RESEARCH ABSTRACT

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SWINE HEALTH

Title: Fecal microbiome transplantation as a preventive strategy against gut-dysbiosis and porcine post-weaning diarrhea (**#19-216 IPPA)**

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Scientific Abstract:
Post-weaning diarrhea (PWD) caused by enterotoxigenic Escherichia coli (ETEC) is an economically important disease in weaned piglets. Currently, antibiotics are used in the swine industry to control enteric infections, including PWD in piglets. Recent studies have confirmed that disruption of the gut microbiome (gut dysbiosis) induced during weaning transition is a critical factor involved in PWD pathogenesis. Gut dysbiosis has been found to be invariably implicated in both initiation and clinical manifestation of PWD. Therefore, stabilizing the gut microbiome during the weaning transition could be an effective strategy for controlling PWD. Recently, fecal microbiome transplantation (FMT) has been shown to prevent gut-dysbiosis and control serious enteric diseases in humans. However, the application of these strategies is minimally explored in the swine industry. This proposal investigated the use of FMT as a preventive strategy against gut- dysbiosis and ETEC infection in weaning piglets. In this project, we tested our central hypothesis that gut microbiome dysbiosis and PWD in piglets could be ameliorated by the transplantation of adult pig gut microbiota to the piglets at weaning. For this experiment, a fecal microbiome mixture prepared from six 3-month-old healthy piglets was transplanted to the piglets at 4th and 7th days postweaning (n=6), and the piglets were challenged with a F18 positive field isolate of ETEC (EC) on 7th day post-FMT. The clinical score and diarrhea score were recorded daily for 8 days post-infection and the fecal samples were analyzed for ETEC load and microbial diversity and abundance using qPCR and Illumina MiSeq-based 16s rRNA sequencing technology respectively. FMT group had a significantly lower mean diarrhea score and lesser histologic lesions compared to controls. In addition, FMT significantly increased the abundance of beneficial bacterial communities such as Firmicutes and *Bifidobacteria* in the gut and significantly increased the gut microbial diversity. Together, this study suggests that FMT could be a promising strategy to prevent gut dysbiosis and ETEC infection in weaning piglets, which could be tested at field level.