Abstract

The metabolism of iron ions is a crucial process in all living organisms and its correct regulation is essential for basic life functions. Homeostasis of iron ions is closely regulated, it usually appears as a component of various proteins and plays role in many oxidation-reduction reactions. *Naegleria gruberi* is a non-pathogenic, free living protozoon, that serves as a laboratory model for closely related pathogenic *Naegleria fowleri*. This work focuses on the study of selected metabolites of *N. gruberi*, that were possible to detect and quantify by the means of modern metabolomic methods, and the influence on culture cultivated in environment with lack of iron ions was shown. The discovery of effect of this condition on the energetic metabolism of this protozoan is an important aspect of understanding the biological processes on cellular level. This method proved a significant influence on certain metabolites and modification of certain metabolic pathways as a direct effect of decreased availability of iron ions.

Second part of this work was focused on the enzyme alcohol dehydrogenase, that was found in the genome of this protozoon. Unusual aspects of this enzyme include a N-terminal mitochondrial presequence, prompting about mitochondrial localization, and utilization of iron ion as a prosthetic group. In the genome of *N. fowleri* this enzyme was not found, this can lead to new findings explaining the distinct life strategies of those organism, based on metabolic processes. The effect of cultivation in environment with lack of iron ions on expression of this protein was described. Consecutively the properties of the recombinant enzyme were described, such as the prosthetic group, coenzyme, optimal value of pH and finally the affinity to chosen substrates, with the aim of determining the role of alcohol dehydrogenase in metabolism of *N. gruberi*.