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New Research Breakthroughs at UHN

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Important New Stroke Finding: Main Source of Brain Damage Identified

Exciting new research conducted by a team of researchers led by TWRI/TWH's Dr. Michael Tymianski and UT's Dr. John MacDonald has provided a better understanding of how stroke causes brain damage.

Reported in *Cell*, the research shows that when brain cells are deprived of oxygen and nutrients—as in a stroke—an ion channel on the surface of brain cells (called TRMP7) is activated. This releases toxic molecules, which then kill other, healthy brain cells in the vicinity.

"Now that we know that TRMP7 is the culprit, we can focus on developing medications that will prevent these consequences and improve patient outcome," says Dr. Tymianski.
Cell. 2003 Dec 26; 115(7):863-877
[PubMed abstract]

Institute: TWRI/TWH
Division: Cell & Molecular Biology
Priority Platform: Genes, Proteins & People

Photodynamic Therapy: How Much is Enough?

New research from the lab of Dr. Brian Wilson (OCI/PMH) may help solve the problem of how to dose photodynamic therapy (PDT), an emerging treatment for cancer.

PDT is based on a drug that is activated by light. After application, the drug zeros in on cancer cells, accumulating there in large concentrations. When activated by laser light, the drug produces toxic molecules that destroy the cancer cells.

To determine exactly how much PDT is needed for effective treatment, Dr. Wilson and graduate student Mark Niedre took an approach never taken before. "Rather than measuring the amount of PDT administered to the cancer cells, we measured the concentration of toxic molecules produced," he explains. "We found that the number of cancer cells that were destroyed was proportional to the concentration of toxic molecules produced, a finding that suggests that this method could be used to measure PDT."

Dr. Wilson plans further studies to test the feasibility of using this non-invasive technique to optimize PDT treatments in a clinical setting.
Cancer Res. 2003 Nov 15; 63(22):7986-94
[PubMed abstract]

Institute: OCI/PMH
Division: Medical Physics
Priority Platform: Medical Technology Innovation

Engineered Brain Cells May Help Understand Brain Chemistry

Dr. Denise Belsham (TGRI/TGH) has developed a new tool that will help

scientists better understand how the brain controls things as basic as our weight, our energy level, and our mood.

The tool is a group of genetically engineered cells that models the hypothalamus—the area of the brain that regulates the genes associated with the most fundamental physiological processes including growth, reproduction, stress, and blood sugar regulation, to name a few.

"This is the first time we are able to represent the many types of hypothalamic brain cells as clonal model systems," explains Dr. Belsham. "This collection of cell lines allows us to study how different types of cells communicate and respond to hormones. Using these models, we can study the basic biology underlying disorders such as obesity and depression."
Endocrinology. 2004 Jan;145(1):393-400
[PubMed abstract]

Institute: TGRI/TGH
Division: Cell & Molecular Biology
Priority Platform: Genes, Proteins & People

Breaking News from UHN Research

OCI/PMH Researcher Appointed to the Order of Canada

UHN Research extends its congratulations to Dr. Alastair Cunningham (OCI/PMH) who was recently named an Officer of the Order of Canada.

Dr. Cunningham is a psycho-oncologist who is best-known for his book, *The Healing Journey.*

TGRI/TGH Scientist Wins Part of $4.6M Award

Congratulations to Dr. Daniel Drucker (TGRI/TGH) for winning one of ten *Freedom to Discover* grants. The grants are provided through a US program to advance human health through the support of basic and clinical scientific research. Dr. Drucker's award, worth US$500,000, was in the Metabolic Disease category, and will be used to support his research in diabetes.

Images adapted from image archives of Drs. Michael Tymianski and Denise Belsham, the NCI and RSS