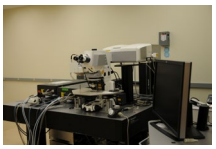
CONFOCAL MICROSCOPY CORE FACILITY
DEPARTMENT OF PHYSIOLOGY
CIBR: Center for Innovative Biomedical Resources

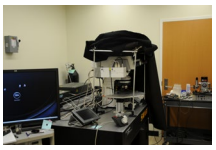
CORE INSTRUMENTATION

Zeiss 710 NLO & Zeiss 7MP



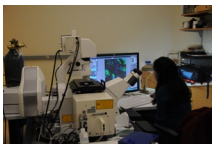
- Upright confocal microscope with single photon and multiphoton excitation capabilities for imaging live cells, slices and whole animals
- Excitation wavelengths 730 to 1300 nm; 2 PMT and 2 sensitive GaAsP detectors
- Provide ability to combine with other measurements (electrophysiology, etc.)

Zeiss 5Live & Zeiss 510



- Point-scanning and slit-scanning confocal microscope
- Fast acquisition frame rates for studying dynamic cellular processes at physiological temperatures
- Dual scan heads (5Live) allow simultaneous imaging and optical manipulation
- Excitation (488, 543, 560, 633, Ti:Sapphire laser)

Olympus LCV Incubated Microscope



- Widefield inverted microscope allowing continuous imaging of cells for hours or days
- Fluorescence and DIC imaging on multiple positions
- Cell migration, cell division, wounding and repair processes, phagocytosis

Olympus FV300/Atomic Force Microscope

- Inverted confocal microscope capable of multicolored imaging
- Equipped with an Atomic Force Microscope accessory (AFM, Bruker)

The new microscope combines the capabilities of confocal imaging with atomic force microscopy for your experiments.

Nikon A1 Laser Confocal

- Point scanning laser confocal
- 4 laser lines for blue, green, red, far red fluorophores
- 2 PMT, 2GaAsp PMT high sensitivity detectors
- Advanced tiling and stitching capabilities
- Automatic z focus tracking

Nikon W1 spinning disk

- Spinning disk confocal
- 4 laser lines for blue, green, red, and far red fluorophores
- Hamamatsu CMOS camera detector
- High speed acquisition, tiling, stitching, reconstruction
- Equipped with incubation chamber for live samples

Imaris Bitplane

Bitplane is an advanced image analysis software for processing images. 3D renditions, display and quantification are readily executed. Some imaging suites are specialized for certain applications, e.g. neurofilament tracing. Other common processing routines are available. The confocal core operates a floating license server which allows easy operation of the software from the investigator's own computers.

MISSION

The Confocal Core's mission is to provide researchers with a wide array of state-of-the-art confocal imaging equipment to enable acquisition of high resolution images (both *in vivo* and *in vitro*). The Confocal Core offers training and assistance in the use of multiple confocal microscopes housed in our facility. Optimization of data acquisition and image processing are both part of the training, thus enabling researchers to efficiently design studies, acquire image data and extract relevant data features. The confocal facility is available to all UMB researchers and extramural users on a fee-for-service basis.

CORE SERVICES

The facility provides individual instruction on an array of confocal microscopes. The needs of the researcher are considered in choosing which microscope will best suit the experimental design. In general, imaging of fixed samples, cultured cells, organ slices and small animals can be accommodated. Imaging techniques including FRET, FRAP, photoactivation and uncaging are readily implemented. The microscopes have excitation sources that cover most fluorophores with excitation ranging from 355-633 nm. Multiphoton excitation of fluorophores is also available on select instruments. An image analysis workstation equipped with software packages is available to users.

The Core also has a culture room with an incubator, culture hood and a widefield fluorescence microscope for use in preparation of cultured and live samples. Preparation of live animals for imaging experiments can also be done in this newly renovated space.

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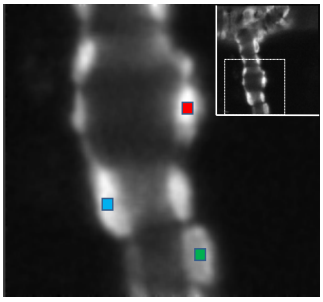
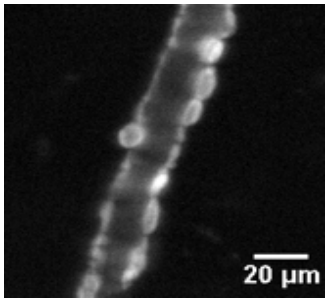
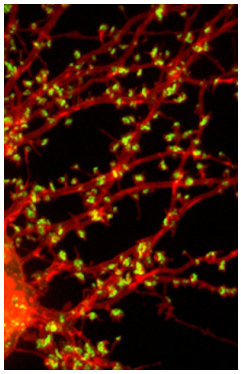
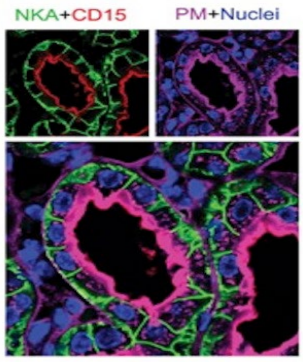




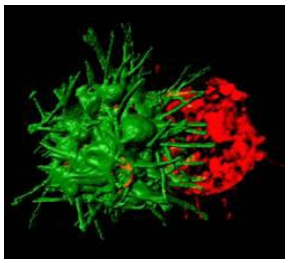
Imaging of vascular tone and Ca^{2+} signaling in murine cremaster muscle arterioles *in vivo*
Mauban *et al.* (2013) Microcirculation



Cultured neuron expressing tdTomato (red) and the synaptic marker PSD-95-GFP (green)
courtesy of Blanpied Lab



Fixed Kidney Sections
courtesy of Dr. A. Villar



Microtentacles on a live, free-floating breast tumor cell labeled with membrane-localized GFP (green) encircle a neighboring tumor cell (red)
courtesy of Martin Lab

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