Science for Solutions: Emerging Contaminants Seminar Series

Mitigating the Spread of Antibiotic Resistance: Managing Human Exposure to Antibiotic Resistance Genes Enriched in Food Production Systems

Edward Tropp
University of Western Ontario

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Amid concerns that the loss of antibiotic efficacy will have dire consequences for human morbidity and mortality, there is an urgent need for a comprehensive and global strategy to forestall the development of resistance to antibiotics by bacterial pathogens. Action must include steps to promote the judicious use of antibiotics in human medicine and in animal production, and to mitigate terrestrial and aquatic exposure to antibiotic residues and antibiotic resistance genes carried in agricultural wastes, and effluents from municipal wastewater treatment. It is important that in mixed agriculture, livestock and crop production systems be tightly coupled with respect to nutrient flow. Manures typically carry antibiotic-resistant bacteria, and numerous genes associated with antibiotic resistance determinants have been detected in molecular inventories of manure microbial populations, and in the environment in proximity to land fertilized with manure. In field experiments in London Ontario, we have been evaluating the dynamics of antibiotic resistance genes (ARGs) and bacteria following the land application of dairy or swine manure, or sewage sludge, and whether the use of these materials as soil amendments in normal farming practice increases the abundance of ARGs on vegetable crops at harvest. This presentation will give an overview of the environmental dimension of antibiotic resistance, present some of our research results and discuss their potential significance within the broad context of antibiotic resistance development.

About the Series

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About the Speaker

A native of Montreal, Dr. Topp obtained his PhD from the Department of Microbiology at the University of Minnesota in 1988. Since then he has toiled as a research scientist with Agriculture and Agri-Food Canada. He has an adjunct appointment in the Department of Biology at the University of Western Ontario in London. Ed's research has focused on the interface between agriculture and human and environmental health, particularly as mediated through water and crop quality. In the last decade he has worked on the environmental fate of "emerging" pharmaceuticals and antibiotic resistance genes present in biosolids and animal manures. Ed is the past-president of the Canadian Society of Microbiologists [2011] and has co-authored over 200 scientific publications.

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