RESEARCH ABSTRACT
SWINE HEALTH

Title: B Cell Repertoire Diversification and Class Switch in PRRS – **NPB #05-174**

Investigator: John E. Butler

Institution: The University of Iowa

Co-Investigators: Kelly Lager, USDA, ARS, Midwest Area
Joseph Urban, Jr., USDA, ARS, Beltsville Area

Date Submitted: September 26, 2008

Scientific Abstract

Germfree isolator piglets were used to determine the effect of PRRSV on the B cell repertoire. These studies showed that PRRSV causes proliferation of pre-immune B cells and by-passes antigen-driven repertoire diversification. This can explain the high levels of Igs of which few are PRRSV-specific and also the autoantibodies that characterize PRRSV-infection of isolator piglets. We propose that PRRSV accomplishes this by supplying or stimulating the production of a B cell superantigen. A vaccine strain lacking this property would be desirable.

Research into IgG subclass usage in PRRSV-infected piglets revealed a new major IgG subclass, IgG3 and resulted in the near completion of the characterization of the IgG subclass genes; there are six subclasses and at least two alleles for all but IgG3. Preliminary data indicate no preferential CSR to an IgG subclass in PRRSV-infected piglets that might explain the delay in the appearance of VN antibodies. Thus it is unlikely that the delay is due to the use of an ineffective IgG subclass and more likely due to the lack of repertoire diversification that would normally result in high affinity VN antibodies.

The results obtained when addressing both objectives strongly indicates the value of NPB-funded research in basic immunology of swine. It resulted in five peer-reviewed publications in high profile journals and contributed to three reviews. It is hoped that the discoveries made will have long term benefit in vaccine development, monitoring immune response and in swine management.