LAB_047 X-ray imaging of live rodents (Expiry: March 2026)

I. OBJECTIVE

To ensure safe and humane X-ray imaging of live mice and rats.

II. DEFINITIONS

Competent - "the consistent application of knowledge and skill to the standard of performance required regarding the care and use of animals. It embodies the ability to transfer and apply knowledge and skill to new situations and environments." (as per, Australian code for the care and use of animals for scientific purposes, 2013)

X-ray imaging - delivering electromagnetic radiation called X-rays to generate images of internal anatomical structures such as bone.

III. COMMENTS / RECOMMENDATIONS

- When performing this procedure within the TRI Preclinical Imaging Facility:
  - Operators must receive prior training and approval from TRI Preclinical Imaging Facility personnel
  - A Personal Use radiation licence from Queensland Health is not required to operate the system, as it is classified as a cabinet X-ray unit. However, operators must have completed relevant radiation safety training as stipulated by TRI.
- The entire workflow, from induction of anaesthesia to imaging to recovery, takes approximately is 5-7 minutes per rodent. The X-ray beam-on time is typically less than 10 seconds per image.
- Inside the X-ray machine, the rodent can be visually monitored by the operator looking through the lead-lined glass door.
- After imaging, the rodent must be monitored continuously until recovered (conscious ambulatory movement).
- If contrast agents are used to enhance visualisation of soft tissue, details must be provided in the AEC application (name, type, volume, route, needle gauge). However, contrast agents are usually not required for this procedure.
- This procedure has been written with specific reference to the TRI Preclinical Imaging Facility. If applying this SOP to a different facility the novel location and any variations to equipment and infrastructure, that may impact to animal wellbeing, must be described in the individual animal ethics application.

IV. EQUIPMENT

- Vaporous isoflurane anaesthetic unit, including:
  - Precision isoflurane vaporiser
  - Induction chamber
  - Nose cone
  - Anaesthetic circuit
  - Isoflurane scavenging system
- X-ray machine
- Contrast agents (if relevant)
- Heated recovery cage
- Surface disinfectant

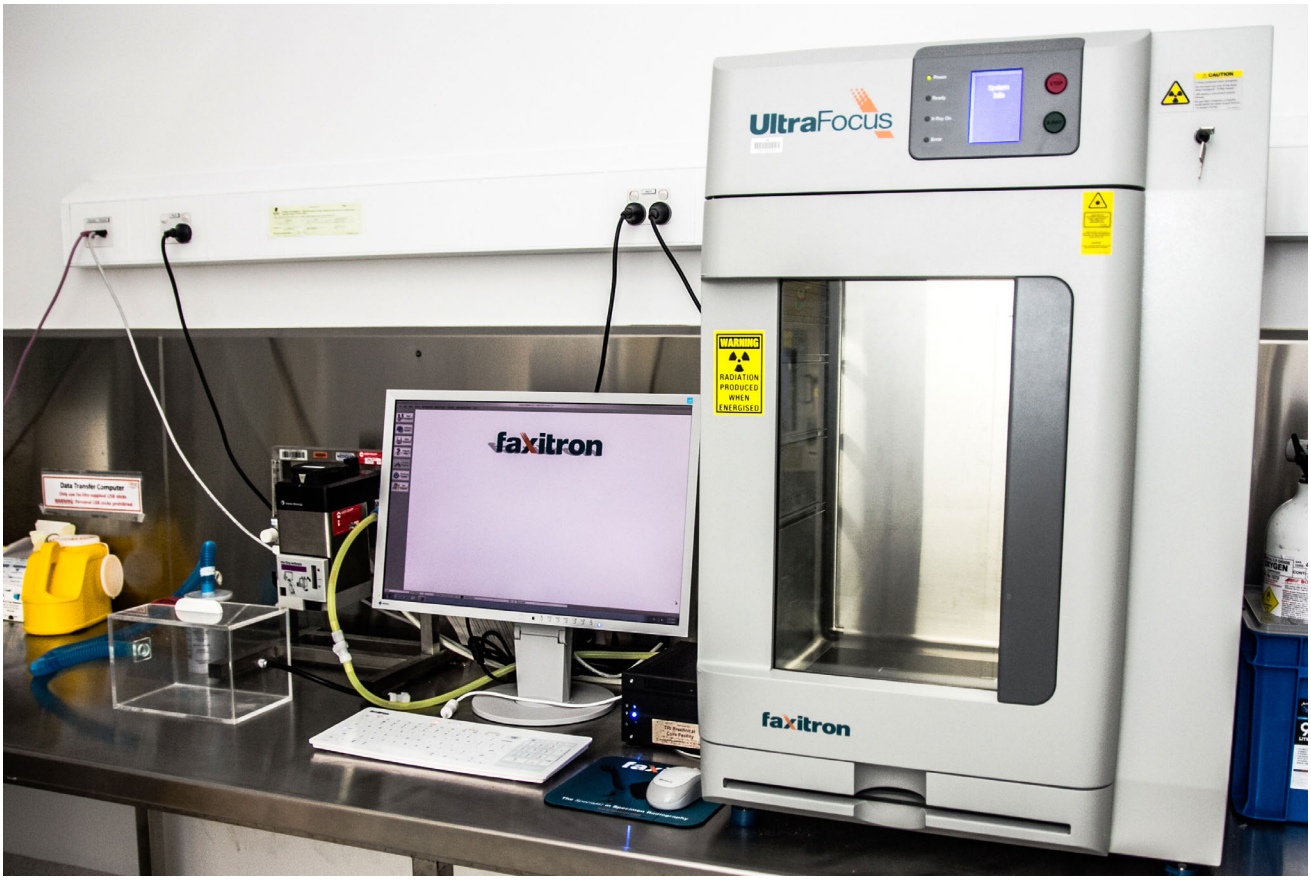

Figure 1. X-ray machine

V. PROCEDURE

1. Ensure all workspaces and equipment are clean using surface disinfectant
2. Fill the anaesthetic induction chamber with 3-5% isoflurane and oxygen gas mixture (~1L/min is appropriate, given a 2-5L induction chamber)
3. Place the rodent into the anaesthetic induction chamber.
4. Once adequately anaesthetised, move the rodent onto the animal bed inside the X-ray machine, maintaining anaesthesia (~2% isoflurane, ~400mL/min gas flow rate) via use of a nose cone.
5. Perform X-ray imaging (typically takes less than 10 seconds to capture each image).
6. Once complete, remove rodent directly to a heated cage with access to feed and water and monitor continuously until completely conscious and able to walk normally.
7. Ensure isoflurane vaporiser and oxygen gas supply are turned off.
8. Clean imager, workplaces and any other equipment with surface disinfectant.

Version #	Reviewing AEC (note: all other relevant AECs ratify the approval)	AEC Review Date	Approval To Date
1	LBM	16/02/2022	16/02/2025

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).