Abstract

In prokaryotes protein phosphorylation has been considered to occur primarily by histidine protein kinases. Recent studies clearly demonstrated that eukaryotes-type serine/threonine protein kinases as well as protein phosphatases operate in many bacteria.

Phosphorylation and dephosphorylation of proteins is well-known mechanism of the regulation of enzymatic function in eukaryotes.

Genome of an opportunistic human pathogen *Pseudomonas aeruginosa* contains at least five genes coding for eukaryotic-type Ser/Thr kinases and phosphatases. Three of them, PpkA and Stk1 kinases and Stp1 phosphatase, have been also biochemically characterized but very little is known about their cellular functions. PpkA has been implicated in *P. aeruginosa* virulence. Upstream of *ppkA* a gene encoding putative phosphoprotein phosphatase *pppA* can be identified. Dual kinase/phosphatase PpkB has been identified and biochemically characterized in our laboratory. To study the properties of particular proteins we prepared *E. coli* strains expressing protein kinase Stk1, and phosphatases Stp1 and PppA. We carried out a basic biochemical characterization of putative phosphatase PppA. We showed that the PppA activity is strictly either Mg^{2+} or Mn^{2+} dependent. We also determined an optimal concentration of ions (both 5mM), optimal temperature (42°) and pH (pH = 9). In addition, we studied the efect of phosphatase inhibitors on the enzymatic activity of PppA.

To prove the expected interaction of protein kinase Stk1 and protein phosphatase Stp1 we completed biochemical characterization of Stk1. Interaction studies performed with these two proteins showed that protein kinase Stk1 is *in vitro* substrate of protein phosphatase Stp1.

proteinkináza, protein kinase; proteinfosfatáza, phosphoprotein phosphatase; fosforylace, phosphorylation; defosforylace, dephosphorylation; biochemická charakterizace, biochemical characterization; interakce, interaction; signální dráha, signal pathway; quorum sensing