

LAB_054 Non-invasive blood pressure (NIBP) measurements on mice and rats (Expiry: March 2026)

I. OBJECTIVE

To ensure the effective and safe non-invasive measurement of blood pressure in rodents.

II. COMMENTS / RECOMMENDATIONS

- This procedure is non-invasive and rapid. Rodents should only be held within the restraint tubes for the minimum time required to complete the procedure. Rodents must not be held within the restraint tubes for any longer than 5 minutes.
- Relative to animal ethics applications, when using this SOP, the following must be described in the individual ethics application: use of NIBP measurements (including duration and frequency of use), and any variation to this SOP.
- This procedure has been written with specific reference to the Integrated Physiology Facility (IPF), NIBP equipment at this facility includes both software (LabChart) and hardware (ADInstruments) 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.
- Most animals require some habituation to the protocol. Two to three short training sessions may be necessary to habituate the animals.
- Equipment/software failures and animal escapes need to be reported to the animal facility manager immediately.
- All incidents/injuries should be reported to the animal facility manager and via [UQSafe](#) online.
- This procedure involves rodent handling, appropriate care should be taken, refer to [LAB_006 Handling and restraint in mice and neonates](#), and [LAB_039 Handling and Restraint in Rats and Neonates](#).
- Wild type and genetically modified animals must be transported to equipment as per OGTR guidelines and [LAB_003 Transportation of Laboratory Rodents](#).
- Users should further read and understand the associated Risk Assessment prior to operation: 3657 UQBR Handling and restraint of laboratory animals; 3940 Handling rats and mice (available online at [UQSafe](#)).
- 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 and closed in shoes. Additional PPE may be required based on additional risk e.g., working with infectious animals (P2 fitted mask).
- PowerLab (4/35 or 8/35) and NIBP controller (Figure 1A)
- Computer with LabChart software
- NIBP tail cuff (mouse or rat) (Figure 1A)
- Rodent restraint tube and holder (Figure 1B)
- Towel

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).

- Heating pad and lamp
- Disinfectant (1-2% Virkon), Ethanol (70%)

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.
- Pulse range bandwidth setting for mice is 240-600 BPM.
- Pulse range bandwidth setting for rats is 90-420 BPM.
- Average measurement cycle time is 20-40 seconds.

V. PROCEDURE

1. Ensure the NIBP controller is connected to the PowerLab. Connect the tail pressure cuff to the cuff connection at the front of the NIBP controller, and the pulse transducer to the Pulse Input connector (MLT125M for mice, MLT125R for rats) (Figure 1A).

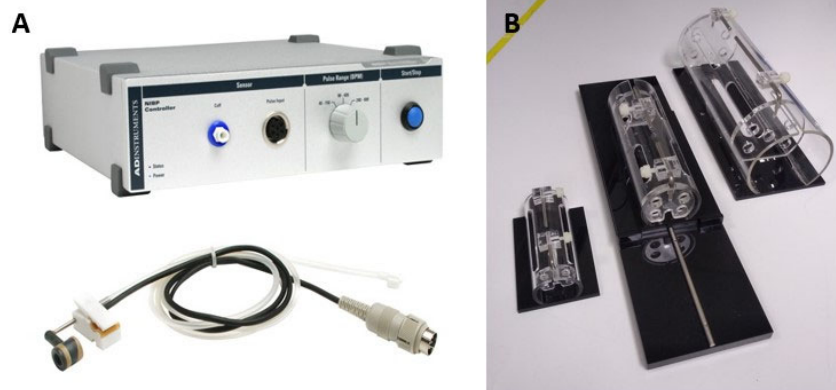


Figure 1. (A) Tail cuff and NIBP Controller. (B) Rodent restraint tubes.

2. Open LabChart on the computer and set up two channels, one for pulse and one for pressure. The pulse channel range should be set to 50 mV, the pressure channel range should be set to 1 V, and the unit conversion should be set up to give 0 V = 0 mmHg and 1 V = 300 mmHg.
3. Check animal identification and enter any relevant details into the software.
4. Choose an appropriately sized restraint tube that prevents the animal from turning around (Figure 1B).
5. Place the restraint tube onto a heating pad and encourage the rodent into the tube. Carefully replace the tube end ensuring the tail protrudes.
Place a towel over the tube to help calm the animal and reduce the impact of external stimuli.
6. Connect the pressure cuff and pulse transducer to the proximal end of the animal's tail.
The active site of the pulse transducer should line up with the ventral surface of the tail, directly adjacent to the caudal artery. The transducer is positioned directly following the pressure cuff.

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).

7. Click the start button in LabChart to begin recording.

8. Push the Start/Stop button on the front of the NIBP Controller to begin the measurement cycle.

The pump will start as the cuff inflates, observe the pressure waveform rise and the pulse signal decrease in amplitude. When the pre-set maximum cuff pressure is reached the pump will stop and the pressure will drop. Average measurement cycle time is 20-40 seconds.

9. At the end of the measurement, release the rodent back into home cage.

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).