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Persistence of PRRSV in Pigs

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Introduction Porcine Reproductive and Respiratory Syndrome virus (PRRSV) remains one of the principal causes of respiratory disease and reproductive loss in commercial swine operations worldwide. The epidemiology of PRRSV is complicated by the fact that the infection produces carrier animals, i.e., clinically normal, but chronically infected animals that serve as potential sources of infection. The presence of carrier animals in endemically infected herds makes the control and/or elimination of PRRSV from commercial herds difficult.

The objective of this study was to characterize the proportion of PRRSV carriers in a population. The experiment was designed as a longitudinal study in which biological samples were collected from pigs over time post inoculation (PI) and assayed for the presence of virus. Detection of infectious virus was required to classify animals as carriers.

Experimental Design Three week-old pigs (n = 180) were obtained from a herd free of PRRSV and randomly assigned to one of 2 treatments: PRRSV inoculated (n = 90) or uninoculated control (n = 90). Pigs exposed to PRRSV were intranasally inoculated with 2 ml (1 ml/naris) of the North American isolate ATCC VR-2332 at a concentration of 10³ fluorescence foci units per ml (FFU/ml).

Serum samples were collected from all pigs for virus isolation and/or serological evaluation on days -5, 0, 7, 14, 21 PI, and every 14 days thereafter or until animals were euthanized. Peripheral blood leukocytes were collected from all pigs on

day 63 PI and every 14 days thereafter or until euthanasia. Thirty pigs from each group were euthanized on day 7 PI and 12 animals from each group on days 63, 77, 91, 98, and 105 PI. Blood samples and oropharyngeal scrapings were collected ante mortem and tissue samples (lung, lung lavage, tonsil, tracheobronchial lymph nodes) were collected post mortem. All samples were appropriately processed, coded with random numbers, and stored at -80°C until tested.

The carrier status of individual pigs was determined as follows: 1) virus isolation (VI) was attempted on oropharyngeal scrapings; 2) if oropharyngeal scrapings were VI negative, VI was performed on tissues; and 3) if tissues were VI negative, swine bioassay was conducted using tonsil homogenate. Pigs were considered to be carriers if PRRSV was detected by either VI or swine bioassay.

Results Uninoculated control pigs remained uninfected and serologically negative throughout the study. All inoculated pigs were viremic at day 7 PI. Results of the assays indicated that 100% of inoculated pigs were carriers at 63 days PI. The rate of carrier animals gradually declined over time, but approximately 20% of pigs were still carriers at 105 days PI.

This is the first study to quantify the rate of PRRSV carriers in a defined population. These results raise important questions regarding the virology and immunology of the virus and have profound implications for the prevention and control of PRRS.