

The CIHR Institute

The CIHR Institute of Aging is helping older Canadians of today and tomorrow enjoy good health and quality of life by focusing on a wide range of conditions associated with aging. Led by Scientific Director Dr. Anne Martin-Matthews, the Institute and its stakeholders have identified cognitive impairment in aging as one of the Institute's five priority areas for research and are focusing on translating knowledge gained through research into better prevention and treatment. The Cognitive Impairment in Aging Partnership, of which the Institute of Aging is a founding member, brings together various organizations from different sectors to advance research in Alzheimer's disease and related dementias. The National Advisory Council on Aging, together with the Alzheimer Society of Canada, is spearheading efforts to catalyze a Canada-wide integrated approach to Alzheimer's disease and dementia management through which research-based evidence, best practices and technology can be applied to the prevention, treatment and care of people with Alzheimer's disease and related dementias.

About the Canadian Institutes of Health Research

The Canadian Institutes of Health Research is the Government of Canada's agency for health research. Its objective is to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system. Composed of 13 Institutes, CIHR provides leadership and support to close to 10,000 researchers and trainees in every province of Canada. For more information visit www.cihr-irsc.gc.ca

The Canadian Institutes of Health Research (CIHR) is the Government of Canada's agency for health research. Through CIHR, the Government of Canada invested approximately \$16.9 million in 2004-05 in research on Alzheimer's disease across Canada.

The facts

- Caring for people with Alzheimer's disease costs about \$5.5 billion each year in Canada.
- One in 20 Canadians over age 65 — and one in four over age 85 — is affected by Alzheimer's disease.
- Alzheimer's disease is the most common form of dementia, accounting for nearly 2/3, or 64%, of all dementias.
- In 2005 there will be an estimated 94,270 new cases of dementia; by 2011 new cases of dementia are expected to reach 111,560/year.
- Twice as many women as men have dementia.
- More than a quarter of a million Canadians (280,000) over 65 have Alzheimer's disease. By 2031, more than 750,000 Canadians are expected to have Alzheimer's disease and related dementias.
- Half of Canadians know someone with Alzheimer's disease and one quarter of Canadians have someone in their family with the disease.

Research finding solutions to Alzheimer's disease

- A discovery by two University of Alberta researchers offers the first opportunity to prevent or delay the progression of Alzheimer's disease by stopping the action of beta amyloid. Beta amyloid is an abnormal protein that is deposited in the brains of people with Alzheimer's disease. Drs. Jack Jhamandas and David MacTavish have found that a compound developed to prevent destruction of insulin-producing cells in diabetes is also effective in blocking the pathways through which beta amyloid destroys brain cells and improves the cells' chances of survival.
- A diet high in the Omega-3 fatty acid DHA, the unsaturated fat found in cold-water fish such as salmon, halibut and sardines, can protect the brain from memory loss and cell damage caused by Alzheimer's disease, according to research by Université Laval's Dr. Frederic Calon. Such a diet prevents damage to synapses, the chemical connections between brain cells that enable memory and learning. It could slow the progression of the disease or even lower the risk of developing it in the first place.
- Women with Alzheimer's disease show less loss in brain mass than men with the disease at the same stage of decline in mental function, according to research by Dr. Sandra Black of Sunnybrook and Women's College Health Sciences Centre. The study is the first to examine sex differences in the area of the brain believed to handle emotions and memory and investigators were surprised by their findings. Because women are more vulnerable to

Alzheimer's disease, they expected women to demonstrate greater brain atrophy than men. The study findings could have impacts on diagnosing and treating the disease.

- Dr. David Thomas of McGill University has discovered a mechanism whereby proteins with an incorrect structure are recognized in the cell. Such proteins are harmful to cells and are the basis of many degenerative diseases, including Alzheimer's disease. His work, conducted with colleague Dr. John Bergeron, is an important step toward the development of innovative ways to prevent and treat these diseases.
- Dr. Michael Hayden of the University of British Columbia, working with Dr. Alaa El-Husseini of the province's brain research centre, has discovered an enzyme called HIP14 in mammals that plays a key role in transporting proteins within cells. This opens up new avenues to understanding the function of nerve cells and new approaches to therapy for degenerative diseases such as Alzheimer's disease. They discovered that, in the absence of this enzyme, proteins are not transported to locations in the cell where they are needed. They believe that this results in cell dysfunction and may be a mechanism underlying Alzheimer's disease.

In the pipeline ... Vascular health and dementia

The links between the health of blood vessels – vascular health – and stroke are well known. There is growing evidence, however, that vascular risk factors such as diabetes and high blood pressure may also predict the onset, severity and progression of Alzheimer's disease. CIHR's Institute of Aging is partnering with the Heart and Stroke Foundation of Canada and the Alzheimer Society of Canada to explore the interrelationships among vascular health, vascular dementia and Alzheimer's disease.

Four researchers are receiving funding under this initiative, including Dr. Sylvie Belleville of the Institut universitaire de gériatrie de Montréal. Dr. Belleville is investigating the similarities between vascular dementia and Alzheimer's disease, following the progress of patients with both diseases over time. She will also focus on patients with mild cognitive impairment, half of whom will go on to develop Alzheimer's disease, to examine cognitive decline in this important group of patients. Finally, Dr. Belleville will measure the impact of vascular health on the cognitive functioning of patients both with and without dementia, to gain a clearer understanding of the relationship between vascular dementia and Alzheimer's disease. Her work will lead to a greater understanding of the important links between vascular health and dementia.

The researchers ... Dr. Serge Gauthier: Leading the fight against Alzheimer's disease

In the early 1970s, Dr. Serge Gauthier watched a 33-year-old nurse at Montreal's Royal Victoria Hospital gradually lose her memory from Alzheimer's disease. Ever since then, he has been trying to prevent others from suffering her fate.

Today, Dr. Gauthier is one of the top Alzheimer's researchers in the world and holds a CIHR/Rx&D Research Chair in the area at McGill University.

Currently his research focuses on assessing the probability of developing Alzheimer's disease, and on preventive techniques that have been shown to reduce the chances of developing the disease, including exercise, smoking cessation and reducing blood pressure. He is also involved in an international clinical trial of a promising new drug that may stop the progression of Alzheimer's disease by stimulating brain repair proteins and in another trial assessing the ability of cholesterol-lowering drugs, called statins, to slow the progression of the disease.

Training the next generation of Alzheimer's disease researchers is another passion for Dr. Gauthier. Through his Research Chair at McGill, he has overseen the work of more than 60 students, encouraging them to undertake multidisciplinary research and to focus on the links between the bench and the bedside.

"I think it's absolutely essential," he says, "for researchers in Canada to meet the people whose diseases they are working on."

His other major focus is knowledge translation – making sure that knowledge created through research translates into better care for patients. As co-chair of the Canadian Consensus Conference on Dementia, he has spearheaded the development of clinical practice guidelines for primary care physicians to recognize, assess and manage Alzheimer's disease and other dementias. He is drafting a textbook for managing Alzheimer's disease for use by physicians and researchers, as well as a book on Alzheimer's disease research for lay people.

"I think I've helped families," Dr. Gauthier says of his research efforts so far. "There is an art to the practice of medicine, and in treating those who suffer from dementia and the loved ones who suffer alongside."