Abstract

The interactions of proteins with their binding partners occur in every living organisms, in almost every cell process. Therefore the exploration of protein interactions forms significant part of biochemical research. It appears that even more valuable information than the value of equilibrium constants of these interactions is determination of individual energy components – changes in enthalpy and entropy. Thermodynamic analysis by isothermal titration calorimetry (ITC) can determine the changes in entropy and enthalpy caused by formation of complex of binding partners. Microcalorimetry is also an important optimization technique in development of new drugs, for example antiretrovirotics.

Despite HIV is a virus known for over 30 years, intensive research has neither brought vaccine nor drug that would permanently cure patients. Already 26 drugs were approved, most of them target viral enzymes reverse transcriptase and protease. Antiretroviral treatment prevents the propagation of HIV and maintains immune system, but long – term use leads to resistance against drugs, which is caused by mutations in the target proteins. One of relatively new targets of therapeutic intervention is capsid core formation of during assembly of new virions. During the assembly many protein – protein interactions take place, which are necessary for production of infectious virions.

Peptide CAI, that binds to the C – terminal domain of capsid protein, has been identified as an effective inhibitor of HIV assembly *in vitro*. Within this bachelor thesis thermodynamic analyses of CAI binding to the capsid protein and its mutant variant CA Y169A were performed by ITC. The tyrosine at position 169 is involved in binding to the peptide, so this mutation in sequence of the capsid protein should lead into the changes in thermodynamic parameters of complex formation when compared to the capsid protein without mutations. (In Czech)

Key words: isothermal protein microcalorimetry; dissociation constant; protein – protein interactions; HIV capsid; viral particle assembly