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The effects of antimicrobial growth promoters on intestinal immune and physiological function in two animal models

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A ntimicrobial growth promoters are characterized by the addition of low-level, sub-therapeutic concentrations of antimicrobials in animal feed to increase the growth and performance of livestock animals; a strategy that has been successfully used for decades. Unfortunately, the use of these products has led to an increase in numbers of antimicrobial resistant pathogens within the environment and a subsequent ban on the administration of antimicrobials to enhance livestock growth in Europe and also recently in North America. Although it is generally believed that sub-therapeutic concentrations of antimicrobials enhance growth by affecting the intestinal microbiota (microbiota modulation hypotheses), research has shown the antimicrobials have anti-inflammatory properties and at low concentration, these antimicrobials may improve intestinal physiological-inflammatory processes (physiologic inflammation hypotheses) and subsequent performance. The effects of sub-therapeutic levels of two commonly used anti-microbial growth promoter (chlortetracycline and tylosin) on inflammatory responses, immune function and physiological responses were investigated in two animal model studies. Mouse model: C57BL/6J mice treated with chlortetracycline demonstrated that chlortetracycline enhanced growth, induced changes in T cell helper responses and attenuated intestinal inflammation. Swine model: Landrace-Duroc commercial pigs were treated with either chlortetracycline or tylosin and preliminary results demonstrated these antimicrobial growth promoters improved the intestinal epithelial barrier, altered mucous and antimicrobial peptide production and improved meat quality. Collectively, these results demonstrate that sub-therapeutic administration of antimicrobials effect intestinal inflammatory responses and intestinal immune and physiological function.

Biography

Richard R E Uwiera has completed his DVM and PhD at the University of Saskatchewan, Canada. He has practiced as a mixed animal Veterinary Practitioner prior to becoming the University of Alberta Veterinary Pathologist and Associate Professor within the Department of Agricultural, Food and Nutritional Sciences at University of Alberta, Canada. He has published more than 40 manuscripts and 2 book chapters and serves as an Editorial Board Member for an international agricultural journal.

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