Type of presentation: Poster

LS-6-P-6010 Structural investigation of polyvalent staphylococcal bacteriophage phi812K1-420 mutant by single-particle electron microscopy

Novacek J.[1], Benesik M.[1], Pantucek R.[1], Plevka P.[1]

[1]CEITEC, Masaryk University, Brno, Czech Republic

Email of the presenting author: jiri.novacek@ceitec.muni.cz

Staphylococcus aureus is a major causative agent of human and animal diseases. The increasing number of pathogenic strains resistant to antimicrobial drugs is a serious public health problem that can be solved by applications of phage therapy as a suitable alternative to antibiotics treatment. Polyvalent staphylococcal bacteriophage phi812 is a member of SPO1-like viruses from family *Myoviridae*. Phage phi812 and its mutants kill 75% MRSA, 95% MSSA and act against another staphylococcus species. Mutant phage phi812K1-420 is most perspective for phage therapy because has broadest host range. The phi812K1-420 virion consist of 1060 A diameter icosahedral head containing 138 kb phage genome and 2100 A contractile tail with the baseplate. Herein, we have employed electron cryo-microscopy to provide first description of the phi812K1-420 three-dimensional structure. The icosahedral symmetry was employed to obtain the initial reconstruction of the phage head. The symmetry relaxation was performed in order to determine an asymmetric phage head structure. The helical reconstructions of the tail sheath and the c6 symmetry reconstructions of the baseplate have been performed for phi812K1-420 in its normal extended state and for the urea treated bacteriophages in order to determine the structural model of the virion during the infection. From the comparison of the phage models prior and during infection, the structural changes related to the bacterial infection are monitored in order to implicate the structural mechanism by which the staphylococcal cell wall is recognized.