

# Guidelines for Using an Ultra-High-Frequency Ultrasonic Device on Small Animals

Article 1 The Guidelines for Using an Ultra-High-Frequency Ultrasonic Device on Small Animals were established to maximize the utility and effectiveness of the device.

Article 2 The functionality and specifications of the device were as follows:

1. Brand: S-sharp
2. Type: Prospect 3.0
3. Main system:
  - (1) The system supports multiple imaging modes, including B-mode, M-mode, Pulse-Wave Doppler, Power Doppler, Analog Doppler, Color Doppler, and Contrast mode.
  - (2) The system enables simultaneous operation of two imaging modes, through which users can observe B/M mode or B/PW mode images simultaneously.
  - (3) The system can be combined with the technology of extended depth of focus to improve image resolution and contrast.
  - (4) The region of interest can be adjusted according to user requirements to facilitate observation of blood flow direction in veins.
  - (5) Imaging parameters, such as frequency, dynamic range, gains, and power can be adjusted to optimize image quality.
  - (6) Molecular imaging can be combined with ultrasound contrast agents for oncology research on microperfusion and drug delivery.
  - (7) The system enables system image data to be processed offline.
  - (8) Images can be saved in various formats, including DICOM, JPG, TIFF, BMP, and Raw Data.
  - (9) A touch screen is included.
4. Image analysis software:
  - (1) Cardiac function indices can be measured to produce the various physical parameters necessary for cardiac research, such as fractional shortening (FS), stroke volume (SV), and cardiac output (CO).
  - (2) Analytical data can be saved in the CSV format. If sufficient parameters are measured in a report, the mean and standard deviation of each measured value will also be calculated.
5. Ultrasound probe:
  - (1) The probe can facilitate frequency modulation when used along with the main system.
  - (2) The spatial resolution of the probe reaches at least 30 $\mu$ m.
  - (3) It is a mouse probe with frequency modulation functions (PB406e Probe).
6. Ultrasonic animal scanning platform (imaging platform):

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- (1) The platform can control the temperature, facilitate physiological monitoring of respiration and heart beats, and provide gate-control functions.
- (2) Positioning and moving along the X, Y, and Z axes are feasible.
- (3) The platform features a mouse imaging bed, which requires electrode pads for the four extremities and anesthesia tube fixers. The bed can be connected to physiological monitors to measure heart rate, electrocardiography, and respiratory rate; it also provides a thermostatic environment of 37°C.

Article 3 The main service targets of the device are researchers from Taipei Medical University and its three associated hospitals. People who are not affiliated to the said institutes can also be permitted to use the device.

Article 4 The device is located in the Laboratory Animal Center on the second floor of the Back Building of the United Medical Building.

Article 5 Service item: anesthetized live mouse.

Article 6 Reservation

1. Reservation is open 10 days before use. Please use the device reservation system to register.
2. Open time: Monday to Friday, 09:00 a.m. to 05:00 p.m.
3. Each reservation is made in intervals of 1 hour; the maximum duration is limited to 4 hours. For use longer than 4 hours, users must request permission from the administration unit.
4. Any user who has made a reservation to use the device should complete sign-in and sign-out processes properly. If the user cannot use the device for any reason, he or she must cancel the reservation. If the reservation is not cancelled in advance, it will remain valid and be charged according to the original reservation hours.

Article 7 Regulations

1. Users must attend the training course for this device and complete practical operation and qualification approval to receive certification to use the device before they apply to the Core Facility Center for authority to use it.
2. Those who arbitrarily use this device without operation authority and appropriate supervisory guidance will be suspended from using the device reservation system for 3 months.
3. When users turn the device on or off, they must follow the steps specified in the user manual. When users finish using the device, they must return it to its original position, clean the table, and dispose of their experimental waste. Anyone who violates this rule, after confirmation by the Laboratory Animal Center, will be suspended from using the device reservation system for 1 month.
4. The device is reserved mainly for processing anesthetized live mice. For experiments on other animal samples, the user must first consult the device's contact person.
5. Only laboratory animals raised in the Laboratory Animal Center can be used with the device. Animals from outside the laboratory cannot be brought and used. Anyone who violates this rule, after confirmation by the Laboratory Animal Center, will be suspended from using the device reservation system for 3 months.
6. The Laboratory Animal Center only provides ultrasound gel. Each laboratory must prepare other necessary equipment, consumables, and drugs for their operation.
7. Users must prepare data storage devices to save the required images. The Laboratory Animal

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Center periodically deletes information from its computers to prevent processing speeds being slowed.

8. In case of any malfunction of the device, the user should notify the device's contact person immediately with a detailed description of the situation. Unauthorized disassembly of the device is not recommended.
9. Users who inflict damage to the device must pay relevant maintenance fees.

Article 8 Charging standard

1. To ensure optimal service quality and extend the effective service duration of the device, individuals and units that use the device must pay for necessary materials, maintenance, and operator services.

	TMU-relevant user	Non-TMU-relevant user
Rate	NT\$500/hour	NT\$1500/hour

2. Charging standards are as follows:

3. Payment method: According to the payment regulations of the Core Facility Center, an audit is conducted each month. Users must pay and verify the fees within 3 months of the payment notice being issued.

Article 9 Device contact person

Laboratory Animal Center staff member: Chang, Yu-Chen, extension: 7152

Article 10 These Guidelines shall be implemented upon approval by an Office Meeting of the Office of Research and Development; the same procedure applies to any amendment.