University of Pennsylvania-Radiology
Small Animal Imaging Facility Steering Committee
Standard Operating Procedure

Title: Guideline for the MRI/ MRS Animal Studies at the Small Animal Imaging Facility.

SOP Number: 4.07 **Revision Number:** 0

Effective Date: November 10, 2005 **Page** 1 of 4

Review Date: November 10, 2005

Approval: _____ _____
Co-Director Co-Director

I. Purpose: The purpose is to provide the guideline for the proper usage of MRI component of the Small Animal Imaging Facility (SAIF).

II. Responsibilities and Scope: All investigators involved in performing MRI/ MRS animal studies must familiarize them-selves with this SOP.

III. Definitions:

None

IV. Procedures:

A. Principal Investigators (PIs) wishing to use any MRI/ MRS imaging instruments at the SAIF must follow the animal transfer SOP (refer to SOP #4.01).

B. All small rodents for the longitudinal imaging studies must be transferred to the 5th Richards mouse imaging holding area (room #509) from the main animal facilities, only prior written approval from ULAR (Abigail Smith, Tel: 215-898-4008, email: abigail4@pobox.upenn.edu) and from the Animal Oversight Subcommittee (AOS) of the SAIF (refer to SOPs #4.03 and #4.04).

C. Prior to the transfer of animals from the Stemmler animal facility to the Founders Basement-MRI animal preparation room for MRI/MRS studies, PIs must sign up for a time slot to use the animal preparation room (refer to SOP #4.02) and MRI instrument.

D. During animal preparation, all researchers must follow the facility guidelines for use of Isoflurane gas anesthesia (refer to SOP #2.04).

E. Before usage of the MRI/MRS instruments, all animal researchers must have a protocol that was reviewed and approved by the SAIF Oversight

Subcommittee. Proper training in the use of the facility and safety procedures is required. All researchers must clean all of the exposed areas of the coils to reduce cross-contamination with cleaning solutions.

F. Since no animal holding areas are available for the non-longitudinal imaging studies, all survived animal must return to the University of Pennsylvania animal facilities within 12 hrs (except the approved IACUC animal protocols).

H. MRI/MRS user procedures for the Imaging studies.

1. PIs wishing to use MRI/MRS instruments for their studies must adhere to all relevant SOPs (refer to SOPs #4.01, #4.02, #4.03 & #4.04).

2. Immediately prior to examination by MR, the animal will be placed in an induction chamber with a 1% Isoflurane/oxygen mixture flowing through at a rate of approximately 0.8 liter/min. All excess Isoflurane will be scavenged by placing an activated carbon canister on the exhaust port of the induction chamber. Once general anesthesia is induced, the gas flow will be turned off, and the animal will be removed from the induction chamber, secured to a pallet (patient bed) and attached to a nose cone. The anesthesia supply line and scavenging canister will be removed from the induction chamber and attached to the nose cone and the flow of anesthesia resumed.

3. Any procedures specific to the protocol (i.e. catheter placement, surgical procedures) should be performed at this stage while maintaining anesthesia. For prolonged procedures core body temperature should be monitored and maintained using either a heat lamp or heating pad.

4. All studies employing general anesthesia must employ some form core body temperature monitoring and maintenance (37°C) while the animal is in the magnet. . A temperature probe should be lubricated with surgical lubricant, then inserted into the rectum of the animal. Any additional vital signs monitoring probes/electrodes should be attached to the animal at this time. The leads for the probe should then be taped to the animal tail to avoid dislodging during the positioning of the animal. The animal and all monitoring probes should be secured to the patient table using tape.

5. Position the patient table in the RF coil such that the region of interest is centered in the homogeneous region of the coil.

6. Attach all vital signs monitoring probes to the remote sensing unit and verify that they are functioning properly. Adjust if necessary.

7. Position the coil in the magnet and insert the warm air hose into the coil such that the air flows over the animal. Airflow over the animal may be improved by sealing the back end of the coil by stuffing some bubble wrap into the opening. Turn on the heater and blower and

verify that the animal temperature control system is functioning properly.

9. Perform the MRI/MRS study.
10. Remove the coil from the magnet.
11. Bring the coil to the patient table in the animal preparation room. Remove all electrodes and tape from the animal, coil and patient table while the animal is still under anesthesia.
12. Turn off the anesthesia, remove the animal from the nose cone and return the animal to its cage.
13. Wipe all surfaces in the coil, patient table and nose cone that came into contact with the animal with Clydox. Also wipe down any vital signs monitoring probes that came into contact with the animal. Remove all tape and tape residue from all equipment used in the study.
14. Monitor the animal's recovery from anesthesia.
15. Return RF coil, patient table, vital signs monitoring equipment to its proper storage location.
16. Turn off main for wall gas.

V. Directions:

None

VI. Safety Considerations:

A. No "hot" radioactive materials or animals should ever be brought to the MRI lab.

B. Reminder: Drinking, eating and open-toe shoes are not allowed under any circumstances in all of SAIF including the 5th Richards animal imaging holding areas, Founders Basement, etc.). Wearing safety glasses is strongly recommended in the Founders Basement when handling animals.

VII. References:

A. Guideline #16 (6/23/99): Penn-IACUC Guideline for Transportation of Laboratory Animals- Philadelphia Campus

B. Penn-ULAR-SOP #4.21. Transport of Laboratory Rodents-Philadelphia Campus (updated version is available as of July 19, 2005)

C. Penn-Website for the Description and Standard Operation Procedures for the MRI/MRS Imaging Core Facility, University of Pennsylvania (in progress).

VIII. Attachments:

None

IX. Document History:

Version Number	Effective Date	Author	Reason
1	November 10, 2005	S. Pickup & I. Lee	New