The newly renovated Cell Restoration Laboratory will celebrate its official opening on February 19th, 2004. The Lab is dedicated to research and development investigating stem cell use in the repair and treatment of brain disorders and spinal cord injury.

Innovative research at the Cell Restoration Laboratory will focus on stem cell restoration strategies with special attention on adult sources. Stem cells are cells that have the ability to divide for indefinite periods of time and give rise to specialized cells which may replace those that die as a result of aging and disease of the central nervous system. Repairing neuronal circuitry in patients with disorders such as Parkinson’s disease, Huntington’s disease, multiple sclerosis, spinal cord injury, and optic nerve injury is the focus of cell restorative strategies. The newly expanded stem cell research facility includes state-of-the-art equipment for stem cell and animal behavioral testing systems and an electrophysiological imaging module.

Researchers at the Cell Restoration Laboratory will build on existing stem cell and molecular biology expertise and enhance the brain repair research cluster in Halifax and Atlantic Canada. The Laboratory complements the existing neural transplantation program, which is unique in Canada and one of only four worldwide. The investigators collaborate closely with laboratories across Canada, the U.S. and Europe in search of ways to improve cell survival, safely transplant cells into the brain and discover new types and sources of cells.

The Cell Restoration Laboratory is a cornerstone in the Stem Cells for Brain Repair Project, providing an integrated environment for multi-disciplinary work. ACCA’s Atlantic Innovation Fund grant of $2.1 million will increase research and development activity, facilitating new ideas, products, processes and services. Matching contributions of $1.1 million from the QEII Foundation’s Working Miracles Capital Campaign and $500,000 from the Dalhousie Medical Research Foundation were pivotal in leveraging AIF funding. The Laboratory is located in Dalhousie University’s Faculty of Medicine that has provided space for the Lab.

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The New Cell Restoration Laboratory

GRAND OPENING OF NEUROIMAGING LAB... SCIENTISTS ACCESS NEW RESEARCH FRONTIERS

It was standing room only at the Queen Elizabeth II Health Sciences Centre’s Royal Bank Theatre when local, provincial, and federal dignitaries and guests were on hand to celebrate the official opening of the Neuroimaging Research Laboratory. The Lab, which opened on Tuesday, December 5th represents a significant milestone for healthcare research in Atlantic Canada and around the globe.

Hosted by Mr. Don Font, CEO Capital Health, Premier Tom Travers, Dalhousie University, and Dr. Ivar Mendez, Chair of the Brain Repair Centre, the Lab was proudly unveiled in the presence of notables such as Lieutenant Governor, Myra Freeman, Premier John Hamm, the Honourable Robert Tridatu, federal government representative, the Honourable Angus MacKeen, Minister of Health, Minister Ernie Fage, Economic Development, and Dr. Iain Smith, Director-General, National Research Council Institute for Biodiagnostics (NRC-BIIO). As part of the ceremony, nearly 200 guests were welcomed with a virtual tour of the Laboratory.

The excitement by partners and supporters from business, government, and the health research community was manifested on numerous levels. For the Brain Repair Centre, the 4 Tesla Magnetic Imaging System (MRI) is the cornerstone of the Lab and represents unprecedented technology. One of a handful of the most powerful human imaging magnets in the world, this cutting-edge technology allows scientists the ability to study both structure and function of the human brain with levels of magnification never before available. It offers a unique capability to study ways in which disease affects the brain.

The 4 Tesla MRI provides Halifax with a unique ability to merge clinical tools. The magnet will be used in conjunction with electroencephalography (EEG). As well, the 4 Tesla MRI will soon be used in tandem with an Intraoperative MRI which will provide space for the Lab.

The Brain Repair Centre, the NRC Institute for Biodiagnostics and Industrial Research Assistance Program, and Dalhousie University spearheaded this initiative. The NRC provided $8.45 million for the MRI system, operating costs, and a team of researchers with world class expertise in functional magnetic resonance imaging. The Government of Nova Scotia invested $1.25 through the Department of Economic Development’s Opportunities for Prosperity Strategy.

The QEII Foundation contributed $150,000 toward construction costs, and Capital Health donated the land adjacent to the New Halifax Infirmary.

The partners attribute actualization of the Neuroimaging Research Lab to true collaboration. A critical mass of individuals have come together to focus on creation of an extraordinary environment, one in which clinicians and basic researchers work with a willingness to share which gives an exceptional competitive edge in research and innovation.

Economic spin-offs, attraction of top flight researchers, and the potential to find cures for the most devastating neurological diseases... Halifax has taken one step further as a world leader in neurological research and patient care.

“Neuroimaging Lab should be a source of pride for both the region and the rest of Canada. We now have the best minds working with the most innovative technology to research ways of curing formerly incurable brain disorders. The future is truly ours to chart.”

Dr. Ivar Mendez, Chair Brain Repair Centre

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Dr. Rob Brownstone is Associate Professor, Division of Neurosurgery, and Associate Professor, Department of Anatomy and Neurosciences at Dalhousie University where he was President of the Medical Student Research Scholars. He also serves as Adjunct Professor at the Department of Physiology, University of Manitoba. As medical staff Neurosurgeon at the QEII, Dr. Brownstone specializes in the treatment of patients with movement disorders, complex spine, surgical pain syndromes, and medically refractory epilepsy.

For over 20 years, Brownstone has investigated nervous system networks. In his Motor Control Lab, he studies motor neurons during activity such as walking. These are the cells of the spinal cord that control the muscles. All activity producing movement must converge on motor neurons in order to make movements contrapuntal. In spinal cord injury, many inputs to the spinal cord are lost because the brain is no longer connected to the spinal cord, yet we know that the network is still present. Understanding how the network operates, and discovering how to turn it on and off, and adjust it properly to produce movement is the basis of his work. Dr. Brownstone is a team work by postdoctoral students Jennifer Wilson from Scotland, Gardin Miles from New Zealand and Evgueni Blagoveshchenski, newly arrived from St. Petersburg, Russia.

Another aspect of his research, Brownstone and his team are using embryonic mouse stem cells to develop a strategy to replace dead motor neurons in disease such as amyotrophic lateral sclerosis (ALS or Lou Gehrig's disease). They have shown that embryonic stem cells, when manipulated with the right conditions, behave electrically like motor neurons and form connections that cause muscles to contract.

Dr. Brownstone was recruited from the University of Minnesota in 2000 and has served on the Scientific Advisory Committee of the BRC ever since. He recalls being whisked off to his first meeting “about three minutes after I stepped off the plane in Halifax”. The BRC’s successful acquisition of funds has enabled development of various new laboratories. One of these is the Neurobiological Signals Lab, which is dedicated to the investigation of synapse and interneuronal functioning of the brain. Under the direction of Dr. Brownstone and Dr Steven Barnes, Professor, Departments of Physiology & Biophysics and Ophthalmology at Dalhousie University, new strategies will be developed to visualize activity of cells, such as those transplanted in animal models of various diseases. With $1.1M of support from the QEII Foundation’s Working Miracles Capital Campaign, this Lab will soon house a highly sophisticated multiphoton laser scanning microscope. This will allow scientists to study neural signaling within living cells at the highest possible resolution, providing investigators with the ability to visualize how well newly transplanted nerve cells are integrating with a host nervous system. This will greatly enhance potential new treatment paths for patients suffering from neurological disease.

Time is an elusive commodity to Brownstone who is clinician, basic scientist, husband and father to four young children. He understands well that many of our greatest human discoveries have come from basic science, and is quick to credit Dr. Robert Stone, Head of Surgery at the QEII and Dr. Ivar Mendez with new strategies will be developed to visualize the activity of cells, such as those transplanted in animal models of various diseases.

Rusak sees the potential for development of intellectual property in drugs, procedures and tools as an important aspect of the BRC. His hope for the future of the BRC is to see it well funded, as success will breed coherent and maintain a strong scientific profile. He also hopes that politicians and the community at large gain an appreciation for the high standing of the scientists currently involved in the BRC nationally and internationally. This can have an enormous impact on the region’s economy and potential benefits to the quality of health care that people receive.

If you ask Dr. Benjamin Rusak the best method of assuring your 40 winks of sleep, he may suggest that you place a cozy sofa in the corner of your office and permit a ten-minute afternoon nap into your daily agenda. Sound advice from an expert? Well, expect he is: Dr. Rusak, heavily steeped in responsibility, currently holds appointments across three departments at Dalhousie University. He is Director of Research in the Department of Psychiatry, Professor of Psychology, Professor of Pharmacology, and Director, Chronobiology and Sleep Program at the QEII. He also carries the temporary assignment of Assistant Dean of Research, Faculty of Medicine.

His research interests are plentiful, but for over 30 years, Dr. Rusak’s principal focus has been on basic and applied research on circadian systems in humans and animals. “Our internal time is a fascinating piece of our biology that most people pay no attention to…a single circadian clock housed in our brain interacts with a number of downstream systems to drive most of our overt rhythms.” He studies sleep and its relationship to psychiatric illness, depression, human memory, performance issues, and shift work. Key to his work is human functional brain imaging. “State of the art neuroimaging technology already has such wide application to the motor and sensory systems. It will offer huge new opportunities for resolution of human circadian issues”.

As a member of its Scientific Advisory Committee, Dr. Rusak has been a key figure in laying the groundwork for the Brain Repair Centre. He has brought a micro level perspective and his organizational skills have facilitated the merging of diverse streams of research activity into a coherent model that shows how the brain and behavior intersect. Rusak agrees with others that one of the most striking, real strengths of the BRC is its capacity to build interdisciplinary teams of neuroscience clinicians and basic scientists. “This is a terrific benefit. I am not sure that it is happening to this degree anywhere else.”

The rare time that Dr. Rusak is not at work or catching up on his own good night’s sleep, you can be sure to find him relaxing with his wife Gail Eskes, sons Jasse and David, or in a stolen moment with his headphones.

Dr. Mark McLeod

Computer workstations in the room will be available for internet access on disease-related information. This room is also equipped with the latest in videoconferencing and voice conferencing, and robotic telemedicine to anywhere in the world. The computers have been generously donated by Medtronic Canada.

The Resource Centre is one aspect of the Barbara Newman Teleconference and Patient Resource Centre. The Barbara Newman Teleconference and Patient Resource Centre is the latest in providing information to patients, their families, and to medical and nursing staff. The room provides a pleasant atmosphere where patients can meet with doctors and nurses to discuss and better understand their disease.