RESEARCH ABSTRACT

SWINE HEALTH

Title: Investigating potential existence of chronic, persistent foot-and-mouth disease virus infection in domestic pigs; implications for disease control strategies - **NPB # 11-174**

Investigator: Jonathan Arzt

Institution: Agricultural Research Service, USDA, Plum Island Animal Disease Center

Support Scientists: Carolina Stenfeldt, Juan Pacheco

Date Submitted: February 18, 2014

Scientific Abstract

A systematic study was performed to investigate the potential of pigs to maintain persistent FMDV infection. The first step in the path to understand late phase of infection was to determine the infection dynamics of the early stages of FMD. Tissue distribution of virus at early time points indicated that oropharyngeal tonsils (specifically the lingual tonsils and paraepiglottic tonsils) function as initial sites of viral replication. Viremia and substantial shedding of virus in oral and nasal secretions was detected 24 hours prior to the appearance of clinical lesions. Following development of viremia, there was extensive dissemination, and infectious virus could be recovered from essentially all tissues analyzed.

After resolution of clinical infection, infectious virus could not be recovered from sera, oral, nasal- or oropharyngeal fluids. Furthermore, there was no isolation of live virus from tissue samples harvested at 28-100 days post infection from convalescent pigs recovered from clinical or subclinical FMD. Despite lack of detection of infectious FMDV, there was a high prevalence of FMDV RNA detection in lymph nodes draining lesion sites harvested at 35 days post infection (dpi), with the most frequent detection recorded in popliteal lymph nodes (positive detection in 88% of samples obtained from non-vaccinated pigs). Similarly, at 35 dpi, FMDV capsid antigen was localized within draining lymph nodes, but without concurrent detection of FMDV non-structural protein. There was a marked decline in detection of FMDV RNA and antigen in tissue samples by 60 dpi, and no antigen or viral RNA could not be detected in samples obtained at 100 dpi.

The work performed within this project provides information of the mechanisms of early FMDV infection in pigs that is critical for future development of improved products for FMDV countermeasure. Moreover, the data provides the most extensive investigation of FMDV persistence in pigs. The overall conclusion is that domestic pigs are unlikely to be competent long term carriers of infectious FMDV; however, transient persistence of FMDV degradation products in lymphoid tissues is common following clinical or subclinical infection.