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# VEVO 2100 ULTRASOUND

## USER GUIDE

### LOGIN INSTRUCTIONS

#### TURN ON SYSTEM

- a. On the back of the cart, turn on the **Main Power**.
- b. On the left side of the cart press the **Computer Standby** toggle.
- c. The system starts the control panel backlights, the display monitor and the computer operating system.
- d. CTRL+ALT+DEL to log on with your net ID and password
- e. On the Desktop, double click the Vevo 2100 app to launch the software.
- f. Once the Vevo app is launched, the Study Browser window opens.
- g. When you click **New** to create a new study, the operator you select is the default owner of the new study.

#### TURN OFF SYSTEM

- a. Ensure that you have stored all the image data that you are working on. *Export data to your folder in the Imaging Share Folder. Create a new folder in your name if you do not have one. Access to this share is limited to computers/laptops on the Cornell campus. \\files.cornell.edu\RS\biotech\CUSTOMER\Imaging*
- b. Press the Shutdown icon on the Study Browser window of the Vevo app.
- c. The computer shuts down, the monitor powers down, and the control panel backlights turn off. The fans continue to run.
- d. If you need to turn off all power to the system: Let the fans run for 10 minutes to safely cool down the internal components.
- e. Push down the Main Power switch.

## Image Acquisition Modes

### B-Mode

- For locating anatomical structures
- Uses multiple scanning beams to create image

### M-Mode

- To measure movement and dimensions of cardiac structures (chambers & walls)
- Uses a single beam across a cross-section to record movement over time (seen as waves)

### PW (Pulsed Wave) Doppler Mode

- To measure velocity and direction of flow
- PW Doppler signal presented as a spectral image in the display window and as an audio output through system speakers

### Color Doppler Mode

- Uses Doppler principles to determine the mean velocities of blood within the region of interest, then applies color that represents the various velocities under the convention of *BART (Blue Away Red Toward)*.
- Used for distinguishing vascular from non-vascular tissue structures

### 3D Mode

- Provides a 3-dimensional view of an area of interest
- System acquires 3D data by creating a rapid series of B mode slices, then combining these slices into a whole image

### Power Doppler Mode

- To visualize and measure flow in 2D and/or 3D

### Contrast Mode

- To detect and quantify vascular structures and dynamics at the molecular level in 2 or 3 dimensions
- Used for real-time in-vivo applications such as:
  - o Targeted molecular imaging for visualizing and quantifying the expression of intravascular molecular markers — for example: angiogenesis and inflammation
  - o Tumor perfusion and relative quantification of vascular volume and structure
  - o Assessment of myocardial perfusion and area of infarction

## **Standard Operating Procedures for Use of Isoflurane in Small Animal Protocols**

- Volatile anesthetics are effective and for the most part free of adverse effects on the animals to which they are administered.
- However, human exposure to waste anesthetic gases has been associated with reproductive effects, and in the case of halothane, rare instances of transient hepatitis.
- In 1977, the National Institute of Occupational Safety and Health (NIOSH) established an exposure limit of 2 ppm, for no greater than one hour, on the halogenated anesthetics *halothane, enflurane, and methoxyflurane*. At the time **isoflurane** was not in widespread use and even though the indications are that it poses a lower risk than older halogenated anesthetics, the recommended maximum exposure level remains 2 ppm.

### **Safety Considerations**

- Under no circumstances shall isoflurane be used without the benefit of a scavenging/ventilation mechanism that eliminates inhalation exposure to the user. These mechanisms are:
  - a certified chemical fume hood when not using a precision vaporizer such as when using a bell jar,
  - connection of the exhaust hose to a certified chemical fume hood (preferred)
  - another appropriate exhaust device if a chemical fume hood is not available
  - Connection of the exhaust hose to a scavenging canister when using a precision vaporizer. The use of the canister requires tracking of canister weight.

### **Work Practices and Protective Equipment**

- Personnel must use the proper personal protective equipment consisting of nitrile gloves, a lab coat, and safety glasses.
- The use of a bottle adapter to minimize spillage is recommended.
- Isoflurane must be used in a well-ventilated room from which there is no recirculation of exhaust air.
- The oxygen concentration delivered will be ~98% (room air is 20-21%), increasing the combustibility of any material this oxygen-rich atmosphere contacts. Exercise care with any nearby heat or ignition sources.

## Use of Precision Vaporizers

### *Pre-procedure:*

- Add isoflurane to reservoir on vaporizer if necessary, closing bottle and reservoir as quickly as possible.
- If using a compressed gas cylinder, ensure that there is adequate supply of oxygen to last the entire procedure.
- Tighten all tubing connections. Ensure that all compressed gas cylinders are safely contained.
- Adjust the stop cock on the y-piece tubing so that the isoflurane/oxygen mixture will flow into the induction chamber, returning to the scavenger canister, and not through the tubing going to the nose cone.

### *Procedure*

- Place the animal in the clean induction chamber, making sure to close the chamber securely.
- Turn on oxygen so that flow rate is 1 liter/minute. Adjust dial for isoflurane delivery to 3-4 %.  
*Note: The induction chamber is functionally air-tight; do not leave animals in the closed chamber without gas flow.*
- When animal loses righting reflex, turn off isoflurane flow and flush induction chamber with oxygen for 20 seconds.
- Remove animal onto a clean procedure surface; snugly attach a nose cone; dial isoflurane concentration to 1.5-2.0% and oxygen flow to 0.8 liters/minute.
- Adjust stop cocks so that flow is into tubing attached to nose cone and not in to induction chamber. Apply bland ophthalmic ointment to animal's eyes.

## Maintenance of Precision Vaporizers

- Precision vaporizers must be calibrated annually by manufacturer or other authorized party, with verification provided by an attached sticker or other readily accessible documentation.
- Induction chambers and breathing circuits must be appropriately sanitized after each use. Note: Do not use alcohols for sanitization of induction chambers as it will weaken the structure of acrylic and may cause clouding.

## **Protocol for Cleaning after Imaging**

1. Use **CAVIWIPES** for cleaning transducers
2. Use **T-SPRAY** to disinfect mouse platform and keyboard
  - Mouse platform: Apply T-spray then wipe clean
  - Keyboard: Apply T-spray and leave on to dry. As an alternative, clean keys/toggles/keyboard with Caviwipes
3. All surfaces that come into contact with the animal must be cleaned thoroughly. Use CAVIWIPES.
4. For vaporizer chamber/induction box, do not use Ethanol nor Caviwipes to clean. Replace pads and dispose in biohazard container.
5. Dispose of *used* gloves, surgical tape, gauze, cotton-tipped applicators in biohazard container.

## Exporting Files (Cine Loops)

- a. Press STUDY MANAGEMENT on the left side of the keyboard. The Study Browser window opens with a list of saved images/cine loops.
- b. Select the files you want to export. You can export a whole series of cine loops or a whole series of images. These are highlighted if you click on the Series name. Hit the EXPORT button.

*Files are exported to the Imaging Shared folder which is currently mapped on the Z drive of the Vevo computer. Create a New Folder with your name if you do not have an existing folder.*

- c. If you are exporting a whole series of cine loops, a default base filename is given to the files. You can change this if you wish.
- d. If you need to create a new folder to contain the cine loops you are exporting: Click New Folder, Type the name of the new folder and click OK.
- e. In the Export Type section, click Cine Loop.
- f. In the Options section: In the top box:
  - a. If you are exporting a single image, the system labels this box Save As. You can keep the system defined date and time stamp file name or type a new file name.
  - b. If you selected to export multiple images, the system labels this box File Name Prefix. Type in text that will be added to the start of all the individual image files that you have selected to export. This way you can identify and group these exported files more easily in your export folder.
- g. In the File Type box select the AVI format based on your requirements.  
*Uncompressed AVI has the largest file size and original image quality. Compressed AVI MS Video 1 has the smallest file size and good image quality.*
- h. Wait for your files to be exported. You can Cancel the export if needed.
- i. If you want to make sure all your files were exported, open the Windows explorer, and check the files on the Imaging Shared folder (Z).