

## ANIMAL WELFARE

**Title:** Transport lairage effects on well-being of 18 kg pigs using a multi-disciplinary approach - **NPB# 04-134**

**Investigator:** Susan Eicher

**Institution:** USDA-ARS

**Date Received:** March 31, 2006

**Abstract:** Long distance transports may significantly affect the health of pigs; thus, adding a rest stop (lairage) during long journeys may improve their well-being. The objective of this study was to determine whether a mid-journey lairage was beneficial to swine behavior, intestine microbial populations, and immune variables during a 16-h transport. Four replications were conducted, one in each of four seasons. Eighteen-kg pigs were housed in 16 pens (13 to 16 pigs/pen) with 8 pens/treatment. Lairage pigs were transported for 8 h, given a rest with food and water for 8 h, then transported 8 h. Continuous (Co) pigs were continuously transported for 16 h. Ambient temperatures reflected 3 seasons. The temperatures on the truck had less variability. Body weight loss was not different between the treatments. Behavior was evaluated by scan sampling of the pens prior to and after transport, pens on the truck, and latencies to eat and latencies to drink during lairage. Drinking and walking after transport was greater for the continuously transported pigs. Latencies to eat and latencies to drink during the lairage varied by season. No vomiting was observed during the transport, so the ingestion of food was not detrimental. There were some differences in whether the pigs were lying. The continuously transported pigs continued to lie after the second group was loaded. Lying increased in the lairage group over the transport until they were equivalent to the continuously transported group.

Intestine microbial population shifts were detected in the jejunum contents on d 1 and 7, in the cecum contents on d 3 and 14, in the cecum tissue on d 14, and the jejunum tissue on d 14. On d 14 the ileum tissue was altered. In all but the ileum tissue, the variability of bacterial populations decreased for the continuously transported treated pigs. Jugular blood samples were collected from 16 pigs (8/treatment) on d 1, 3, 7 and 14 post-transport. Hematocrit and white blood cell (WBC) counts were obtained and neutrophil cell functions (phagocytosis and oxidative burst) and phenotypic cell markers (CD14 and CD18) were analyzed using flow cytometry. There were no treatment by season interactions. In continuously transported pigs, total WBC count was higher on d 1 than lairage pigs. As expected, granulocyte count in continuously transported pigs was higher than in lairage pigs on d 1; further, granulocyte count was lowest on d 3 in continuously transported pigs. In both treatments, lymphocyte count was lower on d 14 than on d 1. There were more cells expressing CD14 in continuously transported pigs than lairage pigs on d 1. In addition, continuously transported pigs on d 1 and 14 had the highest percentage of CD14 and CD18 positive cells and lairage pigs had the highest percentages of both on d 14. Percent phagocytosis was highest on d 7 in the continuously transported pigs; however, in both treatments oxidative burst was highest on d 7. In both treatments, CD18 percentage was lowest on d 0. The anti-microbial peptide mRNA expression by blood leukocytes was greater for continuously transported pigs on d 14, however at d 3 PR-39 expression from jejunum tissue was greater for the lairage pigs. Toll-like receptor 2, 4, and 5 expression, and the cytokine, IL-8, and the chemokine, CCL20 did not differ between treatments. This study indicates that extended transport without lairage alters few behaviors, but changes the microbial populations of the jejunum and cecum contents and the microbial populations of jejunum, ileum and cecum tissues, and alters innate immune functions which may cause greater susceptibility to pathogens.

*These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed*

**For more information contact:**

**National Pork Board, P.O. Box 9114, Des Moines, Iowa USA**

800-456-7675, Fax: 515-223-2646, E-Mail: [porkboard@porkboard.org](mailto:porkboard@porkboard.org), Web: <http://www.porkboard.org/>