

Researchers ID novel virus in US piglets affected by diarrhea epidemic

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A novel virus affecting young piglets and swine blood meal, an ingredient in pig feed, has been isolated and identified by researchers at the Virginia-Maryland College of Veterinary Medicine at Virginia Tech in Blacksburg, Va.

The virus, called mammalian orthoreovirus 3 (MRV3), may be contributing to intestinal infections affecting the [swine](#) population in the United States and other countries, the authors say. The work was published this week in *mBio*, the online open-access journal of the American Society for Microbiology.

Since May 2013, diarrhea outbreaks have caused economic losses in the U.S. swine industry, including the recorded deaths of at least 8 million piglets. Two different viruses, called porcine epidemic diarrhea coronavirus and delta coronavirus, already had been isolated from the affected swine population. Disease has been reported from 32 states as well as Mexico, Peru, Dominican Republic, Canada, Columbia, Ecuador and Ukraine, with repeated outbreaks in previously affected herds. Despite strict, intensive biosecurity measures adopted by many farms to control the epidemics, disease has continued to spread, the authors said.

"It remains to be determined whether MRV3 is responsible on its own or in conjunction with other viruses for the current epidemic of diarrhea in piglets in the United States, but the disease-causing nature of the virus warrants further investigations about its origin and prevalence," said senior study author Elankumaran Subbiah, MVSc, PhD, an associate

professor of virology at the college.

For the study, researchers tested 48 fecal samples taken from piglets living on farms in North Carolina, Minnesota and Iowa affected by swine epidemic diarrhea outbreaks, and 11 samples of ring-dried swine blood meal, a protein source used in animal feed. They found presence of MRV3 in 18 of the 48 (37%) fecal samples and nine of the 11 (82%) blood meal samples.

Then, to test whether normal, healthy pigs were affected by the same viruses, they obtained 36 samples of pig feces and plasma from farms in Indiana, Ohio, Iowa and Illinois that had no ongoing swine diarrhea infections or whose swine had recovered from diarrhea epidemics. None of these samples showed signs of the new virus.

In additional lab tests, neonatal piglets experimentally infected with the virus or given an extract of infected blood meal developed severe [diarrhea](#) and gastroenteritis and died within three days of infection. Genetic and other analyses of the MRV3 isolates from fecal and blood meal samples revealed that they were identical to each other but significantly different from other, non-disease-causing mammalian orthoreoviruses circulating in the United States.

Although MRVs don't commonly cause severe disease outbreaks in livestock, related disease-causing strains have been isolated from pigs in China and Korea, said study coauthor Xiang-Jin Meng, MD, PhD, university distinguished professor of molecular virology. This is the first time it has been identified in the United States, he said. MRV3 strains also have been reported in bats in Europe.

Continuing studies are necessary to determine how the virus originated; how prevalent it is; if it is a pathogen (an organism that causes disease) or an opportunistic infection (a microorganism that does not normally

cause disease but can if a host's immune system is impaired); and if additional blood meal lots have been contaminated. For now, Subbiah said, there is no evidence that the virus can be transmitted to humans.

The ultimate goal would be to develop a vaccine to control the spread of MRV3, the authors said. Subbiah's and Meng's laboratories are collaborating to make these vaccines.

More information: "A Novel Pathogenic Mammalian Orthoreovirus from Diarrheic Pigs and Swine Blood Meal in the United States." *mBio* 6:3 e00593-15; Published 19 May 2015, [DOI: 10.1128/mBio.00593-15](https://doi.org/10.1128/mBio.00593-15)

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