# Multiple sclerosis research charges ahead with new mouse model of disease

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A new study highlights the role of a charge-switching enzyme in nervous system deficits characteristic of multiple sclerosis and other related neurological illness.

Multiple sclerosis (MS) is one of several diseases in which myelin – the insulator for electrical signaling in the nervous system – breaks down and causes severe deficits in brain and nerve function. Much like the rubber insulation on an electrical cord, myelin surrounds long projections from the body of a neuron, and allows signals to travel down the cell with speed and efficiency. Patients with MS and other "de-myelinating" diseases therefore suffer deficits in balance, coordination, and movement, as well as sensory disturbances, from the loss of this neuronal insulation.

A major research initiative in treating these diseases is identifying the molecular factors and changes that lead to myelin breakdown. In a new study published in *Disease Models & Mechanisms* (DMM), dmm.biologists.org, a team of Canadian researchers report on a new mouse model of disease which will help in understanding how demyelination occurs. Previous research had identified that an enzyme known as peptidylarginine deiminase 2, or PAD2, is increased in patients with MS, and that PAD2 switches a charge on a protein key to myelin stability. Therefore, Abdiwahab A. Musse and colleagues at the University of Guelph and the Hospital for Sick Children in Ontario created a genetically modified mouse expressing too much of an enzyme known as PAD2. They found that these mice had significant loss of

myelin, and also have behavioral deficits, such as abnormal movement, balance, and coordination.

Not only does this work present a new mouse model to study demyleinating disease, but it also stresses the importance of PAD in maintaining myelin integrity. Their work highlights PAD as a potential therapeutic target, as well as a potential marker for early detection of MS and other diseases characterized by a loss of myelin.

Source: The Company of Biologists