

A Thioredoxin Peroxidase from the Silkworm, *Bombyx mori*, That Is Responsive to External Temperature Stimulus and Viral Infection

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A cDNA encoding the thioredoxin peroxidase (TPx) from the silkworm, *Bombyx mori*, was cloned and characterized. The *B. mori* TPx (BmTPx) cDNA contains an open reading frame of 585 bp encoding 195 amino acid residues. The BmTPx belongs to the 2-Cys subgroup of peroxiredoxin family. The deduced amino acid sequence of the BmTPx cDNA showed 78% identity to *Drosophila melanogaster* (DmTPx-1), 73% to *Aedes aegypti* (AaTPx), and 54% - 48% to other insects TPx. Phylogenetic analysis confirmed a closer relationship of the deduced amino acid sequences of the BmTPx gene to the DmTPx-1 and AaTPx within the 2-Cys PTx group. The cDNA encoding BmTPx was expressed as a 24-kDa polypeptide in the baculovirus-infected insect Sf9 cells and the purified recombinant BmTPx was shown to reduce H₂O₂ in the presence of dithiothreitol. Northern blot analysis revealed that BmTPx transcripts are present in all tissues examined, suggesting that BmTPx gene is expressed in most, if not all, body tissues. Western blot analysis showed the presence of the BmTPx in the fat body and midgut, but not in the hemolymph, suggesting cytosolic TPx. The induction of BmTPx to H₂O₂ by Northern blot analysis showed that the level of BmTPx mRNA significantly increased during the *in vivo* exposure. Interestingly, the expression levels of BmTPx enzyme from fat body were particularly high when *B. mori* larva was exposed at low (4°C) or high (37°C) temperatures and nuclear polyhedrosis virus infection, suggesting that the BmTPx is responsive to temperature stimuli and viral infection.