

Molecular Organization of the Digestive Process in *Periplaneta americana*  
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Cockroaches are among the first insects to appear in the fossil record. This work is part of ongoing research on insects at critical points in the evolutionary tree to be able to predict the digestive characteristics of non-studied insects of economical importance. A transcriptome (454 Roche platform) of the midgut of *P.americana* were searched for sequences of digestive enzymes. The selected sequences were manually cured. The complete or nearly complete sequences showing all characteristic motifs and highly expressed (reads counting) had their predicted sequences checked by cloning and Sanger sequencing, except for 3 trypsins and one aminopeptidase. There are two chitinases (lacking mucin and chitin-binding domains), one amylase, two  $\alpha$ - and three  $\beta$ -glucosidases, one  $\beta$ -galactosidase, two aminopeptidases (none of the N-group), one chymotrypsin, 5 trypsins, and none  $\beta$ -glucanase. Electrophoretic and enzymological data agreed with transcriptome data in showing that there is a single  $\beta$ -galactosidase, two  $\alpha$ -glucosidases, one preferring as substrate maltase and the other aryl  $\alpha$ -glucoside, and two  $\beta$ -glucosidases. Chromatographic and enzymological data identified 4 trypsins, one chymotrypsin (also found in the transcriptome), and one non-identified proteinase. We confirmed here the lack of  $\beta$ -glucanase expression in midguts, thus lending support to previous claims according to which those enzymes are salivary. With the use of primers based on a consensus region of amylases, a salivary amylase was molecularly cloned and shown to be different from the one from the midgut. This clarifies the finding of two amylases in the midgut contents (manuscript in preparation). Finally, enzyme distribution showed that most digestion occurs under the action of salivary and midgut enzymes in the anterior gut and midgut, except the posterior terminal digestion of proteins. A counter-flux of fluid may be functional in the midgut of the cockroach to explain the low excretory rate of digestive enzymes.

**Keywords:** Digestive Process, *Periplaneta americana*, transcriptome  
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