

Maternal influences on piglet microbiomes and health

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Abstract

The objective of this presentation is to discuss the manipulation of maternal factors in swine production systems and their influence on pig health and production. The sow can potentially be targeted through management or dietary interventions such that the piglet microbiome and physiology are affected. Through modulation of the microbiome, piglet immune status, growth performance, and health may also be affected. Although a handful of studies have observed a large maternal influence on individual piglet microbiome and health outcomes, it is not clear how the abundances of specific taxa within sow microbiomes are linked to those found in the piglet gut microbiome, or how these taxa, when transmitted to the piglet, affect piglet physiology and health. Relevant literature regarding swine microbiome development, as well as current research being conducted at the University of Minnesota, were used to investigate the variety of maternal factors that may contribute to the determination of the pioneer microbes initially colonizing piglets at birth and the impact of early colonization on piglet physiology. These factors include maternal environment, diet, parity, genetics, and health status. Pioneer microbes guide the overall development of piglet microbiomes and influence the promotion or inhibition of other taxa acquired along the lifespan that may impact performance. Because all piglets in a litter are exposed to the same pioneer microbes at birth, piglets belonging to the same litter have similar microbiome development and community compositions. Therefore, regardless of dietary or management interventions later in life, the most influential factors affecting piglet microbiome and health outcomes can be traced back to the sow. Understanding how maternal factors at birth influence piglet microbiomes is key to unlocking the potential for manipulation of these factors to positively influence pig health and production without the need to resort to individualized interventions or strategies later in life.