

BIOFILM FORMATION AND BACTERIAL SURFACE ADHESION OF CYSTIC FIBROSIS DERIVED, MULTI-DRUG RESISTANT PSEUDOMONAS AERUGINOSA BACTERIA IN THE PRESENCE OF GRAPHENE OXIDE

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Background: *Pseudomonas aeruginosa* (PA) is the most common pathogen colonizing lower airways in cystic fibrosis (CF) patients. A multidrug resistant, mucoid PA strains infections are a leading cause of mortality in these patients. Graphene oxide (GO) has a potential bactericidal effect.

The aim of the study: assessment of biofilm formation and bacterial cells adherence of MDR PA strains isolated from sputum of CF patients.

Materials and methods: The MDR PA strains were isolated from sputum of 6 adult cystic fibrosis patients with advanced CF-related lung disease. The PA strains were cultured on a standard medium and with an addition of Brain Heart Infusion (control). The studied strains were cultured in identical condition with the addition of GO solution (50 mg/l). In each culture, a glass slide was submerged and incubated for seven days to allow bacterial adherence and biofilm formation. Standard Gram staining was performed to visualize the bacterial cells attached to a glass slide. Each glass slide was photographed in nine different points in confocal microscope along with a measurement of biofilm thickness.

Results: We observed that the addition of GO to culture medium reduced the summary mean area covered by PA cells from 2500 μm^2 (wild-type) to 800 μm^2 . Mean biofilm thickness biofilm was reduced from 2,7 μm to 1,8 μm .

Conclusions: Addition of GO reduced the PA adherence and biofilm formation. Application of GO surfaces on different materials should be studied wherever MDR bacterias are a clinical problem.