Characterization of novel pneumococcal surface proteins (e. g. ABC transporters) would help in understanding of pneumococcal pathogenesis and may lead to identification of potential therapeutic target/vaccine candidates. With this rationale, a novel immunoreactive protein SP_0845 was identified using an immunoproteomic approach. Bioinformatic and reverse transcription-PCR based operon analysis suggested SP_0845 to be the substrate binding component of an ABC transporter involved in nucleoside transport. Studies performed with sp_0845 deficient mutant and a toxic nucleoside analog 5-fluorouridine confirmed that SP_0845 is the substrate binding component of a transporter of ribonucleosides in pneumococci, and uridine, cytidine and guanosine were the preferred ligands. Mice infection studies done with wildtype and sp_0845 deficient pneumococci indicated a key role of SP_0845 in the virulence of pneumococci. In vitro uptake assay revealed that deletion of sp_0845 makes pneumococci more susceptible for phagocytosis and hence renders it avirulent in mice. This is the first experimental demonstration of the presence of a nucleoside ABC transporter in Streptococcus pneumoniae and its involvement in pneumococcal virulence.

DNA sequencing and bioinformatic analysis indicated that SP_0845 was exceptionally conserved (98.71 ± 0.30%) in the 36 diverse pneumococcal strains analyzed and was absent in humans. Immunofluorescence microscopy and whole cell ELISA data indicated that SP_0845 was accessible on pneumococcal surface to antibodies. Recombinant SP_0845 induced high titer antibodies in
mice that facilitated phagocytosis of pneumococci \textit{in vitro}. Passive administration of anti-rSP\_0845 sera delayed death of mice infected with pneumococci. Active immunization with recombinant SP\_0845 protected mice when challenged intraperitoneally with two heterologous virulent pneumococcal strains. Based on this study, SP\_0845 can be considered as a promising candidate for inclusion in a multi-component protein based pneumococcal vaccine.