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Identification of genes involved in biofilm formation of mycobacteria in relation to susceptibility of antimicrobial agents

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Bacterial biofilms are often associated with infections especially with medical implants such as catheters and other medical devices. Biofilms are formed to protect the bacteria from host defenses, antibiotics and from harsh environmental conditions. We had taken four mycobacterial species *(M. smegmatis, M. fortuitum, M. avium* and *M. tuberculosis)* for study of mycobacterial biofilm. The isolates were subculture and characterized biochemically and molecularly. The large quantity of biofilm was produced by *M. smegmatis* at temperature 37 °C and 42 °C as compared to 30 °C. *M. fortuitum* developed more amount of biofilm at 30 °C as compared to 37 °C and 42 °C. *M. avium* developed strong amount of biofilm at 30 °C and 42 °C as compared to 37 °C. *M. tuberculosis* (H37Rv) developed strong biofilm at 37 °C and no biofilm at 30 °C and 42 °C in MB7H9 media and Sauton media. The selected non-tuberculosis mycobacteria and H37Rv developed strong biofilm in the presence of OADC enrichment in MB7H9 as well as Sauton's medium. Antibiotic susceptibility of biofilms at ultrastructural level was also studied in fast growing clinical isolates *M smegmatis* in presence of Streptomycin, Isoniazid, Rifampicin, Ethambutol and Pyrazinamide. Isoniazid showed strong inhibited biofilm in fast grower and sensitive isolates. However, Pyrazinamide and Isoniazid inhibited biofilm of *M. tuberculosis* (H37Rv) and in MDR isolates Ethionamide and Moxifloxacin inhibited biofilm in slow grower and fast grower mycobacteria. However, many mycobacterial species are known to form biofilms, little is known about the genetic requirements and patterns of gene expression. In micro array hybridization we have found that six genes were expressed in *M. avium*. In *M. tuberculosis* MDR isolates seven genes were expressed and two genes Rv0359 and Rv3526 were homologues as earlier reported in P. areuginosa and *M. avium* which might be responsible for biofilm formation.

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