KINETIC CHARACTERIZATION OF TWO TRYPAREDOXIN PEROXIDASES OF TRYPANOSOMA CRUZI REACTION WITH HYDROGEN PEROXIDE

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During host cellular infection, *Trypanosoma cruzi* are exposed to reactive oxygen and nitrogen species. Trypanosomatids lack catalase and selenium-dependent glutathione peroxidase. Tryparedoxin peroxidases belong to the peroxiredoxin (Prx) family of peroxidases that use redox-active cysteines to reduce peroxides. *T. cruzi* has a cytosolic Prx (*Tc*cTXNPx), and a mitochondrial (*Tc*mTXNPx) Prx. They both use tryparedoxins, as reducing substrates, which in turn are reduced by trypanothione. *Tc*cTXNPx decompose hydrogen peroxide (H_2O_2), organic peroxides and peroxynitrite. Pre-steady state kinetic analysis using cysteine mutants of *Tc*cTXNPx identified Cys 52, the peroxidatic cysteine, as the primary target of H_2O_2 and peroxynitrite oxidation. In this work, we report the kinetic characterization of these two recombinant *Tc*TXNPxs reaction with hydrogen peroxide. Steady-state kinetic analysis studies showed that *Tc*mTXNPx has a Km in the micromolar range for H_2O_2, whereas *Tc*cTXNPx has a submicromolar Km for H_2O_2 and a catalytic efficiency in the 10^6-10^7 $M^{-1}s^{-1}$ range. This high reactivity was confirmed by a competition kinetic approach. These values, together with others recently reported, challenge the idea that these enzymes are peroxidases with poor catalytic efficiencies, and suggest that they play an important role in infectivity by means of their detoxifying capacity against host cell-derived peroxides.