

Identification and expression analysis of the biogenic amine-related genes in the field cricket *Gryllus bimaculatus*

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Cricket shows various behaviors regulated by biogenic amines. Pharmacological and behavioral studies have revealed the involvement of specific biogenic amines in modulating various aspects of behavior such as learning, circadian behavior, mating, and aggressive/escape behaviors. Although physiological and behavioral aspects of the aminergic system have been extensively studied, the molecular basis of the cricket aminergic system has not been investigated yet. To elucidate the molecular basis of the cricket biogenic amine system, we identified genes involved in biosynthesis and transduction of serotonin (5-HT), octopamine (OA), and dopamine (DA) in the field cricket *Gryllus bimaculatus* DeGeer. We identified seven genes involved in biogenic amine synthesis including three genes involved in 5-HT synthesis (*TRH*, *TPH*, *AADC*), three genes involved in OA synthesis (*TDC1*, *TDC2*, *TβH*), and two genes involved in DA synthesis (*TH*, *AADC*), as well as twelve GPCR-type biogenic amine receptors including four 5-HT receptors, five OA receptors, and two DA receptors. Next, we examined tissue-specific expression patterns of biogenic amine-related genes by using RT-PCR. Our study is the first comprehensive analysis of the biogenic amine-related genes in insects.