IACUC Standard Operating Procedure SOP-03-2016: IVIS SpectrumCT Imager

Background: The IVIS SpectrumCT, located in TLS 282, is a small animal imaging instrument that includes an analytical X-Ray emission source. As such, its use must conform to IACUC and Radiation Safety regulatory requirements, and users must have IACUC and EHS approval prior to using the instrument. The experimental procedures and risks associated with those procedures will vary widely between investigators using the instrument. To protect the health and safety of the animal subjects and personnel, this facility is designated a BSL-2 facility. All investigators will be required to follow BSL-2 practices. The door to TLS 282 is equipped with a Locknetics device and users’ IDs or FOBs will be programmed for entry once IACUC and Radiation Safety approvals are documented and the user has demonstrated competency in operation of the equipment. A facility scientist will be available, by appointment, to instruct on the basic operation of the machine. It is the responsibility of the investigator to be aware of safe operating procedures for both the IVIS SpectrumCT and the integrated isoflurane anesthesia unit. Although the IVIS SpectrumCT is primarily intended for imaging of small rodents, imaging of other small animals is also possible. Investigators are encouraged to contact the Facility Scientist and Perkin Elmer for specific recommendations and advice for other applications.

1. Prerequisite X-Ray Training and Room Access
   a. Users must register for the Environmental Health and Safety (EHS) Radiation Safety "X-Ray Safety Training (HuskyCT) online training for analytical X-Ray instrumentation use via the training registration page on the UConn EHS website.
   b. The online training module will appear on your HuskyCT page within 2 business days.
   c. After review of the training materials and successful completion of the online test, contact the Facility Scientist or, if unavailable, the equipment supervisor and make an appointment to complete and document the Laboratory Based Radiation Safety Training for Analytical X-Ray Equipment Operators. The required “Analytical X-Ray Producing Equipment Lab Based Training Checklist” can be found via the Forms page on the UConn EHS website. The form link is located in the Radiation Safety section forms.
   d. Upon completion of the lab-based training form specified in II.3, the Facility Scientist or equipment supervisor shall mail it to the attention of the Radiation Safety Officer at EHS U-4097. Completion of the lab-based training form and the online training will be verified prior to Radiation Safety permitting access authorization to TLS 282.

2. Animal Transport and Housing of Animals for Longitudinal Studies
   a. Investigators are encouraged to consult with Animal Care Services prior to submission of an IACUC protocol, which must describe method of transport, anesthesia, and post-imaging housing. After the first imaging session, animals will not be allowed to return to the original colony. Transport and housing may depend on species, location of colony and specific experimental details. Please consult with ACS for appropriate housing accommodations for animals during an imaging study.

3. Use of the IVIS SpectrumCT
   a. All animal use, and handling, use and disposal of potentially hazardous materials, is governed by IACUC and EHS policies and applicable State and Federal regulations, and approvals must be granted prior to initiation of experiments and use of the equipment.
   b. Prior to use, all users must be trained in the basic operation of the instrument by the Facility Scientist, or will have demonstrated expertise with the machine. As a reference, the instrument manual is available as a pdf file on the instrument’s
dedicated computer and as a hard copy in TLS 282. Use of the instrument other than for University approved procedures and by means specified in the instrument manual is prohibited.

c. For investigators using isoflurane anesthesia, the IVIS has an integrated isoflurane anesthesia unit that includes an induction chamber for initial sedation and imaging manifolds with integrated nose cones. The facility has 1-mouse and 2-mouse manifolds. For higher throughput applications, Perkin Elmer also sells a 5-mouse manifold, which can be purchased separately.

d. Isoflurane should be administered throughout the course of imaging to ensure that proper levels of sedation are maintained. Appropriate isoflurane concentration (typically 1-3%) and flow rate will depend on the length of imaging (typically in the range of seconds to a few minutes) and needs to be approved by IACUC. Perkin Elmer recommends an isoflurane concentration of 2%, with a flow rate of 1.5 lpm and 0.5 lpm for the induction chamber and during imaging, respectively. Please confer with Animal Care Services (acstraining@uconn.edu) and the facility scientist for proper use of the isoflurane system.

e. For prolonged imaging applications, an animal-approved heating pad placed under the animal stage and under the recovery cage may aid in recovery. Heating pads will be available in TLS 282; their use and operation must be approved by IACUC.

f. As a shared facility that will be used by investigators across campus, there is increased risk of transmission of infectious agents between animals from different colonies, and utmost care must be taken to minimize this risk. Minimum precautions will include disinfection of all work areas, isoflurane induction chamber and imaging platform, with an approved disinfectant such as Super Sani-Cloth Germicidal Disposable Wipes before and after each use, frequent glove changes, use of fresh gloves to open doors, and wearing of a lab coat. Hand sanitizer should be used upon room entry and exit. A sink for hand washing is available in TLS 286. Hands must be washed before leaving the floor. More stringent requirements may be required for specific applications and all such requirements would be in addition to the general practices described here.

g. Users whose animals have been exposed to biohazardous material must inform the Biosafety office they will be using the imaging room and when the work is complete. A sign indicating “Biohazard – Authorized Personnel Only” will be available in the room. The researcher will be responsible for posting the sign on the outside of the door with the attached magnetic strips. When work is complete the researcher is responsible for wiping down all surfaces with the disinfectant wipes provided in the room. The biohazard sign will remain in place until biosafety is alerted the work is complete and the room has been decontaminated. Biosafety will remove the sign upon confirmation.

h. Users intending to use radioactive materials in animals must first be authorized by the University’s Radiation Safety Committee under an authorized Licensed Investigator and by the IACUC. Subsequently, Radiation Safety procedures to prevent and monitor for radioactive contamination must be followed. Contact Radiation Safety for authorization requirements and procedures well in advance of any proposed experiments to avoid research delays.

Facility Contacts:

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