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# Translocation of Orally Inoculated Salmonella Following Mild Immunosuppression in Dairy Calves and the Presence of the *Salmonella* in Ground Beef Samples

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## Objectives

The objective of this study was to determine if immunosuppression altered *Salmonella* (SAL) translocation from the GI tract subsequently contaminating the carcass during fabrication.

## Materials and Methods

Weaned Holstein steer calves ($n$ = 20; BW = 102 ± 2.7 kg) received dexamethasone (DEX; $n$ = 10; 0.5mg/kg BW), a synthetic glucocorticoid, or saline (CON; $n$ = 10; 0.5mg/kg BW) for 4 d (from d –1 to d 2) via a jugular catheter prior to oral inoculation of nalidixic acid resistant *Salmonella* Typhimurium ($3.4\times10^6$ CFU/animal) via milk replacer on d 0. Fecal swabs were obtained daily to ensure SAL infection. Blood was collected to assess hematological markers of immunosuppression. Upon harvest (d 5), the ileum, cecal content, lymph nodes (ileocecal, mandibular, popliteal and prescapular), and synovial (stifle, coxofemoral, and shoulder) swabs were collected for the isolation of the inoculated strain of SAL. The trim obtained during fabrication was then ground separating both fore and hind quarters of each carcass. Ground beef samples were collected using a random grab method then combined for a composite sample for each fore quarter and each hind quarter for every carcass. The sample were diluted with 225ml of PBS

## Results

Following inoculation, 100% of DEX calves shed the experimental strain of SAL for 5 d, 90% of CON calves shed from d 1 to 3, and 100% of CON calves shed from d 4 to 5. A treatment by tissue interaction ($P < 0.01$) was observed for SAL in tissues collected at harvest. Greater ($P < 0.001$) concentrations of SAL were quantified from the cecum of DEX calves (3.86 ± 0.37 log10 CFU) than CON (1.37 ± 0.37 log10 CFU); There was no difference in SAL concentrations between DEX and CON calves in ileal tissue ($P = 0.07$), nor ileocecal ($P = 0.57$), mandibular ($P = 0.12$), popliteal ($P = 0.99$), or prescapular ($P = 0.83$) lymph nodes. *Salmonella* was isolated from the stifle joint of one calf in the CON group; however, SAL was not isolated from any other joint fluids sampled. The prevalence of SAL in the ground beef samples was recovered in 7 of the 80 (8.75%) samples taken. This is important to note as it was 3.3% of swabs collected from the CON treatment and the opportunity exists for stifle joint fluid to come in contact with meat during hind quarter fabrication.

## Conclusion

The observed data suggests that the grab method for ground beef sampling may not be a correct quantification of overall presence of SAL in a ground beef sample. Therefore, further studies are needed to determine the effectiveness of pathogen sampling methods on ground beef.