Ovarian Control of Juvenile Hormone Biosynthesis in Locusta migratoria (Orthoptera: Acrididae)

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A factor has been identified in ovaries of maturing Locusta migratoria (Reiche & Fairmaire 1850) which rapidly inhibits juvenile hormone biosynthesis in active corpora allata in a short term in vitro radiochemical assay. When injected into ovariectomized adult female locusts, vitellogenin accumulation is suppressed. This allatinhibin has been partly purified by gel filtration and reversed phase HPLC. It is a heat-stable peptide which can be inactivated by proteases. Its apparent molecular weight is between 1.000–1.3000 Da.

Key words: Juvenile hormone biosynthesis – inhibition – allatinhibin – Locusta migratoria


1 Introduction

Growth, development and reproduction in most insects are regulated by juvenile hormone (JH) which is produced by the corpora allata (CA). Occurrence and titre of JH appear to be well regulated suggesting the existence of feed back loops [Feyereisen 1985: review]. For several insect species it has been shown that neuropeptides from the brain are involved in both stimulatory (allatotropic) and inhibitory (sometimes called allatostatic) control of JH biosynthesis in the CA. A stimulating factor present in brain and corpora cardiaca (CC) has been found e.g. in Locusta migratoria (R. & F.) [Ferenz & Diehl 1983, Ferenz 1984, Gadot & Applebaum 1985] and in the tobacco hornworm Manduca sexta (L.) [Kataoka et al 1989]. In the cockroach Diploptera punctata (Eschscholtz) the presence of an allatinhibin has been reported, which inhibits JH biosynthesis in eggcase-carrying females [Rankin et al 1986]. Also in Manduca sexta (L.) a cerebral allatinhibin has been identified [Granger & Janzen 1987, Bhaskaran et al 1990]. Recently it was purified and sequenced [Kramer et al 1991].