

# Mosquito has Evolved Two Alanine Glyoxylate Aminotransferases with Different Substrate Specificity and Expression Profile

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Mammals and *Drosophila* have only one alanine glyoxylate transaminase (AGT), some of them have mitochondrial and cytosolic types of AGTs, but they are only different in mitochondrial leading sequence. This study describes the molecular cloning, gene transcription, protein profile, recombinant protein production, and biochemical characterization of an AGT isoenzyme from mosquito, *Aedes aegypti* (Ae-AGT). The study shows *Aedes* mosquitoes have an isoenzyme of AGT sharing 48% amino acid sequence identity to a previous reported mosquito 3-hydroxykynurenine aminotransferase (HKT)/AGT. This AGT is transcribed in all stages of the development, while the proteins are mainly detected in pupae and adults. Using an insect-baculovirus expression system, Ae-AGT was expressed and the recombinant protein was purified and biochemically characterized for the substrate specificity. The enzyme shows high substrate specificity, is active towards only alanine, serine and glycine of 24 tested amino acids. Taken together with the characters of Ae-HKT/AGT, we suggest that Ae-AGT functions in pupal and adult stages, and Ae-HKT/AGT plays major role in larval stage; two mosquito AGTs might be evolved in different way, Ae-AGT is typical insect AGT, Ae-HKT/AGT is more like a mammalian AGT.

**Key Words:** alanine glyoxylate aminotransferase, *Aedes*, mosquito, aminotransferase, transaminase, glyoxylate, AGT