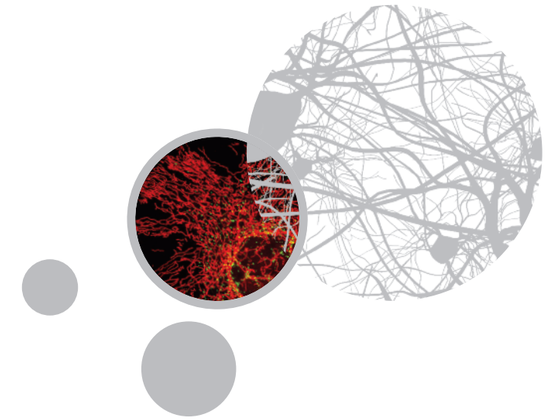
www.unist.ac.kr



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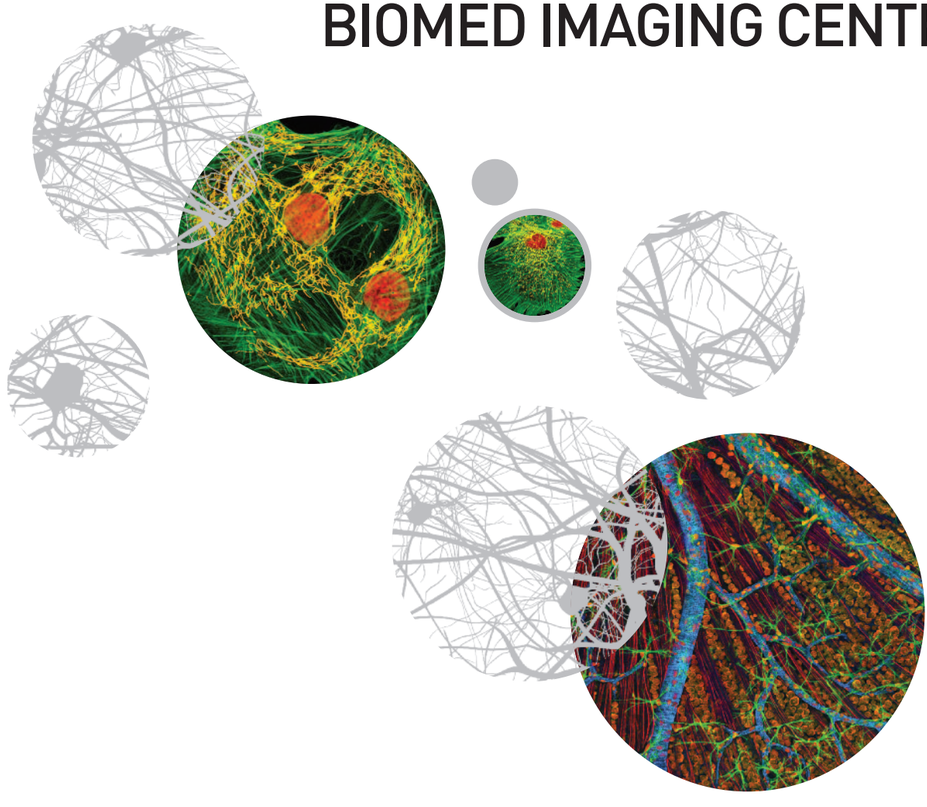
UNIST-OLYMPUS BIOMED IMAGING CENTER



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U O B C

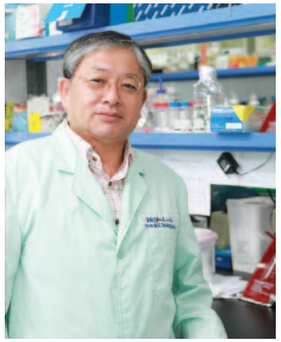
UNIST and Olympus join hands to prepare the stage for biotechnology.

Combining the technology of Olympus, an optical instrument expert,
and the up-to-minute bioscience research skills of the Ulsan National Institute of
Science and Technology (UNIST), we take the initiative in biotechnology.

CONTENTS

The UOBC strives to develop technologies that will make human life better.

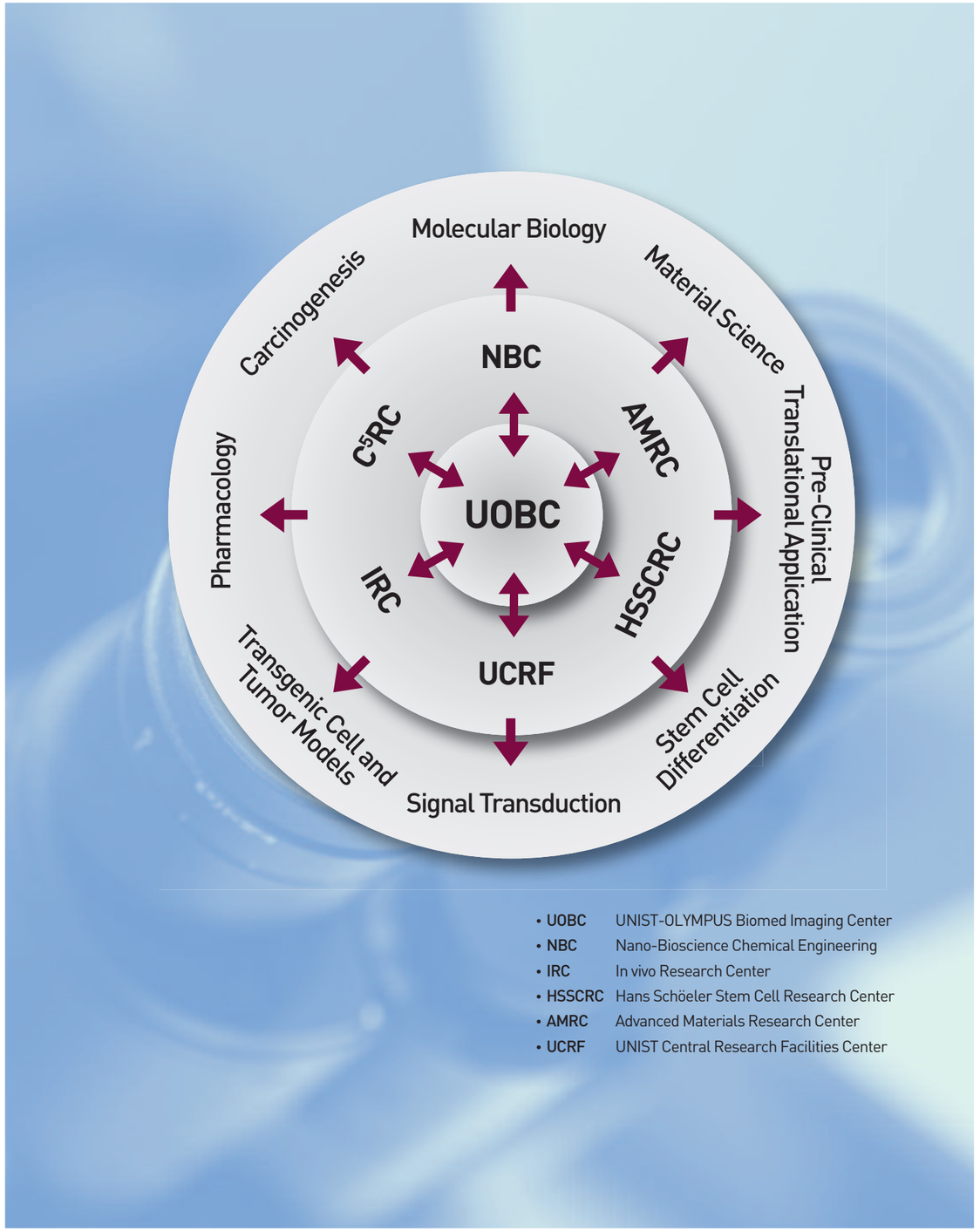
UNIST-OLYMPUS BIOMED IMAGING CENTER (UOBC) attracts a diverse group of scientists who embrace the fields of biology, engineering, chemistry, and medical science. We promote a highly interdisciplinary environment that is enhanced by scientific collaborations from the UNIST community and other research groups in Korea. In each of the UOBC research areas there is a common theme: the use of advanced imaging tools to follow events as they take place inside an intact organism. Our technologies have allowed us to expand into the biomedical realm and our knowledge and expertise is actively bridging the gap between basic science research and science-based medicine.



Dean of Planning & Research Affairs
Head, C^5 Research Center

Although set up as a single integrated facility, it is clear that light and other types of microscope have their own quirks and expertise requirements, and so we have two managers and supporting technicians from Olympus for all of the microscope. We intend to pursue collaborative research in the application of the latest technologies in BT and NT, as well as provide state-of-the-art technologies in life science.

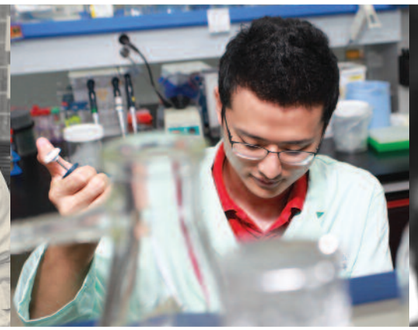
We are now fully open for any kind of research and if you have any questions about the facility or if would like to use any of our microscopes or other equipment, please contact us.

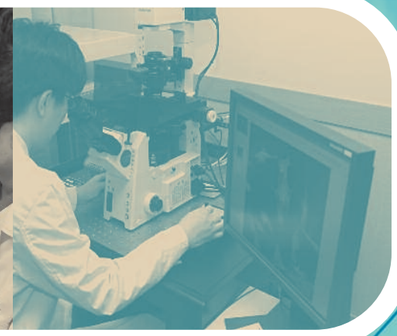


- **UOBC** UNIST-OLYMPUS Biomed Imaging Center
- **NBC** Nano-Bioscience Chemical Engineering
- **IRC** In vivo Research Center
- **HSSCRC** Hans Schöeler Stem Cell Research Center
- **AMRC** Advanced Materials Research Center
- **UCRF** UNIST Central Research Facilities Center

UOBC supports creative research through up-to-minute imaging technologies.





Technology

1. Advanced Live Cell Imaging
2. Application for Optical Highlighter Fluorescent Protein in the Living Cells
3. Cell Surface Dynamics
4. High Resolution Digital Slide Scanning System
5. Macro View Imaging System
6. Brighter and Deeper Imaging with Multi-Photon

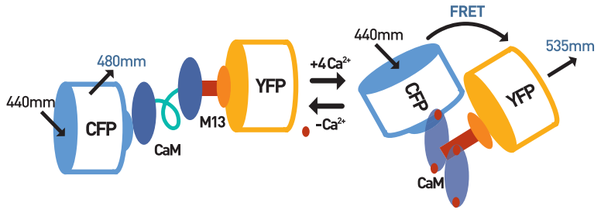
Advanced Live Cell Imaging

UOBC offers the most advanced imaging technologies that are based on the existing live cell imaging techniques.

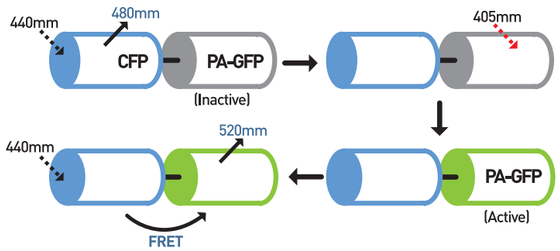
Application

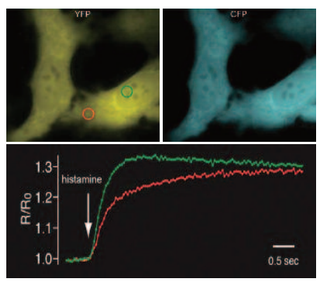
- Ratiomatric FRET
- Photobleached FRET
- Pharmret
- BRET (Bioluminescence Resonance Energy Transfer)
- BiFC (Bimolecular Fluorescence Complementation)

FRET

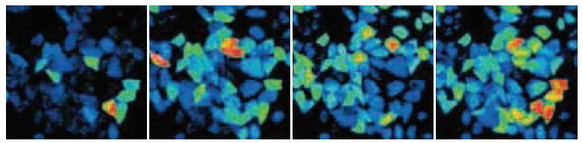


Advanced FRET





● The CFP and YFP image, FRET changes are observed through histamine stimulation.

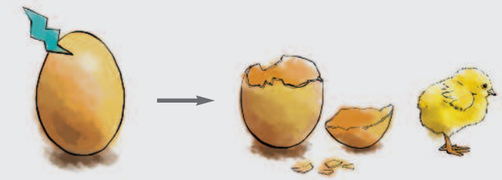


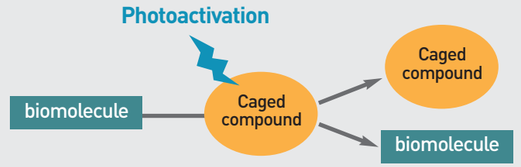
● The FRET image of Ca^{2+} activated camelon protein

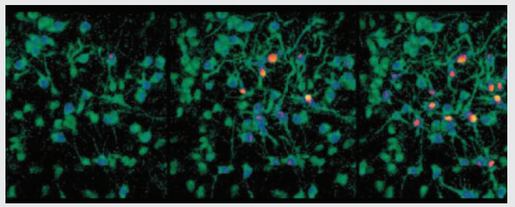
Application for Optical Highlighter Fluorescent Protein in the Living Cells

Live cell imaging of the dynamic functional regulation and activation of proteins in cells is offered using a variety of fluorescent proteins and the Fluorescent Recovery After Photobleaching (FRAP) method.

Caged compounds

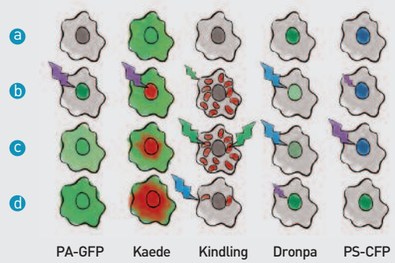


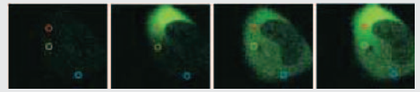




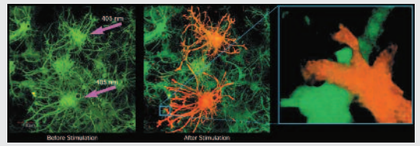
Identifying the changes of Ca2+ using a Ca2+ compound

Photoactivation & photoconversion

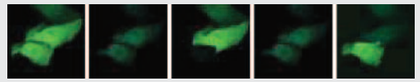




PA-GFP(photo Activatable-Green Fluoresence Protein)
Fluorescence protein PA-GFP can be used to mark targeted cells, organelles and proteins.



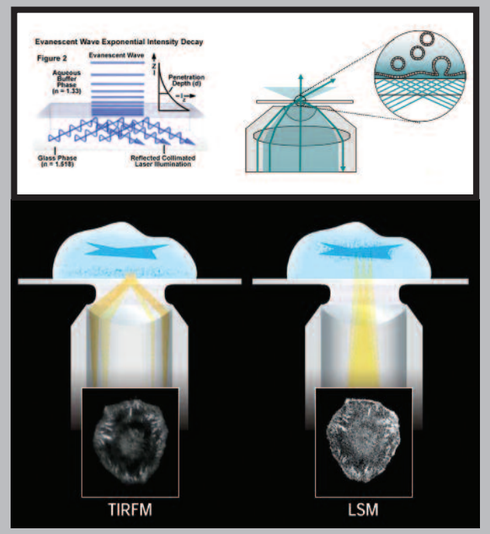
Kaede
The Kaede color can be photoconverted from green to red.
Kaede-expressing astroglia cells are stacked on the Kaede cell. The glial cells in contact with the neurons are observed while they are forming colonies and extending their processes.



Dronpa
User-selected control of fluorescence intensity and enables repeated photoactivation experiments on the same cell.

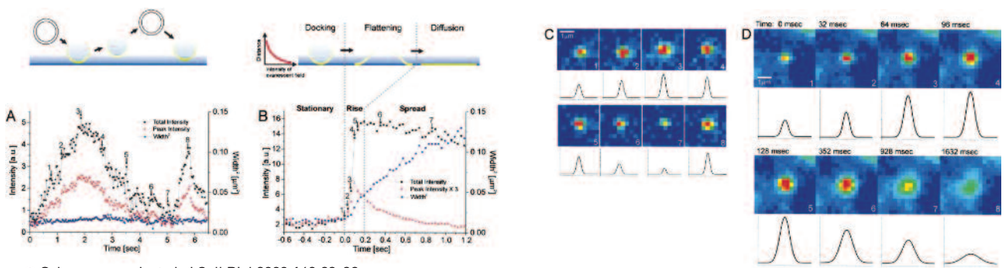
Cell Surface Dynamics

The overall aspects of cell surfaces can be observed using the Total Internal Reflected Fluorescence (TIRF) method that observes fluorescence at an evanescent wave (200 nm range) on the cell surface.

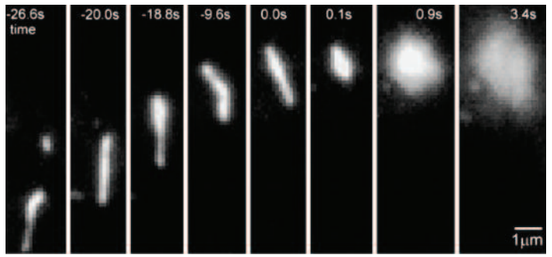


Application

- Exocytosis, Endocytosis
- Fusion of a membrane-bound vesicle to the plasma membrane
- Single molecule imaging
- Cell surface imaging
- Cardiac Ca^{2+} sparks
- Protein dynamics



● Schmoranzer J. et al. J Cell Biol 2000;149:23-32



● Selected frames from a sequence showing the transport, docking, and fusion of a tubular carrier. Times are marked relative to the start of the rise phase.

UNIST-OLYMPUS BIOMED IMAGING CENTER

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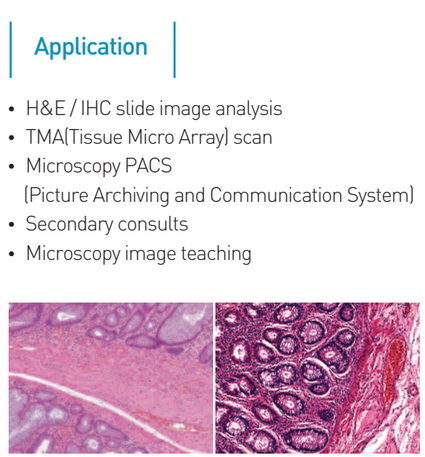
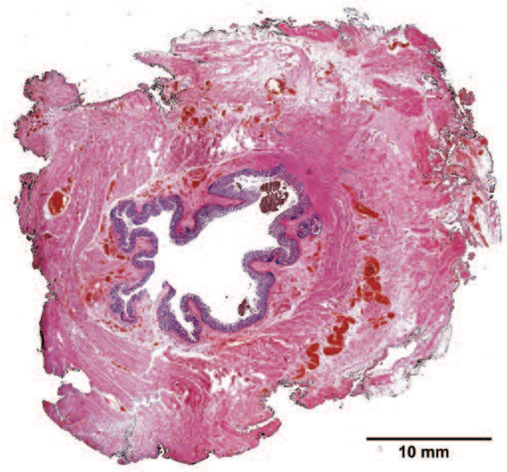
High Resolution Digital Slide Scanning System

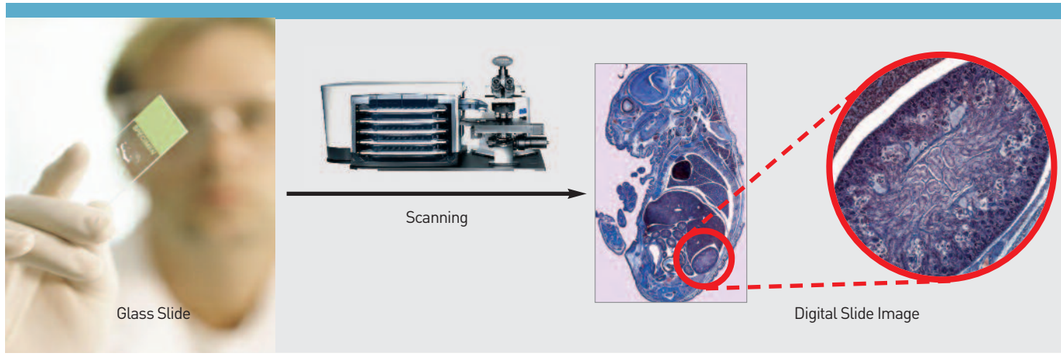
Tissue slides dyed with H&E or IHC can be scanned into a high-resolution image of more than 200 magnifications and the images can be analyzed in various ways on a computer.
Scanned digital slides can be stored in a research slide database and used for quantitative analysis and remote conferences and consulting.

Application

- H&E / IHC slide image analysis
- TMA(Tissue Micro Array) scan
- Microscopy PACS (Picture Archiving and Communication System)
- Secondary consults
- Microscopy image teaching

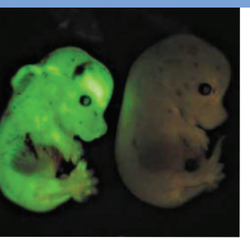


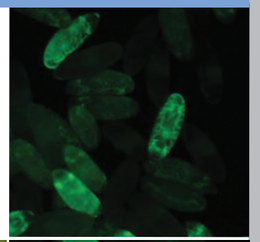


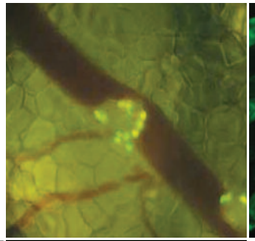


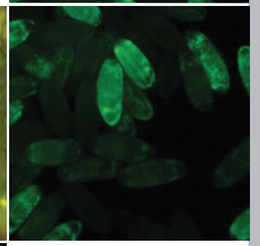
Macro View Imaging System

Based on a zoom method to magnify and observe an actual object as it is, the system can be used comprehensively from bright-field observation to in vivo studies on specific gene proteins in cell, tissue and organ levels using fluorescence.



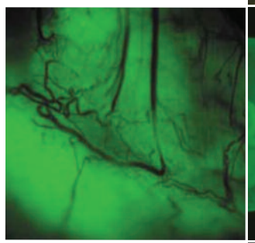


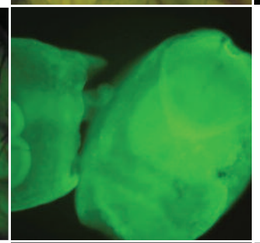


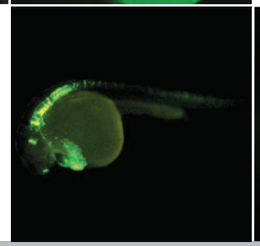


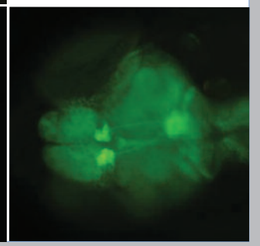
Application

- Cell tracking
- Oncology
- Angiogenesis
- Skeletal disease









UNIST-OLYMPUS BIOMED IMAGING CENTER

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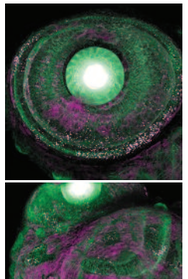
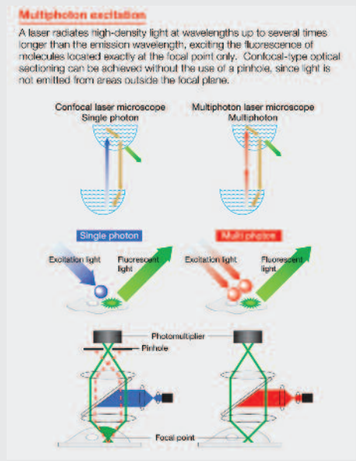
Brighter and Deeper Imaging with Multi-Photon

The Multi-photon imaging system that identifies a narrower focus range than the existing confocal microscopes thereby having the capability of imaging even a sample of 1 mm thick is scheduled to be introduced.
Using Multi-photon imaging, a variety of images from single spine to whole brain can be obtained by stimulating fluorescence located in desired locations and these can be used in various applications.

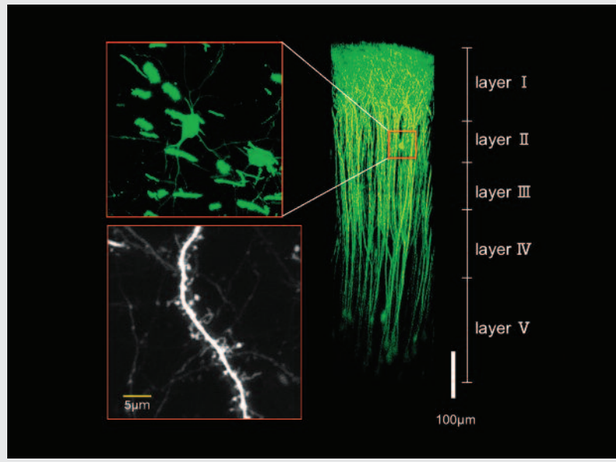


Application

- Multi-dimensional imaging into thickness specimen.
- Functional mapping of receptors at the single spine level.
- Patch clamp
- Analysis of Kinetics : FCS, FCCS, RICS, ccRICS, FRAP



Multiphoton Excitation



Mouse/Rat Brain

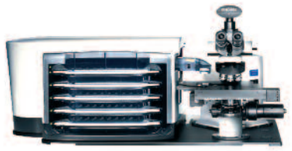
UOBC Imaging Equipment

We offer the ideal research environments for the best results

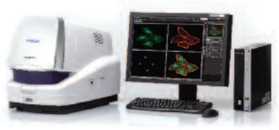
FRET Inverted Microscope
(OLYMPUS IX71)

All-in-one Confocal System
(OLYMPUS FV10i)

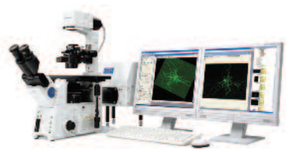
Macro View Imaging System
(OLYMPUS MVX10)



Virtual Microscope
(OLYMPUS .Slide)



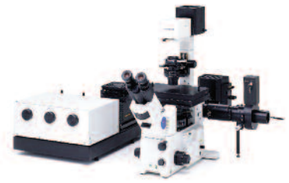
Bio Imaging Navigator
(OLYMPUS FSX100)



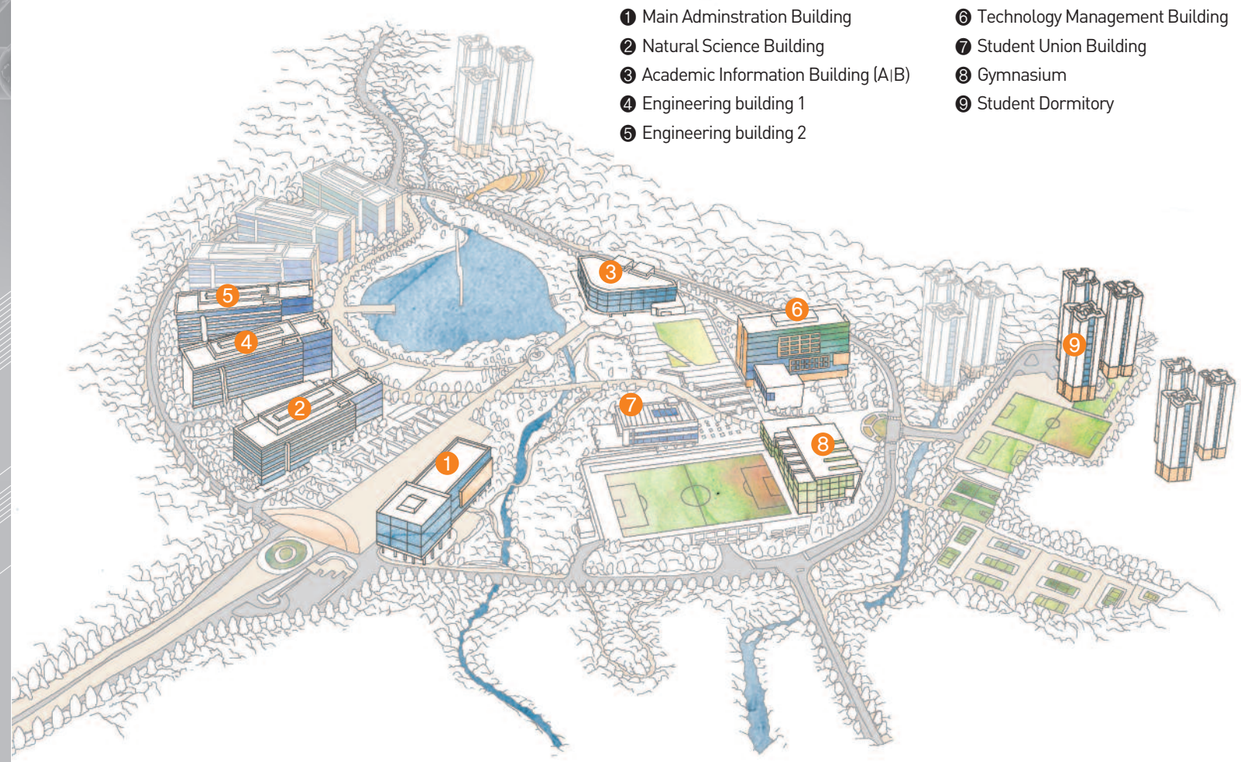
LSCM with SIM and Live
(OLYMPUS FV1000SPD)

Zero Drift Motorized Microscope
(OLYMPUS IX81-ZDC)

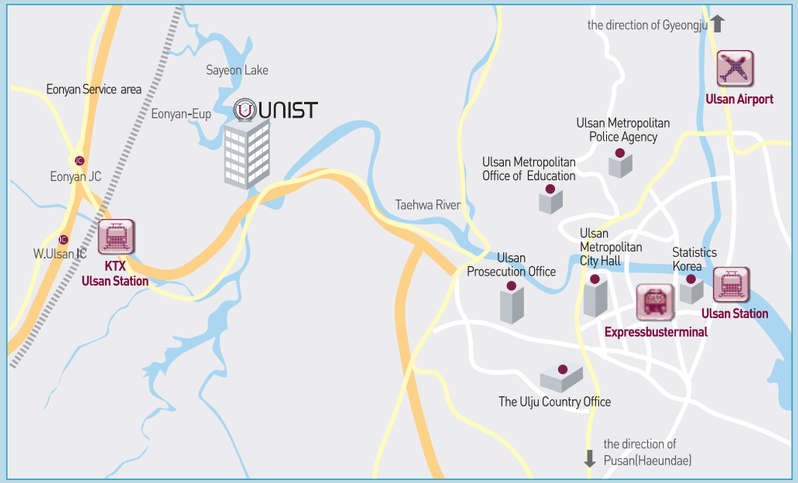
Multi-photon Laser Scanning System
(OLYMPUS FV1000MPE)



TIRF Microscope
(OLYMPUS TIRFM)



How to get to UNIST



By airplane
From Ulsan airport ,
it will take for 40 min by Taxi.

By train
From KTX Ulsan station,
it will take for 15 min by Taxi.

By Car
Gyeongbu expressway ▶ Eonjang IC
▶ Highway No. 24 toward Ulsan ▶ UNIST