

Properties of 600-kDa and 23-kDa haemolymph proteins from the tsetse fly, *Glossina morsitans*: their possible role as biological insecticides.

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Abstract

The haemolymph of the tsetse fly, *Glossina morsitans morsitans*, contains a high (lipophorin) and a low molecular weight protein of high densities, 1.11 and 1.29 g/ml, respectively. The purification of the proteins was achieved by a combination of density gradient ultracentrifugation and reported gel permeation chromatography. The lipophorin is of high molecular weight ($M(r)$ integral of 600,000) and consists of two apoproteins, apolipophorin I ($M(r)$ integral of 250,000) and apolipophorin II ($M(r)$ integral of 80,000) both of which are glycosylated. Lipophorin also has a pI of 6.1. However, electrophoresis under non-denaturing and denaturing conditions showed the low molecular weight protein to be a single polypeptide chain ($M(r)$ integral of 23,000). Amino acid analysis revealed a relatively high content of the acidic amino acids as well as serine and glycine. The protein contained lipids as shown by Sudan Black staining but was unglycosylated. Using rabbit antiserum against the isolated protein in immunodiffusion and immunoblotting experiments, no cross-reactivity was detected with haemolymph samples from insects representing six orders. In conclusion, the finding of lipophorin suggests that, although flies primarily utilize proline for their energy needs, there is an active transport mechanism for the supply of lipid requirements. However, the results for the low molecular weight protein indicate that the protein is unique to *Glossina*, suggesting that it may have an important role in the physiology of this insect and is therefore a significant target for vector management.