

IRON CHELATOR EFFECT ON BIOFILM-PRODUCING *BURKHOLDERIA PSEUDOMALLEI* ANTIBIOTIC SUSCEPTIBILITY IN A MICROFLUIDIC CULTURE SYSTEM

Supaksorn Chattagul^{1,2}, Surasakdi Wongratanacheewin^{2,3} and Rasana W Sermswan^{1,2}

¹Department of Biochemistry, Faculty of Medicine; ²Melioidosis Research Center; ³Department of Microbiology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Abstract. *Burkholderia pseudomallei*, a gram-negative saprophytic bacillus, is the causative agent of melioidosis. In a biofilm production condition, *B. pseudomallei* exhibits tolerance in multiple classes of antibiotics including ceftazidime (CAZ), the drug of choice. Employing a microfluidic culture system, which enables early biofilm formation of attached cells and a continuous flow of culture under low shear stress, biofilm production of strains K96243, H777 and its biofilm defective mutant M10 was inhibited by an iron chelator deferoxamine (DFO) at non-toxic concentration. Sensitivity of *B. pseudomallei* to antibiotics colistin (CS) was enhanced, but with the CAZ antibiotic the mechanism of action of which (in part) is via generation of reactive oxygen species, this benefit could have been compromised by the presence of DFO. Combination of CAZ with CS interfered bacterial cell morphology but showed no synergistic effect. Similar results observed with H777 and its biofilm defective mutant may indicate the tolerance was not due to biofilm barrier. Further investigation will be required to understand the role of biofilm in conferring gram-negative bacteria, *B. pseudomallei* in particular, tolerance to antibiotics.

Keywords: *Burkholderia pseudomallei*, antibiotic tolerance, biofilm, iron chelator, microfluidic system

Correspondence: Rasana W Sermswan, Department of Biochemistry, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.

Tel: +66 (0) 43 363265; Fax: +66 (0) 43 363265

E-mail: rasana@kku.ac.th