

ALPHA-GLUCOSIDASE IS A HEMOZOIN SYNTHASE IN *RHODNIUS PROLIXUS*

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Rhodnius prolixus digests large amounts of hemoglobin and releases potentially toxic heme inside the gut. In *R. prolixus*, hemoglobin-derived heme is detoxified through biomineralization, forming hemozoin (Hz). Here, the Hz synthesis is showed to be associated to a non-soluble alpha-glucosidase (EC 3.2.1.20), the biochemical marker of perimicrovillar membranes (PMM) of Hemipteran. Hz synthesis was evaluated in lipid and protein fractions of PMM and was associated mainly to the protein moiety. Protein extract was submitted to an ion exchange chromatography and a major 60-kDa polypeptide presented both alpha-glucosidase and Hz synthesis activities. Chloroquine (600 μ M), an inhibitor of Hz synthesis, was able to inhibit alpha-glucosidase activity both *in vivo* and *in vitro*. Alpha-glucosidase expression and activity were measured in the midgut of insects fed on plasma and plasma+hemin (100 μ M), and both were higher in the presence of hemin. Alpha-glucosidase double-stranded RNA was injected into insect's hemocoel and reduced gene expression, alpha-glucosidase and Hz synthesis activities. The cDNA amplified by PCR was randomly sequenced and showed similarity with enzymes involved in carbohydrate metabolism. Taken together, the results point strongly to alpha-glucosidase as a catalyst for Hz synthesis in *R. prolixus* midgut, indicating that the plasticity of this enzyme can have been an important adaptation to hematophagy.

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