

REGULATION OF JUVENILE HORMONE SYNTHESIS IN MOSQUITO:  
PHYSIOLOGICAL, BIOCHEMICAL AND MOLECULAR STUDIES.

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Juvenile hormone (JH) is a major hormonal regulator in insects. In the female mosquito, JH signals the completion of the ecdysis to the adult stage, and initiates reproductive processes. The aims of our studies are 1) to understand the regulation of juvenile hormone (JH) levels in mosquitoes. 2) To understand how nutritional signals affect the activity of the neuroendocrine system. JH titer is essentially determined by the rate at which the corpora allata (CA) synthesizes JH. The rate of CA activity is, in turn, regulated by allato-regulatory peptides that exert either allatostatic (inhibitory) or allatotropic (stimulatory) activities. We have described that *Aedes aegypti* allatotropin (AT) stimulates and *Anopheles gambiae* allatostatin-C (AS-C) inhibits JH synthesis; in addition we have showed that nutrients accumulated during the larval stages regulate the CA activity in newly emerged adults. Based on this work we propose that AT and AS-C released by the brain are essential for the activation and modulation of JH synthesis in adult female mosquitoes. The synthesis and release of these peptides is connected to nutritional signals. JH is therefore an important part of a transduction mechanism that connects changes in the nutritional status with activation of specific physiological events during reproduction. In order to test this model we performed the first genomic analysis of an insect endocrine gland; libraries were made from corpora allata-corpora cardiaca complexes from *Aedes aegypti* and *Anopheles albimanus*. More than 1800 clones have been sequenced. Enzymes involved in JH synthesis and other important regulatory molecules have been identified among these clones. We will use these molecular tools to investigate the mechanisms of control of JH synthesis by AT and AS-C and to study the nutritional regulation of synthesis and release of AT and AS-C in the brain.