RESEARCH ABSTRACT

SWINE HEALTH

Title: Effects of high and low virulent PCV2 on activated PBMC populations. – **NPB #07-138**

Investigator: Eileen Thacker

Institution: Iowa State University

Date Submitted: August 11, 2008

Scientific Abstract:

The objective of this study was to investigate the potential differences in viral replication and apoptosis induced by two porcine circovirus type 2 (PCV2) isolates of different genotype and potential virulence. The PCV2 replication rate was determined using real-time polymerase chain reaction and reverse transcription polymerase chain reaction (RT-PCR) assays to detect viral DNA levels and a viral replication product, spliced Cap mRNA, respectively. The apoptotic index was measured using flow cytometric analysis which allowed the determination of the relationship between viral replication and lymphoid apoptosis based on lymphocyte subset. The studies were conducted *in vitro* and concanavalin A (ConA) or pokeweed mitogen (PWM) were used to stimulate peripheral blood mononuclear cells (PBMCs). We found that the high virulent PCV2b isolate, KSDVL 06-06274, replicated at a significantly greater rate, and had a higher apoptotic rate of T lymphocytes stimulated with mitogens ($P<0.05$) at 24 and 72 hours post infection (HPI) in PWM stimulated cells compared to the low virulent PCV2a isolate, 4838. Viral replication in the ConA stimulated cells was increased at the first time point, but no differences were observed at 72 or 120 HPI. By 5 days post infection, the PCV2a isolate, 4838, had a higher replication rate than the high virulent isolate with PWM stimulation. Increased apoptosis was observed at 72 HPI with the PCV2b isolate in ConA stimulated cells, while PWM stimulation resulted in increased apoptosis at 120 HPI. Different subpopulations of T lymphocytes exhibited different apoptotic rates, with CD8+ cells showing significantly greater apoptosis rate than any other population following stimulation with ConA at 72 HPI and at all times with PWM stimlation and infection with PCV2b. These results suggest that viral replication rate and apoptosis in activated immune cells may play a role in the virulence of PCV2 isolates and therefore lymphoid depletion and PCVAD. In addition, the induced apoptosis of CD8+ T cells may play a role in the ability of PCV2 to persist in the pig.