

# User Guidelines for Small-Animal Positron Emission Tomography Services

Approved at the Research and Development Meeting in December 23, 2019.

- Article 1 The Guidelines for Small-Animal Positron Emission Tomography (PET) Services were stipulated to maximize the usefulness of the instrument of interest.
- Article 2 Instrument information:
- A. Brand and category: SuperArgus 4r PET.
  - B. Instrument features:
    - (1) Resolution: 0.8mm.
    - (2) Acceptable animal size and weight: mouse diameter <35mm, weight <0.1kg; rat diameter <60mm, weight <1kg.
    - (3) Effective field of view: 70mm.
    - (4) Physiological monitoring: heartbeat, electrocardiogram, respiration, and body temperature.
  - C. Workstation computer: Image analysis computer. The computer provides medical images compatible with the image output format Digital Imaging and Communications in Medicine (DICOM). The computer can be used for 3D-dynamic, static, 4D-dynamic, and systemic images.
- Article 3 The main service targets of this instrument are researchers from Taipei Medical University (TMU) and its three affiliated hospitals. The instrument service is also available for extramural users.
- Article 4 Location of the instrument: Laboratory Animal Center on the third floor of the Back Building of the United Medical Building.
- Article 5 Service items and time calculation of this instrument include the following:
- A. Ordering and acquisition of radiopharmaceuticals (the cost is borne by the researchers).
  - B. Injection of radiopharmaceuticals into the animal (executed by the technicians of the Laboratory Animal Center [hereinafter “this Center”]).
  - C. PET scan conducted *in vivo* on anesthetized or unanesthetized rats and mice (executed by the technicians of this Center).
  - D. PET image analysis (executed either by the technicians of this Center or the researchers themselves).
- Article 6 Procedure for reserving the machine for use:
- A. Please register using the instrument reservation system of the Core Facility Center and Laboratory Animal Center 7–30 days prior to the intended day of use.
  - B. Instrument availability period: From Monday to Friday. Two periods are available per day: 9:00 a.m. to 12:00 p.m. and 2:00 p.m. to 5:00 p.m. The availability period can be adjusted according to experimental requirements.
  - C. After the user completes the online reservation, the technicians of this Center can decide whether to provide services in support of the user’s experiment.
  - D. If an applicant cannot use the scan service at the reserved time slot because of some emergency, the applicant must cancel or modify their reservation at least 24 h before the reserved time slot. If the applicant does not show up, is more than 15 minutes late, or reduces their reservation period by 3 hours or more

without prior notice, the fee charged to the applicant will be according to the originally reserved time slot.

Article 7 Regulations on instrument use are as follows:

- A. The instrument is situated in the PET laboratory of this Center. The entire laboratory area is a radiation area, and the injection pharmaceuticals used are radiopharmaceuticals. The operating individual will necessarily be exposed to radiation. At present, PET services for small animals must be operated by the technicians of this Center (under radiation-related regulations). If a researcher is a qualified radiation protection personnel and wears the TMU radiation badge for personal use, the researcher may enter the restricted area to supervise the experimental process in compliance with the instructions for on-site technicians. If the researcher hinders the technicians' operation or behaves in a manner that compromises radiation protection safety, this Center can immediately abort the service, where the applicant must then take full responsibility of any losses thereof.
- B. The PET instrument involves the use of positron radiopharmaceuticals. Any damage and cost to the scanned object from these pharmaceuticals are the liability of the users and their affiliated laboratory.

Article 8 Precautions of scanning services:

- A. *In vivo* animal scanning:
  - (1) For *in vivo* animal scanning services, only laboratory animals bred in this Center will be accepted (excluding laboratory animals on the fourth floor of the Medical Laboratory Science and Biotechnology Building).
  - (2) If the applicant is a qualified radiation operation personnel and wears the TMU radiation badge for personal use, the researcher can independently perform *in vivo* animal preprocessing (including anesthesia, fixation, and injection of radiopharmaceuticals) prior to scanning. Otherwise, the technicians of this Center will conduct animal preprocessing. If the animals die during the scanning process, it is deemed to be from the normal risk associated with the relevant operation. This Center is not liable for any compensation from such deaths.
  - (3) The isoflurane or the other anesthetics required for *in vivo* animal scanning must be prepared by the principal investigator of each project and given to the technicians on the day of scanning.
  - (4) Animals for *in vivo* scanning are carried by the relevant personnel of the principal investigator's laboratory to the technicians of this Center on the day of scanning. The technicians of this Center will conduct preprocessing (including anesthesia, fixation, and the injection of radiopharmaceuticals) before scanning. If the animal requires special care or have other fixation needs, the principal investigator or relevant laboratory personnel should actively notify the technicians. If necessary, qualified radiation protection personnel who wear the TMU radiation badge may, in compliance with the technicians' instructions, enter the restricted area to supervise the experiment.
  - (5) During the PET scanning process, animals in the instrument are monitored through physiological imaging systems. If the animals die during the scanning process, it is deemed to be from the normal risk associated with the relevant operation. This Center is not liable for any compensation from such deaths.
- B. Method for withdrawing the raw file:
  - (1) This Center will send a notification e-mail to the user upon completion of the services. The user can download the raw files from the cloud through the attached link (through the intramural network domain only). However, because

the scanned raw file is large, the file will be deleted from the scanning host, analytic computer, and cloud storage space 2 weeks after the notification e-mail is delivered. The user must download the file from the cloud storage space as soon as possible. Upon deletion of the data, no further notices will be sent to the user.

- Article 9 Regulations on the workstation computers for reconstruction and analysis:
- A. Please follow the standard operating procedure when turning the computer on and off. After using the instrument, the user shall maintain the cleanliness of the instrument, clear the operation table, and remove experimental waste. Those violating these regulations will be suspended from using the instrument for a month after this Center confirms the violation.
  - B. The workstation computer can be used free of charge. Users should use it with care.
  - C. In case of fault with the computer, please inform the technicians as soon as possible. Users must not disassemble the instrument without permission. If the user breaks the instrument because of personal negligence, the user must pay the repair fee.
- Article 10 The pricing scheme of this instrument are set to ensure optimal service quality and prolong effective service life. As resolved at the Research and Development Meeting, individuals or units that use the instrument must share in the fees required for consumptive materials, repair and maintenance, and operator services.

A. Charge standards:

	Intramural user	Extramural user
Scan fee	NT\$1000/hour (not including fees for gas anesthesia)	NT\$2000/hour (not including fees for gas anesthesia)

Before purchasing the radiopharmaceuticals, technicians of this Center must consult their colleagues in the Environmental Safety Division of TMU to ensure that the radioactive material transfer application has not expired. The *Regulations on the Safety of Radioactive Material Delivery* requires applicants to be qualified for applying for “radioactive materials and equipment capable of producing ionizing radiation and associated practice.” Only the technicians of this Center can help purchase or principal investigators or researchers can purchase radiopharmaceuticals. The purchase is compensated by the corresponding project fund. The fees charged by this Center does not include the cost of radiopharmaceuticals.

- B. For extramural users, PET operation fees are twice that for intramural users.
- C. Payment method: The use fee for the technical service will be calculated and authenticated by this Center upon the completion of each service. A payment notification of the use fee for the technical service will be sent to the user. The user must pay to write off the technical service use fee within 3 months after the notification is issued. The fees can be paid at the Cashier Section of TMU or written off through research-project or university budgets.

Article 11 Instrument point of contact:

Laboratory Animal Center technician: Chang, Kang-Wei, assistant research fellow. Phone extension: 7149 (Office), 7143 (Operation room).

Article 12 These Guidelines and any amendments therein shall be implemented upon the approval of the Meeting of the Research and Development Office.