Salmonella Surveillance in U.S. Swine Herds

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Previous Research Efforts

Past research has focused on Salmonella choleraesuis virulence determinants and the interaction of this organism with the porcine immune system. Emphasis was placed on interaction of virulent S. choleraesuis field isolates with neutrophils and macrophages. Results suggested a correlation between relative bacterial virulence and the organisms ability to interfere with phagocyte ingestion, inhibit superoxide anion production, and overall intracellular survivability. A 40 kDa outer membrane protein was identified and determined to be involved with bacterial translocation and eukaryotic cell invasion.

Subsequent work with Dr. T. Kramer evaluating S. choleraesuis repeatedly passed through porcine neutrophils led to the discovery of an avirulent live S. choleraesuis isolate. I was involved in the characterization of this isolate and subsequently the commercialization of an avirulent live vaccine (NOBL Laboratories; SC-54). Research by myself as well as others has demonstrated the vaccine is an effective aid in the prevention of porcine salmonellosis caused by S. choleraesuis. Research has demonstrated that pigs vaccinated intranasally at 3 weeks of age are protected following virulent challenge from 2 to 16 weeks post-vaccination. Research by NOBL and a collaborative scientist has consistently demonstrated that vaccinated animals have reduced numbers of infected organs following virulent challenge exposure. In some studies the relative level of Salmonella per/gm of tissue has been reduced and there are some indications that fecal shedding of S. choleraesuis is reduced in vaccines compared to non-vaccinates.

A collaborative effort has also been completed evaluating PCR detection methods and a unique primer set for Salmonella detection in both field samples and pure culture.

Current Research Efforts

Current efforts are focused on Salmonella reduction and monitoring systems to be used by practitioners and possible role in a HACCP/Salmonella Reduction Program. Efforts include:

1. Vaccination of pigs at day 1 of age to reduce pre-weaning infection.
2. Vaccination of pigs and potential cross protection/reduction of Salmonella serotypes other than S. choleraesuis. Initial work will focus on S. typhimurium.
3. Implementation, validation, and evaluation of the Danish Salmonella ELISA in U.S. pigs.
4. Correlation of Danish ELISA results with Salmonella isolation at slaughter. We will also evaluate vaccinated and non-vaccinated pigs to determine potential effects of vaccine use under field conditions.