



Towards a new feeding approach of neonatal and weanling piglets for optimizing nutritional status, immunity and microbiota and minimizing the use of antibiotics

Frédéric Guay, Laval University

Dominic Poulin-Laprade, Sherbrooke Research and Development Centre (AAFC)

Why is this project important?

Previous studies have found that establishment of microbial populations and intestinal expression of several genes involved in immune response were differently regulated in low weight suckling piglets compared to high weight piglets at 16 days of age. Results also showed that weanling feed containing defatted bovine colostrum (BC) and enriched in vitamins and additives with prebiotic and antimicrobial activities, improved performance compared to pigs fed a non-supplemented commercial weaning diet.

Another important challenge in the pre- and post-weaning period is to provide feeds with digestible energy sources that allow for a good transition. In the peri-weaning period, the main source of energy for the piglet changes from milk lactose to cereal starch. New varieties of oats, known as naked oats, now offer the opportunity to add a source of highly digestible starch to the weaned piglet that could positively affect growth and microbiota during the peri-weaning period.

Based on these results, it is evident that new feeding approaches need to be developed for application by commercial swine producers. These strategies would modulate gut health and piglet robustness from birth to after weaning, minimize reliance on in-feed antibiotics, and maximize performance.

What will be the benefit of this research?

The study found that by adding a medium chain fatty acid and yeast extract to the diet, they were able to prevent diarrhea in some pigs and decrease its severity in others.

Researchers are also intrigued by the potential of biomarkers. If all goes as planned, biomarkers could prompt a whole new area of study. Instead of trying to find solutions while working with a model in the lab, scientists could go directly to the barn. In doing so, they would observe the ani-



mals in their natural environment and note the action of the pathogen and how it affects the host. This change in methodology should produce more relevant results going forward.

Based on the results obtained, relevant recommendations will be made to producers and other stakeholders on feeding plans to improve piglets’ robustness and resilience to enteric infection in the absence of antibiotics. Moreover, the blood and feces markers identified will offer breakthrough information and tools to measure pigs’ intestinal and systemic response to pathogens, and to evaluate feeding strategies to improve their resilience.

What did the researchers do?

Scientists inserted feed additives in piglet diets - when they were at the solid food stage - to prevent or lessen diarrhea from *Salmonella*. In the process, they also wanted to identify the effects of *Salmonella* and explore the use of biomarkers to study animals without the need for euthanasia. Employing these markers would enable researchers to preserve animals following a study and save money in the process.

One option explored by this project was a bacterium called *Veillonella*. Scientists observed that when *Salmonella* infection was present in the pig’s gut, *Veillonella* levels were reduced, and these levels rose in the absence of the infection. This could prompt future research on the potential value of this bacterium as a probiotic that would be added to feed and render pigs less susceptible to *Salmonella*.

Collaborators

Alexandre Thibodeau	University of Montreal
Mylène Blais	Agriculture and Agri-Food Canada
Yves Desjardins	Laval University
Étienne Yergeau	<i>Institut national de la recherche scientifique</i>

Project status

Completed in 2023.

Additional resources and information about this project

R&D Featured Articles by Swine Innovation Porc

- [A Proactive Approach to Antibiotics](#)
October 4, 2023

Farmscape Interviews

- [Scientists Seek Alternatives to Antibiotics for Growth Promotion](#)
August 11, 2023
- [Canadian Scientists Evaluate Alternative Feeding Supplements](#)
June 28, 2023

Peer-reviewed articles and abstracts

- Lessard, M., Blais, M., Beaudoin, F., Deschene, K., Verso, L., Bissonnette, N., Lauzon, K., Guay, F. (2018, December). Piglet weight gain during the first two weeks of lactation influences the immune system development. Abstract. *Veterinary Immunology and Immunopathology*, 206. pp. 25-34.
<https://doi.org/10.1016/j.vetimm.2018.11.005>

Additional resources

- Ayers, K. (2019, February). Getting at the “Guts” of piglet health. *Better Pork*. pp. 6-14.
<https://www.betterfarming.com/flippingbook/better-pork/2019/february/#6>
- AAFC (2019, April). Strategy for healthy piglets without antibiotics. *Agriculture and Agri-Food Canada Agri-Info Newsletter*.
<http://www.agr.gc.ca/eng/news/agri-info-newsletter/?id=1419351635969>

Financial support for this project

This project is part of the Swine Cluster 3 (2018-2023) research program, made possible through financial support from Agriculture and Agri-Food Canada’s Canadian Agricultural Partnership, eight provincial pork producer organizations and over 30 industry partners. [Click here to learn more about the financial partners for Swine Cluster 3.](#)