

## SWINE HEALTH

**Title:** Rapid detection and epidemiological surveillance of African swine fever using oral fluid – **NPB #15-125**

**Investigator:** Dr. Juergen Richt

**Institution:** Kansas State University

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### Scientific Abstract:

African swine fever (ASF) is a highly lethal and contagious disease of domestic and wild pigs. ASF is endemic to Africa, however in 2007 the ASF virus (ASFV) spread to Eastern Europe and subsequently spread to nine other countries, causing devastating impacts to their pork industries. If ASF were to emerge in the USA, the availability of accurate diagnostic tools and effective surveillance strategies would be critical for rapid detection and control. Oral fluid-based diagnostics provide a possible solution by allowing pen-based sampling. Using specimens derived from an experimental ASFV contact-infection model, we compared the diagnostic performance of a selection of commercially available diagnostic kits and OIE-recommended tests for the detection of specific antibodies and viral DNA. A comparison of diagnostic performance as a function of specimen (oral fluid vs. serum) was also performed. In three groups of pigs (n=6, n=8, n=16), two, two and four "donor" pigs, respectively, were inoculated intramuscularly with a moderately pathogenic strain of ASFV (Malta/78) and then returned to the remaining (contact) pigs in each group. The donor pigs developed severe disease between 6 and 11 days post infection (dpi) and were euthanized having reached predetermined humane endpoints. Contact pigs began showing clinical signs from day 5 post infection, which progressed to severe clinical signs between 14-35 dpi, at which point the majority of pigs were euthanized. Oral fluids collected with cotton rope, oral swabs, and faeces (pen) were collected daily and blood was taken every 2-3 days. Serological testing for ASFV antibodies in serum and oral specimens was completed using commercially available ELISAs from Ingenasa, IDvet and Svanova, and compared to the 'gold standard' immunofluorescence antibody (IFA) test. The IFA test proved to be more sensitive than the ELISA for detecting serum antibody, however, was comparable to a prototype IDvet Oral Fluids indirect ELISA. These results highlight the need for further development and commercialisation of sensitive ELISAs. Two commercial PCRs (Ingenasa qPPA and the IDEXX RealPCR ASFV DNA test) were also evaluated and compared with an OIE-recommended assay. All three assays showed similar levels of sensitivity for detecting ASFV DNA in blood. However, the IDEXX PCR was markedly more sensitive for detecting ASFV DNA in oral swabs or fluids. This study supports the potential use of oral fluids for surveillance testing, and has identified sensitive diagnostic tools to assist the swine industry and animal health decision makers concerning the tools and surveillance strategies available to deal with the potential emergence of ASFV in North America.

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For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org

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