Can post-weaning *E. coli* diarrhea be prevented in nursery pigs using a live oral vaccine?

Michelle Rose Goodman[1], Robert Friendship[1], and Abdolvahab Farzan[1, 2]

[1]Department of Population Medicine, [2]Department of Pathobiology, University of Guelph, Ontario N1G 2W1

Background: Post-weaning diarrhea (PWD) caused by enterotoxigenic *E. coli* (ETEC) is a common problem on swine farms. It can lead to large economic losses attributable to mortality, weight loss, morbidity and treatment. To control PWD, antibiotics and zinc oxide are often administered to piglets. However, these treatment methods have generated concern related to antibiotic resistance and environmental contamination with heavy metals. Therefore, the swine industry is interested in alternative methods of controlling *E. coli,* such as vaccination.
The objective of this study was to investigate the effects of a live *E.coli* vaccine on occurrence of diarrhea and growth in nursery pigs. Two trials were completed with 90 piglets in each trial. The pigs were divided into two groups vaccinated (VAC, n =30) and non-vaccinated (NV, n=60). The piglets in the VAC group were vaccinated 6 days prior to weaning. Pigs were weighed at weaning, 2 and 5 weeks post-weaning. Pigs were observed daily and diarrhea scores recorded. Rectal swabs were taken for bacterial culture.

Results and Discussion – No significant difference regarding the occurrence of diarrhea was identified between VAC and NC pigs in trial 1. However, in trial 2, VAC pigs were more likely to have diarrhea than NC pigs at 2 weeks post-weaning (OR = 6.9, $P < 0.001$). Frequency of diarrhea was highest for VAC pigs at 2 weeks post-weaning in trial 1 and 2 as well as, 5 weeks post-weaning in trial 2. In both trials diarrhea was reported within the first week, indicating that the vaccination did not have sufficient time to provide immunity. The average daily gain of VAC pigs was not significantly different from NC pigs in both trials. Based on the findings of this study, the vaccine did not reduce occurrence of diarrhea or improve growth in weaned pigs. Regarding presence of ETEC, VC pigs were more likely to test positive for ETEC from fecal swabs at 2 (OR = 5.0, P = 0.001) and 5 (OR = 3.5, P=0.007) weeks post-weaning than NC pigs in trial 1.

Conclusion – Use of the *E. coli* vaccine did not appear to provide protection against post-weaning *E. coli* diarrhea under the conditions of these trials.

Take Home Message – Under the conditions of these trials the vaccine did not prove to be effective in reducing *E. coli* diarrhea or providing an economic return from improved growth rate.

Acknowledgement - This work received financial support from Swine Innovation Porc and Ontario Agri-Food Innovation Alliance