

Veterinary Researcher Makes Inroads in Fighting Classical Swine Fever

A Kansas State University researcher has licensed a new vaccine to an animal health company to fight a highly contagious swine disease overseas. A second discovery by the researcher could improve vaccines for the disease and help protect the U.S. from an outbreak.

Jishu Shi, professor of vaccine immunology and director of [U.S.-China Center for Animal Health](#) in the university's College of Veterinary Medicine, has developed a method of producing a classical swine fever vaccine safely and inexpensively. The disease can cause devastating epidemics among pigs if left unchecked.

Shi's vaccine uses a protein from the virus rather than a live or attenuated virus, which means the vaccine poses no biosecurity risk to produce in the U.S., where classical swine fever was eradicated in 1978.

Shi licensed his new subunit vaccine to an animal health company in China to continue to study its field efficacy. Classical swine fever has not been eliminated in China, and each of the 700 million pigs raised annually in the country currently receives two doses of vaccine against the virulent disease. Shi's version requires only one dose.

"We need to test the vaccine in the field to prove it will work," Shi said. "If it does, we can help China eradicate the disease, which further secures the U.S. by ensuring the disease doesn't spread to our shores."

Pigs given the current modified live virus classical swine fever vaccine test positive for the disease. Shi's other discovery will help develop a test to differentiate infected from vaccinated animals, known as a DIVA strategy. Shi and his collaborators identified two specific antibodies that can be used to differentiate whether pigs are infected or vaccinated, and he is working with colleagues at the U.S. Department of Agriculture, in Europe and in China to conduct more trials and gain full validation.

"This exciting discovery could result in solving an economic and trade problem in China — vaccines are expensive, and countries with classical swine fever can't export pork — and a security problem for the U.S.," Shi said

Peter Dorhout, Kansas State University's vice president for research, said Shi's work highlights the university's capacity for addressing high-consequence diseases.

"Our researchers develop real solutions to problems that threaten global food systems," Dorhout said. "Shi's work shows how we are expanding our reach around the world to build relationships, provide expertise and keep our food industries and supplies safe."

Shi conducted his research in the university's [Biosecurity Research Institute](#), or BRI. The institute gives investigators access to a biocontainment facility in which they can safely conduct research on diseases that threaten animal, plant and human health. Shi's work was supported by a grant from the [National Bio and Agro-defense Facility](#), or NBAF, Transition Fund.

"I couldn't do this work without the NBAF Transition Fund and the BRI," Shi said. "It gives us the competitive advantage of doing research on these diseases. This is an essential capacity, and we have a very good team there."

Stephen Higgs, director of the Biosecurity Research Institute, said Shi's work demonstrates the value of the facility, how funded research at the institute benefits the Kansas State University community as a whole, and how the institute's capabilities dovetail with the National Bio and Agro-defense Facility, which is the Department of Homeland Security's foremost animal disease research facility that is being built adjacent to Kansas State University's Manhattan campus.

"Our mission is to protect the U.S. and the world from diseases that we hope will never spread to North America," Higgs said. "Classical swine fever is one of the diseases that will be studied at NBAF, and we're proud to be supporting progress in fighting this economic threat to pork production worldwide."