

The interplay between StkP/PhpP phosphorylation pathway and diadenylate cyclase CdaA producing c-di-AMP in *Streptococcus pneumoniae*

Second messengers have emerged as a new field of bacterial research. C-di-AMP is one of the most recently discovered second messengers. This compound is responsible for adaptation to multiple environmental stresses, especially those connected with cell wall damage. C-di-AMP is produced by enzymes called diadenylate cyclases. The most widespread diadenylate cyclase is CdaA. It was previously described that the activity of CdaA is regulated by phosphoglycosamine mutase GlmM which participates in the synthesis of cell wall. GlmM is also phosphorylated by serine/threonine kinase StkP in *Streptococcus pneumoniae*. The aim of this thesis is to establish interplay between these three proteins with the emphasis on the activity of CdaA in *S. pneumoniae*. We have proved by two-hybrid system and co-immunoprecipitation that CdaA interacts directly with StkP. We also identified a weak phosphorylation of CdaA by StkP *in vitro*. We confirmed a decrease in CdaA activity in the presence of GlmM in coralyne reaction *in vitro*. On the other hand we did not detect any significant change of CdaA activity in the presence of StkP. Taken together we present a model which suggests a role of StkP in CdaA regulation.