Collaborating with Industry Partners for 10 Years

UHN's biophotonics group has 10 years of experience teaming up with firms from a range of industries. Our projects include more than 40 industrial collaborations, ranging from long-term research projects to short-term fee-for-service contracts. Through support from Photonics Research Ontario (part of the Ontario Centres of Excellence Program), we offer scientific and technical assistance to small- and medium-sized Ontario companies, as well as access to other experts in photonics science and engineering.

Taking Your Device from Concept to Reality

We can help you with early-stage testing of your concept and designing and developing your device. This includes pre-clinical and clinical trials that demonstrate your device's efficacy.

Providing Research Tools for New Therapies

We have developed non-invasive optical tools that provide data for regulatory approval, physiological effects, treatment efficacy, and pharmacokinetics monitoring for fast-track entry of new drugs. At the cellular level, advanced microscopy techniques and optical manipulation tools can extract genetic and proteomic information at the single cell level, providing new insights for molecular medicine.

"UHN's biophotonics program was instrumental in providing us with extensive research and development resources, which have enabled a small company like ours to grow competitively." —Yahia Gawad, MD, CEO, CardioGenics

"The biotonics group at UHN has the experience and skills to bring research from the lab to the clinic. Our collaboration with them has accelerated our progress in current clinical PDT trials." —John Trachtenberg, MD, Professor of Surgery, University of Toronto

University Health Network Biophotonics

Principal Investigators

Dr. Brian C. Wilson, Head, Medical Physics, Ontario Cancer Institute

Dr. Lothar Lilge, Scientist, Ontario Cancer Institute

Dr. Alex Vitkin, Scientist, Ontario Cancer Institute

Dr. James Lepock, Scientist, Ontario Cancer Institute

Biophotonics at UHN

Biophotonics is part of the Ontario Cancer Institute at the University Health Network. UHN is made up of Princess Margaret Hospital, Toronto General Hospital and Toronto Western Hospital, three teaching hospitals affiliated with the University of Toronto. Building on the strengths and reputation of each of our hospitals, UHN brings together the talent and resources needed to achieve global impact and provide exemplary patient care, research and education.

Contact Us

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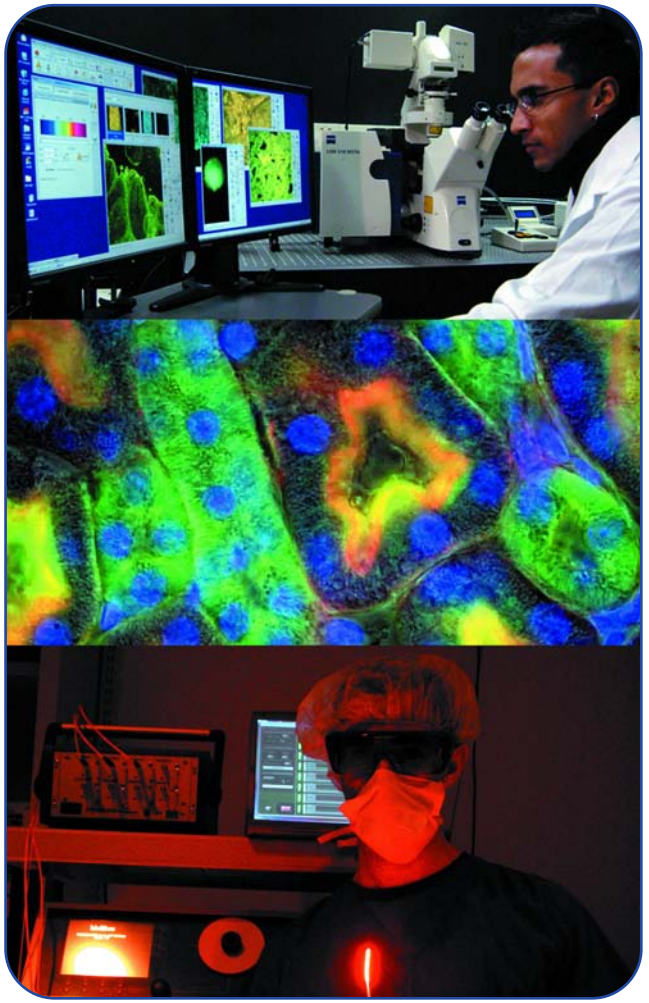
ONTARIO CENTRES of EXCELLENCE

University Health Network
Toronto General Hospital Toronto Western Hospital Princess Margaret Hospital

Biophotonics

Bringing Light to Life



University Health Network
Toronto General Hospital Toronto Western Hospital Princess Margaret Hospital

About UHN Biophotonics

Shedding New Light on Life Sciences

Biophotonics (the science and technology of light applied to the life sciences) is a growing area in biomedical research and clinical medicine as researchers look for less invasive ways to monitor, diagnose, and treat disease. Biophotonics has clear advantages as both a clinical tool for therapy and diagnostics and a research tool for in vitro and pre-clinical studies. It uses a non-invasive, non-contact, safe radiation that can easily be created, delivered and detected.

Partnering for Success in Biophotonics

University Health Network (UHN) is at the forefront of biophotonics R&D in Canada. We have a team of experts dedicated to exploring a wide range of light technologies, including imaging, microscopy, spectroscopy, fibre optics, and nanotechnology. Whether you are a company or a clinician, we can work with you to develop, test, and implement innovative biophotonics technology that will enhance your research or practice. Through our program, you have access to a full range of UHN capabilities.

Offering World-Class Facilities and Expertise

UHN's biophotonics facility is Canada's best and among the top five research facilities of its kind in the world. It comprises 2,500 sq.ft. of laboratories, more than $3M of equipment, and employs some of the world's best scientists in the field.

Our location in Canada's largest teaching hospital provides researchers with direct access to medical support and the country's top clinicians.

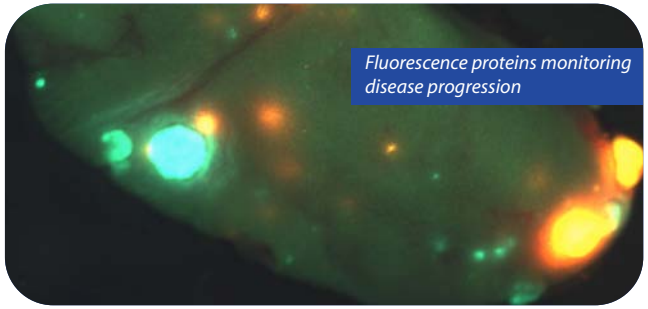
Comprising a Full Suite of Labs and Equipment

- Laser and optical instrumentation labs
- A dedicated advanced microscopy facility with confocal and 2-photon fluorescence
- An in vivo pre-clinical evaluation and operating suite
- A tissue handling and analysis lab
- A tissue culture and in vitro photobiology lab
- A device development and prototyping facility

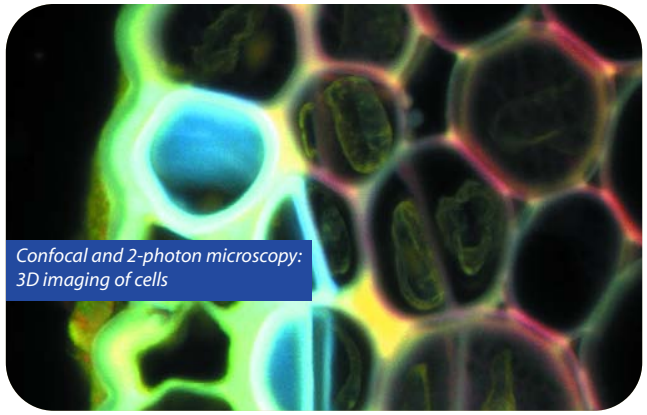
UHN Biophotonics Capabilities

Optical Imaging

- Advanced optical microscopy including confocal, 2-photon, epifluorescence, and MACROscopy
- Novel clinical imaging for diagnostics and surgical guidance, such as laser-induced fluorescence endoscopy and optical coherence tomography
- Small animal imaging including molecular imaging, fluorescence proteins and bioluminescence



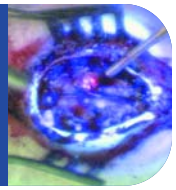
Fluorescence proteins monitoring disease progression



Confocal and 2-photon microscopy: 3D imaging of cells

Optical Diagnostics and Monitoring

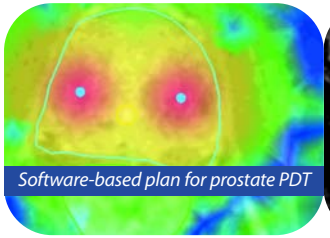
- Surgical guidance and disease detection using fluorescence imaging
- Near-IR and Raman spectroscopy for early cancer/disease detection and in vivo monitoring of analytes
- Trans-illumination spectroscopy for disease risk assessment
- Non-invasive monitoring of drug pharmacokinetics in vivo by diffuse reflectance and fluorescence spectroscopy



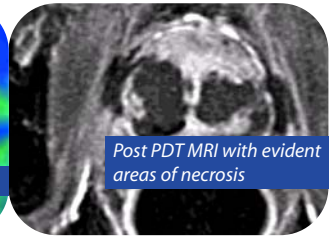
Fluorescence image-guided surgery of brain tumour in animal model: red fluorescence indicates tumour

Photodynamic Therapy (PDT)

- Light and drug dosimetry combined with software-based treatment planning for on-line treatment monitoring
- Clinical studies and partnerships with clinicians at Canada's largest cancer hospital
- Pre-clinical and cell culture studies on drug efficacy, uptake and tolerance
- Development of new PDT techniques and modalities including non-cancer indications such as age-related macular degeneration and infectious disease
- Other light-based therapies such as low-level laser and thermal therapies



Software-based plan for prostate PDT



Post PDT MRI with evident areas of necrosis

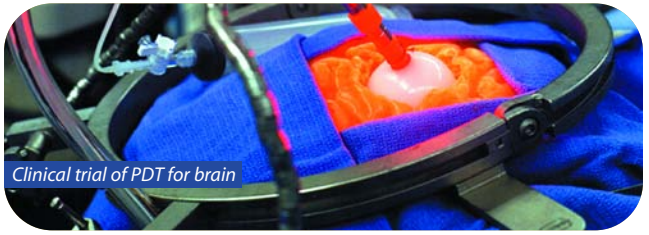
Device Development

- Facilities and expertise from proof-of-concept studies to assembly of machine-ready medical grade prototypes
- Optical, electronics and industrial/mechanical design
- Testing at in vitro, pre-clinical and clinical stages

Prototyping of point-of-care device for heart monitoring

Clinical Translation

- Clinical studies and partnerships with clinicians at several hospitals in Toronto, Canada, and internationally
- Device development and testing for clinical settings
- Translation of both diagnostic and therapeutic applications
- Experience with clinical trials in endoscopy and surgical applications



Clinical trial of PDT for brain