

MRISC STANDARD OPERATING PROCEDURES

SOP Number-version: MRI-3.1	
SOP Title: MRI-7T General	
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1.0 Purpose / Scope:

- 1.1 The purpose of this SOP is to set guidelines for Magnetic Resonance Imaging (MRI) procedures conducted on the 7T Clinscan at the University of Kentucky.
- 1.2 The Scope of this procedure covers all studies conducted at the 7T Clinscan at the University of Kentucky.

2.0 Abbreviations/Definitions: (if applicable)

For definitions, see the Glossary of Terms located on the GRP Access Server
 \\prdlcancifs01.mc.uky.edu\Dept\Neuroscience\GRP or IP address
 \\172.25.104.37\grp\$

3.0 Specialized Materials & Equipment: (if applicable)

- 3.1 Isoflurane and Desflurane anesthesia equipment
- 3.2 SA Instruments Physiological monitoring equipment
- 3.3 7T Clinscan MRI scanner
- 3.4 Water bath
- 3.5 Disinfectant, e.g., HUSKY N/D germicidal Cleaner or equivalent

4.0 Procedures:

- 4.1 Signup on MRISC calendar (<https://www.research.uky.edu/magnetic-resonance-imaging-and-spectroscopy-center>) **Reserve Equipment/Services** prior to MRI procedures.
- 4.2 Set up control room and MRI room for procedure.
- 4.2.1 Turn on heating pad (start at Medium ... adjust accordingly). Turn on water bath (adjust temperature according to your species and scanning protocol). There are two different water heaters. Use one or both and set the valves for water delivery to MRI scanner room appropriately.
 - 4.2.2 Assemble the scanning bed, RF excitation coil (if needed), and receiving coil according to your species and scanning protocol. Use foam to support scanning bed during rodent placement.
 - 4.2.3 Set up temperature probe (with cover), respiration pad, and start SA Instruments SAMS software.
 - 4.2.4 Turn on Oxygen for the scanner at wall until the isoflurane unit is reading 1.0 liters/min.
 - 4.2.5 Register your animal on the scanner. Consider using the **name:** Plname_animalnumber_date.
- 4.3 Prepare the animal for scanning.
- 4.3.1 Turn ON the oxygen for the isoflurane to put the animal down in the anesthesia induction chamber on top of the heating pad. Set the isoflurane between 1.5 and 3.0% percent and watch the animal until it is ready to move into the MRI scan room.
 - 4.3.2 If ECG leads are being used:
 - 4.3.2.1 Move animal from induction chamber to heating pad and place nose in isoflurane cone. Change valve setting to deliver isoflurane to cone.
 - 4.3.2.2 Shave front legs and one rear lead. Attach ECG leads by wrapping them around legs and using tape to hold leads closed.
- 4.4 Turn on the anesthesia for the MRI scanner room. Typical mouse respiration rates will be between 50-110 respirations per minute and 35-80 for rats.
- 4.4.1 If you are using isoflurane, set the flow rate to around 1.0 liters per minute as read on the isoflurane machine and adjust as needed. **Be sure the valves are set for isoflurane delivery.**

4.4.2 If you are using desflurane, set the flow rate to about 0.1-0.2 liters per minute. **Be sure the valves are set for desflurane delivery.**

4.5 Transfer rodent to the MRI scanning bed:

4.5.1 Turn ON anesthetic gas to MRI room

4.5.1.1 Start with 1-2% for isoflurane and adjust as needed

4.5.1.2 Start with 4-10% for desflurane and adjust as needed

4.5.2 Turn OFF the isoflurane and oxygen for the induction chamber on the heating pad.

4.5.3 Transfer the rodent to the MRI scanner room.

4.5.3.1 Secure the animal as prescribed by body part being scanned.

4.5.3.2 Place respiration pillow under animal.

4.5.3.3 Place temperature probe in rectum.

4.5.3.4 Connect ECG and SPO2 if needed.

4.5.3.5 Verify all physiological parameters are being monitored correctly on SA instruments software.

4.5.4 Remove foam from beneath rodent MRI bed.

4.5.5 Slide rodent into scanner bore until point marked on table relevant to coil being used.

4.6 Perform MRI scan as dictated by protocol saved on MRI console.

4.6.1 Record physiological parameters every 10 minutes (use stop clock) on MRISC provided document (see F-MRI-3 Attachment 1 (A1), 7T MRI Scanner Use and Data Disposition).

4.6.2 Adjust bath temperature and isoflurane to keep animal at appropriate temperature and respiration.

4.6.3 Keep scans to under 2 hours.

4.7 When MRI scanning complete

4.7.1 Slide bed out of MRI scanner.

4.7.2 Remove animal and take to heating pad and induction chamber.

4.7.2.1 Monitor animal until it is breathing and moving on its own.

4.7.2.2 If need be, put animal on heating pad and place nose in cone to receive oxygen.

4.8 After all animals have been scanned

4.8.1 Turn of equipment

4.8.1.1 Shut OFF oxygen to MRI scanner room (one wall) and at tank to induction chamber

4.8.1.2 Turn OFF heating pad

4.8.1.3 Turn OFF bath

4.8.1.4 Clean

4.8.1.4.1 Spray with disinfectant and wipe MRI coil, bed, and monitoring equipment

4.8.1.4.2 Spray with disinfectant and wipe induction chamber, heating pad, and table

4.8.1.5 Shut MRI scan room door and turn OFF lights

4.8.2 Backup your data to CD, USB or online server. Researchers/users are responsible for their own data. Although the MRISC often makes a backup of all scans, there are no guarantees that this data will be available at a future date.

4.8.3 Fill out usage form in 3 ring binder labelled "MRISC"

5.0 Reagent and Solution Labeling:

5.1 Disinfectant is prepared according to the manufacturer MSDS Sheet and Guidelines for HUSKY N/D Germicidal Cleaner.

5.2 The spray bottle container is labeled indicating the content (Husky germicidal cleaner), storage conditions, concentration, mixing date, expiration date and preparers initials; the date format DDMMYY is used.

6.0 Housing:

6.1 Animals must be transported in a covered cage or cart when transporting back to their housing facility.

6.2 There is an overnight closet for rats and one for mice in Rm 32 at the MRISC.

6.2.1 Fill out the Animal Housing Room Record in the closet once in the AM and once in the PM (see F-MRI-3 Attachment 2 (A2), Animal Housing Room Monitoring Form).

7.0 Attachments: (if applicable)

7.1 F-MRI-3 Attachment 1 (A1), 7T MRI Scanner Use and Data Disposition

7.2 F-MRI-3 Attachment 2 (A2), Animal Housing Room Monitoring Form

8.0 References: (if applicable)

8.1 MSDS Sheet and Guidelines for HUSKY N/D Germicidal Cleaner

9.0 Record Retention:

9.1 The signed and dated vitals record and checklist forms are kept by the MRISC Administrator.

9.2 The signed and dated animal housing room record forms are kept by the MRISC Administrator.

10.0 Change History:

Rev.	Effective Date	Summary of Changes
1	31-May-2020	New procedure
2		
3		



ATTACHMENT 1
7T MRI Scanner Use and Data Disposition Form

Complete unused fields with 'NI' (for no information) – or – NA (for not applicable). Use lines in combination with 'NI' / 'NA' is needed (for multiple unused fields)

Date:	Subject ID:	Animal Species:
Time anesthesia start:	Time anesthesia end:	O2 (mL/min)
Quality of best shim (scale of 1 = worst, 5 = best):		

Vitals Record

Time [hh:mm]	Body Temp [°C]	Resp Rate [breaths/min]	Cardiac Period [msec] or NA	Isoflurane [%]	Bath Temp [°C]	Recorded by [initials]

Check List

	Value or ✓	Initials
Isoflurane level (mL)		
MRI data saved as (device/file name)		
Turn off isoflurane		
Turn off oxygen		
Turn off water bath		



ATTACHMENT 2 Animal Housing Room Monitoring Form

Facility: MRISC 3T & Surgery Room#:	Animal Housing Room Record	Month/ Year:	Species:																														
Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
To be performed Daily																																	
Health Check																																	
A.M.																																	
Health Check																																	
P.M.																																	
Food and water	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
Vermin Check																																	
To be performed Weekly																																	
Change Cages																																	
Change Water																																	
Change MB-10																																	
Sweep/mop																																	
To be performed Bi-Weekly																																	
Cage change																																	
major or minor																																	
To be performed Monthly																																	
Download																																	
HOBO																																	
Sanitize Room																																	
Sanitize Racks																																	
ALL tasks should be initialed as they are completed																N/A = Not applicable																	
Comments:																																	
notes	BEWARE OF CAGES THAT ARE NOT DESIGNED TO STAND ALONE ALWAYS DOCUMENT ANIMAL REMOVAL ON DOOR IN DLAR																																
Reviewed by:																Date:																	