

Accepted Manuscript

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PII: S0378-5173(18)30675-6
DOI: <https://doi.org/10.1016/j.ijpharm.2018.09.024>
Reference: IJP 17772

To appear in: *International Journal of Pharmaceutics*

Received Date: 3 July 2018
Revised Date: 29 August 2018
Accepted Date: 12 September 2018

Please cite this article as: Y. Lin, R. Y. K. Chang, W. J. Britton, S. Morales, E. Kutter, H-K. Chan, Synergy of nebulized phage PEV20 and ciprofloxacin combination against *Pseudomonas aeruginosa*, *International Journal of Pharmaceutics* (2018), doi: <https://doi.org/10.1016/j.ijpharm.2018.09.024>

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Synergy of nebulized phage PEV20 and ciprofloxacin combination against *Pseudomonas aeruginosa*

Yu Lin¹, Rachel Yoon Kyung Chang¹, Warwick J Britton², Sandra Morales³, Elizabeth Kutter⁴, Hak-Kim Chan¹#

1. Advanced Drug Delivery Group, School of Pharmacy, Faculty of Medicine and Healthy, University of Sydney, Sydney, NSW, Australia
2. Tuberculosis Research Program, Centenary Institute and Faculty of Medicine and Healthy, University of Sydney, Sydney, NSW, Australia
3. AmpliPhi Biosciences AU, Brookvale, Sydney, NSW, Australia
4. The Evergreen State College, Olympia, Washington, USA

Abstract

Nebulization is currently used for delivery of antibiotics for respiratory infections. Bacteriophages (or phages) are effective predators of pathogens including *Pseudomonas aeruginosa* commonly found in the lungs of patients with cystic fibrosis (CF). It is known that phages and antibiotics can potentially show synergistic antimicrobial effect on bacterial killing. In the present study, we investigated synergistic antimicrobial effect of phage PEV20 with five different antibiotics against three *P. aeruginosa* strains isolated from sputum of CF patients. The antibiotics included ciprofloxacin, tobramycin, colistin, aztreonam and amikacin, which are approved by U.S Food and Drug Administration (FDA) for inhaled administration. Phage and antibiotic synergy was determined by assessing bacterial killing performing time-kill studies. Among the different phage-antibiotic combinations, PEV20 and ciprofloxacin exhibited the most synergistic effect. Two phage-ciprofloxacin combinations, containing 1/4 and 1/2 of the minimum inhibitory concentration (MIC) of ciprofloxacin against *P. aeruginosa* strains

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