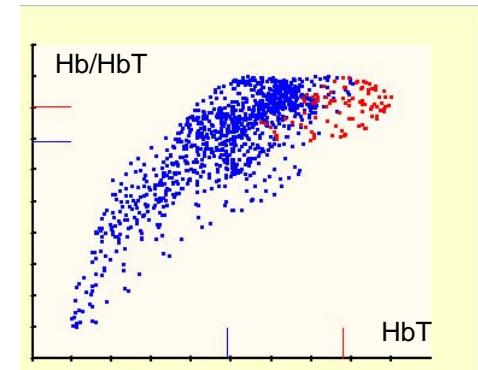
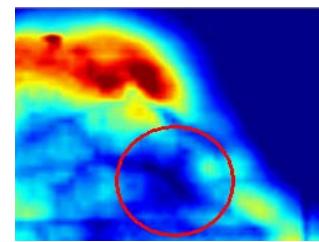
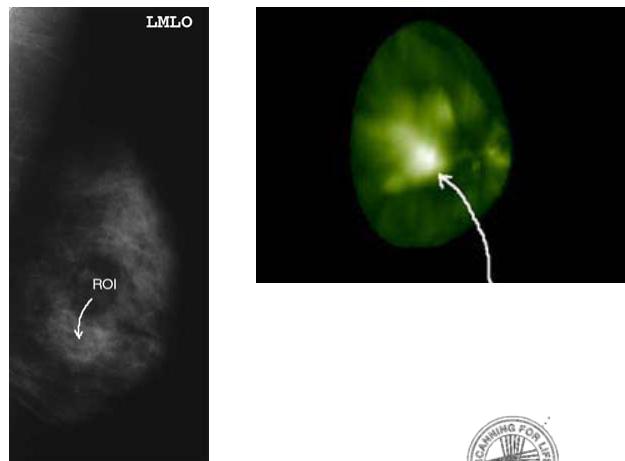


Optical Molecular Imaging Lab

David Hall, Ph.D. DABR
Associate Professor,
Department of Radiology,
University of California, San Diego



Optical Imaging In Vivo - Clinical

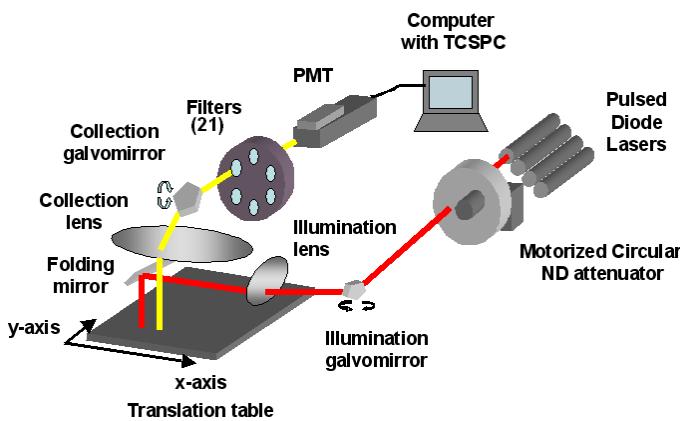
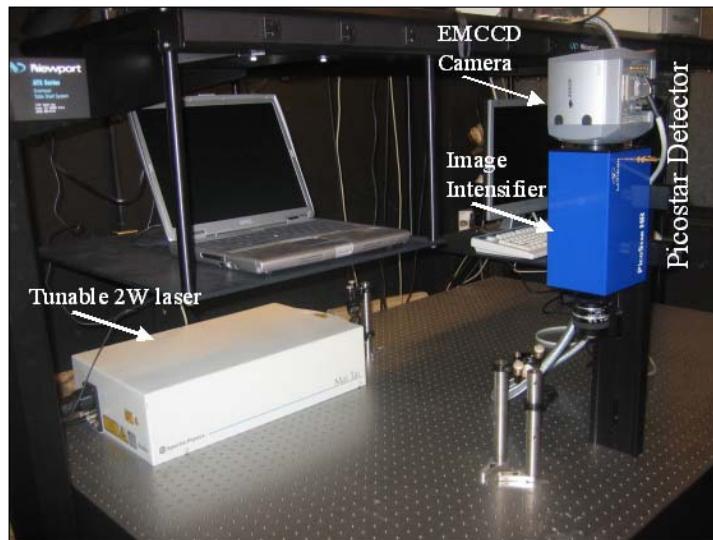


CTLM® by Imaging Diagnostic Systems Inc.

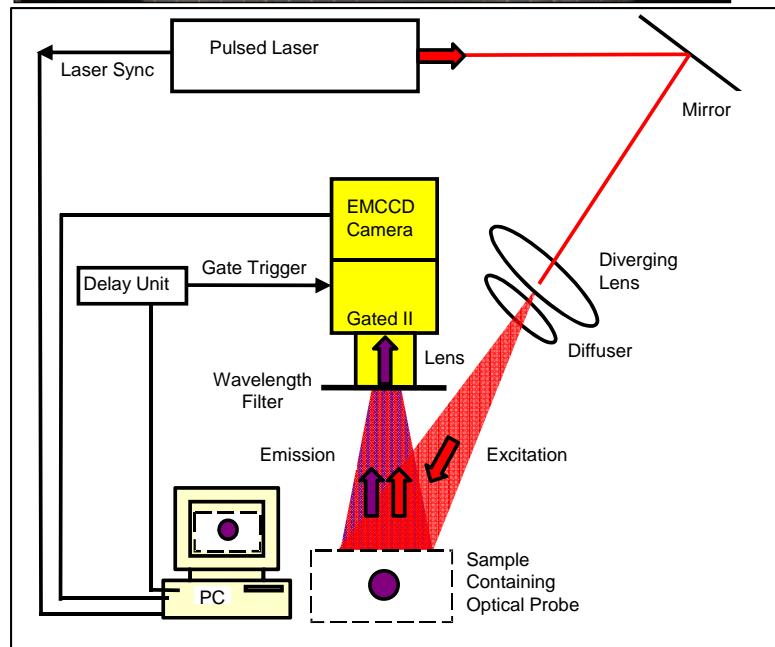
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PI NIH S10 RR22599-01A1

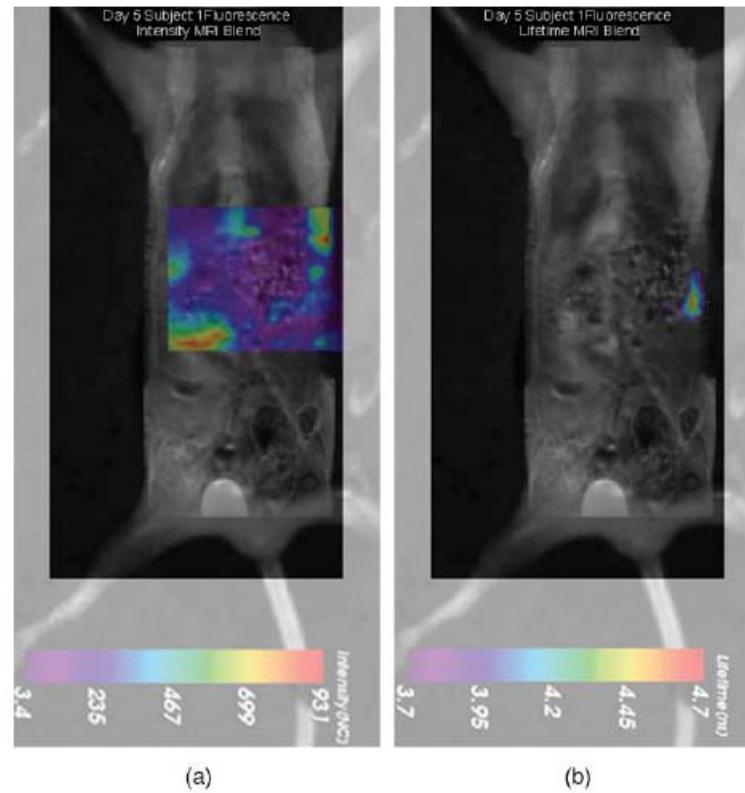
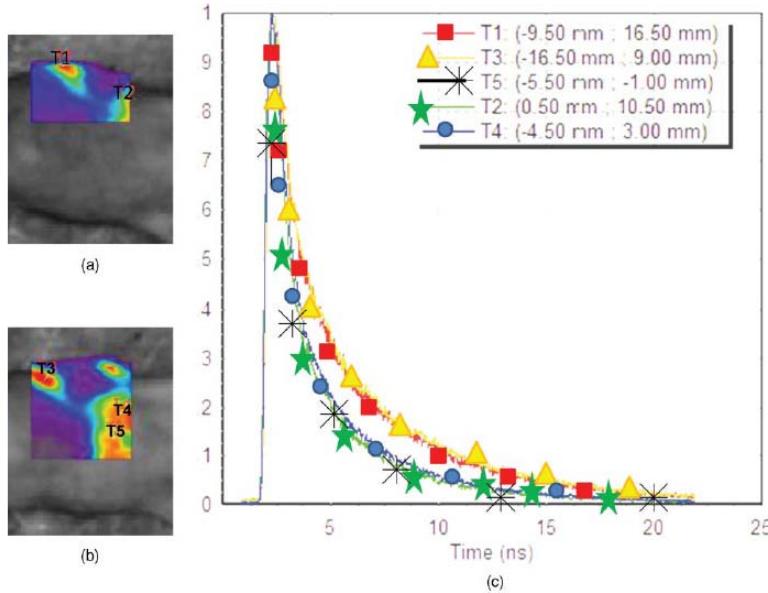


Full-field system
Hall lab UCSD
RSNA Seed Grant &
NIH P50 CA128346-01A1



RFP-Labeled Pancreatic Tumors In Vivo

Autofluorescence Discrimination with Lifetime Contrast



Erten, D. J. Hall, C. Hoh, H. Cao, S. Kushual, S. Esener, R. Hoffman, M. Bouvet, S. Kesari, M. Makale, "Enhancing MRI Tumor Detection with Fluorescence Intensity and Lifetime Imaging" J. Biomed. Opt. 15(6) 066012-1 – 066012-6 (2010).

NCI CA109949 , ACS RSG-05-037-01-CCE, T32 CA121938, NCI CA132971, NIH S10 RR22599-01A1, & NIH P50 CA128346-01A1.

In Vivo Superoxide Levels via DHE Oxidation

Autofluorescence removal with Lifetime-Unmixing

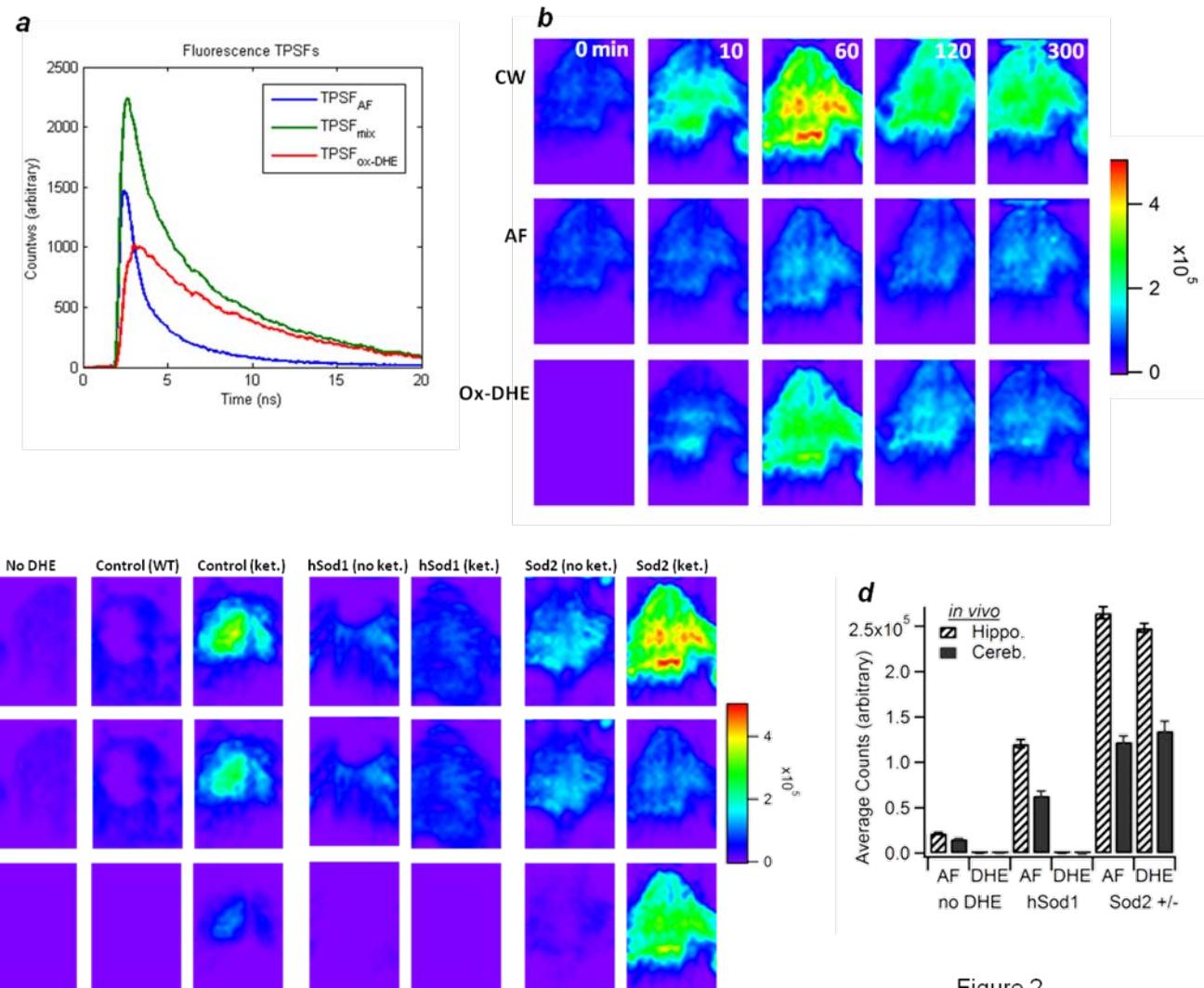
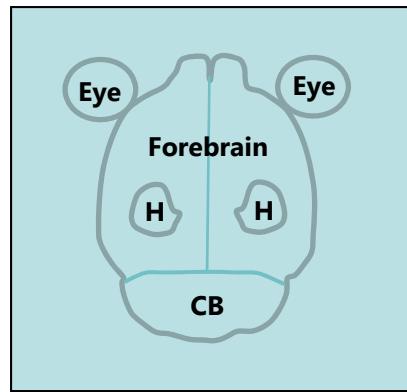
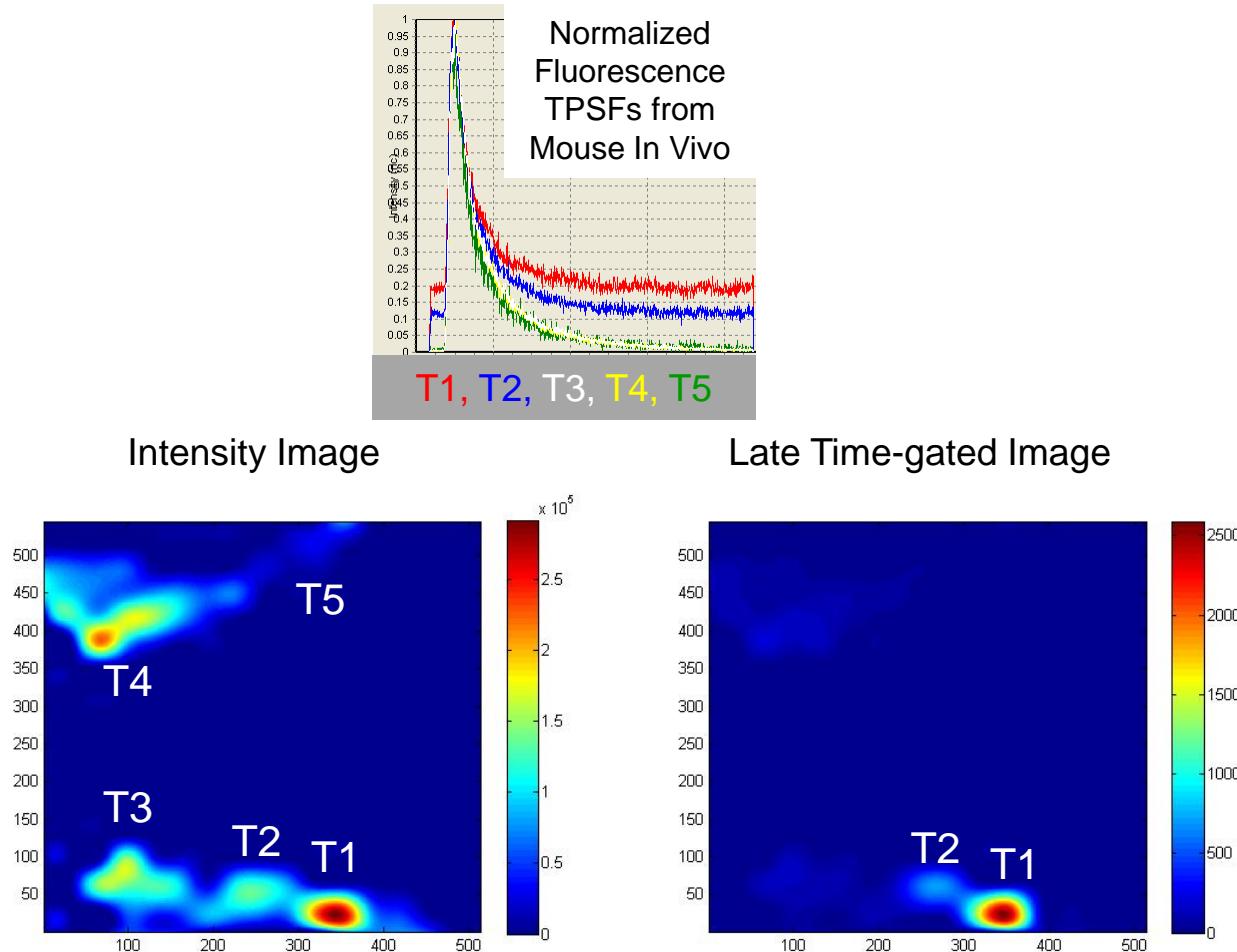


Figure 2

D. J. Hall, S. Han, A. Chepetan, M. Rogers, and L. Dugan, "Dynamic optical imaging of metabolic and NADPH oxidase-derived superoxide in live mouse brain using fluorescence lifetime unmixing," *J. Cerebral Blood Flow & Metabolism* (2012)

Late Time-gated Imaging

Isolating a Long-Lifetime Fluorescent Probe

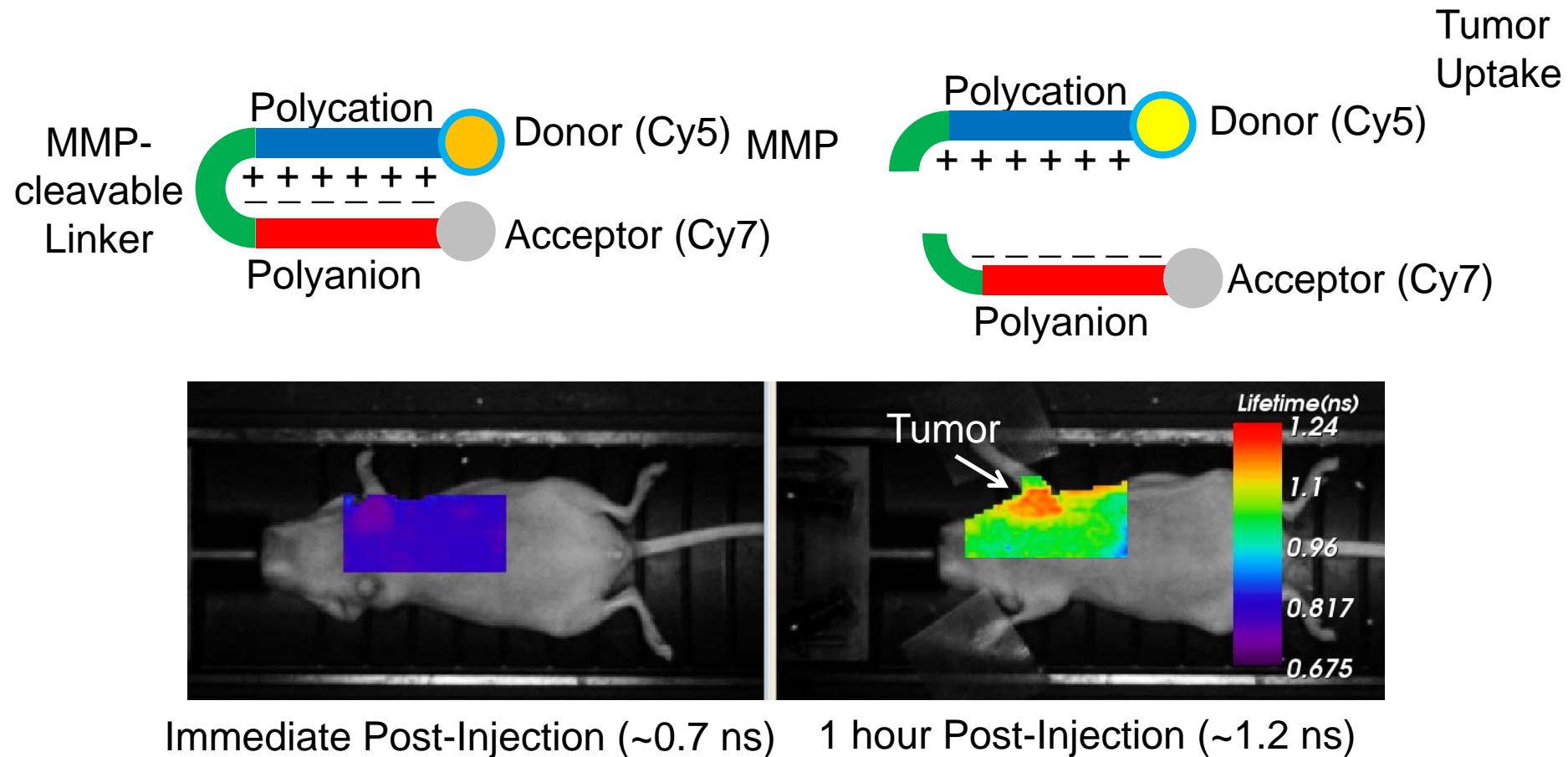


L. Gu, D. J. Hall, Z. Qin, E. Anglin, J. Joo, D. Mooney, S. Howell, M. Sailor, "In Vivo Time-gated Fluorescence Imaging with Biodegradable Luminescent Porous Silicon Nanoparticles," *Nature Communications* 4, 2326 (2013).

NIH ICMIC P50-CA128346, R01 CA124427-01, & NSF DMR-0806859.

Smart Fluorescence Lifetime Probes

FRET-based MMP-cleavable Lifetime Probe

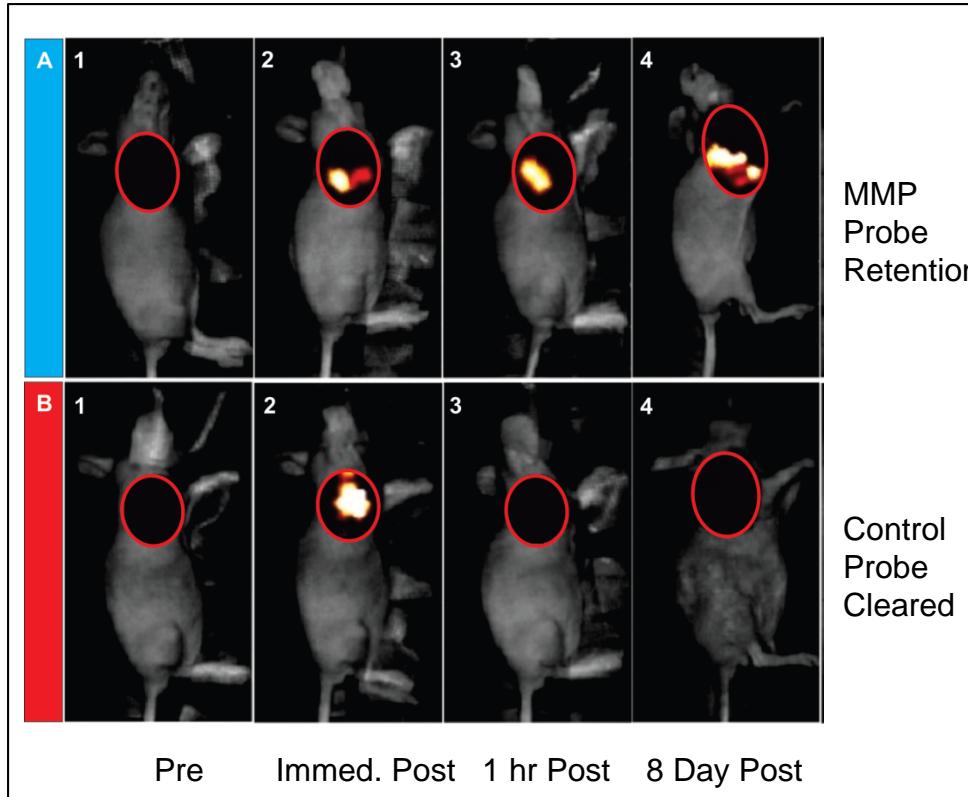


E. N. Savariar, D. J. Hall, J. L. Crisp, P. A. Steinbach, L. G. Ellies and R. Y. Tsien, "Fluorescence resonance energy transfer accelerates and amplifies tumor:background contrast from activatable cell penetrating peptides," WMIC 2011.

D. J. Hall, E. N. Savariar, R. F. Mattrey, R. Y. Tsien, "In Vivo Fluorescence Lifetime Imaging of a FRET-based MMP-cleavable Probe," WMIC 2011
NIH ICMIC P50-CA128346 & DoD W81XWH-09-1-0699.

Enzyme Directed Assembly Particle Theranostics

FRET-based MMP-Assembly Probe



M-P Chien, M. P. Thompson, C. V. Barback, T-H Ku, **D. J. Hall**, and N. C. Gianneschi, "Enzyme-Directed Assembly of a Nanoparticle Probe in Tumor Tissue," *Advanced Material*, 25 (25) 3599-3904 (2013)

M-P. Chien, A. S. Carlini, D. Hu, C. V. Barback, A. M. Rush, **D. J. Hall**, G. Orr, and N. C. Gianneschi, "Enzyme-Directed Assembly of Nanoparticles in Tumors Monitored by *in vivo* Whole Animal Imaging and *ex vivo* Super-Resolution Fluorescence Imaging," *JACS* 135:18710-18713, (2013).

C. E. Callmann, C. V. Barback, M. P. Thompson, **D. J. Hall**, R. F. Mattrey, and N. C. Gianneschi, "Therapeutic Enzyme-Responsive Nanoparticles for Targeted Delivery and Accumulation in Tumors," *Advanced Materials* (In Press) (2015).

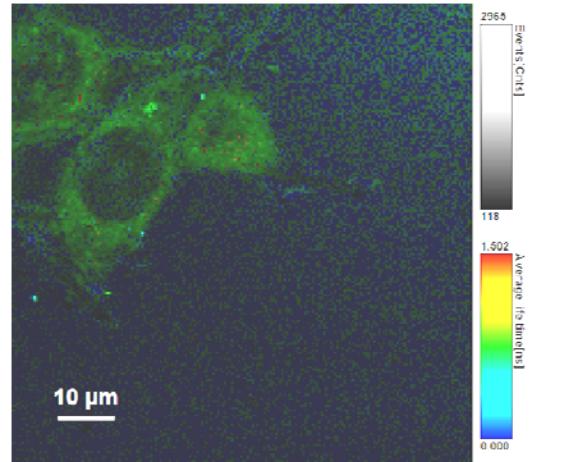
PI NIH R01EB011633.

Optical Imaging Microscopy

PI NIH S10 OD016352



FLImscope (*MicroTime 200, Picoquant*)



Director, Microscopy Shared Resource (MSR), UCSD Moores Cancer Center

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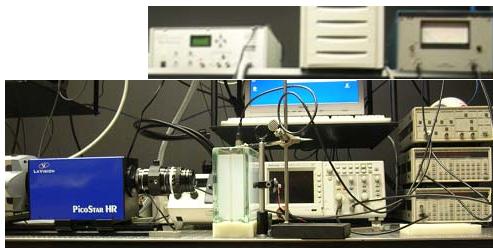


STORMscope (super-resolution), Nikon

co-PI, Cancer Imaging Program Pilot grant with Dr. Bartsch



Optics and Ultrasound



Acousto-Optics with novel Quadrature Detection System
PI DoD PCRP-IDA grant

D. J. Hall, U. Sunar, and S. Farshchi-Heydari, "Quadrature Detection of Ultrasound-Modulated Photons with a Gain-Modulated, Image-Intensified, CCD camera," *Open Optics* 2, 75-78 (2008).



Photoacoustic Imaging System, Vevo LAZR FujiFilm Visualsonics
PI NIHHS10OD021821