RESEARCH ABSTRACT
SWINE HEALTH

Title: Enhanced virulence and treatment of multiple antibiotic resistant *Salmonella choleraesuis* in swine – **NPB #07-076**

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Scientific Abstract:

Previous studies revealed that protozoa can augment the virulence of certain multiresistant *Salmonella* strains bearing the SGI1 integron. This phenomenon has not yet been observed in swine because many of these strains, including *S. typhimurium*, have low virulence in domestic pigs. However, SGI1 has now been detected in *Salmonella choleraesuis*, the swine-adapted serotype. This strain is henceforth designated as mr-*Salmonella choleraesuis.*

The first objective of this project was to evaluate the possibility that protozoa can augment the virulence of mr-*Salmonella choleraesuis in vitro* and *in vivo*. The second objective was to determine the best antibiotic for treating this infection.

In vitro studies involved assessing the host cell invasion of mr-*Salmonella choleraesuis* after exposure to protozoa. *In vivo* studies involved orally infecting 10 day-old pigs with mr-*Salmonella choleraesuis* exposed to protozoa. Swine were monitored for signs of disease and necropsies were performed in order to determine the amount of *Salmonella* in the animals. Some pigs were treated with either ceftiofur or amikacin.

Results from these studies revealed that protozoa are capable mediating hyperinvasion (700% of controls) in mr-*Salmonella choleraesuis*. Animal studies revealed that protozoa-exposed mr-*Salmonella choleraesuis* were capable of causing disease at 24 hours earlier compared to pigs infected with mr-*Salmonella choleraesuis* that had not been exposed to protozoa. Spleen samples revealed that mr-*Salmonella choleraesuis* was ten times more prevalent in swine infected with this strain following its exposure to protozoa. Both ceftiofur and amikacin ameliorated signs of disease (fever, diarrhea, and lethargy) although ceftiofur-treated pigs had smaller burden of mr-*Salmonella choleraesuis*.

The results indicate that mr-*Salmonella choleraesuis* is more virulent after exposure to protozoa. Protozoa are water-borne common microbes and thus it appears that the combination of protozoa and mr-*Salmonella choleraesuis* can lead to a dramatic course of *Salmonella* infection in swine. Ceftiofur seems to be the most appropriate treatment for this infection.

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