conditioning acoustic trains increased the size of the sural antidromic spike to an appreciable extent, with a maximum increase of 50–85% in 4 experiments, but up to 200–300% in 2 experiments (Table). This increase reached a maximum at conditioning-test intervals of 55–65 msec, and ran a prolonged time course lasting over 150 msec (Figure).

In two experiments, conditioning photic stimulation also produced an increase in excitability of sural afferent terminals, but this was much weaker than that produced by acoustic stimulation.

In conclusion, an auditory input depolarizes lumbosacral presynaptic terminals of cutaneous afferent fibers leading to an increase in their excitability. This suggests a presynaptic modulatory influence of acoustic stimuli on cutaneous transmission at the level of the spinal cord[5].

Résumé. L'excitabilité des terminaisons des fibres afférentes cutanées primaires spinales augmente après conditionnement par un stimulus sonore.

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Hormonal Rupture of Larval Diapause in the Tick *Rhipicephalus sanguineus* (Lat.)

In nature in India, eggs of the hard tick, *Rhipicephalus sanguineus* (Lat.) (Acari: Ixodidae) usually hatch during the winter or early spring. But the larvae diapause, they do not seek hosts or attach if they are placed on hosts during the subsequent spring or summer. In the laboratory, larvae exposed to a photoperiodic cycle of 16 h of light, 8 h of dark (LD 16 : 8) at a temperature of 25 ± 1 °C and 75% R. H. diapause in much the same way, but comparable larvae kept in LD 8:16 for 5 weeks attach and feed on rabbit and/or mouse[1].

It is well known that juvenile hormone or juvenile hormone analogues will induce feeding activity[2], yolk deposition[3], oviposition[4] and morphogenetic effects[5] in diapausing insects. Also, moulting hormones (ecdysones) will rupture diapause in several species of insects[6]. We have recently investigated the effects of the insect moulting hormones (α-ecdysone and β-ecdysone (ecdysterone) and an analogue of juvenile hormone (*trans, trans*-10, 11-epoxyfarnesenic acid methyl ester), on the termination of larval diapause in the hard tick, *R. sanguineus*, and the results are reported in this paper.

The ecdysones were dissolved in 10% methanol and the analogue of juvenile hormone was dissolved in acetone. Larvae were anaesthetized by exposing to Co_2 and/or in ice bath before treatment with hormones.

Groups of 30 diapausing larvae exposed to LD 16:8 from the time the adult mother tick dropped from the host were anaesthetized and were treated with either 0.1 or 1.0% solutions (1 µl) of one of the 3 compounds applied

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Table I. Effects of hormones on termination of diapause in *Rhipicephalus sanguineus* (Lat.) larvae as determined by the percentage of attachment to rabbits when treated topically with 1 µl per larva to 6 replicates of 30 diapausing larvae 30 days old

Concentration (%)	Larval attachment (%)						
	1	2	3	4	5	6	Average
	α-ecdysone						
0.1	10	12	6	8			9
1.0	20	19	21	32	30	44	29
	β-ecdysone						
0.1	48	28	28	20			31
1.0	32	28	38	30	25		31
	trans, trans-10, 11-epoxyfarnesenic acid methyl ester[a]						
0.1	0						
1.0	0						
	Long-day control						
	4	8	10	12	6	4	7
	Short-day control						
	52	43	56	45	32	31	43

[a] Methyl-10, 11-epoxy-3,7,11-trimethyl-2,6-dodecadienoic acid. A few larvae escaped or died. Therefore, the percentage of attachment indicates the ratio of the number of larvae which attached to the total number present and alive at the end of 48 h.

Table II. Percentage of larval attachment to rabbits of 100 diapausing larvae immersed at indicated ages (days) in hormonal solutions

Concentration (%)	Larval attachment (%) at day				
	18	28	28	18	42
	α-ecdysone				
0.1	6	10			
1.0		38	36	32	40
	β-ecdysone				
0.1	19	24	28		
1.0	10	38	42	40	46
	trans, trans-10,11-epoxyfarnesenic acid methyl ester[a]				
0.1	0	0	0	0	0
1.0	0	0	0	0	0

[a] Methyl-10,11-epoxy-3,7,11-trimethyl-2,6-dodecadienoic acid. The percentage of attachment indicates the ratio of the number of larvae which attached to the total number present and alive at the end of 48 h.

topically to each larva with a microapplicator. Larvae were kept for 2 to 3 h at 5 °C after hormonal treatment before they were returned to the temperature at which they were maintained normally. One day later, the larvae were placed inside small plastic containers[8] attached to closely clipped rabbits. The percentage of attached (and feeding) larvae was determined at the end of 48 h. Other samples of 100 diapausing larvae were immersed in one of the same solutions for about 15 sec and handled in the same way as those with topically applied solution. Untreated controls from both short and long day photoperiods were placed on rabbits at the same time as the treated larvae. In other tests, the effects of the solvents on mortality and attachment were negligible.

Results recorded in Tables I and II indicate that treatment with either concentration of ecdysones terminated larval diapause in *R. sanguineus*. Treatment of the larvae with both α- and β-ecdysones produced positive results, when applied topically or by immersion in hormone solutions. However, the effects of β-ecdysone were slightly more spectacular than those of α-ecdysone in both ways of treatment. The analogue of juvenile hormone (*trans, trans*-10, 11-epoxy-farnesenic acid methyl ester) was ineffective topically.

It is well established that growth and metamorphosis in insects is regulated by the endocrine activity and the hormones involved such as juvenile hormones[9] and ecdysones[10] have been isolated and synthesized. Furthermore, juvenile hormone and its analogues terminate photoperiodically induced diapause in insects[2–4]. That diapause can also be terminated by ecdysones in larvae of the tick *Dermacentor alpictus* as demonstrated by WRIGHT[11]. Our results, besides substantiating the above author's observations in *R. sanguineus*, suggest that the endocrine mechanisms of the Acarina may be similar to those of the Insecta and Crustacea[12].

Zusammenfassung. Die Diapause von Larven der Zecke *Rhipicephalus sanguineus* (Lat.) wird durch α- and β-Ecdyson beendet.

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Calcium Dependence of Protein Transport by the Small Intestine of the New-Born Pig

The stimulus to pinocytose is normally given to a cell by the binding of cations to negatively charged groups on the membrane surface. The response to this stimulus is, in amoeba, first a change in membrane resistance[1], then a physical movement of membrane substance to the cell interior. Pinocytosis induced with monovalent cations can be inhibited by high concentrations of calcium. In this case competition between calcium and sodium for anionic sites is thought to remove the stimulus to pinocytose[2]. Usually however the inducing cation is believed to displace calcium as it binds to the membrane to cause the pronounced fall in resistance recorded immediately before vesicle formation begins[1]. Removal of calcium with EDTA also causes the membrane resistance to fall but this does not, by itself, initiate membrane movement[3]. It has therefore been suggested that it is the presence of free calcium which links stimulus to response, possibly by activating a cytoplasmic contractile system analogous to the excitation-coupling seen in muscle[4]. If this were true the action of calcium on a pinocytotic cell would be seen to be complex, high concentrations of the ion inhibiting the stimulus to pinocytose but some calcium being essential for the induction of membrane instability. It seemed therefore of interest to test for calcium interactions in another tissue

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