



VOUCHER REQUEST

UWCCC SMALL ANIMAL IMAGING FACILITY ULTRASOUND/PHOTOACOUSTIC (US/PA) IMAGING

The UWCCC Small Animal Imaging Facility (SAIF) invites Cancer Center Members to come forward with exploratory studies to see how ultrasound/photoacoustic (US/PA) imaging in animal models on the VevoLAZR2100 photoacoustic system might advance their research.

The following limitations apply:

- New Users of US/PA imaging only
- Cap of 10 hours of instrument use time per investigator

*These vouchers will be available for a limited time only, so the sooner you get your request in the better. See instructions for submitting a voucher request under “Voucher Requirements” below.

What US/PA imaging can do for you:

The VevoLAZR2100 system includes high frequency array-based ultrasound (US) with center frequencies in the 20-70 MHz range, designed specifically for the depth and high-resolution (~30 microns) needed for scanning small animals in B-Mode, Color and Power Doppler Modes with 3D imaging. M-Mode single line acquisition is also available for high-temporal resolution in left ventricular (LV) function applications.

Photoacoustic (PA) imaging combines the sensitivity of optical imaging and the high-resolution of ultrasound imaging. In PA imaging, visible and near-infrared light (ranging from 700–900 nm in wavelength) focused on tissue(s) of interest is absorbed by endogenous chromophores such as hemoglobin, resulting in the thermo-elastic expansion and creation of pressure (sound) waves that are detected with traditional US transducers.

Photoacoustic imaging is commonly used in cancer research to measure hypoxic tumor conditions, which can be leveraged to monitor treatment response or to assess patient specific predictive outcomes to therapy as hypoxic tumors are linked to resistive therapies (i.e., radiation therapy). More specifically, PA imaging can be used to assess oxygen saturation in tumors before and after radiation or chemotherapy to determine efficacy. PA imaging is also used for tumor detection and monitoring tumor angiogenesis. Therapeutic agents (i.e., gold nanorods) used for photodynamic therapy (PDT) or photothermal therapy (PTT) can act as PA imaging contrast agents providing feedback on delivery and treatment efficacy.

Don't have US/PA imaging included on your animal protocol? Don't worry. Users can easily transfer animals to the SAIF umbrella imaging protocol for the procedure.

Not familiar with US/PA image interpretation and analysis? Don't worry. The SAIF can work with researchers to complete the analysis together, and in many cases, train users how to independently conduct analysis.

VevoLAZR2100 System Capabilities include:

- Acquire ultrasound alone or in conjunction with photoacoustic imaging
- Quantification of oxygen saturation and hemoglobin content
- Microvascular hemodynamics in real-time
- Molecular and cellular imaging
- Spectral functionality/unmixing for characterization of photoacoustic signal (680 - 970nm)
- Vevo Multiplexer tool to detect signal from multiple sources and co-register to anatomy
- High sensitivity, high specificity, real-time 3D volumetric imaging
- 3D Thresholding for optimized signal intensity during data analysis
- Vevo Color for differentiating various targets
- Longitudinal tumor imaging for therapeutic/drug studies
- In vivo nanoparticle and microbubble imaging
- Automatic co-registration of photoacoustic signal to anatomic ultrasound target
- Real-time, in vivo imaging of deep tissue
- High resolution: 30 μ m
- 3D imaging with respiration gating



Voucher Requirements:

- UW Carbone Cancer Center member
- New user of Ultrasound / Photoacoustic (US/PA) imaging service
- Submit request for a voucher to SAIF Manager Justin Jeffery, jjjeffery@wisc.edu, with the following information:
 - Email Subject Line: “US/PA Imaging Voucher Request”
 - UWCCC PI Name
 - Type and proposed # of Animals
 - Any safety requirements
 - Brief description of cancer relevance
 - If found useful, how soon would you anticipate using the US / PA imaging service in SAIF for your research program? In the next 1 year? 1-3 years? or 3-5 years? (select one)