CIHR IRSC

Obesity

The CIHR Institute

Obesity is not rocket science, says Dr. Diane Finegood, Scientific Director of CIHR's Institute of Nutrition, Metabolism and Diabetes — it's more complex. That's why, after extensive consultation with stakeholders, the Institute declared its primary priority to be the growing problem of obesity and the maintenance of a healthy body weight, an issue that cuts across all areas of its mandate. The Institute of Nutrition, Metabolism and Diabetes is mandated to support research to enhance health in relation to diet, digestion, excretion and metabolism. It is developing a new partnership, with the Centre de prevention de l'obésité de la Fondation Lucie et André Chagnon, focusing on childhood obesity.

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 $15.6 million in 2004-05 in research on obesity across Canada.

The facts

- In 2004, 23% of Canadian adults were considered obese, with a body mass index (BMI) of more than 30, compared to just 14% in 1978. One in four seniors over the age of 75 was obese.
- One-quarter of Canadians who were overweight in 1994-95 had become obese by 2002-03; only 10% had returned to a healthy weight.
- Deaths attributable to complications of overweight and obesity nearly doubled between 1985 and 2000.
- In 2004, 18% of children aged 2-17 were overweight and 8% were obese – accounting for more than one quarter of all children.
- Obesity is a risk factor for heart disease, stroke, type 2 diabetes, fatty liver, gallbladder disease and some forms of cancer. It has also been associated with hypertension (high blood pressure), reproductive problems and sleep disorders such as sleep apnea.
- The direct health costs of obesity, including hospital care, physician services and drugs, were estimated to be more than $1.8 billion in 1997, or 2.4% of total health care expenditures for all diseases in that year.
- The World Health Organization has identified obesity as the major neglected public health issue.

Research finding solutions to obesity

- It's easier to breathe when you're not carrying excess weight, according to research conducted by Dr. Shawn Aaron, a CIHR-funded researcher at the University of Ottawa. After six months on a strict weight-reduction program, 58 obese women lost an average of 44 pounds and their lung function improved significantly. According to Dr. Aaron, being obese is like carrying a 20kg weight on the chest; the chest wall can't expand and the muscles have to work harder.
- Adolescents in Canada aged 10-16 rank fifth in the world in terms of being overweight and fourth in terms of obesity, according to an international study sponsored by the World Health Organization and involving 34 countries. CIHR-supported researcher Dr. Ian Janssen of Queen's University, who conducted the Canadian arm of the survey, says that, even though Canadian adolescents are among the most physically active, placing third overall, fewer than 20% meet Canada's physical activity guidelines.
- Children whose mothers smoked while they were pregnant are more likely to be obese, according to CIHR-funded researcher Dr. Alison Holloway of McMaster University. Dr. Holloway and her team studied rat offspring until 26 weeks of age; their findings provide new insight into the mechanisms underlying the increased prevalence of obesity among children exposed to cigarette smoke *in utero*.

- Lifestyle plays a role in developing diabetes — but so do biomedical processes. Dr. Timothy Kieffer of the University of British Columbia has received support from CIHR for his research leading to the discovery of links between leptin (a hormone that affects how the body manages and stores fat), insulin-producing beta cells in the pancreas, and the liver, one of insulin's main targets. Dr. Kieffer believes that there may be a defect in the interactions among leptin, fat and beta cells, and is exploring this possibility further in the hopes of developing a treatment to prevent obesity and one of its most frequent complications, type 2 diabetes.

- Fast food servings are getting bigger, and so are clothing sizes, according to research by Dr. Laurette Dubé, a marketing professor at McGill University who has received CIHR support to explore the links between marketing and obesity. She has found that marketing strategies — including "super-sizing" fast food and making clothes bigger but labeling them in a smaller size — are encouraging consumers to eat more. She suggests that marketers can seek alternative ways to market products without encouraging over-consumption, while health promotion campaigns can borrow successful marketing tools and techniques to make healthy eating more enticing, especially to children.

- Overeating is about making choices and some people are better equipped to make healthy choices than others, according to CIHR-funded researcher Dr. Caroline Davis. Dr. Davis, from York University, found that women with poor decision-making skills, as measured by a computerized gambling task, have higher BMIs than other healthy adult women. Her findings suggest that processes in the brain that regulate the ability to reject short-term rewards when the long-term consequences are harmful may influence eating behaviour.

In the pipeline … Targeting obesity

Unravelling the mystery of obesity isn't a job for just one researcher. But Target Obesity is supporting the training of 14 new obesity researchers, each bringing a different perspective to bear on the issue. The Heart and Stroke Foundation, the Canadian Diabetes Association and five CIHR Institutes are partners in the initiative, which is devoting $1.4 million to supporting trainees investigating:

- chemicals in the brain that regulate food intake and body weight gain (Dr. Beth Tannenbaum, Montreal Neurological Institute);

- childhood predictors of adult obesity among Aboriginal youth (Dr. Kristal Anderson, University of Saskatchewan); and

- the genes involved in obesity (Dr. Mayumi Yoshioka, Université Laval).

The researchers … Dr. Louis Pérusse: Getting to the genetic roots of obesity

For more than 25 years, a group of French-Canadian families has been revealing the genetic secrets of obesity. And Dr. Louis Pérusse has been there from the start.

Since 1979, Dr. Pérusse has helped investigators with the Quebec Family Study (QFS) construct one of the world's first long-term databases of information for metabolic, nutritional and clinical research relating to obesity.

As an Associate Professor in the Department of Preventive Medicine at Université Laval, Dr. Pérusse is now the leader of the genetic component of the QFS. Over the years, his research has revealed how genes combine with lifestyle habits to contribute to obesity.

"The more we know about this combination," he says, "the more we'll be able to better treat obesity."

This spells hope in the continued worldwide fight against obesity and its consequences, including type 2 diabetes, cardiovascular disease, hypertension, stroke and certain forms of cancer.

More than 600 genes make up the human obesity gene map. Derived from the human genome, this map was updated in 2004 and reviews all markers, genes and mutations associated with obesity. Of those 600 genes, Dr. Pérusse has identified five to ten that may play a key role in an individual's susceptibility to obesity.

For example, a gene called plasminogen-activator inhibitor-1 (PAI1) may contribute to the amount of fat women gain during menopause. Those who have two copies of a mutated gene called Neuromedin beta may be twice as likely as others to experience feelings of hunger, making them more likely to overeat and to become obese.

An approach to obesity that focuses solely on lifestyle is wrong, says Dr. Pérusse — just as wrong as an approach focusing solely on genes. Understanding the complex relationship between the two could help to alleviate the worldwide burden of obesity.