INNOVATING FOR A STRONGER PORK SECTOR

Swine Innovation Porc

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Swine Innovation Porc increases Canadian swine industry competitiveness through a national R&D structure

swineinnovationporc.ca

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ORGANIZATION STRUCTURE

Swine Innovation Porc is a not-for-profit corporation that was founded in 2010 to facilitate and coordinate, on a national level, R&D and knowledge transfer for the swine sector. Our corporation members include the Canadian Pork Council along with eight provincial pork producer organizations.

VISION

Science into Practice

MISSION

Provide national leadership in research, development and knowledge transfer to enhance the competitiveness of the Canadian swine sector

FUNDING MODEL 2018-2023

Leveraging industry dollars with government funding is a key element of our strategic plan. To achieve this, eight provincial pork organizations contribute 2.5 cents per market hog towards Swine Innovation Porc. In addition, over 40 other industry partners contribute to our supported research activities. Our research portfolios are driven by industry's needs in order to deliver relevant R&D results to enhance the sector's competitiveness and profitability.

Agriculture and Agri-Food Canada

AGRICULTURE AND AGRI-FOOD CANADA

8

PROVINCIAL PORK ORGANIZATIONS

+40

INDUSTRY PARTNERS

Swine **Innovation** Porc

+35

PARTNERS IN RESEARCH
Universities, Research Centres & Private Research

+40

PARTNERS IN KNOWLEDGE TRANSFER
R&D Centres, Lead User Farms & Organizations, National Swine Events, Media, etc.

BOARD OF DIRECTORS 2019-2020

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9 **John Webb**
Director
Pork Value Chain

10 **Andrew Van Kessel**
Director
Chair of the Science Advisory Body

MESSAGE FROM THE CHAIR 2019-2020

The end of March 2020 marked the end of our last fiscal year, but proved to be the beginning of an unprecedented time due to the COVID-19 pandemic. While this crisis will most certainly change the way we all do things for some time to come, it is more apparent than ever that flexibility and resiliency are important not just for our own health, but also for the health of our businesses and organizations. At Swine Innovation Porc, we have adapted the way we work to ensure we continue to facilitate R&D across Canada and enhance collaboration, all in the goal of providing the pork sector the science it needs to be competitive, successful and flexible in this changing world.

Science into practice

Looking back over 2019-2020, Swine Innovation Porc has worked hard to ensure it is providing continued value to our partners, now and into the future. We have adapted and modernized our strategic plan to 2023, and we are pleased to announce our new and improved vision statement: "Science into practice".

This new plan will be our "road map" to maximize the use of funds in order to generate innovative research results that will return the most tangible benefits to the Canadian swine industry, by addressing current as well as possible emerging issues. We invite you to view a summary of this plan on page 8 of this report.

Leveraging industry dollars

While our $18.5 million Swine Cluster 3 national research program is the centrepiece of our R&D activities, Swine Innovation Porc continues to be ready to take advantage of new funding opportunities in order to multiply industry investment in R&D. Following our strategic initiatives, our board of directors has been active in investigating how to expand our current research portfolio and attract additional investment in swine R&D, and we will certainly continue working towards this goal over the coming months.

Sector partnerships

As we move forward, Swine Innovation Porc is committed to providing value to the pork sector. We are immensely proud of our partnerships with eight provincial pork organizations, as well as with over 40 financial partners from the private and public sector. Thank you all for your important and significant support. Also, we want to express our thanks to the Minister of Agriculture for the federal government's investment in swine related research, in addition to the continued collaboration and efforts from the Canadian research community. Finally, it is important to highlight the dedication and commitment of the Board of Directors, as well as the management team, who have been working diligently to deliver timely and innovative research for the benefit of the sector.

Yours sincerely,

Stewart Cressman

Stewart Cressman
Chair

MANAGEMENT REPORT 2019-2020

Swine Innovation Porc is pleased to report that the second year of our five-year Swine Cluster 3 R&D program has been completed with activities progressing smoothly. This program includes 14 research projects, as well as a significant communications and knowledge transfer component to ensure that research results reach those who it will benefit. Over the last year, Swine Innovation Porc invested a total of $3.2 million in research and development, 60% more than the previous fiscal year, all in the goal toward enhancing the competitiveness, profitability and sustainability of the swine sector.

I am proud to present this year's annual report, where you will find more details about our supported R&D activities, communication and knowledge transfer efforts, as well as our important partnerships with the industry and research community.

New R&D projects

We have been working on expanding our research portfolio beyond our national Swine Cluster 3 program, and we have supported two new projects over the last year, one on testing pig oral fluid for African swine fever (ASF) and another on vaccine development for *Streptococcus suis* (you will find more information about these projects in the Research and Development section of this report). This additional research is testament to our commitment to deliver results that will address the swine industry's challenges, as well as to find ways to leverage and multiply the pork sector's funding in order to maximize the benefits for the industry.

ASF research priorities

As the world in general faces the biggest health crisis in living memory, the swine sector has been no stranger to challenges related to swine health. The possibility of ASF being introduced into Canada has been a major concern over the last few years, and Swine Innovation Porc has acted as the coordinator for a working group that developed Canada's research priorities to address ASF. More about this initiative, as well as other examples of how we have been enhancing collaboration, may be found on page 24 of this report.

Communications

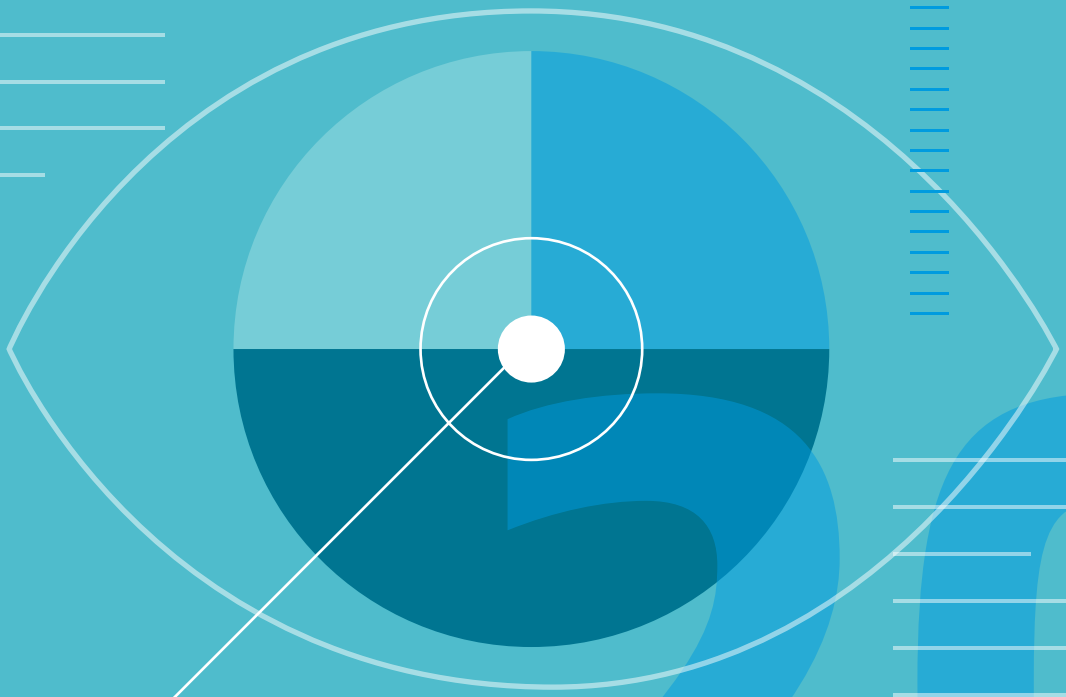
Swine Innovation Porc has been active in communicating research results to the swine sector over the last year. In addition, we have implemented a partnership with the CDPQ (*Centre de développement du porc du Québec*) and Prairie Swine Centre in order to deliver on-farm demonstrations and other knowledge transfer activities, all in the goal to increase the adoption of research results by the end users. We look forward to disseminating information from these activities as they become available. You will find a full overview of our communications and knowledge transfer activities starting on page 24 of this report.

Looking to the future

Having the capacity to respond to the industry's needs in an effective and timely manner is closely linked with the partnerships we have put in place with stakeholders from the industry, government and research community. Over the coming months and years, our goal is to effectively achieve the objectives as outlined in our new strategic plan. This will start by launching preparations for another possible round of federal funding for the cluster program, which will include extensive consultations with the sector in order to determine Canadian swine research priorities for the next few years.

Finally, I would like to thank you all for your involvement and commitment in supporting innovative R&D for the benefit for the pork sector. Achieving our mission and vision is possible only when we all work together toward the same objectives.

Abida Ouyed
General Manager



STRATEGIC PLAN: ROADMAP TO 2023

STRATEGIC INITIATIVES	OUTCOMES
1 PRIORITIZE AND COMMUNICATE RESEARCH OBJECTIVES	National pork research and development strategy that identifies priority outcomes benefiting producers that could be addressed by near- or longer-term science.
	Canadian research funders and the research community are aware of the key outcomes, and these outcomes are considered when developing research portfolios.
2 INCREASE SCIENCE CAPACITY	Available science resources are optimized by minimizing unnecessary duplication.
	Joint research efforts maximize the use of funds and return tangible benefits to collaborators.
	Additional science resources are available.
	Researchers react quickly to emergencies.
	Research infrastructure and human resources meet the Canadian pork sector's needs.
3 MANAGE RESEARCH FUNDING	Swine cluster is effectively/efficiently managed.
	The pork research portfolio is expanded.
	Leveraging is maximized.
	Producers and funders are confident in the fund management.
4 TRANSFER KNOWLEDGE	Pork sector is aware of research results.
	Results are available in a manner that facilitates adoption.
	Producers obtain tangible benefits.

For the complete strategic plan, please visit our website at **www.swineinnovationporc.ca**.

RESEARCH AND DEVELOPMENT

SWINE CLUSTER 3 INNOVATING FOR A STRONGER PORK SECTOR

Swine Cluster 3 is a five-year research program (2018-2023) that includes 14 R&D projects within five main research areas:

- Animal health
- Animal nutrition
- Animal welfare
- Environment
- Pork quality

The program also includes a significant knowledge transfer component dedicated to communicating results to end users through on-farm demonstration and various communication activities.

Swine Cluster 3 is designed to:

- Accelerate the pace of innovation
- Drive sustainable growth
- Strengthen competitiveness and maximize the resilience of the swine sector

Total budget

$18,5M

$12,7M
Agriculture and Agri-Food Canada

$5,8M
Producers and Industry

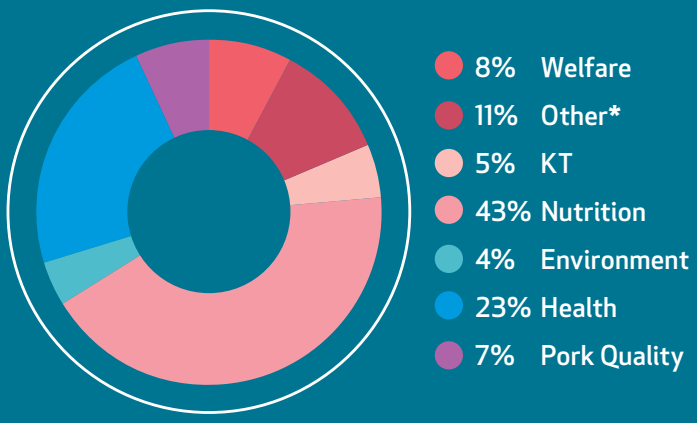
+80
RESEARCHERS

14
PROJECTS

+50
PRIVATE PARTNERS (including provincial pork organizations)

24
RESEARCH ORGANIZATIONS ACROSS CANADA AND AROUND THE WORLD

Allocation of funding



* Includes coordination and fees related to managing the program the program

SWINE CLUSTER 3
ONGOING RESEARCH PROJECTS 2018-2023

The following projects began in 2018 and the majority of projects will wrap up in 2023. Results will be communicated as they become available, but in the meantime, visit our website to read more about each project: **www.swineinnovationporc.ca**.

ANIMAL HEALTH

Improved biosecurity in the Canadian swine transport industry – Phase 3
Led by Terry Fonstad, University of Saskatchewan

Improvement of therapeutic and prophylactic measures against porcine reproductive and respiratory syndrome (PRRS) virus through the discovery of antiviral drugs and the use of antimycotoxins
Led by Carl Gagnon, University of Montreal

Pig Gut microbiome project – Characterization of the core gut microbiome associated with pig health and performance: towards fecal diagnostics and microbiome therapy
Led by :
Vahab Farzan, University of Guelph
Andrew Van Kessel, University of Saskatchewan
Ben Willing, University of Alberta

Survivability and infectivity of PED virus in soil
Led by Mario Tenuta, University of Manitoba

ANIMAL NUTRITION

Development of novel feed additives to replace antibiotics and promote pig gut health
Led by:
Joshua Gong, AAFC (Guelph)
Chengbo Yang, University of Manitoba

Towards a new feeding approach of neonatal and weanling piglet for optimizing nutritional status, immunity and microbiota and minimizing the use of antibiotics
Led by:
Frédéric Guay, Laval University
Martin Lessard, AAFC (Sherbrooke)

Innovative micronutrient strategies for maximizing piglet's robustness and performance during the pre- and post-weaning periods
Led by Jérôme Lapointe, AAFC (Sherbrooke)

Development of innovative strategies to reduce feed costs in the post-weaning period while maintaining optimal performance and health
Led by:
Dan Columbus, Prairie Swine Centre
Martin Nyachoti, University of Manitoba

Reducing feed cost and the environmental footprint and enhancing global competitiveness of Canadian pork production by increased nutrient utilization of feedstuffs fed to growing-finishing pigs
Led by:
Martin Nyachoti, University of Manitoba
Ruurd Zijlstra, University of Alberta

New feeding and management strategies for replacement gilts that will maximize future milk yield
Led by Chantal Farmer, AAFC (Sherbrooke)

ANIMAL WELFARE

Effects of long distance transport on the health and welfare of early weaned pigs
Led by Jennifer Brown, Prairie Swine Centre

Optimizing sow productivity and management: Impact of grouping practices on sow reproductive performance and piglet development and identification of risk factors for sow mortality
Led by Jennifer Brown, Prairie Swine Centre

ENVIRONMENT

Advancing the Canadian swine sector through environmental footprint analyses
Led by Mario Tenuta, University of Manitoba

PORK QUALITY

Classifying Canadian pork based on quality attributes
Led by Manuel Juarez, AAFC (Lacombe)

EXPANDING OUR RESEARCH PORTFOLIO

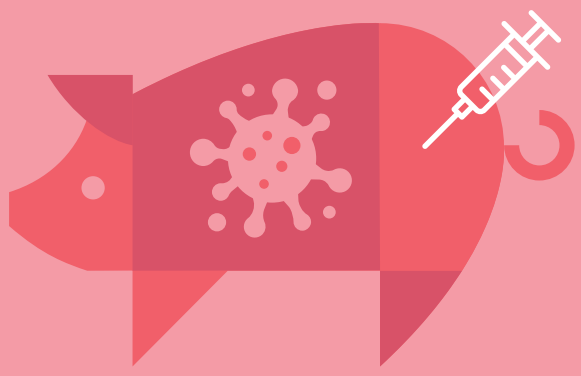
One of Swine Innovation Porc's objectives is to provide scientific answers to the industry's emerging issues. Over the past year, two new projects have been added to our research portfolio:

Novel vaccine design as an alternative to antimicrobial use for preventing and controlling the swine and zoonotic agent *Streptococcus suis*
Led by Marcelo Gottschalk, University of Montreal

This project was part of a proposal for funding on swine health submitted to the AgriScience-Projects program. Work is already underway and results are expected in 2023.

Develop tools required to minimize losses to the swine industry in the event of an African swine fever (ASF) outbreak in North America
Led by Aruna Ambagala, Canada Food Inspection Agency

Swine Innovation Porc has supported a project that will examine pig oral fluid as a way to detect the presence of ASF. The work involves studies being done in Canadian labs as well as field validation on ASF-positive farms in Vietnam. Results are expected in 2021.



RESEARCH HIGHLIGHTS

You will find below highlights from selected projects currently underway within our supported research portfolio. Complete research results from these projects will be published in our 2023 annual report.

WELFARE

Pig Transport Research in it for the Long Haul

Though it's hard to beat a cross country trip with 100 of your best buddies, pig transport has its challenges. Even so, the effect of that travel on early weaned pigs has received little attention, in spite of the fact that weaner pigs differ vastly from mature animals in their physiologic and environmental requirements. Filling that knowledge gap was the goal of the study "effects of long-distance transport on the health and welfare of early weaned pigs".

To date, the research in this area on weaner pigs has involved simulated transport conditions. By contrast, the current project focused on commercial transport of weaner pigs to get a better idea of what occurs in a real-world environment. Using a range of measures of pig behavior and physiology, as well as a variety of ambient conditions in the trailers, researchers studied both short and long duration shipments.

Specifically, the study examined eight commercial loads of weaner pigs, with four loads travelling 36 hours and the other four covering approximately 90 minutes. All pigs were sourced from two sow barns including one near Saskatoon, Saskatchewan and one in southern Ontario. In gathering physiological information on the animals, researchers weighed a subsample of pigs and assigned lameness and lesion scores before, during and 78 hours after transport. They also took blood samples before and after transport on 20 pigs and monitored a random sample for heart rate and/or temperature.

Behavior was another key focus of the study. Using time lapse cameras in both short- and long-term transports, scientists monitored pig behavior at regular intervals to gain a better understanding of how the journey affected the passengers. This monitoring continued after pigs were unloaded, as the same pigs used for physiological measures were placed in pens and videotaped for six hours immediately following the trip and 78 hours post-transport. Animals were assessed for a number of relevant behaviors including feeding, drinking, posture and aggression.

Scientists also paid close attention to trailer conditions, measuring temperature and relative humidity for each load, comparing exterior conditions to the interior environment and gauging the vibration characteristics of each trailer.

Given that there is strong interest being shown by the swine industry, consumers and regulators in how lengthy transport durations impact the health and welfare of pigs, this study on weaner pigs was long overdue. While researchers continue to study and analyze the results, they are confident that the final data will support the development of science-based guidelines to help improve transport practices in the swine industry. They also hope to identify knowledge gaps that will inform future research in this area.

1. *Members of the research team attach a heart rate monitor to a piglet.*
2. *Piglets on board a transport trailer.*
3. *Piglets with and without heart rate monitors.*

PROJECT

EFFECTS OF LONG DISTANCE TRANSPORT ON THE HEALTH AND WELFARE OF EARLY WEANED PIGS

Led by: Jennifer Brown, Prairie Swine Centre

Results expected in 2023

Photos: Prairie Swine Centre

HEALTH

Streptococcus suis as Bad as it Sounds

Whether it is people or pathogens, some names just don't seem to fit the owner. In the case of *Streptococcus suis*, however, the nasty-sounding name is an apt one for a disease that can wreak havoc in pig barns. As science continues to remain relevant by addressing industry concerns, it responded to the threat of *Streptococcus suis (S. suis)* via the project "Novel vaccine design as an alternative to antimicrobial use for preventing and controlling the swine and zoonotic agent *Streptococcus suis*".

The need to address this condition is twofold. As the leading cause of piglet deaths in the post weaning period, *S. suis* can be disastrous for the producer's balance sheet. Add to that the lack of a viable commercial vaccine for the disease, and the urgency around a solution is obvious, especially given the push to reduce antibiotic use in the swine industry and other areas of livestock agriculture.

Though still in the early stages, the project is showing promise in protecting pig herds against this devastating disease. That progress is doubly important given that *S. suis* can infect humans handling pigs or pork, with an impact comparable to meningitis. Consequently, researchers hope that progress on the vaccine front could benefit both producers and the general public by reducing the incidence of *S. suis* in both populations.

While the time and effort involved in seeking a vaccine for *S. suis* is considerable, the payoff could also be substantial, as there are signs that the approach in this study may apply to a range of pig pathogens, giving science and industry the biggest possible bang for their buck.

Like many undertakings this year, the S. suis project was temporarily sidetracked by COVID-19 and its resulting restrictions. Fortunately, scientists now have a number of candidates that seem to induce antibodies in mice and are presently being tested in pigs. The next step in the summer/fall of 2020 is to vaccinate animals and perform experimental challenges in controlled environments to see if one of the candidates offers viable protection against *S. suis*.

4 *Mélanie Lehoux, Research Assistant, carries out serological testing.*

Photo: University of Montreal

PROJECT

NOVEL VACCINE DESIGN AS AN ALTERNATIVE TO ANTIMICROBIAL USE FOR PREVENTING AND CONTROLLING THE SWINE AND ZOONOTIC AGENT STREPTOCOCCUS SUIS

Led by: Marcelo Gottschalk, University of Montreal

Results expected in 2023

Gut Check: Linking Pig Guts and Pig Health

If you've heard all the buzz these days about the impact of the microbiome on pig health, you may be pondering a profound question: What is the microbiome? The term refers to the collection of microorganisms in a particular environment, and it is the critical role of the microbiome in promoting healthy pigs that prompted the study "Pig Gut microbiome project (PGmp) – Characterization of the core gut microbiome associated with pig health and performance: towards fecal diagnostics and microbiome therapy".

To better understand the pig microbiome and its impact on health, researchers broke the project into two sub-projects. In subproject one - Study on Commercial Swine Farms - scientists will visit 24 Canadian farms, where they will compile information on growth performance and health while sampling pig feces on seven occasions from birth through to marketing. Sows will also be sampled to determine their gut and vaginal microbiome.

In sub-project two - Study in Swine Genetics Nucleus Herds – researchers entered agreements with swine genetic organizations for access to their herds. By accessing nucleus herds, researchers are able to collect feed intake and feed efficiency data not available from commercial farms.

Fecal sample collection from the two sub-projects is now well underway and is being analyzed to pinpoint the bacterial gut population that supports pig health and performance. That is no small feat, as science has not yet well identified which bacterial populations lead to which outcomes, and, as a result, there is no consensus on what a healthy microbiome in pigs actually looks like.

In part, the challenge in getting a clear picture of a healthy microbiome results from the nature of the microbiome environment itself. Because it is dynamic and diverse, with up to 1000 different species being constantly changed by age, diet composition, management factors and genetics, scientists have a lot to wade through in identifying organisms linked to health and performance.

PROJECT

MICROBIOME PROJECT (PGMP) – CHARACTERIZATION OF THE CORE GUT MICROBIOME ASSOCIATED WITH PIG HEALTH AND PERFORMANCE: TOWARDS FECAL DIAGNOSTICS AND MICROBIOME THERAPY

Led by: Vahab Farzan, University of Guelph; Andrew Van Kessel, University of Saskatchewan; Ben Willing, University of Alberta

Results expected in 2023

In spite of the challenges, this study looks to break new ground by assessing the impact of pig genetics on the microbiome. Researchers also hope to predict the health and performance of piglets through fecal microbial profiles identified in the project, and how the sow vaginal and fecal microbiome will determine the piglet's gut microbiome.

While such profiles may not make for pleasant viewing, they could offer critical information to producers that would impact decision making in a number of vital areas including nutrition, feed additives, biosecurity and herd management. The end result would be a better microbiome profile, a healthier pig and less reliance on antibiotics.

NUTRITION

Lots to Chew on from Feed Project

Some expenses are optional for producers, but feed is not one of them. As feed costs continue to eat away at the bottom line, there is growing demand for more knowledge on stretching feed dollars, and science is responding with projects like "Towards a new feeding approach of neonatal and weanling piglets for optimizing nutritional status, immunity and microbiota and minimizing the use of antibiotics".

As part of their effort to give producers more bang for the buck, scientists on the project are examining different options for maximizing piglet growth and health in three critical periods: lactation, pre-weaning and post-weaning. At the same time, they are reviewing a number of feeding strategies, including bovine colostrum, naked oat, medium chain fatty acids and yeast extracts. They plan to assess their potential to modulate intestinal microbiota and immune system interactions for maintaining gut homeostasis and functions, including nutrient absorption. Researchers will test each product by itself and also do side by side comparisons.

As well, they will use antibiotics with a separate group of pigs to aid in developing alternate strategies and move away from antibiotic use in response to consumer demand. In the process, they hope to reduce the level of antibiotics in feed and impede the development of antibiotic resistant bacteria. Though the four products being studied are more costly than antibiotics, using them early in a pig's life could lead to long term benefits that outweigh the higher price tag.

Throughout the study, scientists are being mindful of cost as the producer's chief concern. To that end, they are looking at cost cutting measures such as reducing the amount of bovine colostrum – the most expensive of the four feed products – from 5% of the diet to 2% or 1%. This would be achieved by using other products that have a complementary effect to bovine colostrum but at a lower price point.

Reducing expense might also be achieved through the use of other feeds such as prebiotics and nutraceuticals (pharmaceutical alternatives which claim physiological benefits). Even if these alternatives are less effective during the weaning period, it may be possible to combine them with bovine colostrum to enhance their impact.

It is a lot to explore, but given that feed is rather important to pig health and growth, it's well worth the effort.

PROJECT

TOWARDS A NEW FEEDING APPROACH OF NEONATAL AND WEANLING PIGLET FOR OPTIMIZING NUTRITIONAL STATUS, IMMUNITY AND MICROBIOTA AND MINIMIZING THE USE OF ANTIBIOTICS

Led by: Frédéric Guay, Laval University; Martin Lessard, AAFC (Sherbrooke)

Results expected in 2023

Novel Additives Feed Hunger for Options

As any parent will attest, puberty is a stressful time for both the teenager and those around them. The equivalent for pigs may be weaning, when a number of important changes occur. Because those changes can lead to increased disease, the weaning period is the perfect candidate for cutting edge research like "Development of novel feed additives to replace antibiotics and promote pig gut health".

Changes that characterize weaning include a number of stressful events: separating from the mother, changing from milk to solid feed and adapting to a new housing environment. Since the pig's digestive and immune systems are still in the early stages of development at this time, weaners often experience lower feed intake, impaired digestion and a greater likelihood of contracting disease.

Enteric diseases are a prime example, and while they are usually treated with antibiotics in the diet or high levels of zinc oxide, times are changing. The annual consumption of antimicrobials worldwide was estimated at 63,151 tons in 2010, which equates to 172 mg/kg for pigs. As this poses a major health threat to humans and animals by increasing antimicrobial-resistant pathogens, antibiotic growth promoters in animal food production have been banned in the EU since 2006. In Canada, as of December 1, 2018, all Medically Important Antimicrobials for veterinary use are sold by prescription only. The responsible use of these antimicrobials is intended to preserve their effectiveness and minimize the development and spread of antimicrobial resistance.

The challenge for producers, and thus, for researchers, is how to find alternatives to antibiotics that will be effective, affordable and environmentally friendly. Options that have potential in that regard include probiotics, enzymes, antimicrobial peptides and phytochemicals (non-nutritive plant chemicals that have protective or disease preventive properties).

PROJECT

DEVELOPMENT OF NOVEL FEED ADDITIVES TO REPLACE ANTIBIOTICS AND PROMOTE PIG GUT HEALTH

Led by: Joshua Gong, AAFC (Guelph); Chengbo Yang, University of Manitoba

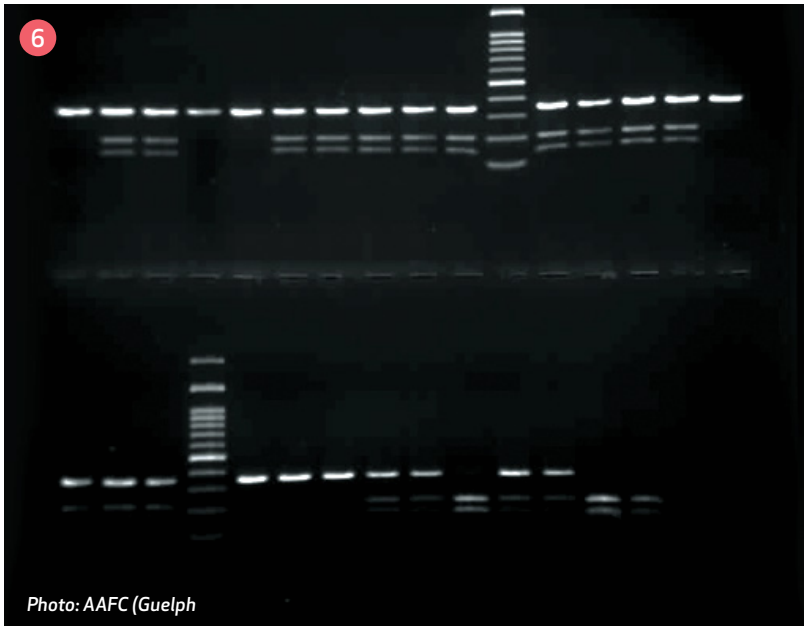
Results expected in 2023

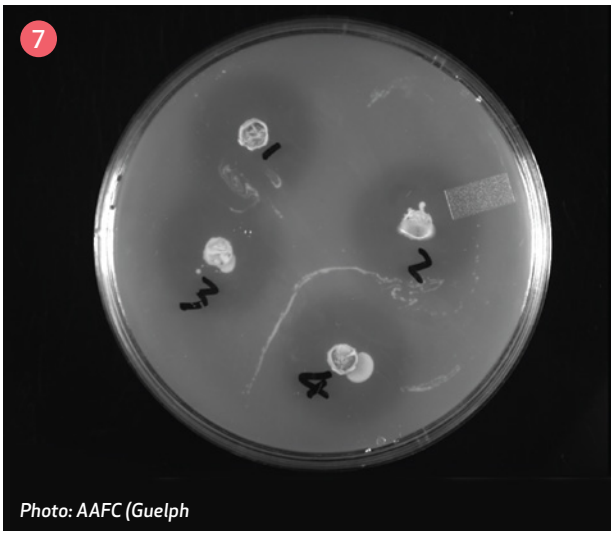
To assess that potential, this project examined novel enzymes and probiotics as alternatives to in-feed antibiotics that may also improve gut health and production levels. After testing three diets on piglets at the University of Guelph, scientists found that diets supplemented with exo-AP (exogenous alkaline phosphatases) outperformed therapeutic antimicrobials when it came to nutrient utilization and maintaining gut health in weaning pigs.

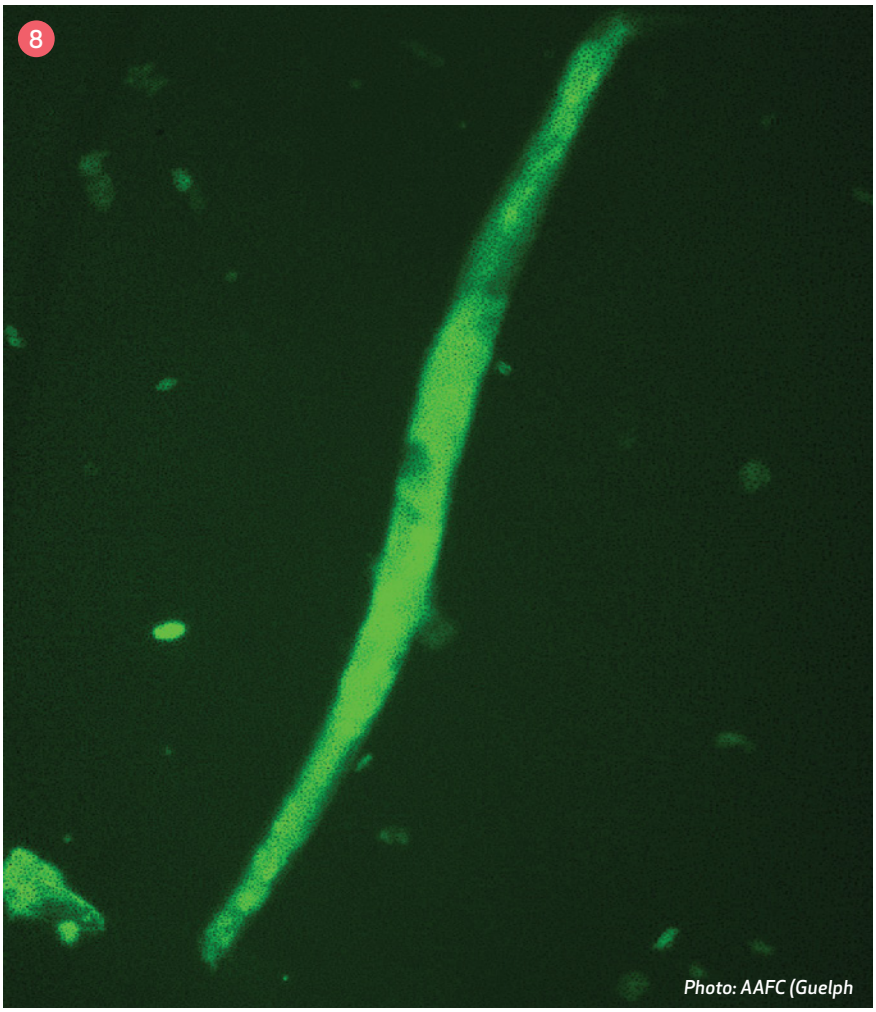
In regard to probiotics, the team established an effective pig challenge model with E. coli F4, which is a major cause of piglet diarrhea. They also evaluated a previously identified Lactobacillus strain for its probiotic functions through pig challenge experiments. The data indicate that the isolate alleviated piglet diarrhea and improved pig gut functions and health.

As researchers continue to analyze exo-AP and ensure that it is safe for animal consumption, the potential is intriguing. Pending approval by the Canadian Food Inspection Agency, exo-AP could serve as a viable alternative to antibiotics while boosting profit margins in the Canadian pork industry.

Add to that the ability of exo-AP to improve nutrient use efficiency while addressing environmental issues such as excessive manure nutrients and antimicrobial resistance concerns, and you have a win-win-win solution for pigs, producers and the public.







5 *Culture plate used to isolate enterotoxigenic E. coli from challenged pigs.*

6 *Diagnostic test analysis used to identify susceptible pigs.*

7 *Agar plate used to grow microorganisms.*

8 *Studies on the selection, encapsulation, and mechanism of novel probiotic isolates are done using Caenorhabditis elegans as an infection model. This photo shows a C. elegans worm labeled with green fluorescent protein.*

9 *Piglets in the isolation unit.*

Photo: 5 Chicks and a Farmer

Photo: AAFC (Guelph

10 *Fecal samples were collected from antibiotic free and free-range, pasture-raised pigs on the "5 Chicks and a Farmer" farm in New Hamburg, ON, for isolating beneficial bacteria.*

11 *The research team at the AAFC research station in Guelph, ON. Left to right: Mr. Yangsheng Xiao, Dr. Hai Yu, Ms. Lauren Santangelo, Dr. Joshua Gong, Mr. Matthew Chase, Ms. Yuanyuan Zho, Dr. Chongwu Yang, Linyan Li, Mr. Alexander Novodvorski.*

10 YEARS OF INNOVATION

Since 2010, Swine Innovation Porc has facilitated and coordinated three national swine research and development programs, in addition to supporting projects that address the industry's emerging issues, such as African swine fever and porcine epidemic diarrhea.

$51 MILLION INVESTMENT

+50 PROJECTS

+100 RESEARCHERS

3 CANADA-WIDE, R&D AND KT PROGRAMS

+100 FINANCIAL PARTNERS

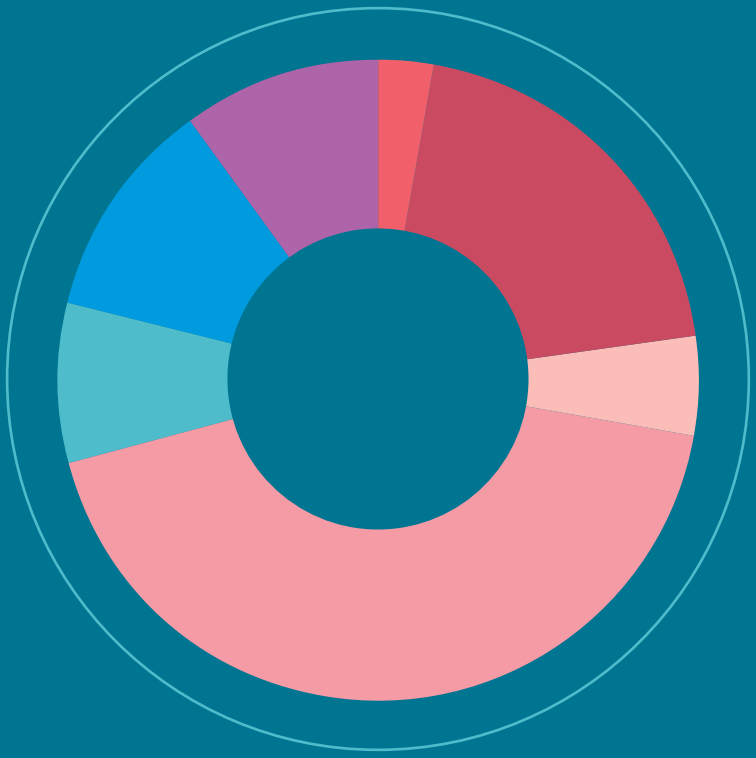
+1450 COMMUNICATION ACTIVITIES

+20,000 EVENT AND CONFERENCE PARTICIPANTS REACHED

Funding by R&D Theme: 2010-2023

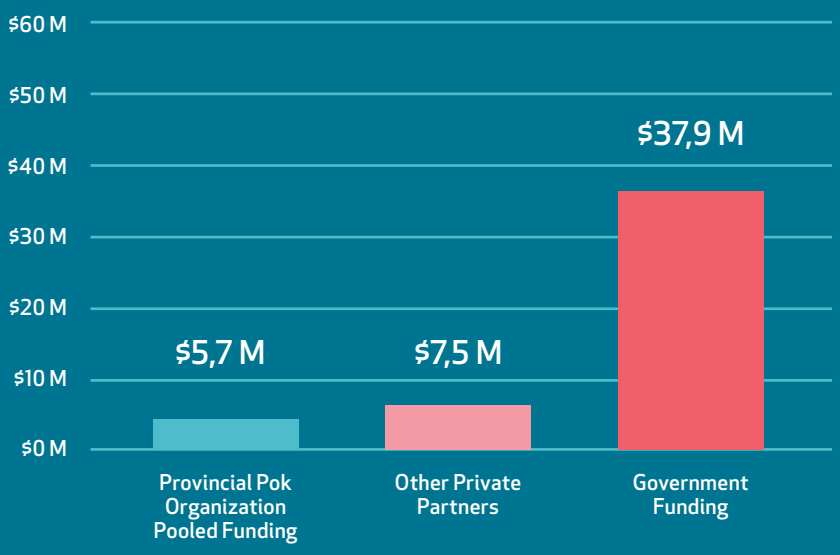
More than 90% of our total funding goes toward R&D activities, including research and all communications and on-farm demonstrations. Here is an overview of funding allocation per theme, since 2010:

- 3% Building & environment
- 20% Health
- 5% KT
- 43% Nutrition
- 8% Pork Quality
- 11% Technology
- 10% Welfare



Investing in Swine R&D: 2010-2023

Since 2010, we have managed over $51 million in investment in R&D. For each producer dollar invested, an additional 8 dollars is leveraged from other sources.



COMMUNICATION & COLLABORATION 2019-2020

Finding meaningful ways to communicate with our partners and the end users of our supported R&D is an essential goal for Swine Innovation Porc. Over the past year, we have continued to host various events and meetings, publish articles and ebulletins as well as partner with existing events and media to help disseminate information. Read below for more details on our communication activities carried out over this past year.

SWINE HEALTH EVENT: *WHAT IS THE MICROBIOME ANYWAY? GUT HEALTH AND HOW IT IMPACTS PIG PRODUCTION*

In January 2020, we held our third swine health event in Banff, where the focus was on the microbiome and pig gut health. This session provided a unique opportunity to learn about the impact of the microbiome on overall health. Videos of the three presentations may be found on our website at **www.swineinnovationporc.ca**.

POSTER SESSION AT THE 2019 PORC SHOW

Our second annual scientific poster session was held at the 2019 Porc Show, an industry event held annually in Quebec City. Posters from projects taking place in Quebec and Ontario were presented.

ENHANCING KNOWLEDGE TRANSFER: PARTNERSHIP WITH CDPQ AND PRAIRIE SWINE CENTRE

Part of the Swine Cluster 3 research program includes a significant component dedicated to knowledge transfer and ensuring that results of projects reach end users. To carry out on-farm demonstration of research results, as well as other communication activities, we have collaborated with Prairie Swine Centre and CDPQ (*Centre de développement du porc du Québec*) to develop a comprehensive knowledge transfer program. Activities within this program will be carried out from 2020 to 2023.

ENHANCING COLLABORATION

Coordinated African Swine Fever (ASF) Research Working Group

The threat of ASF arriving in Canada continues to be a considerable concern for the swine sector. In order to contribute to preparedness and prevention efforts, Swine Innovation Porc invited swine health experts from Canada and the United States to form a working group to develop an analysis of the gaps in the science related to addressing ASF.

Swine Research Centres Group

In 2017, Swine Innovation Porc started an initiative to bring together representatives from nine swine research centres across Canada. The purpose of this initiative is to allow facility managers to share best practices and challenges, as well as provide a venue to network and explore opportunities for collaboration. The group met again in October 2019 to provide updates and it was expressed that these meetings provided value for the centres. Therefore, virtual meetings will be planned over the coming year on an as needed basis.

Truck Wash Project Advisory Group

Industry representatives met with researchers involved in the Truck Wash Project to discuss the project and provide feedback on what had been done so far. From this meeting, the research team received valuable advice and recommendations about the project's next steps. The meeting took place in Winnipeg in July 2019.

Meat Quality Project Networking Meeting

Researchers involved in the Meat Quality Project met with industry representatives in Guelph in October 2019 to update each other on the status of research activities. One highlight of this meeting was an in-lab demonstration of equipment being tested within the project, which included a "belly bender," marbling meter, and a color and texture grading station.

1 *Session presenters Andrew Van Kessel, Emma Allen Vercoe, John Harding, as well as session host Stewart Cressman.*

2 *Our second annual poster session at the 2019 Pork Show.*

3 *Poster session participants Ming Fan, Martin Lessard and Luca Lo Verso.*

4 *Swine Innovation Porc's Health Session, held in Banff, Alberta in January 2020.*

5 *Swine Innovation Porc's Chair Stewart Cressman presents at an Agri-Food Innovation Council meeting in Ottawa, May 2019.*

HIGHLIGHTS OF 2019-2020 COMMUNICATION ACTIVITIES

2019
2020

21
Featured articles published by Swine Innovation Porc on project results and updates

30
InfoInnovation electronic bulletins communicated

46
Farmscape Online reports done on research projects and Swine Innovation Porc activities

6 *A demonstration activity was included in the Meat Quality networking meeting.*

7 *Participants in the networking meeting for the Meat Quality project held in Guelph in October 2019.*

+20

Number of other media reports and articles published on Swine Cluster 2 and 3 research

3

National events and conferences where Swine Innovation Porc was present:

- Banff Pork Seminar (Alberta)
- Porc Show (Quebec)
- Agriculture Show (Quebec)

7

Number of meetings where Swine Innovation Porc representatives made presentations and/or participated

SCIENCE ADVISORY BODY 2019-2020

The Science Advisory Body (SAB) is a committee that evaluates the scientific integrity of research proposals submitted to Swine Innovation Porc. Members of the SAB are recognized professionals who are well-known in their fields and represent a diverse range of expertise within swine research. This committee reviews research proposals, offers scientific expertise, gives technical advice and ultimately provides the Board of Directors with their recommendations.

The following individuals are the members of the Science Advisory Body in 2019-2020:

Andrew Van Kessel
SAB Chair
Professor & Department Head
University of Saskatchewan

Patrick Charagu
Senior Geneticist
Hypor

Neil Ferguson
Swine Nutrition Research Manager
Trouw Nutrition

Sylvain Fournaise
Vice President - Food Safety & Technical Services
Olymel

Éric van Bochove
RDT Director
Agriculture and Agri-food Canada, Sherbrooke & Quebec Research & Development Centres

Dan Hurnik
Chair; Professor, Swine Health Management
Atlantic Veterinary College, University of PEI

Nathalie Trottier
Professor
Michigan State University

MANAGEMENT TEAM

Abida Ouyed
General Manager

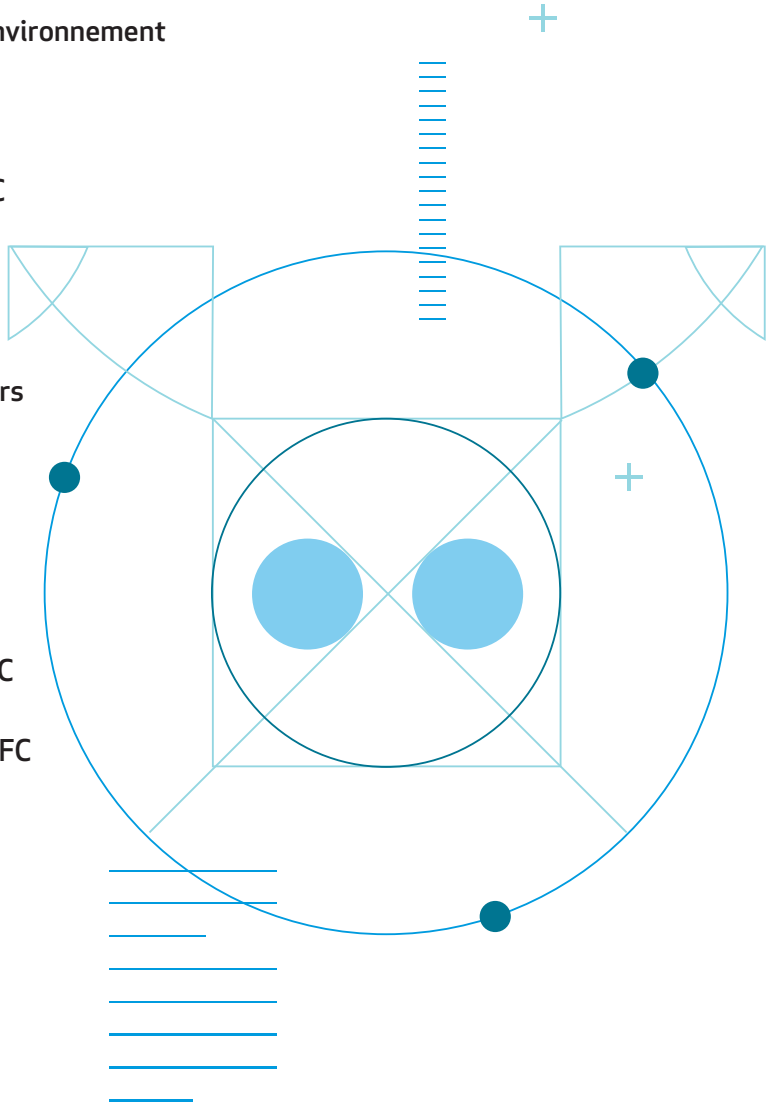
Marie Vachon
Research Coordinator

Leslie Walsh
Liaison & Communications Officer

Pierre-Dominique Munger
Accounting Assistant

PARTNERS IN RESEARCH

Agassiz Research and Development Centre, AAFC
Blue Water Wash
Canada Pork
Canadian Centre for Swine Improvement
Canadian Food Inspection Agency
Centre de développement du porc du Québec
Centre de recherche en sciences animales de Deschambault
CEVA Santé Animale
Guelph Research and Development Centre, AAFC
HyLife
Institut de recherche et de développement en agroenvironnement
Lacombe Research and Development Centre, AAFC
Lallemand Health Solutions
Laval University
Lethbridge Research and Development Centre, AAFC
Luckhart Transport
McGill University
Nutreco
Olymel
Ontario Ministry of Agriculture, Food and Rural Affairs
Prairie Agricultural Machinery Institute
Prairie Swine Centre
Prairie Swine Health Services
Probiotech International
Semican
Shandong University
Sherbrooke Research and Development Centre, AAFC
Sollio Agriculture
St-Hyacinthe Research and Development Centre, AAFC
Transport Genie
University of Alberta
University of California
University of Guelph
University of Manitoba
University of Montreal
University of Saskatchewan
Utrecht University
VIDO-Intervac
Zinpro



FINANCIAL PARTNERS

Alberta Pork

BC Pork — Proudly Grown Close to Home

Les Éleveurs de porcs du Québec

Manitoba Pork

Ontario Pork

PEI Pork

Porc NB Pork

Sask Pork

Canadian Pork Council
Conseil canadien du porc

Canadian Agricultural Partnership — Innovate. Grow. Prosper.

Partenariat canadien pour l'agriculture — Innover. Croître. Prospérer.

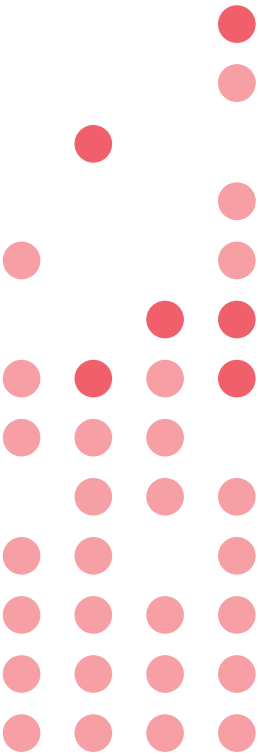
Canada

FINANCIAL PARTNERS

FINANCIAL PARTNERS

ORGANIZATIONS COLLABORATING IN CERTAIN PROJECTS

Agri-Marché
Avivagen
Blue Water Wash
Canada Pork
Centre de recherche en infectiologie porcine et avicole - Scholarship
Centre de recherche en sciences animales de Deschambault
Greensnow Biological
HyLife
ICOR Technology
Illumina
Industrial Vacuum Equipment Corporation
Luckhart Transport
Prevtec Microbia
Southwest Ontario Veterinary Services
Synergy Swine Inc.
Transport Genie
University of Montreal - Diagnostic Services, Faculty of Veterinary Medicine
University of Montreal - Scholarship
Western Swine Testing Association



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