



Standard Operating Procedures (SOP)

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	Version No. 02
	Effective Date: July 28, 2017
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1. Purpose

To describe and outline the proper SPECT/CT and PET/CT scanners procedures for scans performed at the SAIL.

2. Scope

Applies to all studies involving scanning on the SAIL SPECT/CT and PET/CT scanners.

3. Responsibility

- 3.1 The SPECT/CT/PET technician, under the supervision of the SAIL Manager, is responsible for maintaining safety and security standards within SPECT/CT/PET facility.
- 3.2 The SPECT/CT/PET technician, under the supervision of the SAIL Manager, is responsible for the inspection and maintenance of the equipment within the SPECT/CT/PET facility. As such, he/she is responsible for reporting any problem with and/or damage to the equipment to the SAIL Manager as soon as possible.
- 3.3 The SPECT/CT/PET technician is responsible for the reporting of any accidents and/or incidents that occur within the facility. These incidences will be documented and recorded on accident/incident forms as provided by SAIL in accordance with RI-MUHC policies.
- 3.4 Only trained SAIL SPECT/CT/PET technical staff is permitted to operate the SPECT/CT and PET/CT scanners. If external observers and/or collaborators are to be involved in the scan process, their participation will need approval from both the SAIL Director and the Principal Investigator(s) involved in the study.
- 3.5 It is the responsibility of the study Principal Investigator(s) and/or his/her designate(s) to ensure monitor animal health during the course of the scan protocol and to ensure compliance with the procedures described in the AUP. The SPECT/CT/PET technician and the SAIL Manager will provide assistance as required.

4. Materials

- Appropriate scanner bed
- Sterile temperature probe cover slips
- Respiratory sensor
- Temperature probe
- Ophthalmic ointment
- Cotton swabs
- Benchtop liner
- Personal Protective Equipment (PPE)

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5.Procedure

- 5.1 When manipulating animals, all mandatory PPEs should be put on: bonnet, mask, gloves, sleeves.
- 5.2 Standard sensors include: (1) a rectal temperature probe set up in a feedback loop with the heated ventilation to ensure proper temperature regulation, and (2) a pressure sensor that non-invasively registers the respiration rate, allowing monitoring of the animal's general health and anesthetic depth.
- 5.3 After the injection of radioligand at t=0, check to ensure that all pre-scan procedures as outlined in SAIL-PET-SOP-02 and the study's animal imaging protocol have been completed.
- 5.4 Make sure to cover the surface of the scanner's bed with a clean bench liner.
- 5.5 Anesthetize animal as per SAIL-PET-SOP-03 and place the animal ventral side down on the scanner's bed and position the anesthesia nose-cone over the animal's nose.
- 5.6 Apply ophthalmic ointment to the eyes of the animal subject with a cotton swab.
- 5.7 Unwrap and slip a clean probe cover over the rectal temperature probe. Gently insert the probe into the animal's rectum.
- 5.8 Attach the respiration and any other physiological measurements outlined in the study's animal imaging protocol.
- 5.9 Verify at the physiological monitoring station that the equipment is reading the animal's vital signs. Ensure that the respiratory sensor is registering the animal's respiratory rate. Adjust and re-position the sensor under the animal-subject, if necessary.
- 5.10 Set the software heater control module to ~37 degrees Celsius.
- 5.11 Wait and observe the vital readings until they reach a steady-state and maintain the animal's anesthesia levels within the 2-1.5% range at 600 mL/min such that its temperature and respiration rates lie within the acceptable range. Acceptable temperature range is: 36-37 degrees Celsius and respiration rates ranges are: between 85-155 breaths per minute for mice and 50-80 breaths per minute for rats. Lower isoflurane/sevoflurane level if respiration rate is too low or increase it if it's too high.
- 5.12 Position and center the animal in SPECT/CT or PET/CT camera so that the region-of-interest is in the center of the scanner field-of-view
- 5.13 On the SPECT/CT or PET/CT scanner control station set up the control software for an emission scan. Choose the protocol outlined in the study's animal imaging protocol and name the acquisition.
- 5.14 At the appropriate time, begin the scan from the scanner control station. Record the scan start

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time on the Scan Log Sheet. Scan duration specified in the study's animal imaging protocol. When the scan has completed set up a 5 min CT scan for PET or SPECT studies.

- 5.15 The study principal investigator(s) and/or his/her designate(s) will monitor animal health during the course of the scan protocol from the physiological monitoring workstation.

- 5.16 Continue monitoring the vital readings throughout rest of the scan procedure as outlined in the study AUP. Ensure that the vital signs remain within a suitable physiological range given the anesthesia depth.

- 5.17 When the scan is finished, remove the animal from the scanner bed, place it in a clean cage, and then place that cage in the designated radiation shielded space and proceed to recovery as per SAIL-PET-SOP-05. Leave the animal in the cage until the end of the day and transfer to the holding room.

6. References

- SAIL-PET-SOP-02: Scanner preparation and Pre-scan Procedures
- SAIL-PET-SOP-03: Anesthesia Induction and Maintenance
- SAIL-PET-SOP-05: Post-Scan Recovery and Follow Up

7. Appendices

None

