tube by holding it horizontal. Replace the end and slowly depress the plunger until the mouse can no longer move (i.e., unable to turn around) but can breathe freely.



Figure 1A) NMR Minispec unit, by Bruker, and B) Rodent restraint tubes.

- Insert the tube into the NMR when directed by software and the measurement will start automatically (Figure 1).
Total measuring time is approximately 1 minute.
- At the end of the measurement, remove the tube and release the mouse back into the home cage.
- Disinfect and clean the tube of urine and faeces prior to measuring the next mouse.

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