ANGLICKÝ ABSTRAKT

Functional study of the putative nucleotidase encoded by *spr1057* gene in *Streptococcus pneumoniae*, a likely homolog of *Escherichia coli* protein YjjG.

Bacterial cells are constantly exposed to innumerable toxic substances, either in their external environment or by by-products of their own metabolism. For these reasons, the bacterial cells evolved several mechanisms to cope with this challenge. These mechanisms are represented by: blocking the uptake, export by specific transporters as well as specific inactivation of these substance by enzymes. A particular group of these toxic substances are noncanonica nucleotides, which can directly inhibit bacterial cell DNA replication or can result in increased mutation rate. Enzymes recognizing these modified derivatives are known as „house-cleaning“ nucleotide phsphateses, which can inactivate the potentially mutagenic nucleotides and prevent their incorporation into DNA and RNA. Some of the „house-cleaning“ enzymes belong to a group of haloacid dehalogenase enzymes (haloacid dehalogenase-like hydrolase superfamily), which are found in many bacterial species.

This thesis is focused on the function of hypothetical protein Spr1057 of *Streptococcus pneumoniae* with an unknown function. Sequence comparison revealed that Spr1057 has a significant similarity to YjjG protein of *Escherichia coli*.

Analysis of transcription profile of the mutant in the *stkP* gene encoding a eukaryotic-type Ser/Thr protein kinase of *S. pneumoniae* revealed that there is a large decrease (59-fold) in expression for the *spr1057* gene. This gene encodes a homologue of the haloacid dehalogenase (HAD)-like protein superfamily, which includes a variety of enzymes with different functions. The E. coli YjjG protein, a member of the HAD superfamily, exhibits a high-phosphatase activity towards nucleotide monophosphates. It is thought that this enzyme could be protect the cell against noncanonical pyrimidine derivatives and prevent the incorporation of potentially mutagenic nucleotides into DNA.

The aim of this thesis was:

Theoretical evaluation of Spr1057 hypothetical protein with unknown function as a potential homologue of YjjG protein of *E. coli*.

The study focused on the sensitivity of *S. pneumoniae* ΔstkP mutant strain to mutagenic nucleotides.

Expression, isolation and purification of recombinant protein Spr1057.

Analysis of the biochemical properties of purified recombinant protein Spr1057