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Bacteriophages as probiotics: The veterinary perspective

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Bacteriophages (phages) are viruses that specifically infect bacteria. Since their discovery almost a century ago, they have played a vital role in many scientific discoveries. The current concerns related to antibiotic resistant bacteria have thrust phages into the spotlight as potential ways to control bacterial pathogens, or generally modulate immune responses. Pre-harvest agents used to control pathogens in animals include probiotics and vaccines. Successful pre-harvest strategies should reduce or eliminate harmful bacteria without having a negative effect on the animal or environment. The development of a biocontrol strategy, based on the use of phages, would seem to be ideal, due to the fact that they are natural, are ubiquitous in the environment and are nontoxic to animals. In addition, they are often highly specific to their host, unlike antibiotics which are not specific and can lead to the destruction of beneficial bacteria. Furthermore, phages are able to infect a single cell and produce multiple copies of themselves which, when released through lysis of the host cell, allows for infection of other uninfected cells. In this way, phages can be thought of as a natural, self amplifiable antimicrobial treatment. The potential uses of phages in veterinary applications will be discussed. These include their uses to eliminate or reduce the numbers of specific bacteria, but also their potential use in modulating the immune system of animals. The regulatory aspects of phage based probiotics will also be discussed, as phage-based antimicrobials do not readily fall into the scope of the existing regulatory guidelines.

Biography

Lawrence D Goodridge currently holds the Ian and Jayne Munro Chair in Food Safety at McGill University in Montreal, Quebec, Canada. He is a native of Hamilton, Ontario, Canada, and received his PhD from the University of Guelph with a major emphasis in Food Microbiology and Food Safety in 2002. His primary research interests include the use of bacteriophages to solve issues associated with food safety including control, source tracking and detection of foodborne pathogens. He has authored 43 publications and 13 book chapters, and holds two patents related to phage-based bacterial detection.

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