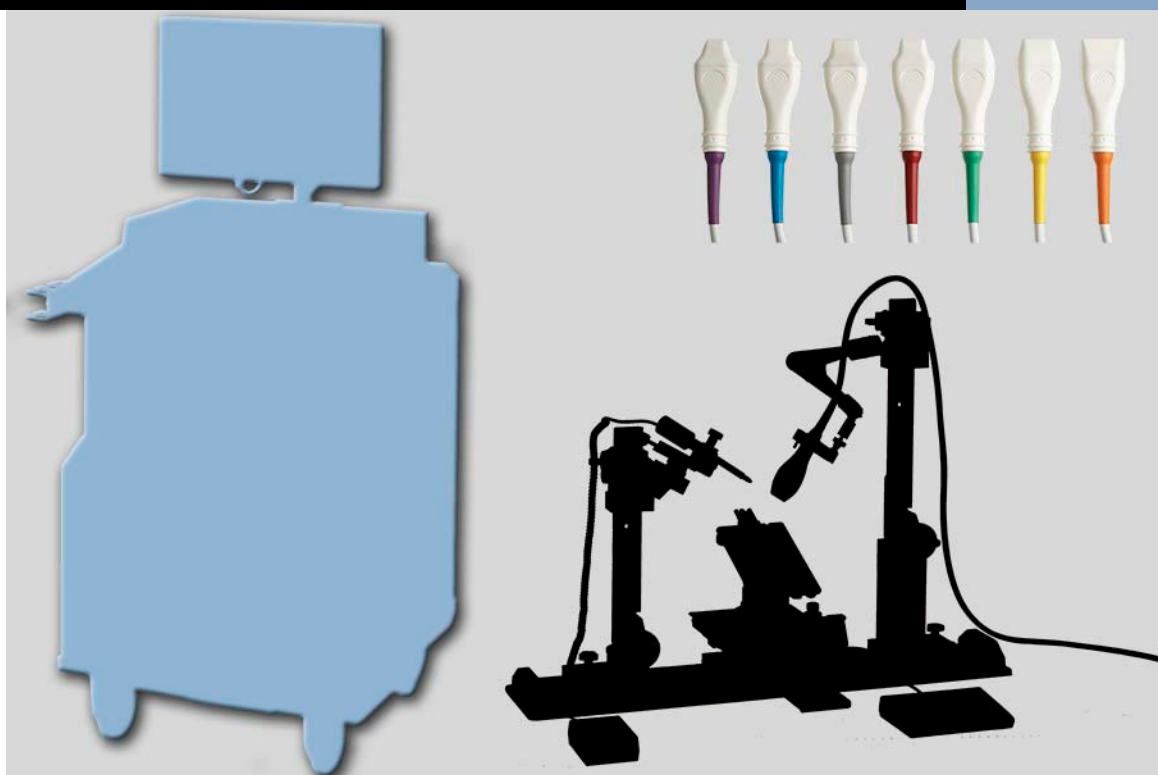


2010

High-Frequency Ultrasound



Features & Benefits:
Cardiovascular

High-Frequency Ultrasound

Overview

Imagine visualizing anatomical structures and hemodynamic functions *in vivo*, longitudinally in a non-invasive manner. The Vevo® high-resolution *in vivo* micro-imaging system provides high-resolution imaging down to 30 microns and the ability to easily export derived statistical data to any PC or Macintosh-based application for analysis. With an interface designed for multiple subject-data collation needs, the researcher is offered opportunities that until now were simply not possible.

All areas of research involving phenotypic expression within the small animal model can apply the high-resolution, real-time visualization benefits of the Vevo. Of particular interest to cardiovascular researchers is the multitude of available applications for physiological monitoring within small animal models, including a suite of cardiac measurement features.



Cardiovascular

Vevo technology provides echocardiograms FOR TRANSLATIONAL RESEARCH and biomarker development in animals with a resolution down to 30 microns. Software and quantification tools are customized for small animal physiology. The high frame rate of acquisition provides the best temporal and spatial resolution specifications compared to other imaging modalities such as MRI or CT.

VisualSonics has developed protocols using our dedicated animal handling platform to ensure that the small animal (mouse/rat) is maintained in the most stable state during imaging. The result is reproducible, reliable results for large cohorts being studied longitudinally.

- **Quantitative evaluation of the cardiovascular system:**
Real-time evaluation and quantification of physiological function of the developing heart and the associated major vessels. Including: left ventricular function, right ventricular function, valve movement and blood flow.
- **Evaluation of cardiovascular disease and therapies:**
The Vevo can also be used to assess the extent of cardiovascular disease and evaluate the effectiveness of cardiovascular therapies. The non-invasive nature of the system allows for longitudinal analysis (studying treatment effectiveness in the same animal over time). Examples of pathologies that can easily be assessed include: myocardial infarct, diastolic dysfunction, cardiac hypertrophy, pulmonary hypertension, atherosclerosis, inflammation, valvular regurgitation, vessel stenosis and diabetes.
- **Evaluation of cardiovascular function in conscious mice:**
Light weight and easily handheld probes allow imaging of conscious mice for researchers interested in assessing VALVULAR DISEASE AT HIGH FRAME RATES.
- **Extensive measurement and annotation functionality:**

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The Vevo software provides measurement and annotation functionality that allows the cardiovascular researcher to conduct comprehensive analysis for monitoring and measuring the progression of disease and the efficacy of therapeutics. Examples of calculation packages include: quantification of ejection fraction, fractional shortening, cardiac output, strain, strain rate, pulsatility indices and resistivity indices. Furthermore all data can be exported in excel and images can be formatted in BMP, TIFF, AVI, GIF and DICOM.

- **Monitoring of full animal physiology:**

The Integrated Rail and Animal Handling Table allow physiological parameters such as body temperature, ECG, heart rate and respiration to be captured and monitored throughout an imaging session. Furthermore these numbers can be integrated in calculation packages and exported for further data analysis and quantification. ECG gating is also possible.

- **Integration of blood pressure external devices:**

Obtain pressure volume data by being able to integrate external blood pressure recordings with the Vevo. This is critical for pharmacologic and stress-echo type studies.

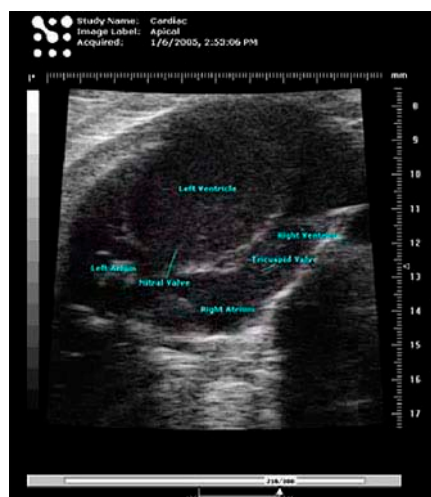
- **Perform and visualize cardiac and vascular injections:**

The integrated rail system and image-guided needle injection system are easily mounted, prepared and operated. Precision adjustments are easily made to ensure that the probe, the injection system, and the mouse table are all in alignment to most effectively ensure a successful procedure.

The Integrated Rail system allows the precise position of a needle/syringe to be mounted and the animal to be carefully positioned on a heated table. The injection can be performed with minimal invasiveness (just watch the needle pierce through the skin, into the target of interest). This convenient set-up eliminates invasive surgical procedures and consequently allows for improved animal survival.

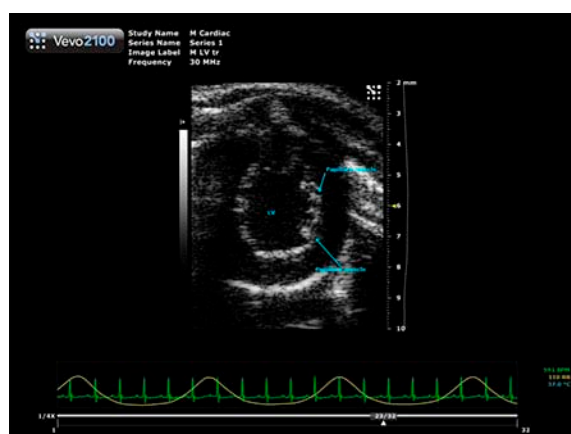
- **Easy to learn and obtain results:**

The Vevo is simple to use so that researchers can maximize their time performing post-imaging analysis. An offline workstation is available to analyze all data. In addition several on-line tutorials and protocols are available to allow researchers to learn quickly, image, analyze and obtain results.



Video 52: Apical 4 Chamber View in Adult Mouse

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Video 14: Parasternal short axis

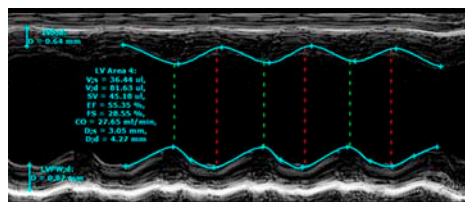
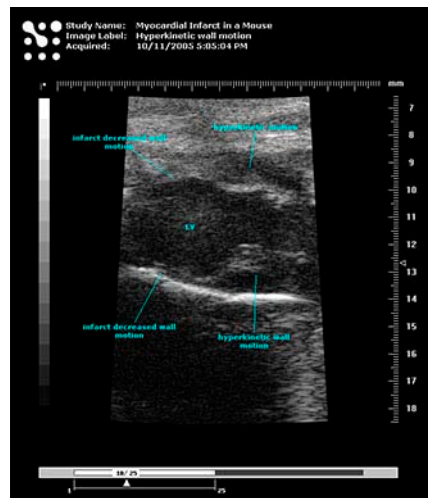


Image 16: Parasternal short axis



Video 17: Infarcted mouse heart

Commonly used terminology:

heart, valve, left ventricle, right ventricle, mitral, tricuspid, atrium, atria, pulmonary, hypertension, diastolic dysfunction, diabetes, heart function, strain, strain rate, speckle tracking, aorta, vessel, pulmonary artery, pulmonary vein, blood flow, regurgitation

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