



**INSTITUT DE  
CARDIOLOGIE  
DE MONTRÉAL**

**APPLIÉE A**  
Université   
de Montréal

Contact information: Johanne Carrier  
Communications Consultant  
Montreal Heart Institute  
(514) 591-0502 (cell.)  
(514) 751-9983 (pager)  
[jccom@videotron.net](mailto:jccom@videotron.net)

## **PRESS RELEASE**

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### **SCIENTISTS FIND MAJOR SUSCEPTIBILITY GENES FOR MULTIPLE SCLEROSIS**

**Discoveries reveal new genetic risk factors for the millions of people  
with multiple sclerosis**

**Montreal, July 30, 2007** – A large-scale genomic study has uncovered new genetic variations associated with multiple sclerosis (MS); findings that suggest a possible link between MS and other autoimmune diseases. The study, led by an international consortium of clinical scientists and genomics experts, is the first comprehensive study investigating the genetic basis of MS. These findings appear in the July 29 online edition of the New England Journal of Medicine.

MS, a disease of the central nervous system whose symptoms range from mild muscle weakness to partial or complete paralysis, is widely considered an autoimmune disease, one that arises from a combination of genetic and environmental factors. This collusion of events leads the body to attack and destroy the insulation along nerve fibers. This study, which analyzed genomic information from 12,360 people, confirmed that immune system genes are altered in people diagnosed with MS, and pointed to potential mechanisms of the disease.

The researchers gathered 931 sets of DNA samples from MS patients and their parents. They analyzed approximately 500,000 single nucleotide polymorphisms (SNPs), that is, small differences in DNA sequence that represent the most common genetic variations between individuals, and looked for variations that were more commonly inherited by people with MS compared to samples from people without the disease. To double-check the findings, they performed a second analysis of other sets of families, individual cases of MS, and a control group. In the end, all the samples were combined for a final analysis of more than 12,000 subjects.

The only genetic link for MS previously identified using other techniques is in the major histocompatibility complex (MHC), a large cluster of genes responsible for many immune functions, including preventing the body's immune cells from attacking its own tissues. This analysis confirmed that link but went further to find other variants in genetic regions that are more common in people with MS.

One of the regions contains a gene called the IL-2 receptor, which has also been linked to two other autoimmune diseases; type 1 diabetes and autoimmune thyroid disease.

“Scientists are increasingly finding genetic links between immune-mediated diseases that affect different tissues in the body, including type one diabetes, Crohn's disease, psoriasis, and rheumatoid arthritis,” says Dr. John D. Rioux, PhD, Associate Professor of Medicine at the Montreal Heart Institute and the Université de Montréal, one of the study's authors. “This study will likely spur further research into the connection between these seemingly separate conditions.”

Another region harbors a gene called the IL-7 receptor, which helps to control the activity of a class of immune cells called regulatory T cells. Two papers appearing simultaneously in Nature Genetics confirm this finding, and explore how the change in the IL-7 receptor affects the immune system. “I believe that this receptor and its interaction with regulatory T cells will now become a major focus of research on MS,” says Stephen Hauser, professor of neurology at University of California San Francisco, and another author on the paper.

“One of the most encouraging outcomes of this current genomic study,” says David Hafler, the Jack, Sadie and David Breakstone professor neurology at Harvard Medical School and Brigham and Women's Hospital, “is that it is helping us to pin point genes that may elevate the risk of developing MS and other autoimmune diseases pointing the way to new areas of research and therapeutic targets to both treat and eventually prevent these diseases.”

“This study illustrates the power of collaboration”, added Dr. Rioux. “Individually, none of us could have completed a study of this scale and complexity. In an effort to see the work extended, we are now committed to making the entire data set available to MS researchers worldwide.”

This work was supported by grants from the US National Multiple Sclerosis Society, the U.S. National Institutes of Health, and the Penates Foundation.

A complete list of authors and their affiliations can be found below.

### **About Dr. John D. Rioux**

Dr. Rioux, PhD, is an Associate Professor of Medicine at the Université de Montréal and at the Montreal Heart Institute where he works as a researcher and director of the Laboratory in Genetics and Genomic Medicine of Inflammation ([www.inflammgen.org](http://www.inflammgen.org)), as well as visiting scientist at the Broad Institute of MIT and Harvard, and holder of the Canada Research Chair in Genetics and Genomic Medicine of Inflammation.

### **About the Montreal Heart Institute**

Founded in 1954, the Montreal Heart Institute is Canada's largest and oldest institution dedicated to research, education and clinical care of cardiovascular diseases. It is affiliated with the Université de Montréal and constantly aims for the highest standards of excellence through its leadership in prevention, ultra-specialized care, professional training, clinical and basic research, and development of new innovative treatments. The MHI Research Centre officially came into existence in 1976 and has made enormous strides since its creation. Today, there are approximately 500 employees, students and researchers at the MHI Research Centre. The MHI's outstanding feature is the balance it achieves between basic research, clinical research and clinical care. Its prime focus areas of research are vascular diseases, myocardial function and electrophysiology. Genomics (including pharmacogenomics), biomarkers and preventive cardiology are other areas of focus. To learn more about the Institute, please visit our website at [www.icm-mhi.org](http://www.icm-mhi.org).

### **About the Université de Montréal**

Deeply rooted in Montreal and dedicated to its international mission, the Université de Montréal is one of the top universities in the French-speaking world. Founded in 1878, the Université de Montréal today has 13 faculties and together with its two affiliated schools, HEC Montréal and École Polytechnique, constitutes the largest centre of higher education and research in Québec, the second largest in Canada, and one of the major centres in North America. It brings together 2,500 professors and researchers, accommodates more than 55,000 students, offers some 650 programs at all academic levels, and awards about 3,000 masters and doctorate diplomas each year.

## **Risk Alleles for Multiple Sclerosis Identified by a Genomewide Study**

The International Multiple Sclerosis Genetics Consortium\*

The authors are:

David A. Hafler, M.D., Alastair Compston, F.Med.Sci., Ph.D.,  
Stephen Sawcer, M.B.Ch.B., Ph.D., Eric  
S. Lander, Ph.D., Mark J. Daly, Ph.D.,  
Philip L. De Jager, M.D., Ph.D., Paul I.W.  
de Bakker, Ph.D., Stacey B. Gabriel, Ph.  
D., Daniel B. Mirel, Ph.D., Adrian J. Ivinson,  
Ph.D., Margaret A. Pericak-Vance,  
Ph.D., Simon G. Gregory, Ph.D., John D.  
Rioux, Ph.D., Jacob L. McCauley, Ph.D.,  
Jonathan L. Haines, Ph.D., Lisa F. Barcellos,  
Ph.D., Bruce Cree, M.D., Ph.D., Jorge  
R. Oksenberg, Ph.D., and Stephen L.  
Hauser, M.D.

The authors' affiliations are as follows:

the Division of Molecular Immunology, Center for Neurologic Diseases, Department of  
Neurology,  
Brigham and Women's Hospital, and Harvard Medical School, Boston (D.A.H., P.L.D.J.);  
Broad Institute of Harvard University and  
Massachusetts Institute of Technology, Cambridge, MA (D.A.H., E.S.L., M.J.D., P.L.D.J.,  
P.I.W.B., S.B.G., D.B.M., J.D.R.); Department  
of Clinical Neurosciences, Addenbrooke's Hospital, University of Cambridge School of  
Clinical Medicine, Cambridge, United Kingdom  
(A.C., S.S.); Massachusetts General Hospital, Harvard Medical School, Boston (M.J.D.,  
P.I.W.B.); Harvard Partners Center for Genetics  
and Genomics, Boston (P.L.D.J., P.I.W.B.); Harvard Center for Neurodegeneration and  
Repair, Harvard Medical School, Boston (A.J.I.);  
Duke University Medical Center, Durham, NC (M.A.P.-V., S.G.G.); University of Miami  
School of Medicine, Miami (M.A.P.-V.);  
Université de Montréal, Montreal Heart Institute, Montreal (J.D.R.);  
Center for Human Genetics Research, Vanderbilt University Medical  
Center, Nashville (J.L.M., J.L.H.); University of California at Berkeley, Berkeley (L.F.B.);  
and the University of California at San Francisco, San Francisco (L.F.B., B.C., J.R.O.,  
S.L.H.).