

## SWINE HEALTH

**Title:** Physical Characterization of the PRRSV Virion - **NPB #05-202**

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### Abstract

Current research strategies for development of better methods of PRRSV diagnosis, prevention and control are based primarily on the assumption that PRRSV behaves in pigs like related viruses behave in their own host species. However, PRRSV does not behave like other viral diseases. The 4-5 week course of acute, viremic infection and the months-long persistence in lymphoid tissues are exceptional. Here, we expanded on a prior NPB project to further investigate the molecular composition of the PRRSV virion to better understand the nature of viral interaction with host cell membranes and neutralizing antibodies. We determined that PRRSV is secreted from infected cells, both porcine macrophages and simian MA-104 cells, within 48 hr as a single population with respect to density, infectivity, RNA composition, and protein profile. Direct assessment of viral protein composition by two independent direct physical methods (mass spectrometry) indicated the presence of nucleocapsid (N), membrane protein (M), and envelope glycoproteins (GP) 5, 3, 2a, and 2b. We did not detect GP4 but detected a novel open reading frame peptide within GP5. We established the specific amino acid sequences of the mature forms of GP5, M and N and discovered that GP5 exists in a number of distinct glycosylation states. Host cell proteins also were identified in the virion. Growth characteristics of PRRSV were similar in macrophages and MA-104 cells. The results will help us determine the effect of GP5 glycosylation on antibody neutralization, a key concept in anti-viral immunity, and will provide a better foundation for development of effective vaccines.

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