

ABSTRACT

Biofilms represent universal strategy for bacterial survival. Living in form of biofilms, bacteria acquire wide range of advantages over planktonically growing cultures. It can be assumed that nearly 99% of world bacterial population is living in form of biofilms. There are benefits and drawbacks associated with bacterial biofilms for mankind. Life in biofilms makes pathogens more effective and persistent through higher antibiotic resistance and helps them to hide before immune system of the host. Mycobacteria, which are capable of forming biofilms on variety of surfaces, differ from most of other bacteria by unique composition of their cell wall. It provides them with high resistance against physical or chemical damage. This is one of the reasons for considering *Mycobacterium tuberculosis* as a highly potent pathogen. The studies of mycobacterial biofilms are motivated by effort to improve or find new therapeutic methods.

This work is aimed at morphological and proteomic comparative analyses of biofilms obtained from *Mycobacterium smegmatis* grown on surface of glass and silica/zirconium beads, on liquid medium surface or grown submerged in shaken planktonic culture. We have developed technique for preparation of “floating” biofilm sample to be observed in SEM. We have shown that the growth of floating biofilm starts with formation of clumps of mycobacteria forming filaments and in further stages the cells start to divide in a standard way. We have followed the dynamics of biofilm formation on glass beads and showed that it is a very fast process. There can be observed a compact layer covering the beads after 24h. We compared proteomes isolated from planktonic cultures and glass beads biofilms. Using subtractive analyses we predicted proteins which might play crucial role during planktonic growth and biofilm formation.

Key words: biofilm, Mycobacteria, *Mycobacterium smegmatis*, glass beads, silica/zirconia beads, scanning electron microscopy, 2D-electrophoresis, proteins, proteome