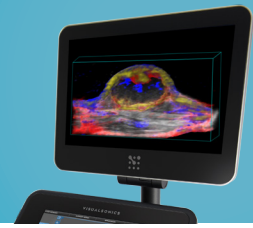


Vevo for ONCOLOGY

Micro-Ultrasound and Photoacoustic Imaging for Translational Cancer Research in Preclinical Animal Models

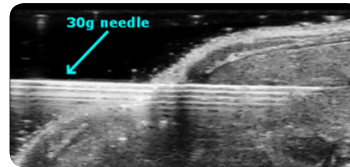


Characterize Tumor Tissue Non-invasively: Detect Lesions Early, Monitor Tumor Development and Assess Response to Therapy

Orthotopic Tumor Model Induction

Image-guided Injection

Visualize anatomy and the needle in high resolution for minimally invasive, accurate and reproducible orthotopic tumor induction

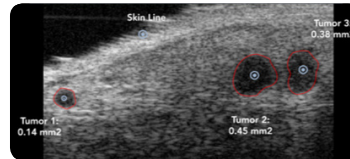


Needle delivering tumor cells into the pancreas

High-throughput Screening

Early Tumor Detection

Detect pre-palpable, sub-millimeter lesions quickly with imaging resolution down to 30 μ m

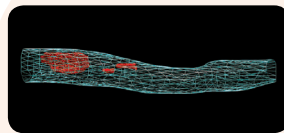


Sub-millimeter cancerous lesions in the liver

Disease Monitoring



Volumetrics



3D wireframe of colorectal cancer in mouse model

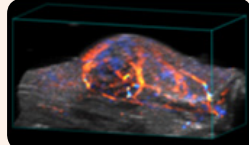
Tumor sizing

Measure tumor volumes in deep orthotopic models quickly and accurately

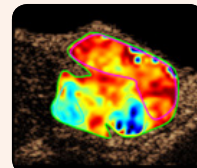
Treatment Monitoring



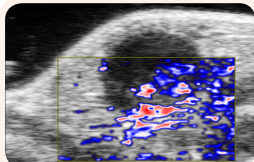
Hemodynamics



Color Doppler showing tumor blood flow



Relative blood volume in orthotopic pancreatic tumor



Parametric map of oxygen saturation in bladder tumor

Hypoxia

Quantify dynamic changes of oxygen saturation and total hemoglobin in 2D or 3D

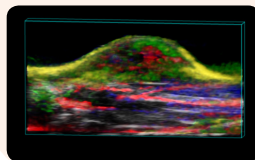
Vascularity

Visualize blood flow in tumor tissue and measure percent vascularity

Perfusion

Assess tumor capillary function and hemodynamic changes with contrast agents

Pharmacokinetics and Molecular Data



Multispectral photoacoustic image of blood and targeted molecular agents in a tumor

Molecular

Assess molecular markers of disease, metastasis and drug delivery with high resolution

Why Vevo for imaging cancer?

- Anatomical, functional and molecular data
- Longitudinal
- High resolution
- Real-time
- Non-invasive
- High-throughput

188+ CANCER

publications and growing. Visit visualsonics.com

We asked cancer researchers **"Would you recommend Vevo imaging system for imaging cancer?"**

"Yes, High resolution, fast acquisitions, nice respiratory and ECG gating (easily implemented), accurate tumor volume measurements (orthotopic models), high throughput. A lot of parameters can be monitored in a given animal with time..."

- RAES Florian, CIPA CNRS French National Center for Scientific Research

"Yes, advantages: high-resolution, user-friendly and robust software"

- Hadi T. Nia, MGH, Harvard Medical School

"Yes! Worth learning how to do ultrasound imaging for rodents. The Vevo system works for micro- and molecular imaging of tumor phenotypes."

- Victoria Herrera, MD, Boston University School of Medicine

"Yes. I would say that the high throughput and image quality is ideal for monitoring tumor growth."

- Doug. H, Dana-Farber Cancer Institute

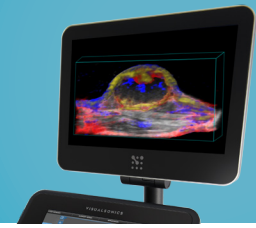
"Yes. I use 3D mode a lot to gain an overall volume of abdominal tumors. I have also used Power Doppler to gain an understanding of the vascularity of the tumor."

- Saadia Karim, Cancer Research UK Beatson Institute

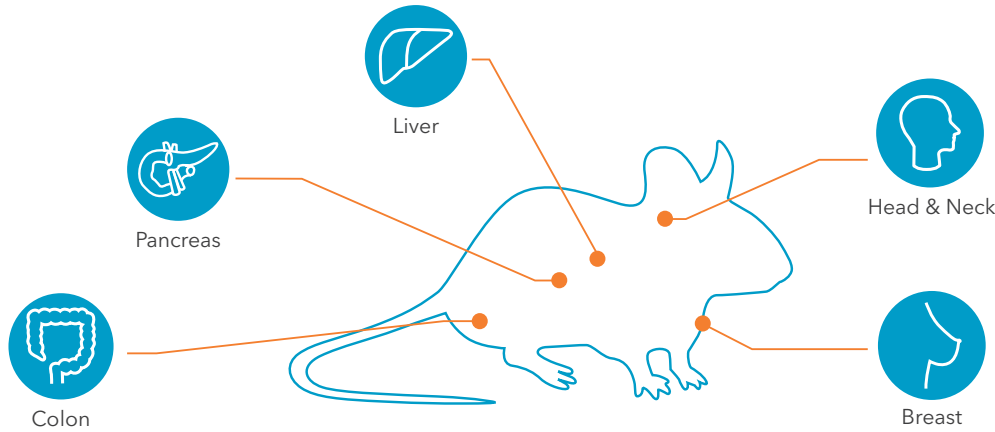
Longitudinal Study Workflow

Vevo for ONCOLOGY

Micro-Ultrasound and Photoacoustic Imaging for Translational Cancer Research in Preclinical Animal Models



Featured Publications Using Vevo Technology Across Various Cancer Types



Liver

Co-option of Liver Vessels and Not Sprouting Angiogenesis Drives Acquired Sorafenib Resistance in Hepatocellular Carcinoma

Contrast-enhanced ultrasound was used to longitudinally monitor acquired drug resistance and identify vessel co-option as a possible mechanism.

Kuczynski, E. A. et al. **J. Natl. Cancer Inst.** 108, djw030 (2016).



Colon

Assessment of Murine Colorectal Cancer by Micro-ultrasound Using Three Dimensional Reconstruction and Non-linear Contrast Imaging

Longitudinal evaluation of orthotopic CRC progression using micro-ultrasound for sizing and perfusion as a more accurate and economical method for preclinical studies.

Freeling, J. L. & Rezvani, K. **Mol. Ther. – Methods Clin. Dev.** 5, 16070 (2016).

*Watch related webinar online



Breast

Functional Flow Patterns and Static Blood Pooling in Tumors Revealed by Combined Contrast-Enhanced Ultrasound and Photoacoustic Imaging

Tumor vascular morphology, functional perfusion and oxygen saturation were assessed with contrast-enhanced ultrasound and phototacoustic imaging to sensitively and non-invasively monitor anti-vascular treatment over time.

Bar-Zion, A., Yin, M., Adam, D. & Foster, F. S. **Cancer Res.** 76, 4320-4331 (2016).



Pancreas

Development of an Orthotopic Human Pancreatic Cancer Xenograft Model Using Ultrasound Guided Injection of Cells

Orthotopic pancreatic xenograft model generation using ultrasound image-guided injection and subsequent 3D monitoring of tumor progression. Demonstrates that this method is “feasible, reproducible, facile, minimally invasive and improved” compared to surgical models.

Huynh, A. S. et al. **PLoS One** 6, e20330 (2011).



Head & Neck

Phototheranostic Porphyrin Nanoparticles Enable Visualization and Targeted Treatment of Head and Neck Cancer in Clinically Relevant Models

Demonstrates delineation of primary and metastatic tumors in a clinically-relevant model using a photoacoustic contrast agent as well as using this agent for complete ablation of tumors using photothermal therapy.

Muhanna, N. et al. **Theranostics** 5, 1428-1443 (2015).

Featured Videos

Available Online

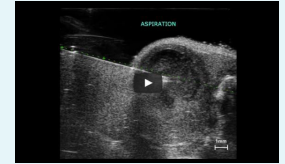
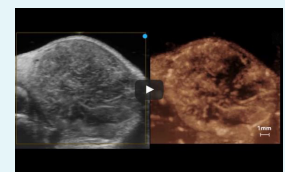
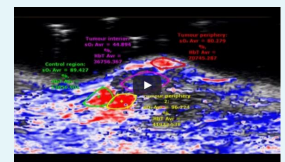


Image Guided Injection into a Mouse Tumor



Contrast Injection into Mouse Subcutaneous Tumor



Parametric Map of Oxygen Saturation in an Orthotopic Breast Tumor Model

Watch videos at visualsonics.com/application/preclinical/oncology



Vevo 3100 and Vevo LAZR-X

Talk to us to find out how the Vevo 3100 or the Vevo LAZR-X can advance your cancer research.

Learn from other researchers.

Check out our educational webinars!

* visualsonics.com/resource/webinars