Neuroscience at Memorial University
Faculty of Medicine

Dr. Karen Mearow
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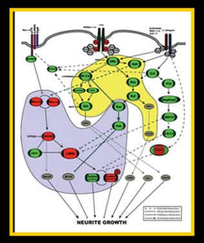
MEAROW Lab



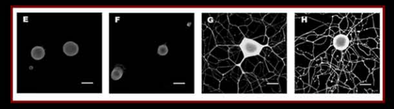
Major Research Interests:

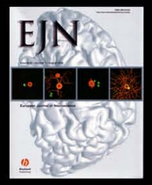
⇒ Regulation of neuronal survival and axonal regeneration in the nervous system and processes regulating the regrowth of damaged axons

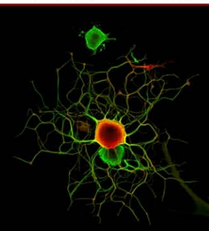
Our major research project aims to characterize how signals from neuronal growth factors interact with signaling from the cell's microenvironment to promote optimal axonal growth and regeneration. Cooperation of these factors is necessary to provide for optimal neuron regeneration.

The nervous system has evolved adaptive responses to insults that are potentially lethal to neurons such as oxidative stress, heat shock, growth factor withdrawal, or amyloid toxicity. We are interested in elucidating the role of an inducible molecule, *heat shock protein 27*, in protecting neurons from these stresses as well as its potential role in stabilizing the neuronal cytoskeleton.

Our research aims to provide a better understanding of how the nervous system can be repaired after injury or disease (including neural trauma, diabetes, Alzheimer's disease)







The Neuroscience Program is home to 7 active research labs

Learning & Memory
Stroke
Alcohol Damage
Addictions
Neural Regeneration
Obesity
Neurogenesis

CORBETT Lab

Dr. Dale Corbett
Professor of Neuroscience
Canada Research Chair in Stroke and Neuroplasticity
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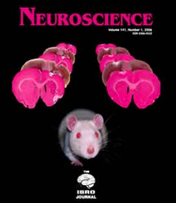
Major Research Interests:

⇒ Promoting recovery of function after stroke using novel treatments (e.g. environmental rehabilitation, mobilization of endogenous stem cells (neurogenesis), and transplantation of stem cells) and understanding mechanisms of brain injury and repair



Our functional recovery studies encompass motor, cognitive and emotional dysfunction after stroke.

To better understand neuronal injury we look at the processes that influence stroke-induced cell death (e.g. inflammation); intrinsic brain repair processes; dietary influences on stroke outcome, and the relationship between aging, exercise and cognitive impairment.

The brain has considerable innate capacity for self-repair. We examine the detrimental effects of stress on neuronal rewiring (neuroplasticity) and hormonal involvement in plastic changes during recovery.

Our research aims to translate clinically relevant therapies validated in the laboratory into clinical practice to improve patient quality of life.

VANDERLUIT Lab

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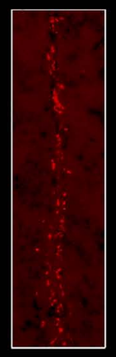
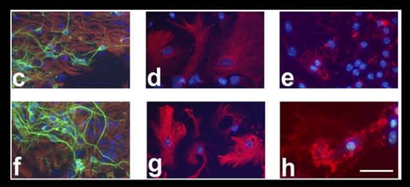


Major Research Interests:

⇒ Stem cells and neurogenesis in the developing and adult mammalian brain

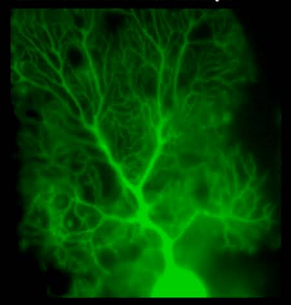
Neural stem cells generate the building blocks of the brain. The discovery of stem cells in the adult mammalian brain has directed research towards stem cell based regeneration strategies. Since neural stem cell numbers are maintained by a balance between cell division and cell death, I propose that promoting neural stem cell survival represents an alternative strategy to transplantation.

The goal of my research is to identify the genes that regulate neural stem cell survival and death, and to manipulate survival-promoting factors to expand the neural precursor population and promote regeneration. This is essential for understanding the role and therapeutic potential of stem cells in developmental disorders, cancer and regeneration.



Above:
Using specific markers we can determine what type of cells stem cells mature into when they stop dividing. Furthermore, using gene manipulation techniques, we can identify which genes are required for stem cells to mature into neurons versus support cells (glia).

Below:
A Purkinje neuron in the cerebellum which has been filled with a fluorescent calcium indicator dye



Dr. John Weber
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Cross appointment: BioMedical Sciences
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WEBER Lab

Major Research Interests:

⇒ Neuroprotection from pathologies that affect a region of the brain involved with motor learning and coordination, the cerebellum

Electrical properties of specialized cells in the cerebellum, Purkinje cells, are affected by brain injury such as trauma or stroke, and alcohol consumption.

We use cell recordings and tests of motor coordination to examine long-term effects on cell survival and function, as well as test the ability of natural substances to protect cells from injury and the natural aging process, such as antioxidants from berries.