

## Photoacoustic Imaging 光聲超音波影像

### 1. Purpose

- 1.1 The Vevo LAZR-X combines high frequency ultrasound and photoacoustics into one platform for high resolution anatomical, functional and molecular imaging.

### 2. Safety Requirements

- 2.1 General laboratory procedures should be followed, which include: no eating, no chewing gum, no drinking, and no applying of cosmetics in the work area. Laboratory coats and gloves must be worn at all times in the work area, unless the protocol specifically describes the appropriate attire for the procedure.

### 3. Associated Documents

- 3.1 Visualsonics Vevo LAZR-X

### 4. Notes

- 4.1 Isoflurane is metabolized nearly all by lung, only extremely on a small quantity by liver, and very small to cardiovascular influence.

### 5. Quality Control

- 5.1 The Vevo Imaging System is a software-controlled device that acquires and displays high-resolution, real-time ultrasound images. Available features depend on your system configuration, transducer, and operational mode.

### 6. Equipment

- 6.1 Visualsonics Vevo LAZR-X  
 6.2 Vevo Optical Fibers and Jackets  
 6.3 Physiological monitoring system  
 6.4 Inhalation Anesthesia System

### 7. Supplies

- 7.1 Gloves  
 7.2 Paper mask  
 7.3 Paper towel  
 7.4 Isoflurane  
 7.5 Pure oxygen  
 7.6 PI-Spray II  
 7.7 Tape  
 7.8 Animal mask  
 7.9 Plastic air tube

### 8. Procedures

- 8.1 Connect a transducer.  
 8.2 Turn on the system.  
 8.3 Narcosis of mouse by 1.5 vol.% isoflurane with oxygen, rate of 1 L/min.  
 8.4 Installation of mouse.  
 8.5 Select an application type.  
 8.6 Scan.

Frame-based image modes	Time-based image modes	Additional modes
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B-Mode	M-Mode and Anatomical M-Mode (AM-Mode)	3D-Mode
Color Doppler Mode	Pulsed Wave (PW) Doppler Mode	4D-Mode
Nonlinear Contrast Mode		
PA-Mode		

8.7 Enter study and series information.

8.8 Export data.

8.9 Wipe clean the apparatus with PI-Spray II and renew animal platform before testing another group of mouse.

8.10 After testing the last mouse, wipe clean the apparatus with PI-Spray II.

8.11 Audio Measurements Guideline. All data analysis was done using the Vevo® LAB desktop software

8.11.1 Systolic Parameters- LV Trace Tool in M-Mode Calculated Parameters

1. Select Cardiac Package
2. Select PLAX or SAX
3. Select LV Trace
  - Stroke Volume (SV)
  - Ejection fraction (EF)
  - Cardiac output (CO)
  - Fractional shortening (FS)
  - LV Mass

8.11.2 Diastolic Parameters- Color Doppler Mode

1. Apical view in B-Mode
2. Optimize view in Color Doppler Mode
3. Assess Mitral flow in PW Doppler Mode
  - E/A ratio