While both products of lipolysis increase in the blood after the injury the time courses of the changes in glycerol and NEFA concentrations do not run parallel. The NEFA concentration is maximal at the time of release of the tourniquets and shortly afterwards, whereas the glycerol concentration reaches its peak about 1 h later. This could be explained by the different volumes of distribution of the two products of lipolysis, but the possibility remains that injury affects the subsequent metabolism of one more than the other.

The fat stores may not be the only source of blood glycerol and NEFA in injured rats. In rabbits, the total lipid content decreases in the muscles below the tourniquets[7], and the release of material from the injured muscles could have complicated the interpretation of the present experiments[8].

Considering these experiments with those on plasma NEFA, it is clear that both the glycerol and NEFA concentrations are high within 1 h of releasing the tourniquets, suggesting that fat mobilization is increased. Further evidence is necessary to confirm this point, and experiments are being undertaken to search for better indices of fat mobilization[9].

Résumé. Le sérum des rats présente une concentration élevée de glycérine après l'application de garrots aux membres postérieurs pendant quatre heures. L'auteur compare ses résultats avec ceux des recherches dans lesquelles les acides gras non-estérifiés ont été soumis à des mesures quantitatives.

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Reticulospinal Inhibition of Transmission through Interneurones of Spinal Reflex Pathways

It has been shown that many reflexes are facilitated from the corticospinal tract and from the rubrospinal tract[1]. This facilitation is achieved by excitatory action on the interneurones of these reflex pathways. Descending inhibition of reflex transmission can be very profound and is tonically active in the decerebrate state and is also found after electrical stimulation of the brain stem[2,3]. The mechanism by which the reflex pathways are inhibited has been difficult to analyse in that it could be exerted either at a primary afferent or at an interneuronal level. Indirect evidence suggests that the tonic decerebrate inhibition is interneuronal[2,4], although it is known that a large primary afferent depolarization (PAD) can be evoked from the brain stem[5]. In order to investigate this problem further, it is necessary to employ electrical stimulation of the brain stem at a strength that does not evoke a PAD. In experiments of this type, it has been shown that transmission to primary afferents can be inhibited at an interneuronal level through pathways descending from the reticular formation in the ventral part of the spinal cord[6].

The tonic descending inhibition in the decerebrate state is mediated via dorsal spinal pathways[7]. The present experiments were made on decerebrate cats with the spinal cord transected except for the dorsal quadrant contralateral to the side tested in the lumbosacral region (see diagram in Figure 1). Electrical stimulation in the ventromedial part of the medullary reticular formation gives an effective depression of the synaptic actions evoked in flexor and extensor motoneurones by volleys in the flexor reflex afferents (FRA). This is shown in Figure 1 for a motoneurone belonging to the ankle-extensor, gastrocne-

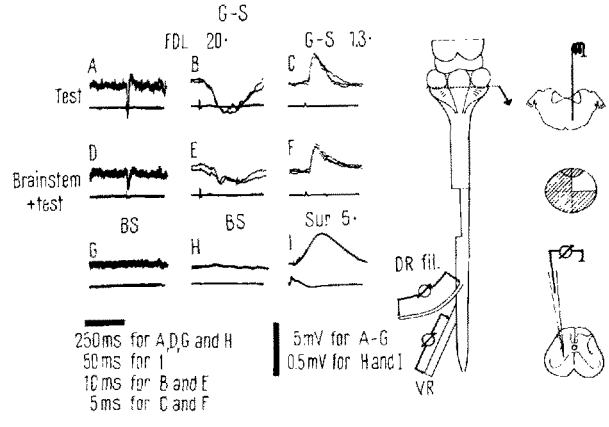

Fig. 1. Inhibition from the reticular formation of transmission in the inhibitory pathway from the flexor reflex afferents (FRA) to an extensor motoneurone. Experiment on a decerebate, decerebellate cat with the spinal cord transected except for the dorsal part of the lateral funicle contralateral to the side of recording (see drawings). The upper traces in A–G are intracellular (citrate electrode) recordings from a gastrocnemius-soleus (G-S) motoneurone. The upper traces in H and I are from the most caudal dorsal rootlet in L6. The lower traces in all records are from the dorsal root entry zone in L7. A and B, taken simultaneously at different sweep speeds, show the IPSP evoked from high threshold muscle afferents in the flexor digitorum longus (FDL) nerve. In the corresponding records D and E the IPSP from FDL is depressed by a conditioning stimulation of the brain stem reticular formation (150/sec for 300 msec at the site shown in the right upper drawing). This stimulation of the brain stem has no effect on the Ia EPSP (test alone in C and conditioned in F). G shows that brain stem stimulation alone does not evoke any postsynaptic potential in the motoneurone. H illustrates that this stimulation of the brain stem does not evoke any dorsal root potential (DRP); for comparison the DRP from sural (Sur) is shown in I.

mius-soleus, and in Figure 2 for a motoneurone of the pretibial flexors. Figure 1, records G, H, and I, also illustrates that this inhibition is evoked by stimuli that evoke neither a dorsal root potential (DRP) nor a postsynaptic potential in the motoneurone. Furthermore, these reticular stimuli have no effect on the Ia EPSP or IPSP (Figure 1, C and F; Figure 2, C, D, G, and H). Since the conditioning reticular stimulation has no effect on primary afferents or motoneurones, it is concluded that the inhibition is exerted on the interneurones transmitting effects from the FRA. The time course of the inhibition is shown in the curve of Figure 2. The same reticular stimuli in addition effectively depress the transmission from the FRA to primary afferents and to different ascending spinal pathways. These depressant actions are similar to those tonically active in the decerebrate state. The effect is evoked from a region within the reticular formation that is more ventral than that from which postsynaptic inhibition is produced at the lowest strengths of stimulation in motoneurones[8]. We propose to denote this descending pathway mediating the inhibition to reflex pathways, the dorsal reticulospinal tract.

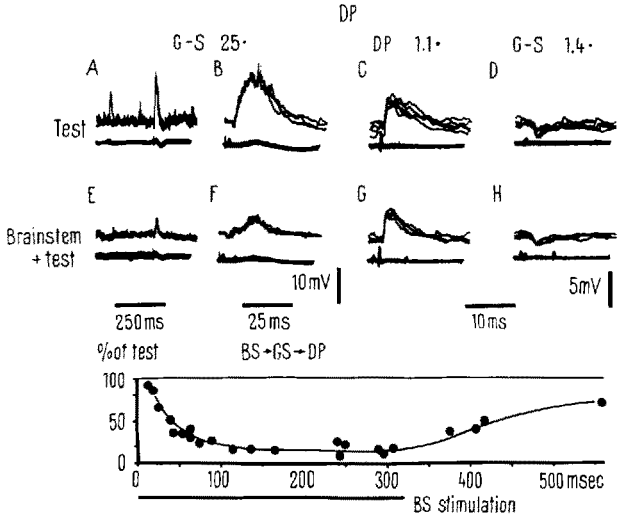

Fig. 2. Inhibition from the reticular formation of transmission from the flexor reflex afferents (FRA) to a flexor motoneurone. A and B, taken simultaneously at different sweep speeds, show the EPSP evoked from high treshold muscle afferents in the gastrocnemius-soleus (G-S) nerve. In the corresponding lower records E and F the EPSP is depressed by stimulation of the brain stem (the same site, frequency and strength as in Figure 1). The time course of the depression is shown in the curve. There is no depression of the Ia EPSP and IPSP, shown unconditioned in C and D and conditioned by brain stem stimulation in G and H. As in Figure 1 the conditioning stimulation of the reticular formation evokes neither a dorsal root potential (DRP) nor a postsynaptic potential in the motoneurone, hence the inhibition is exerted at the interneuronal level.

Experiments are in progress to disclose the mechanism whereby the inhibition is achieved. We have observed that reticular stimulation effectively inhibits activation of interneurones from the FRA; but, in the few interneurones so far investigated with intracellular recording, there has been no postsynaptic inhibition. Presynaptic inhibition at an interneuronal level should also be considered as a possible mechanism.

Résumé. La transmission entre les afférences des réflexes de fléxion (FRA) et les motoneurones peut être inhibée par une stimulation de la formation réticulée bulbaire, sans qu'il se produise une dépolarisation des afférences primaires ou un potentiel postsynaptique des motoneurones. On conclut qu'il existe une inhibition des neurones intercalaires entre les afférences des réflexes de fléxion et les motoneurones.

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PRO EXPERIMENTIS

Fluorescent Staining Techniques in Early Diagnosis of Tissue Alterations

Fluorescent staining techniques have been used in histology mainly in order to differentiate live tissues from dead[1–6]. In developing fluorescent staining techniques, we found this method helpful for demonstrating early degenerative alterations in parenchymal cells that did not show in tissues stained by conventional techniques.

The method proved very sensitive when examining the effect on parenchymal cells of rat livers of a new chemotherapeutic agent (a nitrofurane derivative synthesized at the Institute of Organic Synthesis of the Latvian Academy of Sciences: Director, Professor S. A. Hillers). The sensitivity of this method was confirmed also when examining cancer cells of human tumours.

The compound mentioned above was administered to white rats at a level of 6 mg/kg body weight daily for 20, 40, 60, 80 and 100 days. Animals were sacrificed and small pieces of their livers fixed in a solution of 10% neutral formalin. Frozen sections were stained with a 0.1% solution of coriphosphine on Krebs-Ringer solution at pH 7.4,