Immunity or Digestion: The Role of Beta-1,3-glucanases of *Lutzomyialongipalpis* and *Aedes aegypti*

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Insect beta-1,3-glucanases hydrolyze plant and fungal polysaccharides being members of Glycoside Hydrolase Family 16. They were studied in Dictyoptera, Coleoptera, Orthoptera and Lepidoptera. GH16 proteins were implicated in defense against pathogens in the midgut or hemolymph. We investigated the role of beta-1,3-glucanases in the detritivore larvae of the dipterans *L. longipalpis* and *Ae. aegypti*. *L. longipalpis* larvae feed on fungi, secreting a diverse array of digestive glycosidases. *L. longipalpis* genome has three GH16 genes (LlβGlu, LlGBP1, LlGBP2). Expression analysis (RT-PCR; RNA-Seq, Roche-454) showed that LlGBP1 and LlGBP2 are mainly expressed in the hemolymph. LlβGlu is expressed mainly in the gut of larvae, being the putative digestive beta-1,3-glucanase of this insect. *Ae. aegypti* genome has six GH16 proteins (AaeGH16.1 to AaeGH16.6), suggesting an expansion of GH16 genes in Diptera Nematocera. AaeGH16.5/6 and AaeGH16.1/4 are preferentially expressed in the larval gut or head/rest of body, respectively. Knock-down of GH16 genes in larvae suggest that AaeGH16.5 is involved in digestion (developmental delay), while AaeGH16.1/4 are involved in immunity (melanization and death). Biochemical analysis of silenced insects confirmed that GH16.5 is the larval gut beta-1,3-glucanase. Therefore, insect beta-1,3-glucanases seem to fulfill specific and diverse physiological roles.

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