



THERANOSTIC IMAGING IN THE SAIF

Theranostics is the field of combining diagnostic imaging approaches to be paired with and guide therapeutics. This innovative field not only facilitates the identification of disease through diagnostic imaging but also enables targeted therapeutic interventions based on the specific characteristics of the identified pathology.

Nuclear imaging and medicine enables a targeted imaging probe to be used to identify locations of disease (gamma emitter), and then swapping the radioisotope out for one that is therapeutic in nature (alpha/beta/alpha emitter). Examples that are currently used clinically include $^{68}\text{Ga}/^{177}\text{Lu}$ targeted to PSMA for prostate cancer or targeted to SSTR2 for neuroendocrine tumors.

With advancements in PET and SPECT instrumentation at UAB, and leveraging the unique array of radioisotopes that can be produced by the UAB Cyclotron facility, we have been able to image paired nuclear imaging theranostics. Figure 1 shows the preclinical PET and SPECT instruments available for imaging rodent models of disease at UAB. The radioisotopes that are included are $^{64}\text{Cu}/^{67}\text{Cu}$ and $^{43}\text{Sc}/^{47}\text{Sc}$, as seen in Figure 2, with paired PET and SPECT imaging of PSMA in prostate cancer.

The field of theranostics has potential to further integrate imaging into personalized medicine in cancer and other diseases. We are excited to be a part of this translational research happening at UAB.

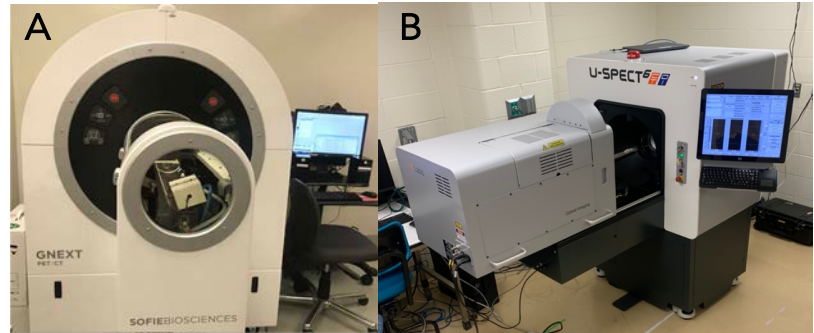


Figure 1. (a) PET imaging can allow for disease characterization and identify if the target is available, while (b) SPECT imaging can provide imaging of the systemic target radiotherapy.

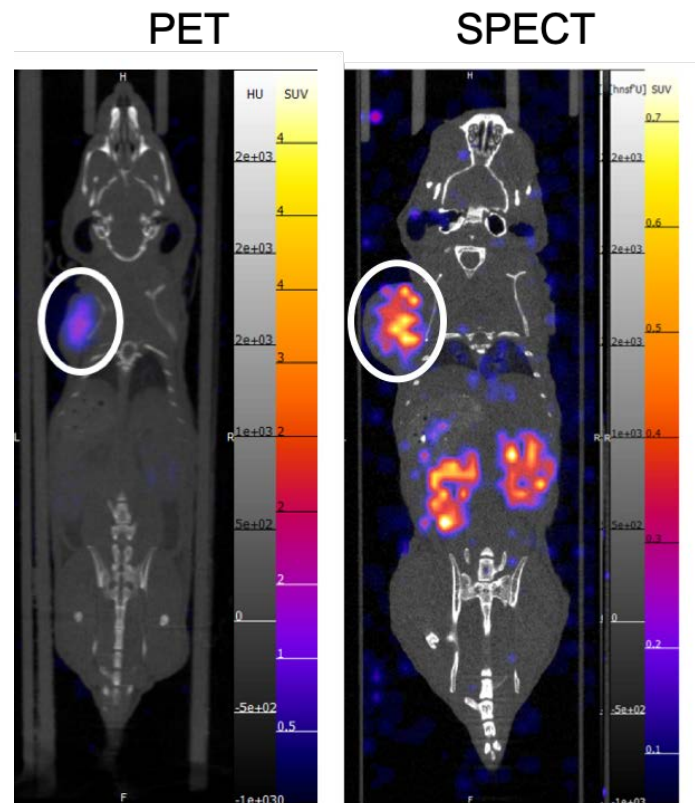
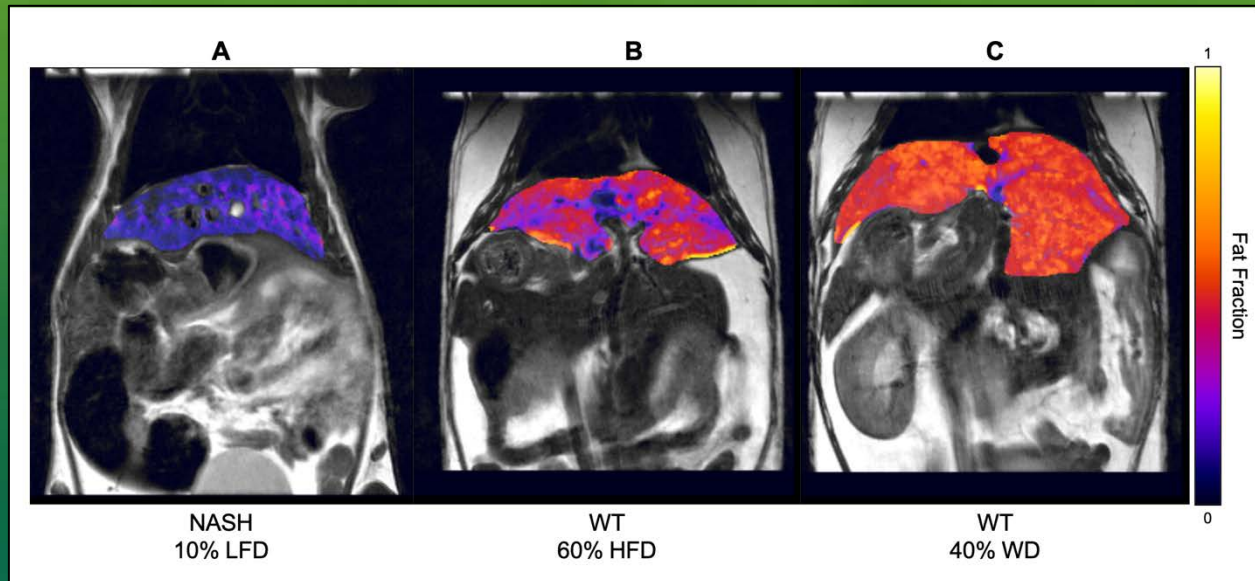


Figure 2. $^{[43}\text{Sc}]\text{-PSMA-617}$ PET and $^{[47}\text{Sc}]\text{-PSMA-617}$ SPECT images of male athymic nude mice bearing PSMA+ LNCaP xenografts. Images are windowed the same for comparison. Used for **diagnostic** and **therapeutic** imaging. (Images courtesy of Shelby Cingoranelli in Dr. Suzy Lapi's Lab).

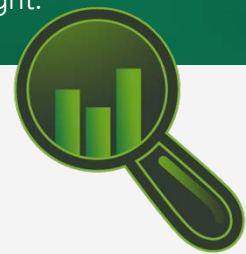


FEATURED IMAGE OF THE QUARTER



Magnetic resonance imaging was performed by the Small Animal Imaging Facility to quantify liver fat fraction using the 9.4T Bruker BioSpec MRI scanner. Animals that were imaged consisted of mice with varying disease states and diets. A) Mouse with non-alcoholic steatohepatitis (NASH) and fed a low-fat diet (10% kcal from fat). B) Wild-type mouse fed a high-fat diet (60% kcal from fat). C) Wild-type mouse fed a high-fat, high-cholesterol western diet (40% kcal from fat). Images used for fat fraction quantification were acquired using the Dixon fat-water separation method. Image courtesy of Dr. Wood and Dr. Knight.

FEATURE SPOTLIGHT



SAIF's New Researcher:

Paris Maddox joined the SAIF in September 2023. She graduated from the University of Alabama at Birmingham, in December 2022 with her B.S. degree in Biology. She will be assisting SAIF users with training and image acquisition. In her free time, she enjoys the great outdoors and reading. We are very excited to welcome Paris to our group!



USEFUL LINKS

➔ UAB SAIF

Homepage for the Small Animal Imaging Facility core.

➔ SAIF FAQ's

The Small Animal Imaging Facility's Frequently Asked Questions

➔ TRAINING FORMS

Download training material for submission prior to scheduling imaging.

➔ PRE-CLINICAL IMAGING CALENDAR

Check for any available time slots for imaging modalities.

➔ DEPARTMENT OF RADIOLOGY

Homepage for UAB's Department of Radiology.

➔ O'NEAL COMPREHENSIVE CANCER CENTER

Homepage for O'Neal Comprehensive Cancer Center at UAB.

➔ O'BRIEN CENTER

Homepage for O'Brien Center for Acute Kidney Injury Research.

➔ UAB CYCLOTRON FACILITY

Homepage for UAB's Cyclotron Facility.

DID YOU KNOW?

You can find The Small Animal Imaging Facility at Core Day on January 9th, 2024 from 2-4pm in the West Pavilion 1st Floor Lobby!

More information here:

<https://www.uab.edu/cores/ircp/core-day>



CONTACT INFO



ULTRASOUND

MRI

NUCLEAR

OPTICAL

MRI

Facility Director
Anna Sorace
Ph.D.
agsorace@uab.edu

Suzanne Lapi
Ph.D.
lapi@uab.edu

Jason Warram
Ph.D.
mojack@uab.edu

Mark Bolding
Ph.D.
mbolding@uab.edu

SAIF LAB PERSONNEL

Associate Director/Operational Manager
Sharon Samuel
ssamuel@uab.edu

Program Manager
Jordyn Wheeler
jlaw9413@uab.edu

Staff Researcher
Seth Lee
snlee729@uab.edu

Staff Researcher
Paris Maddox
pmadd@uab.edu

MAIN LAB

Volker Hall Laboratory
1670 University Blvd.
Rm. G082G, 975-6465

IMAGING FACILITIES

WTI Imaging Suite
WTI 630D

MRI 9.4T Imaging Suite
LHL B15, 934-0265

Volker Hall Imaging Suite
VH B21A, 975-6466

SAIF MODALITY PRICING

* Labor charges are \$45 per hour (for each personnel), when assisted during imaging.

Prices effective 01/01/2022.

* Training is available on some modalities, free of charge.

* Accounts will be auto billed after 7 days of no response to invoices.

MODALITY	COST	INSTRUMENT
Bioluminescence	\$60/hour, No substrate \$80/hour, Core substrate	IVIS Lumina III
Fluorescence	\$60/hour	Custom Leica Microscope with Nuance spectral camera IVIS Lumina III
Ultrasound	\$75/hour	Vevo 660
MRI	\$200/hour	Bruker 9.4T
SPECT/CT	\$200/hour + dosing	U-SPECT ⁶ -µCT
PET/CT	\$200/hour + dosing \$60/hour + dosing	Sofie GNEXT PET/CT Beta Eye 2D PET System
Gamma Camera	\$20/hour + dosing	Picker Camera with Numa computer
Specialty Fluorescent Imaging	\$100/hour	Li-Cor Pearl Impulse Luna/SPY Systems FMT 4000
Flow Cytometry	\$35/hour, non-assisted \$50/hour, assisted	Attune Flow Cytometer
Staff Image Analysis/Assistance	\$45/hour	

*NON-CANCELLATION POLICY:

If user is not present at scheduled appointment time without prior notification of cancellation, user will be charged an hourly-use fee for that instrument.

IMAGE SUBMISSIONS

Submit images that you would like featured in the newsletter to jordynlawrence@uabmc.edu. Please include PI's name, modality, brief experiment summary, and species.

PUBLICATION REFERENCE

Please acknowledge support of SAIF services in grants and publications by citing the [O'Neal Cancer Center Grant P30CA013148](#).

For data obtained with the IVIS Lumina III systems, please cite [S10 instrumentation grant 1S10OD021697](#).

Please acknowledge [DK137307](#) and the [UAB-UCSD O'Brien Center](#) support for all preclinical imaging of the kidney and related biological processes.