RESEARCH

Use of bacteriophage-derived lysins in combatting multi-drug resistant (MDR) pathogens that cause bovine respiratory disease (BRD).

EXPLORING NON-ANTIBIOTIC TREATMENT OPTIONS FOR BOVINE RESPIRATORY DISEASE

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Background: Antibiotics are effective tools to prevent or treat BRD but concerns about antibiotic resistance and pressure to reduce antibiotic use mean that non-antimicrobial options need to be explored. One possible solution may come from viruses that specifically attack bacteria (these are known as phages). Phages infect bacteria, hijack the bacterial machinery to manufacture more phages, then produce enzymes (called lysins) that cause bacteria to burst. This releases the offspring phages, which that can go on to infect other bacteria. These researchers will examine whether the page lysin enzymes that cause bacteria to burst can be an effective antibiotic alternative to combat three of the main BRD bacteria, *Mannheimia*, *Pasteurella* and *Histophilus*.

Objectives: The objectives of this study are to:

1. Identify and engineer lysins from lysogenic phages of *Mannheimia haemolytica*, *Pasteurella multocida* and *Histophilus somni*
2. Evaluate antibacterial activities of the engineered lysins against multidrug resistant BRD pathogens including *M. haemolytica*, *P. multocida* and *H. somni*.
3. Optimize anti-BRD activities of lysins by fusion with lipopolysaccharide-destabilizing peptides and bovine tracheal antimicrobial peptide.
4. Determine effectiveness of the optimized lysins for controlling BRD in experimentally challenged calves.

Implications of the Research: This initial study will determine whether phage lysins have potential as antibiotic alternatives and are worth further development as a potential BRD treatment option to replace or supplement antibiotics.

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