CANADA’S GENOMICS ENTERPRISE

Dr. David Bailey
Genome Alberta

Dr. Cindy Bell
Genome Canada

January 10, 2016

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GLOBAL CHALLENGES / GENOME SOLUTIONS - DECO WORKSHOP - SOLVING GENOPROBLEMS

Genome Canada’s Vision and Mission

Our Vision: Harness the transformative power of genomics to deliver benefits to Canadians

Our Mission:

CONNECT ideas and people across public and private sectors to find new uses and applications for genomics

IMPROVE QUALITY OF LIFE FOR CANADIAN AND STRENGTHEN OUR BIOECONOMY

INVEST in large-scale science and technology to fuel innovation

TRANSLATE discoveries into applications to maximize impact across all sectors

Genomics offers solutions for sectors vital to Canada’s future:

Health, agriculture, forestry, fisheries and aquaculture, the environment, energy, mining—drivers of Canada’s emerging bioeconomy.

Increasing genomics uptake

We are working to build “receptor capacity” for genomics in multiple sectors through consultation and strategies focused on how genomics can address sector challenges.

Attracting investment through partnership

OR PHASE 2 PROJECTS

PERCENT OF FUNDING EXTERNAL TO CANADA

2008-12

2012-16

OR PHASE 2 PROJECTS

TOTAL OF ALL FUNDING SOURCES FOR CANADA
Programs that take discoveries from lab to society

Genome Canada Programs

Large-scale Applied Research Project (LSARP) Competitions
• discovery and applied research with a high potential for producing concrete deliverables by the end of the funding period; ($3.3M max from GC)

Genomic Applications Partnership Program (GAPP)
• academic-user partnerships to develop a genomics-derived solution to a user-defined need - user “pull”; focus on downstream R&D activities ($2M max from GC)

Emerging Issues Program
• research addressing an emerging issue or opportunity that requires immediate attention and timely resolution; ($250K max from GC)

LARGE-SCALE APPLIED RESEARCH PROJECTS

Genome Canada LSARPs

Previous Campaigns:
• 2010 LSARP (Completed)
• 2012 LSARP Genomics and Personalized Health
• 2014 LSARP Genomics and Feeding the Future
• 2015 LSARP Natural Resources and the Environment: Sector Challenges – Genomic Solutions

Proposed Next Campaigns:
• 2016 LSARP Genomics and Health
• 2018 LSARP Agriculture/Agri-food and Aquaculture
• 2019 LSARP Natural Resources and the Environment

2010 LSARP - Application of Genomics to Improve Swine Health and Welfare (Completed)

Project Leader(s): Graham Plastow (U of Alberta), John Harding (U of Saskatchewan), Bob Kemp (PigGen Canada Inc)

Genome Centre: Genome Alberta
Project Budget: $12,472,751
Project Partners:
• Genome Canada
• Genome Alberta
• Genome Prairie
• PigGen Canada
• Canadian Swine Health Board
• US PRRS Host Genetic Consortium
• US Department of Agriculture
• Roslin Institute
• Alberta Livestock and Meat Agency
• Pork Checkoff

2010 LSARP - Whole Genome Selection through Genome Wide Imputation in Beef Cattle (Completed)

Project Leader(s): Paul Stothard (U of Alberta), Stephen Moore (U of Queensland), Stephen Miller (U of Guelph)

Genome Centre: Genome Alberta
Project Budget: $8,098,924
Project Partners:
• Genome Canada
• Genome Alberta
• Alberta Livestock and Meat Agency (ALMA)
• AgResearch, New Zealand
• Cooperative Research Centre (CRC Beef), Australia
• USDA
• SEMEX Alliance
• Teagasc, Ireland
• Scottish Agricultural College, UK
• BIO, Ontario
• Western Economic Diversification Canada
2014 LSARP - Application of Genomics to Improve Disease Resilience and Sustainability in Pork Production

Project Leaders: Michael Dyck (U of Alberta), John Harding (U of Saskatchewan), Bob Kemp (PigGen Canada Inc)

Genome Centres: Genome Alberta and Genome Prairie

Project Budget: $9,801,714

Project Partners:
- PigGen Canada
- Alberta Livestock and Meat Agency (ALMA)/Genome Alb
- Swine Innovation Pork
- Saskatchewan Ministry of Agriculture and Food
- INFIA
- National Pork Board
- ABtech Inc.
- Ontario Genomics

2014 LSARP - Increasing Feed Efficiency and Reducing Methane emissions through Genomics: A New Promising Goal for the Canadian Dairy Industry

Project Leaders: Filippo Miglior (U of Guelph), Paul Stothard (U of Alberta)

Genome Centres: Genome Alberta and Ontario Genomics

Project Budget: $10,306,910

Project Partners:
- Canadian Dairy Network
- Dairy Producers
- GrowSafe System
- Ontario Ministry of Research and Innovation
- Australia DEEWR
- UK Scottish Research College
- USDA Beltsville Research Herd
- Qualitas, Switzerland

See Poster P0512

2014 LSARP - Reverse Vaccinology Approach for the Prevention of Mycobacterial Disease in Cattle

Project Leaders: Andy Potter (VIDO), Robert Hancock (UBC)

Genome Centres: Genome Prairie and Genome BC

Project Budget: $7,358,606

Project Partners:
- University of Saskatchewan
- Genome BC
- AFBI (Agri-Food and Biosciences Institute)

Genome Alberta - Development and Deployment of MBVs/gEPDs for Feed Efficiency and Carcass Traits that Perform in Commercial Beef Cattle

Project Leader: John Basarab (U of Alberta), Donagh Berry (Teagasc), John Crowley (U of Alberta)

Genome Centre: Genome Alberta

Project Budget: $4,473,035

Project Partners:
- Genome Alberta
- Alberta Livestock and Meat Agency (ALMA)
- BIG, Ontario
- Beefbooster Inc.
- Cow/Calf Health Management Services (CCHMS)
- Irish Cattle Breeding Federation (ICBF)
- USDA-ARS

2014 LSARP - Develop and commercialize new enzyme supplements for swine and poultry

Project Leader: Adrian Tsang (Concordia University)

Industry Partner: Elanco Animal Health

Genome Centres: Genome Quebec

Project Budget: $6,000,000

Project Partners:
- Genome Quebec
EMERGING ISSUES PROJECTS

2012 - Program on Research and Innovation Leading to Rapid Detection of Pathogenic E. coli (Completed)

Objective:
The main objective of this competition was to develop an innovative genomics based test for the presence of generic and pathogenic E.coli bacteria during food production.

Funding Including Partners: $1.8 Million

Duration: 18 months

2012-Detection and Surveillance of Listeria monocytogenes using next-gen genomics tools (Completed)

Project Leaders: Linda Chui (U of Alberta), Jian Zhang (AITF), Franco Pagotto (Health Canada)

Budget: $ 1,461,774.00

Partners: Genome Canada, Canadian Food Inspection Agency (CFIA) and Alberta Innovates – BioSolutions (AI-Bio)

2014-Porcine Epidemic Diarrhea Virus (PEDV) Competition

Objective:
This program was created by a consortium of funders intended to respond to the current threat of the PEDVs to Canadian pork producers and economy

Funding from partners: $650,000

Duration: 18 months

Program on Research and Innovation Leading to Rapid Detection of Pathogenic E. coli

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<thead>
<tr>
<th>Title</th>
<th>Investigator(s)</th>
<th>Institution(s)</th>
<th>Total Budget</th>
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<tbody>
<tr>
<td>Point-of-Need Gene-Based System for Detection of Priority STEC in Beef</td>
<td>Michel Bergeron, Burton Bias</td>
<td>Université Laval</td>
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<tr>
<td>Rapid Sampling and Detection of STEC in Meat</td>
<td>Linda Pilarski, Lynn McMullen</td>
<td>University of Alberta</td>
<td>$726,000</td>
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Porcine Epidemic Diarrhea Virus (PEDV) Competition

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<td>Development of a new generation of modified live virus vaccine for PEDV using reverse genetics system</td>
<td>Alexander Zakhartchouk, Volker Gerdts</td>
<td>University of Saskatchewan</td>
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<td>Enhanced molecular diagnostics and validating genetic resistance to PEDV in pigs</td>
<td>John Harding, Soren Alexandersen</td>
<td>University of Saskatchewan National Centre for Animal Disease</td>
<td>$325,917</td>
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<td>The use of new molecules in association with real time-qPCR assays to discriminate infectious from non-infectious porcine epidemic diarrhea virus (PEDV) particles</td>
<td>Carl Gagnon</td>
<td>Universite de Montreal</td>
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