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| **Bacteriophage therapy eradicates biofilm-residing bacteria using *in vitro* primary airway epithelial cells** |
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| **Introduction/Aim:** Chronic lung disease patients experience recurrent bacterial infections and frequent antibiotic regimens that lead to antimicrobial resistance. Bacteriophages (“phages”) offer an alternative treatment in this setting. We hypothesised that a mucosal model comprising primary airway cells is a suitable preclinical model for investigating biofilm formation and host-phage-bacteria dynamics.**Methods:** Primary airway epithelial cells (AECs) (3-7 years, 2 males) established at the air-liquid interface (ALI) were inoculated with *Pseudomonas aeruginosa* (PAO1, MIC74 and MIC90) over 24 hours. Cellular markers β-tubulin (cilia), biofilm marker Wheat Germ Agglutinin (WGA) and anti-pseudomonas were used to assess biofilm formation. Biofilms on AECs were then exposed to different morphotypes of phages (Kara-mokiny 3 (KM3), Boorn-mokiny 1 (BM1), Minga-mokiny 4 (MM4), and E79) over another 24 hours. Bactericidal activity was measured by viable *P. aeruginosa* enumeration, and apical and basolateral supernatants were measured for IL-8 production.**Results:** Biofilm development occurred in all *P. aeruginosa* (PA) isolates 10 hours post-inoculation on ALI cultures. Bacterial enumeration was significantly reduced when treated with phages compared to bacteria-only controls; KM3 (2.3±1.7 x 109 vs 2.0±3.4 x 105 (SD); n=7; p<0.05) and MM4 (1.7±1.6 x 109 vs 0.6±1.6 x 108 (SD), n=7; p<0.05). Also, MIC74 biofilm exposed to BMI for 6 hours had significantly reduced bacterial load compared to bacteria-only controls (3.4±7.3 x 109 vs 1.6±3.7 x 104, n=6; p<0.05). Infected AECs treated with phages did not induce additional IL-8 production apically when compared to bacterial infected only AECs (KM3: 1.1±0.2 x 105 pg/mL vs 1.1±1.2 x 105 pg/mL; MM4: 1.5±0.5 x 105 pg/mL vs control: 0.9±0.7 x 105 pg/mL; p>0.05).**Conclusion:** Phages significantly reduce culturable pathogen load in vitro, providing key implications for phage administration and efficacy evidence**Grant Support:**Vertex Mentored Innovation AwardConquer Cystic Fibrosis Research Fellowship |