Oral *Salmonella* Challenge and Subsequent Uptake by the Peripheral Lymph Nodes in Calves

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Abstract

Previous attempts to infect peripheral lymph nodes (PLNs) with *Salmonella* via oral inoculation have been inconsistent. Therefore, we performed a series of experiments to determine whether multiple exposures to an oral challenge would result in *Salmonella*-positive PLN in cattle. In each of three experiments, calves were inoculated with *Salmonella* Montevideo. In the first experiment, calves were challenged with either no *Salmonella* (control), a single oral dose (~10¹⁰; PCON), or 10 consecutive doses in water (~10³; WAT). The positive control treatment resulted in an increase ($P < 0.05$) in the percentage of *Salmonella*-positive PLNs, compared with the WAT-treated and control animals. Experiments 2 and 3 were designed to additionally determine if the stress associated with feed and water deprivation influences the systemic spread of *Salmonella* from the gastrointestinal tract to PLNs. Following 14 days of oral inoculation (average 7.1 × 10⁴ CFU/day) in experiment 1, *Salmonella* was recovered from one subiliac and one superficial cervical lymph node of calves that were deprived of feed and water (72 h). No treatment differences ($P > 0.05$) were observed between control and deprived calves. Based on the poor recovery of *Salmonella* from the PLNs in WAT-challenged calves in experiments 1 and 2, a higher challenge dose (average 1.2 × 10⁷ CFU) was used in experiment 3. The increased dose resulted in the recovery of the challenge strain of *Salmonella* from the PLNs (70.8 and 75.0% of control and deprived calves, respectively). However, no treatment differences ($P > 0.05$) were observed between control and deprived calves. Results of this research demonstrated that a substantial oral challenge is required to produce *Salmonella*-positive PLNs. However, as the challenge periods examined herein were considerably shorter compared with the normal time spent by cattle in feedlots, increased exposure time to lower doses may produce the same effect observed in experiment 3.

*Journal of Food Protection®, Number 3, March 2015, pp. 484-627, pp. 573-578(6)*

*The study reported here in this Research Brief was not funded by the beef checkoff, but is made available to expand the usefulness of this checkoff-funded website for those interested in beef safety.*