



## FINAL REPORT

### Avian Biosciences Grant Program

**Award Recipient** Rolf Joerger and Kali Kniel

**Department** Animal and Food Sciences

**Date of Award** 2006-2007

**Title** *Virulence Gene Prevalence and its Connection to Cell Invasion Potential of *Salmonella enterica* Isolated from Poultry Production Environments*

#### Summary of Findings

Genetic and physiological features of a set of 30 serovar Kentucky chicken isolates were compared with those of chicken isolates belonging to a range of other *S. enterica* serovars. Most of the known *Salmonella* virulence genes were detected in the serovar Kentucky isolates by PCR, but the *cdtB*, *spvB*, *spvC* and *pefA* genes were not found. Despite the absence of these virulence genes, the serovar Kentucky isolates were as invasive as the non-Kentucky isolates in *in-vitro* assays involving human HCT-8 cells and chicken embryo hepatocytes. No statistically meaningful differences between the groups of isolates were found with respect to resistance to environmental stresses such as exposure to 55°C, 4°C, H<sub>2</sub>O<sub>2</sub>, disinfectants, high salt, organic acids, dessication, and starvation. Exposure to growth medium adjusted to pH 2.5 with hydrochloric acid revealed that the serovar Kentucky isolates were more sensitive to HCl (average reduction in 20 min = 4.9 vs. approximately 3 log<sub>10</sub> reduction for the non-Kentucky isolates) and were not able to mount as strong an acid tolerance response as the non-Kentucky isolates after growth in medium adjusted to pH 5.5 with acetic acid (log<sub>10</sub> reduction of 3.1 vs. < 1 log<sub>10</sub> for the other isolates). It is likely that the apparent susceptibility to low pH induced by HCl is one of the factors that makes serovar Kentucky less of a threat to humans. Further studies need to be done to identify the basis of the extraordinary ability of serovar Kentucky to populate commercial chickens.

#### Publications Resulting From Research

Rolf D. Joerger, Casey A. Sartori, and Kalmia E. Kniel. *Salmonella enterica* Kentucky isolates from chickens exhibit low tolerance to hydrochloric acid-induced pH 2.5. Submitted to Foodborne Pathogens and Disease.

**Additional Grant Support Received as a Result of ABC Grant** None