RESEARCH ABSTRACT

PUBLIC HEALTH/WORKER SAFETY

Title: Factors driving the emergence and persistence of multidrug resistance-encoding plasmids in the swine environment – NPB #12-080

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Scientific Abstract.

The contentious debate on the public health impact of antimicrobial use in food animals has perpetuated for over 40 years, and remains a front-burner issue for the swine industry. The failure to approach meaningful consensus on this question is largely a consequence of the void of detailed knowledge of the epidemiology and ecology of resistance determinants in bacteria populations under different conditions of antimicrobial exposure. The presence of multidrug resistance-encoding plasmids in the pig farm environment, within the animal, and on retail meat presents a plausible threat to both animal and human health. IncA/C plasmids pose a particular threat in this respect, because of their abundance in swine, their broad bacterial host range, and their apparent ability to rapidly disseminate through diverse bacterial communities [1]. In this study, we examined the influence of subtherapeutic and therapeutic levels of chlortetracycline in feed on plasmid selection in growing pigs. We found that subtherapeutic levels of chlortetracycline had no effect on the selection of IncA/C plasmids over the course of six weeks, but therapeutic levels of the drug resulted in a significant increase in plasmid-containing *Escherichia coli* populations in feces. Similarly, subtherapeutic levels of chlortetracycline did not affect the dissemination of this plasmid among bacteria in the feces, whereas therapeutic levels of this drug enhanced the ability of the plasmid to move between *E. coli* in the gastrointestinal tract. Finally, use of chlortetracycline was effective at significantly promoting the growth of pigs over the course of 8 weeks. Overall, this study demonstrates that the short term use of subtherapeutic levels of chlortetracycline in feed does not select for IncA/C plasmids or promote their dissemination in the pig gastrointestinal tract.