Effects of very low-dose antibiotics on gene expression profiles in ileal mucosa of weaned pigs infected with a pathogenic *E. coli*

Kwangwook Kim¹, Sungbong Jang², and Yanhong Liu¹

¹University of California, Davis, CA, ²University of Georgia, Athens, GA

<PSIV-11>

**Background**

- Antibiotics have been widely used as growth promoters and to treat the diarrhea disease caused by enterotoxigenic *Escherichia coli (E. coli)* in livestock production.
- As one of the biggest public health concerns, antibiotic resistance leads to tremendous economical losses and increased mortality of both humans and livestock.
- Potential antibiotic residue in food supply chain causes the selection of resistance genes in bacteria, which may lead to the failure of medical treatment in animal production.

**Objective**

To investigate the effect of very low-dose antibiotics on gene expression profile in ileal mucosa of weaned pigs experimentally infected with F18 *E. coli*.

**Materials and methods**

- Experimental design: RCBD (Blocks: BW x Sex)
- Low package: 5 PI (*pig*)-8 30
- Rec package: 2 PI-11 PI 50 mg/kg of antibiotics
- Statistical overrepresentation test was performed using Test type & correction: Binomial & Bonferroni correction
- LOW < 0.05 using Reference gene list:

**Results**

- Modulation of biological process in ileal mucosa of pigs challenged with F18 *E. coli*
- LOW VS. CON, d 11 PI
- REC VS. CON, d 11 PI

**Conclusions**

- Recommended-dose antibiotics enhanced disease resistance of pigs, as indicated by down-regulated the expression of genes involved in inflammatory response and response to stress.
- Very low-dose antibiotics adversely altered the expression of genes that are related to metabolic processes and immune responses.
- These observations support the adverse effects of very low-dose antibiotics on performance and overall health of weaned pigs infected with F18 *E. coli*.

**References**


**Preliminary data**

Supplementation of very low-dose antibiotics exacerbated growth performance and systemic inflammation of weaned pigs infected with a pathogenic *E. coli* (Kim et al., 2019a,b)