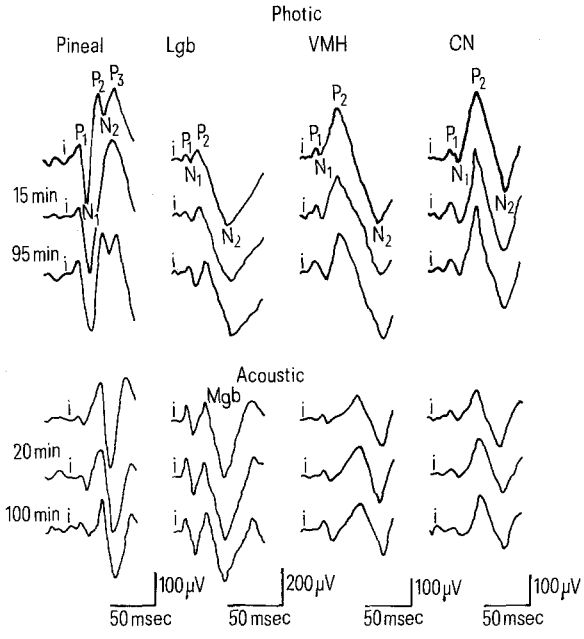
Several studies[4,8,9,14,17] indicate that the central nervous system makes neuronal connection to the pineal through the habenular and/or the posterior commissure complex. The finding of the present study demonstrated that local anesthesia, which is known to block electrical transmission[18] eliminated only the 2 late components (N_2-P_3) of the photic evoked responses recorded from the pineal. The photic responses recorded from the VMH, CN and Lgb were unchanged as were the acoustic responses in all 4 structures. The use of local anesthesia instead of surgical intervention. (i.e. scg-gangliectomy) in such experiments is advantageous because it provides recordings from the same animal at short time intervals both before and after interference of activity mediated through the scg. Moreover, in 4 animals, scg-gangliectomy was performed and similar observations obtained. Simultaneous recordings from 4 different brain locations allowed for more reliable conclusions regarding the effects of drugs on specific brain sites. Since only the late photic responses recorded from the pineal were abolished, it is possible to conclude that the early photic response reaches the pineal presumably via the stria medullaris habenular connection and therefore was not affected by the neuronal blockage at the level of the scg. The late responses were eliminated by the neuronal blockade and therefore it is possible to assume that they are transmitted via the classical pathway through the superior cervical ganglion.



Representative simultaneous recording of averaged photic (upper traces) and acoustic (lower traces) evoked responses from pineal, lateral geniculate body (Lgb), medial geniculate body (Mgb), ventromedial hypothalamus (VMH), and caudate nucleus (CN) before (upper traces) and after local anesthesia of both superior cervical ganglions. Time in min indicates the recording time after injections; i indicates onset of stimulation; P_1 indicates the 1st positive component of the evoked response; N_1, the 1st negative deflection; P_2, N_2 and P_3 the 2nd positive, negative and 3rd positive deflection, respectively.

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The effect of a juvenile hormone analogue on *Eucelatoria* sp. (Diptera: Tachinidae) through its host, *Heliothis armigera* (Hubn.) (Lepidoptera: Noctuidae)

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Summary. The juvenile hormone analogue, ZR-515 Methoprene, when applied topically to *Heliothis armigera,* adversely affected its parasite, *Eucelatoria* sp.

In the attempts to use synthetic hormones and pheromones to control insect pests, trials with several juvenile hormone (JH) analogues were made on several species of *Heliothis,* a serious polyphagous pest[2-5]. In biological control programmes, it is of the utmost importance to evaluate the effect of these synthetic compounds on the parasite complex as well. The effect of JH analogues on *Apanteles rubecula* Marshall[6], spruce budworm parasitoids[7], *Pales pavida* Meig.[8], and on the endoparasites of *Liriomyza sativae* Blanch.[9] have been studied earlier. The following is an account of the effects of a JH analogue, ZR-515 Methoprene (isopropyl-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate) on *Eucelatoria* sp., a larval endoparasite of *Heliothis armigera,* when applied to the host.

H. armigera has been bred on an artificial diet[10] in the laboratory for a number of generations under aseptic and

Effect of ZR-515 Methoprene on *Eucelatoria* sp.

	No. of larvae parasitized	No. of puparia obtained	No. of flies emerged
Larvae treated with JH analogue and parasitized	25	82	Nil
Untreated and parasitized larvae	25	74	72

controlled conditions. *Eucelatoria* sp., originating from the USA, was obtained through the Indian station of the Commonwealth Institute of Biological Control, Bangalore, and mass-multiplied in this laboratory on *H. armigera* for use in biological control programmes.

For experimental purposes, healthy *Heliothis* larvae in their penultimate larval stage were taken. In one group, the JH analogue was topically applied to the larvae at the dose of 1 µl (= 1 mg, in olive oil) per larva. They were fed on the artificial diet and the effect on metamorphosis was observed. In another group, the treated larvae were parasitized by *Eucelatoria* and the effect of the JH analogue on the final emergence of the parasitoid was observed. Untreated *Heliothis* larvae of the same age group and untreated larvae parasitized by *Eucelatoria* were used as controls. 5 larvae were taken each time with 5 replicates. The results are shown in the table.

When the JH analogue was applied to *Heliothis* larvae, the majority of them failed to pupate. The larval life was prolonged to over 10–15 days after the controls pupated and the larvae were much larger in size than the normal ones. They died as larval-pupal intermediates with either partial pupation or with pupal cuticular patches on the body. A few of those which pupated did not develop into adult moths.

When the treated larvae were parasitized, they died on the 2nd or 3rd day after parasitisation as in the controls, and the puparia of the parasitoid were obtained. However, the emergence of flies was nil even after 3 weeks, while flies emerged from the untreated parasitized controls within 1 week.

Wilkinson and Ignoffo observed no apparent effects on adult emergence, length of life and sex-ratio of *Apanteles rubecula* when a JH analogue was applied to its host, *Pieris rapae*[6]. However, topical application of a JH analogue to 6th instar larvae of *Choristoneura fumiferana* (Clem.) adversely affected the development of the tortricid and its parasites *Glypta fumiferanae* (Vier.), *Meteorus trachynotus* Vier., and *Phryxe pecosensis* (Tns.)[7]. Similarly, JH analogue treatment of *Liriomyza sativae* not only inhibited adult emergence of the host but also its parasite, *Opius dimidiatus* (Ashm.)[9]. The data in the present experiment also indicate that Methoprene applied to *Heliothis armigera* adversely affects the emergence of its parasite, *Eucelatoria* sp., as in the case of another tachinid endoparasite, *P. pavida* when Methoprene is applied to the parasitized host, *Galleria mellonella* L.[8].

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Renin in mouse but not in rat submandibular glands

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Summary. Renin was found in the submandibular glands of male Quackenbush mice in concentrations higher than has been reported for any tissue of any strain or species. However, no renin-like activity could be detected in glands from male and female Wistar rats using either pH 5.8 or 7.4 for assay and a radioimmunoassay specific for renin's reaction product, angiotensin I. Rabbit submandibular glands contained renin.

The submandibular (submaxillary) gland of the male mouse would appear to contain the highest concentration of renin (EC 3.4.99.19) of any tissue of any species[2–7]. The high concentration is due to an action of testosterone[5]. Submandibular renin has been isolated and is immunologically and biochemically similar to renal renin[7]. However, the physiological function, if any, of submandibular renin in the mouse is not known. Rat submandibular glands have also been reported to contain high concentrations of renin-like activity[8–10]. Renin is usually determined indirectly in terms of the initial velocity of its hydrolysis of angiotensinogen to liberate the decapeptide angiotensin I. In the studies of rat glands[8–10] a bioassay was used. In bioassay, the reaction product, angiotensin I (AI), is quantified by i.v. injection of AI which is converted into the pressor octapeptide angiotensin II (AII) in an anaesthetized rat. The assay does not therefore differentiate between AI and AII. This is particularly important as rat submandibular glands contain a serine protease, tonin,[11,12] which can hydrolyze AII directly from angiotensinogen, without formation of AI. Furthermore the studies of rat glands used pH 5.5[8], 5.8[9] and 6.5[10] during incubation of samples with angiotensinogen and recent evidence indicates that at pH less than 6.5 (but not at pH 7.4) tissue cathepsin D can hydrolyze AI from angiotensinogen and so give the illusion of renin activity[13–15]. The present study used a radioimmunoassay specific for AI and assay pH values of 5.8 and 7.4 in a re-examination of the question of renin in rat submandibular glands.

Materials and methods. Adult male and female Quackenbush and Balb/C mice, Wistar rats and Castle Hill white