It is hard to explain fully this effect of corticotrophine on FFA content, because there are only a few observations on the role of fatty acids in the biosynthesis of steroid hormones. TAMAKI[7], KUMANO[8], and ISHIHARU[9] found a close relationship between the essential fatty acid level in adrenals or in diet and the function of adrenal cortex. It was postulated that these fatty acids combine with cholesterol to form an active esterified cholesterol from which adrenocortical hormones are synthesized. It may be possible that the low values of FFA in the adrenals observed in our experiments after ACTH administration are due to increased esterification of cholesterol to more metabolically active esters. The marked cholesterol esterifying activity was demonstrated in rat adrenal homogenates[10] which maintain high levels of cholesterol esters in the adrenal glands of this species. But in the papers of PÉRON[11] and GRANT[12] it was suggested that free cholesterol was the substrate utilized for the corticoid synthesis, and loss of its esters was found as a consequence of ACTH action. Since the level of FFA in adrenal glands decreases after ACTH administration (in spite of the presence of an active lipase), it might seem reasonable to suggest that free fatty acids from cholesterol esters and triglycerides might serve as a source of fatty-acyl-CoA and acetyl-CoA from which the adrenal steroids may be synthesized[13], and ACTH probably accelerates this metabolism of fatty acids.

Zusammenfassung. Es wurde die Wirkung von ACTH auf den Gehalt unveresterter Fettsäuren in Rattennebennieren verfolgt. Nach Injektion von 2 IE ACTH per 100 g Körpergewicht (1, 2, 6 und 12 h post inj.) findet in der Nebennierenrinde keine Abnahme an freien Fettsäuren statt.

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Postsynaptic Inhibition Evoked from Primary Afferents in Spinal Interneurones

Several investigations have dealt with the excitatory actions evoked from different types of primary afferents in interneurones of the spinal cord[1–3]. Inhibitory effects on interneurones have been given less attention, although it has been shown that a discharge in interneurones may be evoked from one peripheral source and inhibited from another[2], and that during inhibition there is a repolarization of the membrane[3]. Such effects may be due to presynaptic inhibition at the primary afferent level, but it has now been found that in many interneurones in the spinal cord both EPSPs and IPSPs can be evoked from primary afferents.

The experiments were made on spinal cats either decorticate, unanaesthetized, or under chloralose anaesthesia. Microelectrodes (K-citrate or, in a few cases, KCl) were inserted into the dorsal horn and the intermediary region. The cells recorded from were classified as interneurones when they could not be antidromically activated from the ventral root or from either spinal half, dissected in the lower thoracic region. The effect of single volleys in ipsilateral nerves has been investigated with intracellular recording from 78 interneurones. 21 received only EPSPs (excitatory postsynaptic potential), 43 both EPSPs and IPSPs (inhibitory postsynaptic potential), while in 14 interneurones only IPSPs could be evoked. In the interneurone of the Figure there is an EPSP evoked from low threshold cutaneous afferents of the superficial peroneal nerve (SP). Superimposed on the EPSP, there is also a hyperpolarization evoked from the same nerve. The latter effect is evoked from the FRA (flexor reflex afferents = cutaneous afferents and high threshold muscle and joint afferents); there is a hyperpolarization from high threshold muscle afferents in the lower records. On recording with KCl electrodes, it was found there is a reversal during passage of a hyperpolarizing current through the recording electrode and hence that the hyperpolarization is an IPSP and not caused by removal of excitation.

IPSPs from the FRA were evoked in 22 interneurones that received monosynaptic or disynaptic EPSPs exclusively from cutaneous nerves. Volleys in the FRA also evoked IPSPs in 13 out of 22 interneurones that received monosynaptic excitation from group I muscle afferents. In some interneurones there was evidence of mixed excitatory and inhibitory effects from the FRA, either with opposite effects from different nerves or with mixed effect evoked from the same nerve. Other interneurones received IPSPs from the FRA but no EPSP from any of the nerves dissected. IPSPs are not only evoked from the FRA. Interneurones have been found that receive IPSPs from cutaneous afferents but not from high threshold muscle afferents, and in some interneurones we have observed disynaptic IPSPs evoked from group I muscle afferents.

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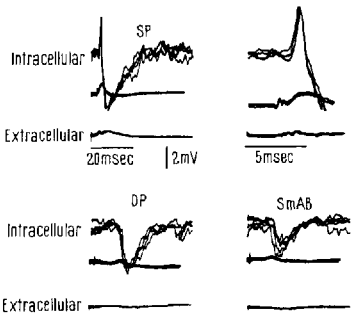
In some experiments the effect from contralateral nerves was investigated as well. It is of particular interest that interneurones activated from the ipsilateral FRA do receive IPSPs from the contralateral FRA.



Intracellular recording from an interneurone located at a depth of 2.15 mm from the cord dorsum in L7. In each record the upper traces are intracellular. The lower traces were recorded after withdrawal of the microelectrode to a just extracellular position. Middle traces are from the L7 dorsal root entry zone. Upper records were taken simultaneously at two sweep speeds. The superficial peroneal nerve (SP) is stimulated at a strength of 5 times threshold. The initial upward deflection (internal positivity) is an EPSP, which is followed by a large IPSP. Lower records, at the slower speed, show IPSPs evoked from high threshold muscle afferents of the deep peroneal nerve (DP) and the nerves to semi membranosus and anterior biceps (SMAB). IPSPs were also evoked from the 5 other muscle nerves dissected, from the sural nerve and from the posterior joint nerve. Calibration refers to the microelectrode recording. All records consist of superimposed traces.

Although IPSPs can be evoked in interneurones from group I muscle afferents and from low threshold cutaneous afferents, it is noteworthy that they are predominantly evoked from the FRA. Previous investigations have suggested a complex organization of the pathways from the FRA with inhibitory interaction between different paths from these afferents[4]. The present results show that postsynaptic inhibition in interneurones is an important mechanism for interaction between spinal pathways.

Résumé. L'enregistrement intracellulaire de l'activité des 81 interneurons localisés dans la corne postérieure et la région intermédiare de la moëlle épinière lombaire a été effectué chez des chats spinaux. Dans 76% de ces interneurons, on a trouvé des potentiels postsynaptiques inhibiteurs (IPSP's), provoqués le plus souvent par l'activation des afférences des réflexes de flexion, mais aussi des fibres afférentes d'origine cutanée à seuil bas et du groupe I des fibres musculaires.

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The Influence of Estrogens on Scorbutic Bone Lesions in Guinea-Pigs

Introduction. Conjugated equine estrogen has been used extensively in the clinic as a hemostatic agent although the exact mechanism of action is still not clear. According to some authors[1,2] the ground substance of the connective tissue is the target of the estrogen action. The deficient ground substance formation in scorbutic guinea-pigs has been used as a model for studying this mechanism. RONA and CHAPPEL[3] described the protective action of conjugated equine estrogen against the epiphyseal bone lesions in experimental scurvy. Recently, it was suggested[4] that a synthetic estrogen, estriol sodium succinate, has a hemostatic action similar to that reported following the use of equine estrogen. It appeared therefore interesting to compare the protective effect of conjugated equine estrogen with estriol sodium succinate on scorbutic bone lesions.

Methods. 88 male guinea-pigs (400–550 g) – divided into 3 groups – were maintained on an ascorbic acid deficient diet (Nutritional Biochemicals, Cleveland, Ohio) for 22 days while receiving the following treatment: (1) Control – 0.6 ml distilled water; (2) 1 mg estriol sodium succinate in 0.6 ml distilled water; (3) 1 mg conjugated equine estrogen in 0.6 ml distilled water. Ten intraperitoneal injections were administered during the experimental period (approximately every second day). (Equal doses were selected for both estrogens since they are recommended clinically in the same dose.)

At the end of the experiment autopsy was performed and both knee joints were taken and fixed in Bouin's solution. After decalcification the sections were stained with Hematoxylin-eosin and Colloidal iron stains[5]. Some slides were also studied after toluidine blue and periodic acid Schiff methods.

Results. Several histological parameters were studied and the results are presented in the Table. The pathological changes of scorbutic animals were similar to those which have been described previously[3]. The control guinea-pigs exhibited severe epiphyseal changes. The joints and periarticular soft tissue were also involved (Figure 1). The second group of guinea-pigs on estriol sodium succinate showed changes comparable to those of

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