



This research seeks to provide a natural, non-antibiotic strategy to keep piglets healthy after weaning, and provide a continuous supply of high-grade pork to consumers.

Evaluating Segmented Filamentous Bacterial Colonization of Piglet Intestine

Who cares and why?

Maintaining healthy hog herds, and increasing pork production, is vital to a state that counts pork production as a \$2.5 billion industry. Farmers and producers, consumers and the state's economy all stand to gain from a safe, nutritious product.

Weaning piglets early, at 2-3 weeks, increases profits and has become the industry norm. However, this practice also leaves piglets vulnerable to infections, as their gastrointestinal tract is still immature. Pathogenic bacteria can colonize the GI tract, leading to such conditions as post-weaning diarrhea, the leading cause of death in piglets.

Since the standard industry practice of using antibiotics to prevent post-weaning diarrhea is now limited by the FDA's Veterinary Feed Directive, as it has been linked to the rise in antibiotic-resistant bacteria, it has become vital to livestock producers to find new strategies to improve piglet health.

This project aims to explore the role of a "positive" type of bacteria that colonizes the gut of healthy, weaned piglets, segmented filamentous bacteria (SFB), to see if this bacteria can boost piglets' intestinal immunity and provide a new, natural, alternative strategy to antibiotics for post-weaning diarrhea prevention.

Livestock producers, health-care professionals, scientists and the general public could all benefit from the identification of a non-antibiotic intervention that would prevent a major problem in the swine industry while providing a safer, more nutritious product for consumers.

What has the project done so far?

The primary aims of this project were to find out the stage at which segmented filamentous bacteria colonizes the small intestine of piglets weaned between 2-3 weeks old, and to determine whether having the bacteria influences the piglets' development of intestinal immunity to pathogenic bacteria and a reduction in the incidence of post-weaning diarrhea.

Researchers collected and analyzed fecal samples and intestinal tissues from piglets at various ages and analyzed them to detect traces of the beneficial bacteria. Analysis showed that the bacteria is primarily present after weaning, which is consistent with expectations and encouraging.

This is the first time that a role for this bacteria on pig immunity has been described.



Impact Statement

North Carolina ranks second in the nation in pork production. The pork industry contributes \$2.5 billion to the state economy each year. Weaning piglets early maximizes profits for livestock producers, but can result in conditions that make piglets sick, a major problem for the industry. This research seeks to provide a natural alternative to antibiotic treatments in preventing post-weaning problems, providing a safe, nutritious product for consumers without the use of antibiotics, which have been linked to the increase in antibiotic-resistant bacteria. This research would be the first to describe a role for this particular beneficial bacteria in piglet immunity.

What research is needed?

More study is needed to determine whether or not piglets' immunity is aided by the beneficial bacteria. Data indicate that using intestinal samples instead of fecal samples to determine if an animal has the beneficial segmented filamentous bacteria would be more accurate. The next steps are to identify a biomarker produced by colonizing, growing bacteria, and to increase the number of animals in the study to make definitive conclusions. Although promising, more work needs to be done to find a correlation between segmented filamentous bacteria and protection from post-weaning diarrhea.

Want to know more?

Dr. Radiah Minor, (336) 285-4787; rcminor@ncat.edu

Funding for this project was provided by the Evans Allen Program within the USDA's National Institute for Food and Agriculture (NIFA), Accession # 1003260. It addresses the NIFA Knowledge Areas (302) Nutrient Utilization in Animals; (311) Animal Diseases.