[PS2.66]

Role of the *E. coli* Common Pilus in Biofilm Formation and Adherence in Clinical Isolates of *Klebsiella pneumonia*

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Klebsiella pneumoniae is an opportunistic nosocomial pathogen that primarily affects immunodeficient people. Clinical diseases caused by this bacterium include pneumonia, bacteremia, urinary tract infection, diarrhea, upper respiratory tract infection, and wound infection. Biofilm formation is a property associated with virulence of pathogens colonizing the upper respibacteria to adhere specifically to tissue surfaces and to promote interbacterial interactions for biofilm formation. *K. pneumoniae* produces two major fimbrial types, type 1 and type 3 fimbriae. The *E. coli common pilus* (ECP) is a recently described adhesive structure produced by most *E. coli* pathogroups. A search for the major pilus subunit gene *ecpA* homologs among the *Enterobacteriaceae* indicated that *K. pneumoniae* contains the *ecp* gene cluster, *ecpRABCDE*. The goal of this study was to investigate the frequency of *ecpA* among *K. pneumoniae* clinical isolates and to explore the role of ECP in cell adherence and biofilm formation. Ultrastructural analysis using electron microscopy on two different strains of *K. pneumoniae* showed long peritrichous pili that reacted with anti-ECP antibodies by immunogold labeling. In agreement, pili purified from one of the strains showed a 21-kDa band in SDS-PAGE corresponding to EcpA. No antigenic cross reactivity was found between the type 3 pilus MR/K and ECP. We then tested a collection of 69 laboratory and clinical isolates among which, *ecpA* was found in 66 (96%) strains and 62 (94%) of these *ecpA* positive strains produced ECP after 6 h of incubation with HeLa cells as shown by immunofluorescence. Forty-eight (70%) of the 55 BF+ strains displayed ECP in biofilms produced after 24 h of incubation. In contrast, the *mrkA* gene was found in 100% of the strains examined, but only 55% of them produced MR/K when adhering to HeLa cells. ECP and MR/K were co-produced by 51% of the strains. The high incidence of *ecpA* and its presence on *Klebsiella* adhering to host cells and in biofilms suggest a role of ECP as an important adhesive structure in this species. Future studies will aim to construct *ecpA* mutants to determine the role in adherence to epithelial cells and biofilm formation.

Keywords: Klebsiella pneumonia, Adherence, Biofim, Fimbrial