

# LEADING GENOMICS RESEARCH

*in* AGRICULTURE

HEALTH

ENVIRONMENTAL STEWARDSHIP

GENOMICS & SOCIETY



**GenomePrairie**

ANNUAL REPORT 2007-2008

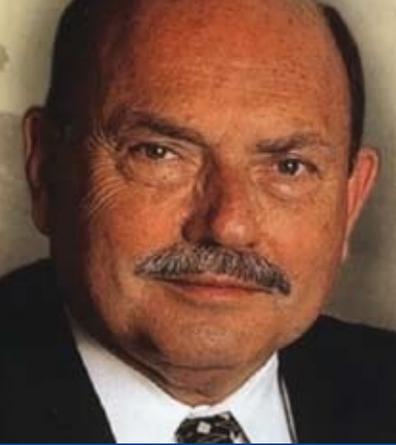


# UNRAVELLING THE CODE

EVERY LIVING ORGANISM COMPRISES A COMPLEX  
CASCADE OF MOLECULES CONSTANTLY INTERACTING  
WITH EACH OTHER.

Genes provide the code, or instructions, for constructing proteins such as enzymes and antibodies that carry out all biological processes. These processes consist of a chain of interactions whereby one gene regulates another and so on down the pathway, ultimately determining which cells or functions are turned on or off, and whether a cell or organism dies or survives.

Genome Prairie researchers strive to decipher the complex code of life. As a result of collaborations nationally and internationally, Canada's Prairie region is recognized for leading large-scale genomics research with applications in agriculture, health, genomics and society, and environmental stewardship.



## PROVIDING LEADERSHIP

As our Annual Report for 2007–2008 indicates, Genome Prairie continues to build on its strengths as a leader in genomics research related to agriculture, health, environmental stewardship, and the societal impacts of innovative genomics research applications.

With its expertise in project development and implementation, Genome Prairie has amply demonstrated its effectiveness as a vehicle for nurturing productive collaborations amongst academia, industry and government at regional, national and international levels.

Genome Prairie's success is the result of the work of many people: talented and productive scientists; outstanding managerial and support staff; and an accomplished, expert and supportive board of directors. Their collective, steadfast dedication to the mission and goals of the organization bode well for continued success in the future. Last, but by no means least, we acknowledge with sincere thanks the crucial support of federal and provincial governments and their respective agencies.

Dr. Arnold Naimark  
Chair

### GENOME PRAIRIE BOARD OF DIRECTORS 2007–2008

June Bold  
CEO, Saskatchewan Health  
Research Foundation

Gerald L. Brown  
Consultant

David Gauthier  
Regional Director, IRAP West,  
National Research Council  
Industrial Research Assistance  
Program

Martin Godbout  
President and CEO,  
Genome Canada

Murray McLaughlin  
President, McLaughlin  
Consultants Inc.

Lyle F. Merrell  
President and CEO,  
Cronus BioPharma Inc.

Arnold Naimark (Chair)  
Director, Centre for the  
Advancement of Medicine,  
University of Manitoba

Gordon Neish  
Director General, Bioproducts  
and Bioprocesses National  
Science Program, Agriculture  
and Agri-Food Canada

Ashley O'Sullivan  
President and CEO,  
Ag-West Bio Inc.

Ian Smith  
Director General, Institute for  
Biodiagnostics, National Research  
Council Canada

# GROWING STRONG

## *Genome Prairie Research Highlights*

- The identification of genetic markers for cold tolerance and other desirable traits is helping crop breeders incorporate these traits into new, hardier strains of wheat.
- Interactive web-based models assist farmers in determining the best crop varieties to sow based on more detailed weather predictions.
- With advanced gene-trapping technology, researchers are isolating disease-critical genes within cell lines to facilitate understanding of the interaction of genes with molecules, enzymes and proteins in mouse models.
- Genome Prairie research is helping to build an extensive mouse embryonic stem cell library that is available for biomedical research worldwide.
- Genome Prairie-funded researchers have demonstrated that the peptide IDR-1 selectively enhances the innate immune response in mouse models, protecting against a wide range of antibiotic-resistant pathogens.
- In collaboration with the Grand Challenges in Global Health initiative, the Bill & Melinda Gates Foundation, and the US Foundation for the National Institutes of Health, several novel synthetic peptides are being tested in mouse models for their protective effects and for their ability to assist in immune responses to whooping cough vaccines.
- Cerebral, a novel visualization software tool developed by Genome Prairie researchers, provides an interactive, intuitive interface for exploring biological pathways or systems.
- By knocking out genes involved in the synthesis of compounds that are indigestible or toxic to livestock and fish, researchers are adding value to canola crops.
- Using genomic and proteomic methods, researchers are working to reduce seed coat thickness to make canola meal more easily digestible by livestock and to increase the amount of oil in the seed.





## BUILDING PARTNERSHIPS

*This past year at Genome Prairie has been punctuated by many organizational and scientific highlights.*

In partnership with Genome Alberta, Genome BC and Western Economic Diversification, we have launched the creation of four genomic networks in sectors of strategic importance to the Prairie region. The networks will bring together scientists, industry, government, and producers to collectively identify research priorities and opportunities for knowledge transfer and technology commercialization. The areas of focus include crop research in flax and brassicas, vaccine development, and genomics and society. These networks will play an integral role in assisting Genome Prairie in the achievement of its mission.

Genome Prairie also supported its provincial governments and institutions in forging and growing international linkages, which will create important opportunities for research partnerships and commercialization. During the past year, relationships and agreements have been built in New Zealand, Australia, the Netherlands, India, Taiwan, the United Kingdom, and the United States. These efforts are beginning to bear fruit as Manitoba scientists, supported by the Manitoba government, have announced the launch of projects with their colleagues from Australia.

Genome Prairie extends its congratulations to the scientists from Manitoba and Saskatchewan who are turning investment in genomics research into valuable social and economic benefits. I would also like to take this opportunity to express my appreciation to the board of directors for their thoughtful guidance and enlightened advice. Finally, my heartfelt thanks go to all Genome Prairie staff for their hard work and professionalism in achieving our corporate goals and for their sincere and genuine commitment to our values.

Jerome Konecsni  
President

## GENOME PRAIRIE RESEARCH HAS GLOBAL BENEFITS

Genome Prairie provides leadership, support and management for large-scale genomics and proteomics research projects in Manitoba and Saskatchewan. In collaboration with national and international partners, Genome Prairie has supported more than \$120 million in research activity in plant, animal and human genomics, bioinformatics, instrumentation development, and bioethics.

Research projects in agriculture and human and animal health will help to produce more nutritious and weather-resistant food crops, more economical biofuels and innovative therapies to treat disease.

In 2007–2008, Genome Prairie researchers contributed twelve expressions of interest in the areas of human health, agriculture, environment, and social impact.

The \$24.9-million North American Mouse Mutagenesis project, co-led by Dr. Geoff Hicks of the University of Manitoba, is part of an international consortium working to understand the role of genetics in health and disease and to accelerate drug research.

The \$8.1-million Crop Adaptation Genomics project, led by Dr. Brian Fowler at the University of Saskatchewan, in collaboration with scientists from the USA, Sweden and the Czech Republic, is unlocking and harnessing the code for frost tolerance to improve future crop breeding programs.

Genome Prairie supports the \$17.1-million Pathogenomics of Innate Immunity project, led by Robert Hancock of the University of British Columbia. Researchers are working to harness the body's innate immune response in order to develop novel therapies to fight infection.

In the \$14.8-million project Designing Oilseeds for Tomorrow's Market, led by Randall Weselake of the University of Alberta, researchers are working to increase yields and nutrients in canola seeds and the meal used for feed.

Of particular importance in each project area, the GE<sup>3</sup>LS (genomics: ethics, environment, economics; law; and society) component examines the genomics research from an interdisciplinary social perspective.

Dr. Reno Pontarollo  
Chief Scientific Officer



### GENOME PRAIRIE STAFF

Jerome Konecni  
President and CEO

Dr. Reno Pontarollo  
Chief Scientific Officer

Patrick Pitka  
Chief Financial Officer

Carol Reynolds  
Director, Communications and  
Government Relations

Lisa Jategaonkar  
Director, Business Development

Colette Chantler  
Office Manager

Patricia Reid  
Accountant

Faye Pagdonsolan  
Branch Office Manager (Winnipeg)

Kristen Dube  
Administrative Assistant

Cindy Yungwirth  
Corporate Secretary

Dr. Carolyn Ashley  
Project Manager, North American  
Conditional Mouse Mutagenesis  
(NorCOMM) Project

Chris Barker  
Project Manager, Crop Adaptation  
Genomics Project

*“Genome Prairie’s support has helped Canada remain an important player in the international genomics field. It has increased our ability to train students and post-doctoral fellows and to develop international linkages.”*

Dr. Graham J. Scoles, Acting Dean,  
College of Agriculture and Bioresources,  
University of Saskatchewan



**CROP ADAPTATION GENOMICS: USING GENOMIC TOOLS FOR CROP IMPROVEMENT IN TEMPERATE CLIMATES**

**Led by:** Genome Prairie

**Project Leader:** Dr. Brian Fowler, Crop Development Centre, University of Saskatchewan

**Project Manager:** Chris Barker, Genome Prairie, Saskatoon

**Project Value:** \$8.1M

**Genome Canada Contribution:** \$4.1M

# HELPING FARMERS GROW BETTER CROPS

*Understanding the mechanisms behind cold tolerance in hardy grains such as rye can improve yields and value in wheat and other commercial cereals crops. It is also good for the environment.*

**Crop adaptation genomics** carried out by Genome Prairie-funded researchers will help traditional crop breeders incorporate traits from cold-hardy plants into new varieties of wheat and barley better adapted to Canada's short growing season. Improving frost tolerance of spring wheat by only one or two degrees could greatly reduce crop losses. Earlier planting also takes advantage of spring moisture, giving crops an edge on weeds and thereby requiring less herbicide.

Increasing cultivation of winter wheat provides multiple benefits:

- Improved cold tolerance in winter wheat would provide more opportunity for farmers to rotate crops and expand winter wheat production. Being able to plant winter wheat after peas, which provide poor stubble for snow trapping, would reduce winterkill risk. In addition, legumes provide residual nitrogen for the wheat, reducing fertilizer costs.
- The high yield potential of winter wheat is important to ethanol and feed industries.
- Increasing winter wheat acreage reduces spring runoff, preventing soil erosion and increasing soil moisture for crop production.
- Winter wheat fields provide a safe nesting place for upland birds and waterfowl.

**Marker-assisted selection** for cold tolerance in wheat will speed up the traditional crossbreeding process. Progress to date:

- Genome Prairie researchers have identified quantitative trait loci (QTL)—sections on the genome of different wheat and barley species where a desired trait is expressed. These genetic markers are used to combine desirable traits from one variety with good traits from another in breeding programs.
- These maps are continually being updated and refined to narrow down DNA marker sections and to tag other desirable traits.

**Through collaboration** with the US Department of Agriculture, Genome Prairie used the Affymetrix microarray facility at Santa Clara, California, to study the multiple gene expression patterns of winter, spring, hardy, and sensitive varieties of wheat. Messenger RNA from plants was also isolated and studied during their cold-acclimation period. The benefits of access to the Affymetrix facility are multifold:

- Project scientists have discovered that thousands of genes are expressed differently in cold-tolerant varieties versus cold-sensitive varieties of Norstar and Manitou wheat.
- Genetic characterization will be completed in June 2008, ahead of schedule.
- Ninety-six samples are being studied, versus 44 originally planned.

**An interactive website** was established to help farmers identify low-temperature response in varieties of wheat, rye, oats, barley, and triticale (rye-wheat cross). The project uses long-range weather models from Alberta, Saskatchewan, Manitoba, and the Czech Republic. By including data from outside of Canada, researchers have an increased understanding of how changing climate patterns could affect prairie farmers.

- Web-based models provide researchers with better estimates of crop survival and help farmers determine what crop varieties to plant based on historical weather data and projected climate change.

## *terms of reference* | GENE EXPRESSION

the process by which inheritable information from a gene, such as the DNA sequence, is made into a functional gene product, such as protein or RNA.

Photograph (opposite page, bottom left): winter wheat by Dr. Brian Fowler.

# ACCELERATING HEALTH RESEARCH

*The North American Conditional Mouse Mutagenesis (NorCOMM) project is a major international initiative to generate a freely available resource of mouse embryonic stem cells for studying the role of genetics in health and disease and facilitating therapeutic drug research.*

**Managed by Genome Prairie,** NorCOMM is Genome Canada's largest funded Competition III project—fostering collaborations among scientists in functional and molecular genetics from across Canada, the US, Europe, and around the world.

**NorCOMM researchers have expertise in two methods** of knocking out gene function: gene trapping, a process that randomly “traps” genes, and gene targeting, which “knocks out” function from specifically targeted genes. Mice bred from the resulting embryonic stem (ES) cell clones can be used to analyze the consequences of the loss of a gene's function.

This research is helping to build an extensive mouse ES cell library that is available for biomedical research worldwide. The mutant cell lines are used to produce mouse models that are lacking genes involved in a wide array of diseases, including cancer, neurodegenerative disorders and arthritis.

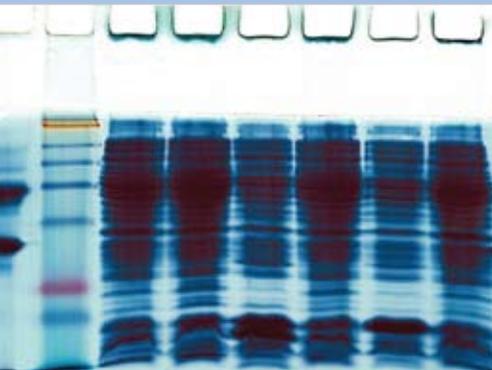
**When the project is complete,** NorCOMM will have made a significant contribution of trapped and targeted mouse ES cell lines to the international resource—providing virtually complete coverage of the estimated 23,000 genes in the mouse.

**A focal undertaking of NorCOMM** is targeting genes that have been requested by individual Canadian researchers and biotech companies. Researchers from across Canada can request specific genes to be targeted, based on their knowledge of which genes would have the greatest impact if a knockout mouse cell line or knockout mice were available. The NorCOMM project uses this information in setting priorities for gene targeting.

- The number of gene-trap cell lines produced by NorCOMM researchers to date—over 48,000—is expected to reach 70,000 by the end of the four-year project.
- In addition, NorCOMM will produce at least 500 gene-targeted ES cell lines to respond to requests for specific gene knockouts from Canadian researchers. Up to 100 of these targeted ES cell lines will be used to make knockout mice, and NorCOMM will carry out basic phenotypic characterization of these mice.
- Over the past year, Canadian gene trapping in the NorCOMM project was consolidated in two centres, Toronto and Winnipeg. Each centre uses different methods, and this diverse approach broadens and strengthens NorCOMM resources.
- The Canadian Mouse Mutant Repository (CMMR) in Toronto is now the centralized distribution centre for all ES cell line requests. This streamlines and standardizes response to requests from researchers around the world.
- NorCOMM has established an online Gene Submission Form through the following website: [www.NorCOMM.org](http://www.NorCOMM.org).

## WHY MOUSE MODELS?

The mouse is an important model organism in genetic research because the structure and function of its genes are very similar to those of humans. By “knocking out” the function of particular gene products in the mouse, researchers can determine the role of these genes.



## NORTH AMERICAN CONDITIONAL MOUSE MUTAGENESIS (NorCOMM)

**Managed by:** Genome Prairie

**Project Co-leader:** Dr. Geoff Hicks, Director, Mammalian Functional Genomics Centre, Manitoba Institute of Cell Biology, University of Manitoba

**Project Co-leader:** Dr. Janet Rossant, Chief of Research, Hospital for Sick Children, University of Toronto; Director, Centre for Modelling Human Disease (CMHD), Toronto

**Lead Project Manager:** Dr. Carolyn Ashley, Genome Prairie, Winnipeg

**Toronto Project Manager:** Dr. Lauryl Nutter, CMHD

**Project Value:** \$29.4M

**Genome Canada Contribution:** \$8.4M



*“With the opening of the Toronto Centre for Phenogenomics this year, we are entering the next phase of the NorCOMM project. The ability to examine mice for diseases that model the same diseases in humans is expected to significantly increase the rate at which we can translate research discoveries to applications for human health.”*

Dr. Geoff Hicks, Project Leader, NorCOMM, and Director,  
Mammalian Functional Genomics Centre, University of Manitoba

# RALLYING THE BODY'S DEFENCES

*Genome BC and Genome Prairie researchers are working to decipher the interplay of genes and proteins that are responsible for innate immunity. By harnessing the body's own defence mechanisms, they are working to develop novel therapeutics to fight infection.*

**The body's immune system** involves an elaborate molecular cascade to fight the daily onslaught of ubiquitous disease-causing microbes. However, the increase in diseases that cannot be treated with antibiotics, such as severe acute respiratory syndrome (SARS), avian flu and bovine spongiform encephalopathy (BSE), as well as increased resistance of some bacteria to antibiotics, are posing severe global health threats.

The goal of the Pathogenomics of Innate Immunity project is to understand the key genes and pathways involved in infection and innate immune responses, and to develop novel therapeutic approaches and alternatives to antibiotic-resistant pathogens. The international collaboration involves scientists and research institutes from Canada, Britain, Ireland, Singapore, and the US. The project has four main research components and goals:

**Mouse Mutagenesis**—to identify and knock out specific genes and pathways involved in immunity using mouse models.

**Gene knockdown in human and bovine cells**—to knock down, using small inhibitory RNAs, analogous genes and pathways in human and bovine cells to see if they respond similarly in humans and large animals. In gene knockdown, disruption of gene expression is usually temporary, versus the permanent effect of gene knockout.

**Bioinformatics**—to provide novel computing and software tools to assist in gene and peptide targeting, data analysis and further understanding the complex interplay of genes and proteins in the immune system.

**Peptide-based therapeutics**—to harness the body's innate immunity in fighting antibiotic-resistant disease.

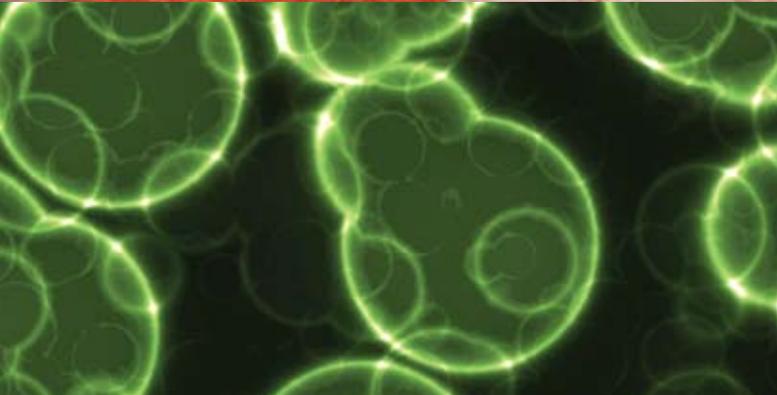
Over the past year, project researchers have made major inroads in all areas:

- Using *Salmonella* bacteria as the model microbe, they found that knockout mice deficient in selectin genes (products that recruit immune cells to the infection site) were more susceptible to infection.
- By examining the function of peptides (short-chain protein molecules) in cells and in animals, researchers demonstrated that the peptide IDR-1 selectively enhances the innate immune response in mouse models. Importantly, it protects against a wide range of antibiotic-resistant bacteria, including *Staphylococcus aureus*, *Enterococcus* and *Salmonella*.
- In collaboration with the Grand Challenges in Global Health initiative, the Bill & Melinda Gates Foundation, and the US Foundation for the National Institutes of Health, the group has discovered and patented several new synthetic peptides, which are being tested in mouse models for protective effects and for their ability to assist in immune responses to whooping cough vaccines.
- Project researchers developed Cerebral, a novel visualization software tool that provides an interactive, intuitive interface for exploring biological pathways or systems.



## terms of reference | MUTAGENESIS

the process whereby a chemical or physical agent is used to cause permanent genetic alterations in model organisms.



## THE PATHOGENOMICS OF INNATE IMMUNITY

**Led by:** Genome British Columbia

**Project Leader:** Dr. Robert Hancock, Director, Centre for Microbial Diseases and Immunity Research, University of British Columbia

**Supported by:** Genome Prairie

**Project Leader:** Dr. Lorne Babiuk and Dr. Andy Potter, Vaccine and Infectious Disease Organization (VIDO), University of Saskatchewan

**Project Manager:** Bernadette Mah, University of British Columbia

**Project Value:** \$17.1M

**Genome Canada Contribution:** \$8.5M

*“Genomics research is critical for the improvement of important Canadian crops and will have a positive economic impact for our country. Genome Prairie’s strong partnership with NRC-PBI will ensure that genomics research in crops such as canola, flax and pulses will continue to build a healthy advantage for Canada.”*

Dr. Wilf Keller, Acting Director General,  
National Research Council-Plant Biotechnology Institute



# BOOSTING THE VALUE OF CANOLA SEED

*Increasing the oil content of canola seed and enhancing the quality of canola meal to provide high-value animal feed encompasses another key area of Genome Prairie research.*

**The canola industry is a made-in-Canada success story**, contributing more than \$13 billion annually to the Canadian economy. Developed in the 1970s using traditional plant breeding techniques, canola oil is prized for its low level of saturated fats, balanced polyunsaturated and monounsaturated fats, versatility, and light taste.

While oil is the primary product of canola (*Brassica napus*), the meal left after crushing—which comprises 50 percent of the weight of the seed—is an increasingly important co-product. The high-protein meal has a huge potential market in the animal feed sector. The main research goal of this project is to maximize the value of canola by increasing the total value of the meal produced in the oil crushing process. Researchers are using genomics, proteomics and metabolomics techniques to:

- Understand the genetic basis of yellow-seeded canola types that are associated with higher seed oil yields and lower fibre in canola meal.
- Develop canola with fewer undesirable compounds by knocking out genes involved in various biochemical pathways. (For example, the metabolite glucosinolate is toxic to fish but fine for cattle feed. The metabolite sinapine creates a fishy odour in the eggs of brown egg-laying hens.)

- Reduce seed coat thickness by understanding and manipulating seed coat developmental genes, which will result in lower meal fibre and canola meal that is more easily digestible for monogastric livestock (swine and poultry).

Several milestones have been achieved to date:

- Twenty candidate genes related to the yellow-seeded phenotype have been identified for further characterization.
- More than 100,000 expressed sequence tags have been sequenced and submitted to GenBank.
- Genomic libraries and gene expression studies are nearing completion for the identification of genes and other genetic elements involved in seed coat cell wall formation.
- Functional characterization of 40 selected seed-quality genes are underway.

In a related project, Improving Brassica Oil Content (IBOC), researchers are investigating the genetic interplay between seed coat and the developing embryo in order to improve oil content in canola seeds.

## DESIGNING OILSEEDS FOR TOMORROW'S MARKET

**Led by:** Genome Alberta

**Project Leader:** Dr. Randall Weselake, Canada Research Chair in Agricultural Lipid Biotechnology, University of Alberta

**Supported by:** Genome Prairie

**Project Leader:** Dr. Gopalan Selvaraj, National Research Council—Plant Biotechnology Institute

**Project Manager:** Dr. Jeff Parker, Genome Alberta, Calgary

**Project Value:** \$14.8M

**Genome Canada Contribution:** \$6.8M



Photographs on pages 12–13 courtesy of Canola Council of Canada.



# GENOMICS AND SOCIETY

*GE<sup>3</sup>LS provides leadership in ethical, environmental, economic, legal, and social issues related to genomics in Canada.*

Translating world-class academic research into applications that maximize societal and clinical benefits is an area of research in itself—and integral to all Genome Canada-funded projects. As a result of GE<sup>3</sup>LS research, Canada is the only non-European nation besides Israel to be invited to join the European Research Area for Societal Aspects of Genomics.

Genome Prairie projects in genomics and society are investigating how the benefits of research can be applied to help the broadest community.

As part of the Pathogenomics of Innate Immunity project, the Translational Genomics (TG) study is investigating how academic researchers learn to translate the results of their work into practical applications for clinical health, societal, research, and economic benefits. The goal of the TG study is to understand how the training environment of young scientists affects how they translate their research for future applications.

In the NorCOMM project, researchers continue to examine the costs and benefits of global access to a public database of single-gene knockouts of mouse embryonic cells.

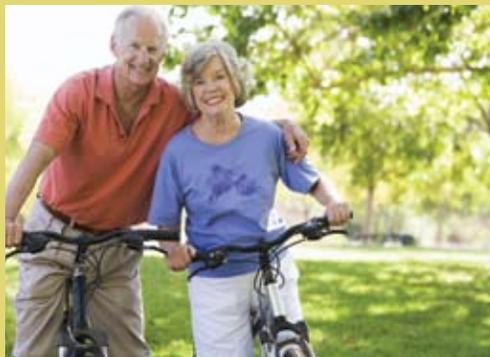
Researchers continue to work with growers' associations to examine market acceptability, environmental effects and socio-economic issues surrounding the development of genetically enhanced plants or seed crops with novel traits.

Other questions examined by GE<sup>3</sup>LS researchers across Canada include:

- The food versus fuel debate: should arable land be used to grow crops for biofuels?
- What are the dilemmas involved in developing personalized medicine (where a patient's genetic information is used to determine treatment)?
- Should organic farming include transgenic crops?
- What is the role of biotechnology in sustainable development?
- How do biomedical technologies challenge governance and bioethics?
- What issues do reproductive technologies pose to identity and parenthood?
- What are the ethical issues surrounding animal testing and genomics?

*“Genomics research is leading to the development of crops that are tolerant of frost, heat and drought, as well as resistant to plant diseases, thereby requiring fewer chemicals to grow in a healthy manner. These crops will also have unique traits for enhancing animal and human health, and for developing industrial bioproducts.”*

Dr. Joanne C. Keselman, Vice-President (Research), University of Manitoba



# EDUCATION AND OUTREACH

*Tomorrow's genomics researchers are today's students.*

Informing the public about genomics and ensuring that we have skilled scientists to advance future genomics research are important educational goals of Genome Prairie. Through exhibits, educational events and resource support, Genome Prairie aims to inspire passion in the next generation of scientific adventurers and encourage young people to consider careers in genomics research.

The Gee! in Genome Suitcase Exhibit is an interactive tool circulated to schools and educational events in Manitoba and Saskatchewan to raise awareness of the exciting world of genomics. The Genome "suitcase" (see photo below) was part of Canada's national Biotech Week held in Winnipeg last September. School groups and the general public were invited to scheduled events to learn how biotechnology is shaping the future.

Genome Prairie participated in Saskatchewan's Biotechnology Day at the University of Saskatchewan College of Agriculture and Bioresources in Saskatoon. More than 300 junior high school students took part in interactive activities sponsored by organizations that included SIAST, Agriculture in the Classroom, Sask Pork, and Ag-West Bio.

Sanofi-Aventis BioTalent Challenge (SABC) and Genome Prairie are pleased to provide the Genome

Prairie Awards for outstanding genomics projects to high school students in Manitoba and Saskatchewan. Genome Prairie is proud to join with other national and regional sponsors of the event, which provides cash awards in recognition of students with the top genomics projects.

Students in both senior and intermediate levels (grades seven to 12) are asked to design a biotechnology research project. For the selected projects, students are paired with a mentor in the scientific community who helps them carry out their research. Prizes are awarded based on the recommendations of judges from the scientific and education communities.

Genome Prairie sponsors various science fair events in Saskatchewan and Manitoba as part of our ongoing commitment to encouraging young people to pursue careers in genomics.

Photographs (below, left to right): Yale Michaels, winner of Genome Prairie SABC award for genomics, 2008; Ted Paranjothy, winner of SABC national and international award, 2007 (centre); children enjoying Genome Prairie's Gee! in Genome suitcase display at Biotechnology Day at the Forks, Winnipeg, 2007. Photograph (opposite page, left to right): Dr. Brian Fowler explains the Crop Adaptation project to Saskatchewan Members of Parliament Brad Trost and Lynne Yelich.

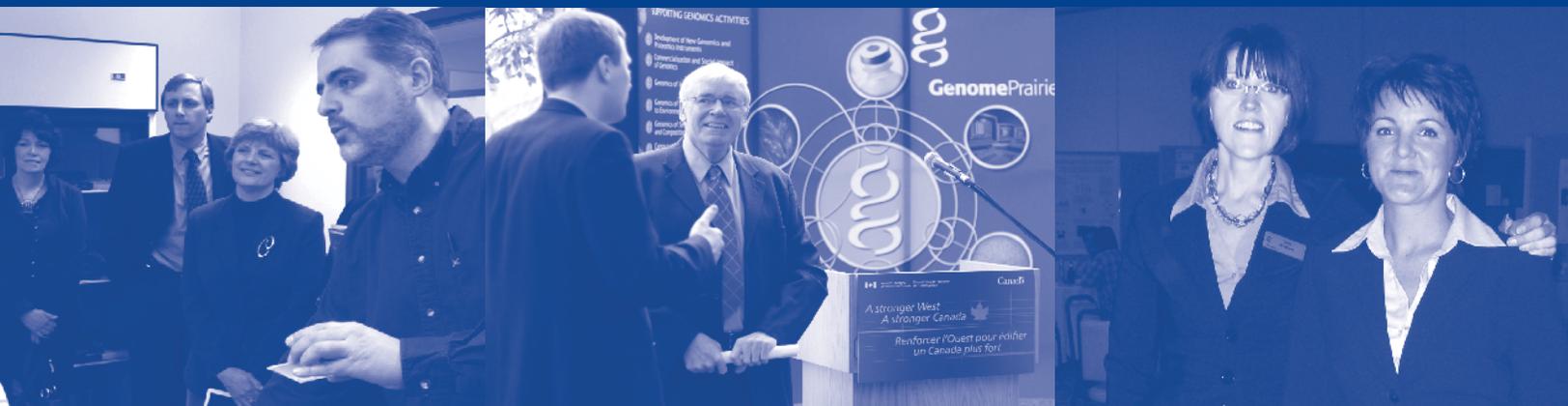




*“Genome Prairie’s annual support of the genomics awards in the Sanofi-Aventis BioTalent Challenge has encouraged aspiring young scientists from Saskatchewan to pursue science projects in the areas of genomics and proteomics. These students are the future leaders of research in our country, representing genomics projects in health, agriculture and environment.”*

Sue Brooks, Coordinator, Sanofi-Aventis  
BioTalent Challenge, Saskatoon Region

# BUILDING COLLABORATIONS



## Good ideas don't develop in a vacuum.

*In order for innovative research to be translated into applications and products that benefit society—good ideas need to be shared.*

A primary function of Genome Prairie is bringing partners together to bridge the gap between basic research and commercialization. Genome Prairie actively pursues collaborations through network building, communication, and outreach and interaction with stakeholders, government and other genome centres in Canada and around the world.

Photograph (this page): Dr. Geoff Hicks, Genome Prairie project leader. Photographs (opposite page from top, left to right): Jerome Konesci and Claudine Renauld; Jim Rondeau, Minister of Manitoba Science, Technology, Energy and Mines, Lyle Merrell, Genome Prairie Board Director, and Dawson Reimer, Life Sciences Association of Manitoba; Carol Reynolds, Genome Prairie Director of Communications and Government Relations with Australia's Commonwealth Scientific and Industrial Research Organization representative; MP Lynne Yelich with NRC-PBI researchers; MP Brad Trost; Klaus Fiebig, Ontario Genomics Institute (right); Jerome Konesci, John Clarkson, Deputy Minister of Manitoba Science, Technology, Energy and Mines, and Dr. Reno Pontarollo; Dr. Bill Greuel tours the NorCOMM labs in Winnipeg; Dr. Sue Abrams and MP Carol Skelton; Andrew Sharpe and Saskatchewan MPs at NRC-PBI; MP Brad Trost with Dr. Ashley O'Sullivan, Genome Prairie Board Director; Carol Reynolds and Jill Murrin, Director of Communications and Government Affairs, Genome Atlantic.



## GENOME PRAIRIE PARTNERS

*Regional, national and international partners are key to successful research discoveries and innovations. Genome Prairie believes in the collaborative efforts of networks and relationships to enhance the beneficial global impact of genomic research.*

*We would like to acknowledge our strategic partners in this mission.*

Ag-West Bio Inc.	Ontario Genomics Institute
Agriculture and Agri-Food Canada	Oregon State University
Alberta Agricultural Research Institute	Province of Alberta
Alberta Ingenuity Centre for Machine Learning	Province of Manitoba
British Columbia Cancer Agency	Province of Quebec
Canadian Foundation for Innovation	Province of Saskatchewan
CancerCare Manitoba	RIKEN Genomic Sciences Centre
Cold Spring Harbor Laboratory	Saskatchewan Health Research Foundation
Crop Research Institute, Czech Republic	Simon Fraser University
CryoLab	St. Boniface General Hospital
Ducks Unlimited	Sun Microsystems
European Union	Swedish Agricultural University
Flax Council of Canada	United States Department of Agriculture
Genome Alberta	University of Alberta
Genome Atlantic	University of British Columbia
Genome British Columbia	University of Calgary
Genome Canada	University of California, Davis
Genome Quebec	University of Giessen
Hospital for Sick Children	University of Manitoba
GSF–Institut für Entwicklungs-genetik	University of Manitoba, Faculty of Medicine
Inimex Pharmaceutical Inc.	University of Saskatchewan
Irish Department of Agriculture and Food	University of Toronto
Manitoba Institute of Cell Biology	Vaccine and Infectious Disease Organization
MDS Sciex	Wellcome Trust Sanger Institute
Meril Limited	Western Ag Innovations
Mount Sinai Hospital	Western Economic Diversification Canada
National Institutes of Health	Western Grains Research Foundation
National Research Council–Plant Biotechnology Institute	

*“In the next 20 to 30 years, genomics will be what the Internet was in the past three decades.”*

Dr. Henry Friesen, Past Chair, Genome Canada, and Distinguished Professor Emeritus, University of Manitoba





**Genome**Prairie

**For more information:**

[www.genomeprairie.ca](http://www.genomeprairie.ca)

[info@genomeprairie.ca](mailto:info@genomeprairie.ca)

**Head Office:**

101-111 Research Drive

Saskatoon, SK Canada

S7N 3R2

ph: 306.668.3570

fax: 306.668.3580

**Winnipeg Office:**

John Buhler Research Centre, Room 815A

715 McDermot Avenue

Winnipeg, MB Canada

R3E 3P4

ph: 204.480.1356

fax: 204.975.7772



Financial Statements of

# **GENOME PRAIRIE**

Year ended March 31, 2008



**KPMG LLP**  
**Chartered Accountants**  
600 - 128 Fourth Avenue South  
Saskatoon SK S7K 1M8

Telephone (306) 934-6200  
Fax (306) 934-6233  
Internet [www.kpmg.ca](http://www.kpmg.ca)

## **AUDITORS' REPORT TO THE DIRECTORS**

We have audited the statement of financial position of Genome Prairie as at March 31, 2008 and the statements of earnings and changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of the Corporation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Corporation as at March 31, 2008 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

*KPMG LLP*

Chartered Accountants

Saskatoon, Canada

June 6, 2008

# GENOME PRAIRIE

## Statement of Financial Position

March 31, 2008, with comparative figures for 2007

	2008	2007
<b>Assets</b>		
Current assets:		
Cash	\$ 3,441,729	\$ 4,265,383
Receivables	29,976	48,548
GST receivable	14,577	17,488
Project advances	(67,070)	651,725
Prepaid expenses	64,985	12,278
	<u>3,484,197</u>	<u>4,995,422</u>
Equipment and leasehold improvements (note 3)	-	22,803
	<u>\$ 3,484,197</u>	<u>\$ 5,018,225</u>
<b>Liabilities and Net Assets</b>		
Current liabilities:		
Accounts payable and accrued liabilities	\$ 224,369	\$ 202,251
Deferred contributions:		
Expenses of future periods (note 4)	2,994,341	4,527,685
Equipment and leasehold improvements	-	22,803
	<u>3,218,711</u>	<u>4,752,739</u>
Net Assets		
Unrestricted	265,486	265,486
	<u>\$ 3,484,197</u>	<u>\$ 5,018,225</u>

See accompanying notes to financial statements.

On behalf of the Board:

  
\_\_\_\_\_  
Director

  
\_\_\_\_\_  
Director

# GENOME PRAIRIE

## Statement of Earnings and Changes in Net Assets

Year ended March 31, 2008, with comparative figures for 2007

	2008	2007
Revenue:		
Project revenues (note 4)	\$ 4,288,542	\$ 3,308,824
Administrative support revenues (note 4)	794,095	848,277
Amortization of deferred capital contributions related to equipment and leasehold improvements	27,859	25,526
Interest	198,368	243,850
	<u>5,308,864</u>	<u>4,426,477</u>
Expenses:		
Research project expenditures	4,288,542	3,308,824
General and administrative	992,463	1,006,988
Amortization	27,859	25,526
	<u>5,308,864</u>	<u>4,341,338</u>
Excess of revenue over expenses	-	85,139
Net assets, beginning of year	265,486	180,347
Net assets, end of year	<u>\$ 265,486</u>	<u>\$ 265,486</u>

See accompanying notes to financial statements.

# GENOME PRAIRIE

## Statement of Cash Flows

Year ended March 31, 2008, with comparative figures for 2007

	2008	2007
Cash flows from (used in):		
Operations:		
Excess of revenue over expenses	\$ -	\$ 85,139
Items not involving cash:		
Amortization of deferred capital contributions	(27,859)	(25,526)
Amortization	27,859	25,526
Change in non-cash operating working capital:		
Receivables	18,572	33,744
GST receivable	2,911	53,355
Project advances	718,795	(345,862)
Prepaid expenses	(52,707)	(6,178)
Accounts payable and accrued liabilities	22,118	(24,857)
Net change in deferred contributions	(1,533,343)	2,406,491
	(823,654)	2,201,832
Financing:		
Capital contribution	5,056	30,586
Investing:		
Purchase of equipment and leasehold improvements	(5,056)	(30,586)
Increase (decrease) in cash	(823,654)	2,201,832
Cash, beginning of year	4,265,383	2,063,551
Cash, end of year	\$ 3,441,729	\$ 4,265,383

See accompanying notes to financial statements.

# GENOME PRAIRIE

Notes to Financial Statements

Year ended March 31, 2008

---

## 1. Operations:

Genome Prairie (the "Corporation") was incorporated in 2000 under the *Canada Corporations Act* as a not-for-profit organization. The Corporation funds organizations and institutions that conduct genomic research and development for the economic benefit of the Prairie Region (Saskatchewan and Manitoba) and Canada.

## 2. Significant accounting policies:

### (a) Use of estimates:

The preparation of financial statements in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenue and expenses during the reporting period. Actual results could differ from these estimates.

### (b) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions which includes funding from Genome Canada, Provincial Ministries, the Commercial sector and other funding sources.

Deferred contributions related to expenses of future periods represent unspent externally restricted funding and related investment income, which are for the purposes of providing funding to eligible recipients and the payment of operating and capital expenditures in future periods.

Deferred contributions related to capital assets represent the unamortized amount of contributions received for the purpose of capital assets. The amortization of such contributions is recorded as revenue in the statement of operations. Restricted contributions related to the purchase of capital assets are deferred and recognized to revenue using the same methods and rates of the capital assets.

Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

### (c) Equipment and leasehold improvements:

Equipment and leasehold improvements are recorded at cost. Amortization is provided for on the straight line basis to amortize the cost of the assets over their remaining estimated useful life which is determined based on committed funding.

# GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2008

---

## 2. Significant accounting policies (continued):

### (d) Financial Instruments:

Effective April 1, 2007, the Corporation adopted the Canadian Institute of Chartered Accountants' Handbook Section 3855, Financial Instruments-Recognition and Measurement. The adoption of this accounting policy has not had any impact on the financial results of the corporation for the year.

Under the new standard, financial assets and financial liabilities are initially recognized at fair value and their subsequent measurement is dependent on their classification as described below:

- Cash and short-term investments are classified as financial assets held for trading and are measured at fair value. Fair value fluctuations in these assets including interest earned, interest accrued, gains and losses realized on disposal and unrealized gains and losses are included in investment income.
- Accounts receivable are classified as loans and receivables and are recorded at amortized cost using the effective interest method.
- Accounts payable and accrued liabilities and other liabilities are classified as other liabilities and measured at amortized cost using the effective interest method.

Transaction costs related to held for trading financial assets are expensed as incurred. Transaction costs related to other liabilities and loans and receivables are netted against the carrying value of the asset or liability and are then recognized over the expected life of the instrument using the effective interest method.

The Corporation uses the effective interest method to recognize interest income or expense which includes transaction costs or fees, premiums or discounts earned or incurred for financial instruments.

The fair values of cash, accounts receivable, and accounts payable and accrued liabilities approximate their carrying values due to their short-term maturity.

### (e) Income taxes:

The Corporation qualifies as a tax exempt organization under Section 149 of the Income Tax Act.

# GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2008

### 3. Equipment and leasehold improvements:

				2008	2007
	Cost	Accumulated amortization		Net book value	Net book value
Furniture and equipment	\$ 22,619	\$ 22,619	\$	-	\$ 5,088
Computer equipment	27,136	27,136		-	7,498
Computer software	8,899	8,899		-	3,568
Leasehold improvements	13,662	13,662		-	6,649
	\$ 72,316	\$ 72,316	\$	-	\$ 22,803

# GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2008

## 4. Expenses of future periods:

The corporation receives funding from Genome Canada, Provincial Ministries, Western Economic Diversification Canada and other sources to be held, administered and distributed in accordance with the related funding agreements between Genome Prairie and the other parties. Deferred contributions related to expenses of future periods represent these unspent externally restricted funding and related investment income, which are for the purposes of proving funding to eligible recipients and the payment of operating and capital expenditures in future periods. The changes in the deferred contribution balances for the period are as follows:

	2008	2007
Opening deferred contributions for expenses of future periods	\$ 4,527,685	\$ 2,121,194
Contributions for the year:		
Genome Canada	3,329,921	3,228,379
Western Economic Diversification	150,000	50,000
Flax Council of Canada	29,698	28,302
University of Manitoba	16,428	16,428
Genome Alberta	15,498	308,186
Ag-West Bio Inc.	2,728	3,765
Province of Manitoba	2,500	-
Genome Atlantic	1,894	-
Genome Quebec	1,894	-
Ontario Genomics Institute	1,894	-
Genome BC	1,894	-
Saskatchewan Government	-	4,600,000
Advancing Canadian Agriculture and Agri-Food Saskatchewan	-	5,471
Agriculture Biotechnology International Conference	-	2,000
Canola Council	-	1,200
	3,554,349	8,243,731
Total contributions available	8,082,034	10,364,925
Less amounts recognized as project revenues	(4,288,542)	(3,308,824)
Less amounts recognized as administrative support revenues	(794,095)	(848,277)
Transfer to deferred contribution - equipment and leasehold improvements	(5,056)	(30,586)
Transfer to Genome Alberta	-	(1,649,553)
Closing deferred contributions for expenses of future periods	\$ 2,994,341	\$ 4,527,685

Changes related to equipment and leaseholds are as follows:

	2008	2007
Beginning balance	\$ 22,803	\$ 17,743
Add: Contributions received during the year	5,056	30,586
Less: Amounts amortized to revenue	(27,859)	(25,526)
Ending Balance	\$ -	\$ 22,803

# GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2008

---

## **5. Project commitments:**

In accordance with an agreement for funding signed with Genome Canada effective April 1, 2005, Genome Prairie has agreed to obtain equivalent funding support from other parties. As specified in the agreement, Genome Canada may provide transition funding to Genome Prairie notwithstanding the fact that formal commitments from other parties have not yet been secured. In such cases, funds provided in advance "in good faith" as part of the transition budget shall not be reimbursable in the event such commitments from other parties have not been secured. Genome Canada may then terminate the agreement or funding for a particular component. Additional funding arrangements are negotiated with Genome Canada to cover administration, program management, and position papers.

## **6. Comparative figures:**

The Corporation has changed its accounting to no longer reflect revenue and expenses for non-cash contributions. This change in accounting has resulted in a reduction of revenues and expenses for 2007 of \$5,643,817. Certain other comparative figures have been reclassified to conform with the financial statement presentation adopted in the current year.

## **7. Financial assets and liabilities:**

The carrying value of cash, receivables, GST receivable, project advances and accounts payable and accrued liabilities approximate fair value due to the short period to maturity of these items.

## **8. Prior period event:**

In July 2007, Genome Prairie became aware that between January 2002 and September 2005, a fraud had been perpetrated against the organization. A forensic audit to determine the extent of the loss was immediately undertaken. The total loss to Genome Prairie during the period amounts to \$318,582. Genome Prairie anticipates that the costs associated with the forensic investigation, which includes the forensic audit and legal services can be recovered. All of the amounts relate to periods prior to the currently reported results and do not affect the current or prior year's figures. Any recovery will be reported when realized.