Abstract

Oxidative decarboxylation of pyruvate is a fundamental reaction of living organisms in general, leading to energy conservation. In some anaerobic or microaerophilic eukaryotic or prokaryotic organisms pyruvate decarboxylation is carried out by a single enzyme, pyruvate:ferredoxin oxidoreductase (PFO). PFO contains Fe-S clusters and thiamin pyrophosphate cofactor (TPP).

In the reaction catalyzed by PFO, from pyruvate and Co-A arise acetyl-CoA, CO_2, and two electrons are released. Those electrons are accepted by low molecular carrier proteins. Most frequently these proteins are ferredoxins or flavodoxins such as in nitrogen fixating bacteria. PFO can perform a reversible reaction.

Trichomonads are mostly parasitic or endosymbiotic organisms with mitochondria-like organelles, hydrogenosomes. These organelles possess PFO which is one of the key enzymes in the metabolism of *Trichomonas vaginalis* hydrogenosomes.

PFO of *T. vaginalis*, a sexually transmitted pathogen of man, plays also a role in a term of medical importance. PFO is, by a universally accepted concept, one of the key proteins acting in the activation of antimicrobial drugs against trichomoniasis 5-nitroimidazoles, including metronidazole.

In the genome of T. *vaginalis* seven PFO genes were identified. They were named PFO A, B1, B2, C, D, E and F. PFOD has the longest and the most diverse nucleotide sequence of all paralogs. This led us to a more detailed examination of protein PFOD and to an attempt to determine its activity, function and level of expression in cells of *Trichomonas vaginalis*, both in the parent strain, and the strain resistant to metronidazole. We also wanted to determine the relation of PFOD to alternative 2-keto acid oxidoreductases. Such activity was previously found in hydrogenosomes, but without identification of the corresponding proteins.