

# Small Animal-based Magnetic Resonance Imaging Services and Usage Regulations

Article 1 The Small Animal-based Magnetic Resonance Imaging (MRI) Service and Usage Regulations have been established to optimize the instrument usage efficiency.

Article 2 The instruments include the following:

1. Brand and model: PharmaScan.
2. Strong magnet: 7T (bore size: 16 cm).
3. Gradient: B-GA9S HP.
  - (1) Inner diameter: 9 cm.
  - (2) Gradient magnetic force: 380 mT/m.
4. Radio frequency coil: One set of body and surface coils for mice and rats each:
  - (1) Body coil for rats (inner diameter: 72 mm).
  - (2) Surface coil for rats.
  - (3) Body coil for mice (inner diameter: 40 mm).
  - (4) Surface coil for mice.
5. Image acquisition system: ParaVision 6.0.
6. Instrument properties:
  - (1) The instruments consist of monitoring equipment for the following physiological variables: breathing, body temperature, pulse, pulse blood oxygen, heart rhythm, and blood pressure.
  - (2) Analysis software: The workstation features built-in morphology analysis and measuring software (i.e. ParaVision Processing Workplace) and software that analyzes MR spectra (i.e. the Processing Only Spectroscopy Package).
  - (3) Multifunctional MR pulse sequence: Cardiac Package, Diffusion Package, Angiography Package, Pulsed ASL Perfusion Package, fMRI and DCE Package, Short Echo Time Package, Relaxation Package, and Spectroscopy Package.
7. Workstation computer: Image acquisition and control workstation computer.
8. Animal loading device: A set surface and body image device for rats and mice.

9. Anesthesia and waste gathering systems.
10. Water bath and towels for rats and mice.
11. Uninterrupted power supply.

Article 3 The instruments are to be used mainly by researchers from the Taipei Medical University (TMU), TMU Hospital, TMU Shuang Ho Hospital, and Taipei Municipal Wanfang Hospital. The instruments may also be used by users from outside the school.

Article 4 Instrument storage location: United Medical Building (Back Building) F1, Laboratory Animal Center

Article 5 The MRI lab contains the following:

1. MRI lab: Location of the MRI scanner.
2. Instrument console: Provides image acquisition and hosts the console workstation.
3. MRI machine room: This room contains MRI-related instruments including control modules, an uninterrupted power supply, a water bath, anesthesia, oxygen cylinders, an animal preparation area, and experiment consumables.

Article 6 The instruments can be employed for the following:

1. Anesthetized live rats and mice.
  - (1) Rats <400 gw and are P10 or older.
  - (2) Rats <225 gw and are P10 or older.
  - (3) Mice that are P10 or older.
2. Euthanized rats and mice, dried specimens, soaked specimens, and nonbiological sample materials.

Article 7 Reservations are made as follows:

1. First-time applicants for the small animal MRI service must contact the TMU Translational Imaging Research Center for consultation and to ensure that the instrument service variables fulfill the applicant's experiment requirements.
2. Service reservations should be made 7–30 days before the experiment date. Applicants can download the image acquisition application and make reservations on the online reservation system located at the Core Facility Center and Laboratory Animal Center. Laboratory Animal Center technicians determine whether their service is required according to actual reservation information.
3. Technical service hours: Monday to Friday 9:00–12:00, 13:00–15:00, and 15:00–17:00.
4. Applicants who are unable to use the scanning service at the reserved

time must cancel the reservation at least one day before the reservation date to enable the center to reduce the MRI wait times for other users. If the applicant does not show up, is 15 minutes late, or shortens the reserved usage hours by more than 3 hours on short notice, the applicant will be required to pay for the original reservation period in full.

#### Article 8 Instrument usage regulations:

1. Laboratory Animal Center technicians must be present in all operations of this MRI acquisition service.
2. The MRI equipment creates a powerful electromagnetic field capable of sucking in metallic objects (e.g. needles, ear tags, studs, electrodes, instruments, metal cylinders, and furniture), thereby posing a safety risk. Personnel and animals that are unverified by the TMU Translational Imaging Research Center or Laboratory Animal Center are prohibited from entering the MRI acquisition room. A perpetrator and their respective laboratory are held responsible for the damage and costs caused by violation of this rule.
3. If a metal item is sucked into the MRI instrument or MRI safety concerns arise, technicians should press the red quench button located on the left wall of the MRI room or on top of the MRI module in the MRI machine room to immediately activate the demagnetization function. Please report to the Laboratory Animal Center manager immediately after demagnetizing.
4. If the quench button is accidentally pressed under safe or unnecessary circumstances, the applicant is responsible for sharing the reactivation cost of the TMU MRI (more than NT\$1 million)
5. Pressing the pulse sequence button during the scanning process produces different types of sound frequency.
6. The MRI scanning process does not generate ionizing radiation.
7. If behavior that may influence the MRI operation or instrument safety is detected, the center will immediately force-stop the service. The applicant is responsible for any damage caused.
8. Scanning of samples that are wet, sticky, volatile or radioactive or may cause pollution is prohibited, with the exception of completely sealed soaked specimens, to prevent instrument damage. The applicant is responsible for any damage caused as a result of violating this regulation.
9. The live animal scanning service is limited to laboratory animals held in the Laboratory Animal Center and Medical Laboratory Science and Biology Building, 4F.
10. Isoflurane or other anesthetics that are required should be prepared by the project moderator or their laboratory and submitted to the technician on the scan day.

11. The project director should provide the contrast agent for live animal MRI contrast scans. The contrast agent should be submitted to the technician on the scan day.
12. After the technician receives the live animals provided by the project director or related laboratory personnel, the technician conducts prescan preparations including anesthetization, fixation, and injection of the contrast agent. The project director or related laboratory personnel should inform the technician if the animals require special care or have specific fixation needs. Additionally, the technician will participate in the experiment if required.
13. The scanned animal's physiological variables are monitored and recorded during the scanning process. Additionally, animal deaths that occur during the scanning process are considered to be caused by standard operation risks; the Laboratory Animal Center will not be held responsible.
14. This service provides only the original file after scanning and does not include the follow-up analysis process. Users can reference the analysis process provided on the center website and use free image software to browse and analyze the scan file. Users can also contact the TMUT Translational Imaging Research Center for other analysis services.
15. Because the sizes of original image acquisition files are substantial, the files are burned onto CDs and presented to the applicant.

Article 9 The instrument usage cost standard has been established to ensure optimal service quality and to increase the effective service years of each instrument. Based on the discussion of the Office of Research and Development, personnel or research units that use the instruments must share the expenses related to instrument consumables, maintenance, and operating personnel service.

1. The usage payment standard is as follows:

|               | TMU personnel  | Non-TMU personnel   |
|---------------|--|---|
| Scanning cost | NT\$1200 per hour<br>(not including anaesthetization service cost) | NT\$2000 per hour (not including the anaesthetization service cost) |

2. The operation cost of tail vein intubation operation for injecting contrast agent into the animal during the scanning process is NT\$100 per animal (the contrast agent should be provided by the applicant).
3. Payment method: The Laboratory Animal Center calculates the usage statistics and payment fees for the technology service each month and

sends payment notices for the technology service usage to the corresponding users. Technology service payments must be paid to the Laboratory Animal Center and settled within three months of the payment notice issue date. Applicants can make direct payments at the TMU Cashiers Section or write-off the payments through research programs and TMU school budgets.

Article 10 Instrument contact personnel:

1. Laboratory Animal Center technician: Wu Wen-Chi TEL: 27361661#7256.

Article 11 The regulations are implemented after the internal discussion and approval of the Office of Research and Development. Similar procedure is adopted for future revisions of the regulations.