The experiment was repeated and confirmed in 12 rats first injected with uranium acetate to produce proteinuria[6] and then with bovine TSH. The urine collected within 2 h after TSH injection gave a response of 387 $\pm$ 32% SEM as compared to 114 $\pm$ 5% in 6 controls. TSH was no longer detected in the nephrotic animals in any sample obtained later than 2 h after injection.

The present work confirms the hypothesis, anticipated on theoretical grounds, that exogenous polypeptide hormones of rather high molecular weight are lost from the serum into the urine of nephrotic rats. In subsequent papers we will demonstrate that the same is true for *endogenous* TSH and, moreover, that the amount of hormones lost is a biologically significant fraction of the total body pool.

Zusammenfassung. An Ratten mit experimentell erzeugter Proteinurie wurde gezeigt, dass das bovine thyreotrope Hormon nach i.v. Injektion von der geschädigten Niere in kurzer Zeit ausgeschieden wird. Die Versuche stützen die These, dass dem Verlust von hypophysären Hormonen in der Pathogenese von endokrinen Störungen bei Eiweissverlustsyndromen beträchtliche Bedeutung zukommt.

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H Reflex Depression by Soleus Sinusoidal Stretching and Facilitation by Voluntary Contraction

In man, stimulation of the posterior tibial nerve in the popliteal fossa produces an electromyographic response in the soleus muscle exhibiting the features of a monosynaptic reflex (HOFFMANN[1], MAGLADERY et al.[2], PAILLARD[3]). This response, termed the H reflex, generally occurs at lower intensity stimuli than those required to produce a direct motor response (M response) in the muscle. When stimuli of higher intensity are applied, the amplitude of the H reflex first increases and then diminishes along with a concomitant increase in the M response.

These changes are conveniently expressed by plotting curves relating H reflex amplitude variations to stimulus intensity (recruitment curves) (Figure 1). Such curves make it possible to detect the thresholds of the 2 responses, the maximum amplitude of the H reflex, and the ratio between reflex and motor response amplitudes. For each subject, the recruitment curves are reproducible provided that a rigorous methodology is applied (HUGON and DELWAIDE[4]).

H reflex amplitude may be greatly modified by various physiological and experimental procedures. By comparing the recruitment curves obtained under these conditions, one can estimate the intensity of the facilitatory and inhibitory influences acting on the spinal cord.

It is possible to produce a depression of the H reflex by a continuous sinusoidal movement of the ankle such that the soleus is stretched passively and periodically. Care must be taken to limit the movement to the ankle; the knee must be immobile. The conditions under which the tibial nerve is stimulated must be kept constant. This may easily be verified by observing the M response, which must remain constant during stretching even if, at the level of stimulation being studied, discrete changes in intensity can elicit marked changes in the motor response (Figure 1, T).

The effects of sinusoidal movement of the ankle were studied in 40 volunteer subjects. In each subject, significant H response inhibition occurred throughout the sinusoidal cycle. Inhibition was modulated according to the particular phase of the cycle, being more pronounced when the muscle was in a relatively stretched position. The magnitude of inhibition is a monotonic function of the amplitude and frequency of sinusoidal movement; it also varies with the initial tension of the muscle.

The figures present data obtained with a stretching frequency of 100 cycles/min and an ankle rotation of 7°. Under these conditions, no spontaneous electromyographic activity is registered in the tibial or soleus muscles. The recruitment curve obtained during sinusoidal stretching clearly exhibits a depression of the H reflex. The mechanism of this inhibition would clearly seem to implicate the proprioceptive muscle afferents, especially the Ia afferents. However, it also raises certain problems which are currently being explored.

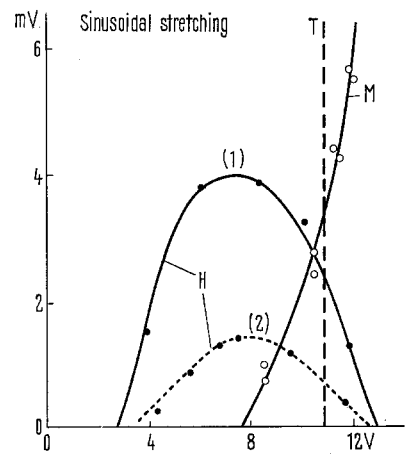

Fig. 1. This graph shows 2 recruitment curves of the H reflex. Because the values of the M responses are almost identical (see M), it is possible to compare in a given patient the curves of the H responses. The control H-curve is plotted in (1). During sinusoidal stretching, the amplitudes are depressed and the curve then obtained is drawn as (2) (datched line). T on the abscisse represents the response with an H and an M component chosen to be sure that stimulation intensity remains constant (see text).

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Other conditions can facilitate the H reflex. A voluntary contraction of the soleus produces a recruitment curve which originates at a slightly lower threshold and attains a higher maximal amplitude (Figure 2). Some well-trained subjects have learned to maintain constant voluntary muscular activity. Under these conditions, using an auditory monitor coupled to the electromyogram of the soleus, one readily obtains reproducible recruitment curves. The curves in Figure 2 were accurately reproduced 5 times.

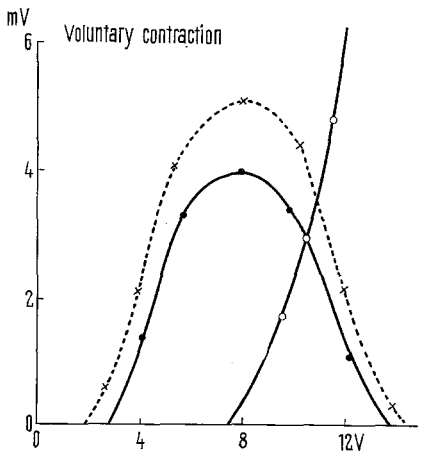

Fig. 2. As in Figure 1, the control curve is represented by black dots. The amplitudes of the H reflex recorded during a constant voluntary contraction are represented by asterisks.

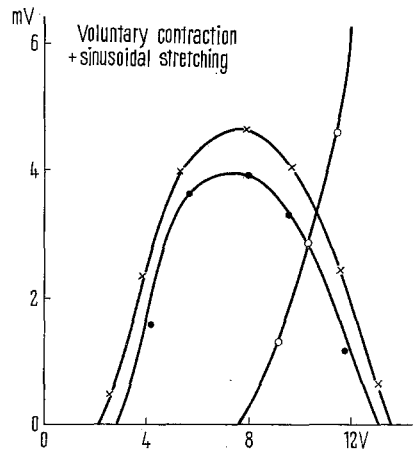

Fig. 3. As in the other graphs, black dots indicate control values. When the sinusoidal stretching and the voluntary contraction are combined, the amplitudes are higher than controls and are shown by asterisks.

It is also possible to combine passive sinusoidal stretching of the soleus with moderate voluntary contraction of the muscle. The recruitment curves obtained with this procedure are identical in every respect to those produced by a voluntary contraction of the same intensity (Figure 3). The effect of these combined manipulations on the H reflex is thus not the algebraic sum of the inhibitory and facilitatory influences. Rather, it is as if the voluntary command, at the same time as it increases motor pool activity, suppresses the inhibitory effect exerted by the proprioceptive muscle afferents.

These findings suggest a functional organization of the descending pathways which could interfere with the influence of the proprioceptive segmental afferents and in particular with the Ia afferents. This interpretation is corroborated by studies dealing with polysynaptic reflexes and voluntary contraction (HUGON[5]). It is also consistent with models of the motor system recently developed by NAVAS and STARK[6].

The competitive action of facilitatory and inhibitory influences is of great interest in investigations of spinal reflex activity in man. In this regard, the study of voluntary contraction is particularly informative.

Résumé. Les courbes de recrutement du réflexe H permettent d'exprimer de façon commode les phénomènes inhibiteurs et facilitateurs spinaux. Lorsque l'on associe la mobilisation de la cheville à une contraction volontaire de même intensité, l'effet observé est égal à celui obtenu par la contraction volontaire seule. Ces résultats suggèrent que la contraction volontaire pourrait contrôler le mécanisme inhibiteur mis en activité par les afférences musculaires.

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Effect of Methyl Amphetamine on the Brain 5-Hydroxytryptamine Content of Isolated and Aggregated Rats

Drugs having central stimulatory effects increase the brain 5-hydroxytryptamine (5-HT) content. Lysergic acid diethylamide (LSD), imipramine, atropine, etc., have been shown to increase brain 5-HT content of rats[1–4]. Convulsions produced by electroshock as well as chemical agents like cardiazol have also been shown to increase the level of 5-HT in rat brain[5]. MILINE, STERN and HUKOVIC[6] observed increase of brain 5-HT in rats with experimentally induced fear. GUNN and GUARD noticed that the symptoms of excitation and stimulation caused by injection of amphetamine and related compounds were much more pronounced if the animals were kept together in one cage rather than singly, and the toxicity of amphetamine was increased nearly 10 times by keeping the injected animals in groups of 10 instead

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