Using RNA interference in analyzing the role of juvenile hormone in insect reproduction

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Insect growth, metamorphosis and reproduction is controlled by juvenile hormones (JH) and ecdysteroids. JH is considered to have morphogenetic functions during larval development, whereas it plays a gonadotropic role in adult insects. In adult females, for example, yolk production and yolk incorporation into the ovaries is stimulated by JH. Juvenile hormones are synthesized in the corpora allata (CA), and the haemolymph titer in the female is affected by either changes in JH biosynthesis (JH synthesis enzyme activity, allatotropic and allatostatic neuropeptides), in JH degradation (activity of JH esterase) or in JH transfer from males to females through the spermatophore.

RNA interference (RNAi) is a novel tool to elucidate *in vivo* functions of proteins (enzymes) and (neuro)peptides. Here we show that RNAi has become a useful technique to elucidate the role of allatoregulating neuropeptides, and JH synthesis and degradation enzymes, respectively, in controlling haemolymph JH titers, and thus fertility, of females from various "model" and "non-model" insect species (*Tribolium castaneum, Ceratitis capitata, Gryllus bimaculatus, Spodoptera frugiperda*).

Understanding the molecular details in JH action may help to develop novel pesticides.