Appendix C

HAZARD MANAGEMENT – SAFE OPERATING PROCEDURE (SOP)

Only to be completed where required as a control measure under a Risk Assessment

NAME OF THE TASK/ACTIVITY	**IVIS LUMINA BIOLUMINESCENCE/FLUORESCENCE IMAGING SYSTEM**	**DATE: 20/02/2020**
LOCATION	ADELAIDE MICROSCOPY, HELEN MAYO NORTH, NG38A	/Insert photo /(Optional)
RISK ASSESSMENT (RA) NAME	**IVIS Lumina Bioluminescence/Fluorescence Imaging System**	
Residual risk rating on the RA	☒ **Low** ☐ **Medium** ☐ **High** ☐ **Very High**	
Hazards identified on the RA	**Contact with electricity or potential for electric shock** **Exposure to ionising radiation** **Exposure to UV light**	

PERSONAL PROTECTIVE EQUIPMENT

	Eye protection: ☒ Safety glasses ☐ Eye shields ☐ Safety goggles ☐ Other:
	Hand protection: ☐ Rubber ☐ Cut resistant ☐ Leather ☐ Vinyl ☐ Neoprene ☒ Nitrile ☐ Barrier creams ☐ Other:
	☒ Enclosed footwear: ☐ Footwear that is resistant to spills of hazardous substances ☐ Boots with steel caps ☐ Other:
	Protective clothing: ☐ Lab coat ☒ Gown ☐ Long sleeves ☐ Long pants ☐ High visibility ☐ Helmet ☐ Sun protection ☐ Other:

DESCRIBE, IN SEQUENCE, STEPS TO COMPLETE THE ACTIVITY SAFELY

Pre-operational checks

YOU MUST NOT USE THIS MACHINE UNTIL YOU HAVE HAD APPROPRIATE TRAINING BY TRAINED ADELAIDE MICROSOCPY STAFF. Unauthorised use may result in damage to the instrument.

Operational checks/steps to complete the activity from start to finish (including transport and waste disposal where relevant)

The IVIS Lumina XRMS Bioluminescence/Fluorescence Imaging System is a low-light camera system that uses light in the visible and infrared range of the electromagnetic spectrum. In addition it has an enclosed X-ray source for single X-Ray imaging and as such poses no radiation safety problems to operators. This imaging system is non-invasive and can be performed repeatedly on live animals, thus reducing the number of animals used to track experimental progress.

Hazards
Contact with electricity or potential for electric shock
Exposure to ionising radiation
Exposure to UV light

Risk Control Measures
Personal Protective Equipment:

The Skyscan 1276 is located in a PC2 facility so PPE including Gown, Enclosed Footwear and Safety Glasses must be worn at all times. An induction into the PC2 facility by Adelaide Microscopy staff is required before access into the facility is granted.

Engineering Controls:

The user operable parts on the IVIS Lumina are all accessible from the front of the instrument, and include the sample loading tray, and the computer (switch, mouse and keyboard). There is no risk involved in the operation of these parts. However, misuse of these parts can result in damage to the instrument. Users of the instrument should not remove any fixture or panel from the scanner or access the rear of the instrument.

The scanner has several inbuilt safety features to prevent exposure to ionizing radiation (X-Rays) and UV light. These include lead shielding, and interlocked access which ensures the X-Ray source and UV light cannot operate when the sample chamber is open. This interlock cannot be overridden in any way.

There are no operator adjustable parts on the IVIS Lumina and all instrument control is via a computer interface. This interface does not pose any safety problems but must be operated in accordance with the manufacturer supplied operating instructions to avoid damage to the instrument.

Procedural Controls:

All new users must have a practical demonstration and training of the operation of the IVIS Imaging System from a member of Adelaide Microscopy (AM) staff.

Users are required to acknowledge the training by a member of AM staff. Users should operate the instrument in accordance with the manufacturer supplied operating instructions to avoid damage to the instrument. The user operable parts are all accessible from the operator's console: users of the instrument should not access the rear of the instrument. Nor should they attempt to remove any fixture or panel from the imaging system.

Users must read and acknowledge the safe operating procedures and PC2 certification requirements appropriate to the IVIS Lumina XRMS Bioluminescence/Fluorescence Imaging System.

Equipment peripheral to the IVIS Lumina XRMS Bioluminescence/Fluorescence Imaging System (in particular the anaesthetic machine and the biological safety cabinet) must be operated in accordance with the safe operating procedures relevant to this equipment.

Handling of biological material may present some safety problems and the safe operating procedure for handling animals and biological material must be followed. The safe handling of general laboratory items is detailed in the Adelaide Microscopy laboratory general safety procedures. Low stocks of consumable items (gloves, paper towel, etc.) should be reported to a member of AM staff.

All users must shave mice prior to imaging as hair significantly reduces the signal emitted.

This document describes standard operating procedures for IVIS imaging including anaesthesia and biocontainment

General Procedures:

Anaesthesia:

1. Animals will be anaesthetized with isoflurane (in an anaesthetic chamber) and placed in the IVIS where isoflurane anaesthesia is maintained via nose cone. For studies that require imaging of the face, mice will be injected with anaesthetic prior to placement into the IVIS.
2. Following the imaging session, animals are returned to their home cage and observed until they are able to move about the cage. Animals that display clinical signs of illness which place them at risk for anaesthetic death, will not be imaged.
3. Active anaesthetic scavenging will be employed to minimize personnel exposure to anaesthetic gases.

Biocontainment Procedure:

The IVIS imaging facility is a common use area where there is potential for animals to become infected with pathogenic agents. The following procedures will be followed to prevent the dissemination of infectious agents.

1. Only Biosafety Level 2 pathogens or lower will be permitted in this facility.
2. All animals will be handled using Animal Handling Procedures.
3. Work surfaces and equipment (counter tops, the biosafety cabinet, imaging chamber, nose cones, dividers, anaesthetic equipment) inside and outside the IVIS will be disinfected before **and** after each imaging session using F10 solution followed by 70%ethanol/ 30% water solution which is provided.
4. Biohazardous waste will be placed in a biohazard container located within the room.
5. Any spills will be handled as potentially biohazardous.
6. All personnel involved with the animals will be gloved, and wear laboratory coats which will be laundered or replaced on a weekly basis.

IVIS Bioluminescence and X-Ray Imaging Procedure:

1. Each person using the IVIS imaging system must be specifically trained and authorized to use the equipment by an AM staff member.
2. Users must wear a lab coat and rubber gloves while working with animals.
3. Animals must be transported to and from animal rooms in suitable covered cages.
4. Animals will be returned to their home cage or a separate enclosed container and observed continuously during recovery from anaesthesia.

5. All surfaces and equipment (counter tops, the biosafety cabinet, imaging chamber, nose cones, dividers and anaesthetic equipment) must be disinfected before AND after each imaging session using F10 solution followed by 70%ethanol – 30% water solution.
6. Dispose of contaminated biohazardous materials in the biohazard container located within the room.
7. Wash hands after handling animals.
8. Personnel may not eat, drink or store food intended for human consumption in this area.

On completion of work – steps to make safe (including clean up, any waste disposal & service/maintenance requirements)

Following the imaging session, all work surfaces are to be disinfected after each imaging session using F10 solution followed by 70% Ethanol/ 30% water solution which is provided.

Biohazardous waste will be placed in a biohazard container located within the room.

Any spills will be handled as potentially biohazardous.

Emergency and Spill Procedures, Transport or storage requirements (where relevant), First aid/Medical

Any spills will be handled as potentially biohazardous and neutralised with 1% hypochlorite solution. Followed through with F10 and 70% ethanol. A spill response kit is located in the corridor within close vicinity of the PC2 labs.

Emergency shower and eye wash are located in the foyer of both PC2 labs.

A First aid kit is located in the corridor within close vicinity of the PC2 lab and First aid officers contact details are on the front.

Prepared by

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	Position:	Director, Adelaide Microscopy	

This SOP must be reviewed after any incident/injury associated with this activity or when a Risk assessment is reviewed.