

PRESS RELEASE

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Major breakthrough in the mechanism of myelin formation, the nerve component affected in multiple sclerosis and peripheral neuropathies

Montréal, November 2, 2006 -- The group of Dr. Michel Cayouette, researcher at Institut de recherches cliniques de Montréal (IRCM), and Dr. Jonah Chan, collaborator at the University of Southern California, will publish in the next issue of the prestigious scientific journal *Science*, the results of their study that could have a major impact on the treatment of diseases such as multiple sclerosis, and peripheral neuropathies.

At a basic level, our nervous system is like a collection of wires that transmit electrical signals encoding our thoughts, feelings, and actions, both conscious and unconscious. The connections in our brain are formed by neurons that extend to each other and to muscles long wires called axons. Just as an electrical wire needs insulation, our axons require an insulating sheath (myelin) that helps to propagate the electrical signal and maximize the efficiency and velocity of these signals in our brain and body. It is this property (myelination) that facilitates the long-distance communication in our nervous system across junctions called synapses, such that a thought can result in the movement of a finger or a toe. Diseases and injury that compromise the integrity of myelin such as multiple sclerosis, or peripheral neuropathies, have dramatic consequences like paralysis, uncoordinated movements, and neuropathic pain. The discovery reported in this study sheds light on the mechanisms that control how myelin is formed during development of the nerves. The article, which will be published in the November 3rd issue of *Science*, constitutes an important step forward in our understanding of the process of myelination, and opens the way to new research in this field.

More specifically, the study showed that a protein called Par-3 is at the base of the myelination process. This protein becomes localized to one side of the myelin-forming cells called Schwann cell, upon contact with the axon that is to be myelinated. Par-3 acts as a sort of molecular scaffold to set-up an "organizing centre", which brings together key proteins essential for myelination, in particular a receptor for a molecule secreted by the neurons. The scientists found that when they disrupted this organizing centre, cells could not form myelin normally. Importantly, their discovery demonstrates that Schwann cells need to become polarized so that they know which side of the cell is in contact with the axon so that they can initiate wrapping and bring essential molecules to this critical interface. These studies open the way to new research, which should help to identify other components that are recruited at the organizing centre

set-up by Par-3. Importantly, in conditions such as multiple sclerosis or after injury, it is believed that Schwann cells could be used to re-myelinate axons. But so far this approach has proved to be relatively inefficient. Therefore, these experiments bring about the possibility that manipulating the Par-3 pathway in Schwann cells might allow for more efficient re-myelination of damaged or diseased nerves.

The article can be accessed at www.sciencemag.org

Dr. Michel Cayouette is Director of the Cellular Neurobiology Research Unit at the Institut de recherches cliniques de Montréal (IRCM). His work is supported by grants from the Canadian Institutes of Health Research (CIHR) and the Foundation Fighting Blindness - Canada. Dr. Cayouette is also professor at the Université de Montréal.

The IRCM (www.ircm.qc.ca) is recognized as one of Canada's top-performing research centre. Its mission is to bring the benefits of research to the patient, promote disease prevention, and train the next generation of front-rank scientists. The IRCM, which is affiliated with the Université de Montréal, currently houses 37 research units and employs nearly 450 people.

- 30 -

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