significantly after 30 min of suckling. A significant increase was found in PRL serum concentrations, but not in the PD content.

These results show that the pars tuberalis of the adult female rat contains immunoassayable LH and that the amount increases after castration. Although the FSH content in intact rats was below the sensitivity limits of the method, after castration the level became assayable. Thyrotrophin activity has been described in the rat stalk-median eminence[7], and the activity found was 100 times lower than that in the PD. Our results show that the immunoassayable TSH of the PT is about 5000 times lower than that found in the PD. This small amount of TSH could be due to the relative scarcity of this type of cell in the PT and explains why it could not be detected in rats by immunocytochemical methods[5].

The amounts of LH and FSH found in the PT after castration, as well as the amount of TSH, speak against the possibility of contamination by blood. Although the low amount of PRL found could be due to the blood present in the sample, this is highly improbable. In the former case, the contribution of the blood levels to the hormonal content in the PT would be negligible, even if it were considered that the 4 mg of PT tissue was all blood. In the case of PRL, the hormonal blood levels would only account for the PRL content in the PT if 100% of the tissue were blood, which is far from reality.

In spite of the fact that our PT samples also contain adjacent basal hypothalamic tissue, according to previous immunocytochemical studies[5] we can assume that all the hormones studied are localized within the PT. The total amounts of these hormones were in all cases much lower in the PT than in the PD. Furthermore, to obtain the same concentrations of these hormones in both structures, the PT would have to weigh a maximum of 6 µg. Thus, we can consider that not only the hormonal content but also the concentration of the hormones tested is much lower in the PT than in the PD.

We can therefore conclude that the rat PT contains FSH, LH, PRL and TSH. However, the low hormonal levels found could imply that the PT plays no very important role in the hormonal control of the target organs, except perhaps after hypophysectomy. Nevertheless, other interpretations are at hand. The direction of blood flow in the portal circulation is not yet clearly established, and loops starting in the PT reach the median eminence and return to the PT[8,9]; consequently, we can assume that the PT secretes to the hypothalamus-median eminence (H-ME). Therefore, our hypothesis is that the hormones secreted by the PT reach the hypothalamus-median eminence, where they could modify the release of factors which regulate PT as well as adenohypophysial secretion. Thus, a circuit PT ⇄ H-ME → PD could be present to maintain a basal secretion. Long feedback, starting from the target organs to H-ME, PD or PT could modify this situation to release a greater or smaller amount of adenohypophysial hormones.

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Effect of removal of the Harderian glands on pineal melatonin concentrations in the Syrian hamster[1]

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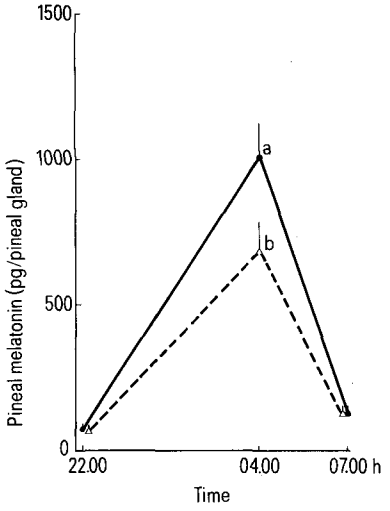
Summary. Peak melatonin levels which are normally present in male Syrian hamsters at 8 h after the onset of darkness in animals maintained under a light:dark cycle of 14:10, were significantly decreased following the removal of the Harderian glands.

In rodents, the Harderian gland is a large, lobulated, compound tubuloalveolar gland situated within the orbital cavity directly behind the eyes[2]. Although its function remains largely undefined, it has been considered to provide a lipoidal secretion for lubrication of the nictitating membrane[2-4]. Likewise, several investigations suggest that in rats and hamsters the glands may function as a link in a retinal-pineal-gonadal system[5,6]. For example, the Harderian glands have been shown to have a regulatory effect on pineal serotonin and on an enzyme involved in the synthesis of melatonin, hydroxyindole-O-methyltransferase (HIOMT)[5,6]. Pineal synthesized melatonin may normally act as a hormone in mediating gonadal regression in hamsters exposed to restricted photoperiods (< 12.5 h of light/24-h period)[7]. In the following experiment, we tested whether the removal of Harderian glands would have any effect on peak pineal melatonin concentrations in the Syrian hamster.

Materials and methods. Adult male Syrian hamsters, *Mesocricetus auratus*, weighing 80–100 g (Lakeview Hamster Colony, Newfield, N.J.) were housed in polycarbonate cages (6 animals/cage) and were supplied food (Wayne Lab-Blox) and tap water ad libitum. Lights were turned on at 06.00 and off at 20.00 h daily (14 h light and 10 h darkness). 3 days after arrival, hamsters were divided into 2 groups. One group had their Harderian glands removed and the other served as unoperated control animals. 2 weeks after surgery, the hamsters were decapitated at 22.00, 04.00 and 07.00 h and their pineal glands were collected and stored on solid carbon dioxide. Animals sacrificed during the hours of darkness were exposed to a dim red light (25 W tungsten bulb behind a No. 1 A Safe

light filter, Kodak) for approximately 6 sec prior to decapitation. Melatonin content of individual pineal glands was quantitated by radioimmunoassay[8]. The validity of utilizing antiserum R1055 (9/16/74) of Rollag and Niswender[8] for quantification of melatonin in hamster pineal gland homogenates was established previously[9].

Results and discussion. Pineal melatonin contents of unoperated hamsters sacrificed at 22.00, 04.00 and 07.00 h were 71±6 (SEM), 1005±106, and 132±18 pg/pineal gland, respectively. Following the removal of the Harderian glands, pineal melatonin levels in hamsters sacrificed at 22.00, 04.00 and 07.00 h were 70±10, 689±94, and 123±28 pg/pineal gland, respectively. Thus, compared to that in unoperated controls the nighttime levels of pineal melatonin in hamsters lacking their pineal gland were significantly depressed (figure).



Pineal melatonin levels in unoperated (●) hamsters and in hamsters from which the Harderian glands had been removed (△). Animals were maintained in a light:dark cycle of 14:10 and killed at 22.00, 04.00 and 07.00 h. Values represent the mean±SEM; *a* vs *b* $p < 0.05$.

In blinded suckling rats, the Harderian glands may mediate the effects of light on pineal serotonin[5] and on pineal HIOMT, an enzyme involved in the synthesis of melatonin[6]. In adult rats, however, these glands do not appear to be essential for the light-induced rhythms in the acetylating enzyme[10]. In the presently reported study, peak pineal melatonin levels, which are normally present in male hamsters at 8 h after the onset of darkness in light:dark cycle of 14:10[9], were significantly decreased following the removal of Harderian glands ($p < 0.05$). However, the peak pineal melatonin levels were still significantly elevated at 04.00 h when compared to daytime melatonin values for the same group ($p < 0.01$). It is possible that the removal of Harderian glands merely shifted the time of occurrence of peak pineal melatonin concentrations and thus the 04.00 h value does not represent the true peak level in these animals. Regardless of whether peak melatonin levels were shifted or depressed, it appears as though the Harderian glands may have a role in mediating changes in pineal melatonin metabolism in the hamster.

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The presence of ecdysteroids and the variations of their level during the first adult stage of the myriapod *Hanseniella ivorensis* Juberthie-Jupeau and Kehe (Symphyla)

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Summary. Adult individuals of the Symphyla *Hanseniella ivorensis* had their antennae cut off at the beginning of the first adult stage; this had the effect of triggering the following molt, which occurred 7.5 days after the treatment. We determined, by a radioimmunoassay method, that ecdysteroids were present in the Symphyla throughout the period studied. They were composed mainly of β-ecdysone but small amounts of α-ecdysone and of high polar products were also detected. During the artificially-induced molting process, the ecdysteroid level showed a smooth peak which took place 5 days after the amputation of the antennae. This indicates that ecdysones probably control the molt in the Symphyla as they do in insects or in crustacea. However, the increase in the hormonal level appears to be not the primary response to the treatment.

Ecdysone level variations during the developmental stages of insects have been well-charted (see Delbecque et al.[2] for review); they also have been studied in some crustaceans[3-9] and in one arachnid[10]. In myriapods, on the other hand, ecdysone determination have been neglected; in fact, no one has even noted the presence of ecdysteroids in these animals. Nevertheless, it may reasonably be assumed that molting is controlled by the same, or similar, hormones as in other arthropods, since ecdysone injections in chilopods induce the molt[11]. However, no one has been able to pinpoint a glandular organ as controlling the molting process in any myriapod. In the present study, we sought to detect the presence of ecdysteroids in a Symphyla and to determine their variations during the first adult stage. Adult Symphyla molt periodically and, in addition to the tegumentary modifications, the intermolting period is characterized by a renewal of the mesenterum and by a spermatogenesis cycle in males[12]. Molting can be triggered artificial-