

## Kansas State University Research Foundation TECHNOLOGY LICENSING PROFILE

Porcine post-weaning diarrhea vaccine candidate & MEFA vaccine platform for enteric and respiratory diseases

REF. NO. (2014-020 & 2018-063)

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**Description:** Researchers at Kansas State University have created a novel structure-based multiepitope fusion antigen (MEFA) vaccine platform to allow for the development of enteric and respiratory disease vaccine candidates, including **porcine post-weaning diarrhea (PWD) vaccines**. Enterotoxigenic *Escherichia coli* (ETEC) bacteria are the primary cause of PWD. Currently there are no effective vaccines against PWD.

The PWD MEFA is cloned in a plasmid which is introduced into a non-pathogenic E. coli strain that binds at the animal and human intestinal epithelial cells and induces mucosal immunity. The live E. coli strain will proliferate in the small intestine constantly delivering the MEFA to receptors of the intestinal epithelial cells to induce specific host mucosal immune responses.

## **Development Status:**

- The framework for a universal MEFA-based structural vaccinology platform is verified
- PWD protective epitopes have been identified (Completed)
- Mouse immunogenicity studies of vaccine candidate (Fall 2018)
- Pig immunogenicity studies (Planned for Spring 2019)
- Pig challenge studies (Planned within the next 2 years)

**Funding:** In December 2017, the USDA's National Institute of Food and Agriculture awarded Dr. Zhang a multi-year grant in the amount of \$460,000 to create a cost-effective PWD vaccine.

## **Advantages**

- Structure- and epitope-based vaccines are safer to use than MLV vaccines, since there is no concern about reversion back to virulent strain and subsequently shedding the viruses
- Includes protective B-cell and T-cell epitopes
- A non-pathogenic E. coli strain will carry the epitope-toxin chimera construct to the animal, and the epitope-toxin antigen will be expressed while the E. coli colonizes and replicates on the mucosal surface

## Patent Status: Patent Pending