Abstract: Weaning is a critical period during swine production, as pigs endure multiple stressors. Stressors provide an opportunistic gut environment for development of enterotoxigenic Escherichia coli (ETEC) diarrheal disease. Probiotics are known to improve gut health, but the specific mechanisms to protect intestinal barrier function are unknown. The objective is to investigate protective effects of Pediococcus acidilactici (PA) and Lactobacillus helveticus (LH) against ETEC challenge using porcine IPEC-J2 intestinal epithelial cells. IPEC-J2 cells were seeded at a concentration of 1 × 10⁶ cells/insert, grown for 4 d, then treated with PA or LH for 3 h at concentrations of 10⁶, 10⁷, 10⁸, and 10⁹ colony forming units (CFU)/mL. Bacterial adherence assays were performed to determine probiotic CFU adhered to the cells. To assess probiotic inhibition of ETEC adherence, cells were treated with probiotics at previously defined concentrations and ETEC 3030-2: K88ac (multiplicity of infection 2:1) for 2 h. Following incubation ETEC adherence assays were conducted. Cell cytotoxicity was assessed by lactate dehydrogenase (LDH), and paracellular permeability was measured using 4-kDa fluorescein isothiocyanate-dextran (FITC-dextran). Data were analyzed according to a randomized block design using GLM procedures of SAS. Both probiotics exhibited a concentration-dependent ability to attach to epithelial cells (PA 5.05, 6.03, 6.96, 7.67 ± 0.08 log₁₀ CFU/cm² P < 0.001; LH 5.54, 6.24, 7.38, 8.16 ± 0.19 log₁₀ CFU/cm² P < 0.001). In the presence of ETEC, probiotic treatment linearly inhibited ETEC adherence (PA 23.49, 31.48, 4.59, 0.17 ± 6.85% of control P < 0.001; LH 39.50, 28.0, 0.49, 0.020 ± 5.21% of control P < 0.001). Increasing concentrations of probiotics modulated IPEC-J2 cellular cytotoxicity in the presence of ETEC (P < 0.05). However, the probiotics were not able to protect FITC-dextran flux across the epithelial cell barrier following ETEC challenge. Our findings indicate these probiotics have protective effects in preventing ETEC adhesion and modulating cell death, but do not reduce paracellular flux.

**Keywords:** swine, intestinal barrier function, probiotics

PSXII-18 Genome-Wide Association for Behavioral Anestrus in Swine.

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Abstract: Gilts represent a significant portion of breeding females, and producer success largely depends on lifetime prolificacy and number of lifetime litters produced. Expression and precise detection of first estrus are key components for successful breeding. Failure to express behavioral signs of estrus, also known as prebreeding anestrus, affects 10-30% of gilts resulting in premature culling. Behavioral anestrus (BA), that is ovulatory cycles of the ovary without signs of estrus, is a major type of prebreeding anestrus that affects up to 5% of the gilt population at the U.S. Meat Animal Research Center. Examination of ovaries revealed that 38% of BA gilts had exhibited more than one ovulatory cycle. Identification of ovaries of ovarian precursors of BA could minimize prebreeding anestrus in gilts. Data collected from normal cyclic (n=2,421) and BA gilts (n=515) from a multigeneration Yorkshire-Landrace-Duroc composite population were used for a case-control genome-wide association to identify candidate genes and cell signaling pathways associated with BA in gilts. The genomic heritability for BA in the population was 0.35. Fifty-six genome-wide significant SNP were identified with proportion of phenotypic variance explained by each SNP ranging from 0.009 to 0.06. Quantitative trait loci identified for BA harbor candidate genes involved in olfaction (OR13H1) and behavioral disorders (PLCB4). Biologically this is expected because, activation of olfactory pathways by boar pheromones is important to stimulate female lordosis behavior and sexual receptivity to boar. Several candidate genes identified for BA (IGSF1, MSTN, RXRG) were previously reported for age at puberty in humans and cattle suggesting the pleiotropic nature of these genes influencing multiple estrus related traits in different species. To our knowledge this is the first large scale association analysis performed for BA in pigs and these data are an important first step to facilitate future studies to identify functional polymorphisms regulating estrus behavior in gilts. The USDA is an equal opportunity provider and employer.

**Keywords:** gilt, behavioral anestrus, GWAS