

## Functional analysis of Spr1057 protein *Streptococcus pneumoniae*

The genome of important human pathogen *Streptococcus pneumoniae* encodes a single gene of an eukaryotic type serine/threonine protein kinase StkP.

Analysis of the global transcriptome of a mutant strain with inactivated *stkP* gene identified *spr1057* gene whose expression was significantly repressed in  $\Delta$ *stkP* strain. This gene is coding for Spr1057 protein which is a member of haloacid dehalogenase family. The analysis of the substrate specificity of the Spr1057 protein confirmed nucleotidase activity of this protein *in vitro*.

To study the function of this protein *in vivo* we prepared several mutant *S. pneumoniae* strains. Growth characteristics of mutant strains were observed in the presence of modified nucleotides, 5-fluoro-2'-deoxyuridine (5-FdU) and 5-bromo-2'-deoxyuridine (5-BrdU). In addition, we monitored the rate of incorporation of 5-BrdU into the chromosomal DNA of the mutant strains in comparison with the wild type *S. pneumoniae* strain.

The growth of the  $\Delta$ *spr1057* strain was significantly inhibited in the presence of the modified nucleotides and increased incorporation of 5-BrdU in DNA was showed. Neither growth inhibition nor incorporation of 5-BrdU in DNA was observed for the wild type strain. The expression of an ectopic copy of *spr1057* gene from inducible promotor resulted in complementation of Spr1057 protein deficiency and rescued the phenotype to the level without toxic nucleotide added.

Spr1057 protein is a nucleotidase with a house cleaning function, whose presence has a major influence on the degradation of toxic modified nucleotides in *S. pneumoniae* cells.