

Abstract

The flow of electrons the terminal oxidases present in the bloodstream and procyclic trypomastigotes of *Trypanosoma brucei* LUMP 1026 has been investigated by the use of salicylhydroxamic acid (SHAM) and cyanide. Respiration in bloodstream trypomastigotes was completely inhibited by 0.5 mM SHAM with a K_i below 10 μM . The K_i for SHAM in procyclic trypomastigotes was 70 μM . In procyclic trypomastigotes there are at least three terminal oxidases of which the two major ones are cytochrome aa₃ oxidase, sensitive to cyanide inhibition, and alpha-glycerophosphate oxidase (GPO), sensitive to SHAM inhibition. These two oxidases contribute 60 and 30%, respectively, to total cell respiration. Inhibition of the cytochrome system with cyanide causes an increase in the flow of electrons through the GPO system, and inhibition of the GPO system with SHAM stimulates electron flow in the cytochrome system. Succinate oxidation in the mitochondrial fraction is partially inhibited by SHAM and this SHAM-sensitive respiration is not inhibited by antimycin A. The kinetic data of respiration by procyclic trypomastigotes fit a model proposed by Bahr and Bonner to determine the maximum rates of two competing electron transport pathways. It is concluded that the electron transport chain in *T. brucei* is branched.