

Discovery could impact the treatment of autoimmune diseases

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The internationally-renowned scientific journal *Immunity*, from the Cell Press group, publishes online today, and will publish in its August 27 print issue, the results of a study conducted by a team of researchers led by Dr. André Veillette, Director of the Molecular Oncology research unit at the Institut de recherches cliniques de Montréal (IRCM). Their scientific breakthrough could have an impact on the treatment of multiple sclerosis and other autoimmune diseases, which affect tens of thousands of Canadians.

Dr. Veillette's team discovered the function of a protein located in [T cells](#), which are immune cells known as lymphocytes that play a central role in the protection against viruses and other microbial agents. They also take part in the development of certain diseases, including diabetes and [multiple sclerosis](#). The protein in question is the "phosphatase" PTP-PEST, an enzyme that removes phosphates from other proteins in the cell.

"By removing PTP-PEST from mouse T cells, we determined that this protein was required for repeated immune responses such as those occurring during vaccination," explains Dr. Dominique Davidson, a researcher in Dr. Veillette's laboratory and first author of the study.

"More particularly, we showed that PTP-PEST controls the activity of Pyk2, a molecule that stimulates the ability of cells to interact with one another and move within the body."

The researchers showed that, through this mechanism, PTP-PEST

stimulates the participation of T cells in an immune reaction. Once activated, T cells encourage other immune cells to join in an immune response, thereby explaining their pivotal role in this process. The team's results also show that the elimination of PTP-PEST in T cells can prevent certain [autoimmune diseases](#), at least in mice. This suggests that suppressing the function of PTP-PEST through medication could be of value for the treatment of some human diseases.

"The removal of PTP-PEST can unfortunately prevent immunization and weaken the response to a vaccine," concludes Dr. Veillette. "Fortunately, it can also prevent overactive immune responses and could eventually help treat autoimmune diseases. It's like a double-edged sword."

According to the Multiple Sclerosis (MS) Society of Canada, MS is the most common neurological disease affecting young Canadians. Canada is known as having one of the highest prevalence rates of multiple sclerosis in the world, with an estimated 55,000 to 75,000 Canadians living with multiple sclerosis. The MS Society estimates that approximately 1,000 new cases of MS are diagnosed in the country each year, which means three Canadians are diagnosed with the disease every day.

This research project was funded by the Canadian Institutes of Health Research (CIHR). "This new discovery regarding the immune regulatory properties of PTP-PEST may have profound implications for the treatment of MS and other autoimmune disorders," says Dr. Judith Bray, Assistant Director of the CIHR Institute of Infection and Immunity. "Current therapies for MS that target the [immune](#) system are general and can have significant adverse side effects, so clearly more specific, targeted therapies are needed. This is one of the reasons that CIHR has heavily invested in Clinical Autoimmunity research, in an effort to understand the mechanisms that cause autoimmune disorders and develop more effective treatments for them."

Provided by Institut de recherches cliniques de Montreal

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