ethyl-isothiouronium bromide) was added after neutralization and incubation at 20°C for 30 min. The final concentration of *E. coli* endotoxin[3] was 100 µg/ml. The mixtures with a final volume of 2 ml were incubated at 37°C for 90 min in polyethylene tubes. After centrifugation, histamine and serotonine determinations[4] were carried out in supernatants and sediments.

Among the thiol-compounds examined, *l*-cystein, mercaptoethanol, thioglycolic acid and AET show 20–50% inhibitory effect on the histamine release also in a concentration of 5 m*M*, while reduced glutathion has such an effect only at 10 m*M* concentration (see Table). The above-mentioned compounds – with the exception of glutathion – inhibited completely, in a concentration greater than 20 m*M*, the endotoxin-induced histamine release and platelet agglutination, furthermore the morphological changes: the platelets did not lose their double refracted contours in such a medium under the effect of endotoxin. Such an effect of *d*-penicillamine (=*d*-β-β'-dimethylcystein) was not observed, and likewise the platelet agglutination was not inhibited by ascorbic acid, which is a well-known reducing agent. The above-mentioned compounds inhibited also the serotonine release in a similar manner to the histamine release.

There are data that the endotoxin effect shows in many respects a close similarity to the consequence of the antigen-antibody interaction. These similarities can be well explained with the natural endotoxin hypersensitivity[5,6] and further that normal sera contain also antibodies against endotoxin[7–9]. GILBERT and BRAUDE's experiments[9] call attention to the possible participation of complement. The one possibility in explaining the effect of SH-compounds is that these substances may reduce the natural antibody against endotoxin. The examinations of the structure of antibody demonstrated the importance of the S–S linkage in the function of antibodies[10,11]. According to our experiments, the above-mentioned SH-compounds inhibited the guinea-pig complement in sensitized sheep's red blood cells; furthermore the cystein inhibited the precipitation of ovalbumin and native ovalbumin antiserum[12]. The reducing and dissociating action of some SH-compounds on the S–S linkages is well known in the case of the γ-globulins and macroglobulins[10]. On the basis of the above-mentioned data, it is suggested that the inhibitory effect of the thiol-compounds described is due to the reduction of the natural antibodies or other competent macromolecules.

Zusammenfassung. Es wird festgestellt, dass gewisse Thiolverbindungen wie Cystein, Mercaptoethanol, Thioglycolsäure und AET die von Endotoxin ausgelöste Thrombocyten-Agglutination, die Freisetzung von Histamin und Serotonin im Kaninchen-Thrombocytenplasma hemmen.

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Substances	Inhibition of agglutination	Inhibition of histamine release %		
		5 m*M*	10 m*M*	20 m*M*
Cystein	+	20–30	40–60	80–100
Reduced glutathion	+	–	20–30	30–40
Mercaptoethanol	+	30–50	80–100	100
Thioglycolic acid	+	25–40	60–80	100
AET	+	30–50	80–100	100
Penicillamine	Ø	Ø	Ø	Ø
Ascorbic acid	Ø	–	–	–

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Monosynaptic Reflex and Natural Sleep

Since the re-appreciation of the so-called paradoxical phase of sleep[1], various features of this sleep have been described and possible mechanisms have been suggested[2]. There are certain typical activities in the motor system, such as the silence of neck muscles and occasional twitch-like contractions of muscles, including the rapid eye movement. The present paper will show that the monosynaptic reflex (MSR) discharge from the lumbar spinal motoneurons is depressed during this phase of sleep in the cat.

Pairs of silver electrodes, similar to those used by SWETT and POMPEIANO[3,4], were implanted in the tibial or peroneal nerve at the popliteal fossa of the chronic cat. In order to avoid the contamination of muscle contraction and proprioceptive γ motor activity, nerves were crushed at the distalmost part. Stimulating the central portion of the recording nerve bipolarly, the action potential of reflex origin could be recorded from the distal part of the tibial or peroneal nerve, either bipolarly or monopolarly, with a latency of about 4 msec. Recorded in

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Figure 1 are examples of the response obtained from the tibial nerve with bipolar lead by the stimulation of the same nerve.

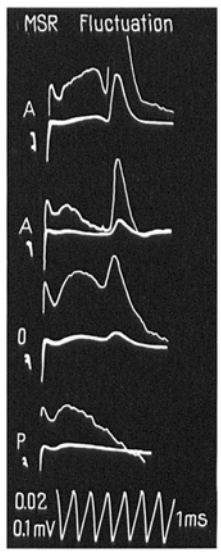

Fig. 1. Monosynaptic reflex responses produced by stimulating the tibial nerve bipolarly and recorded also bipolarly from the same nerve at the more distal portion than the stimulus site. Two traces in each record show the same response, but with different amplification, being 0.02 and 0.1 mV respectively, as seen from the peak to peak readings of 1000 cps wave at the bottom. The stimulus intensity used was 0.84 V, 0.1 mS pulse, being 1.1 times as large as the threshold for MSR elicitation. Upper two pairs (A) are from awake state. The third one (O) is from the drowsy state and the fourth one (P) is from the paradoxical state.

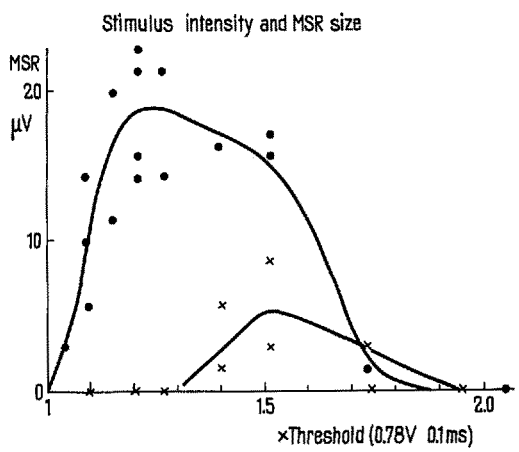

Fig. 2 Comparison of the extensor monosynaptic reflex size in μV (ordinate) represented as function of the stimulus intensity (abscissa) during two states of sleep: drowsy state (O) and paradoxical state (P). Square pulses of 0.1 msec duration were used for bipolar stimulation of the tibial nerve. Each point represents the average value of more than 5 responses at a repetition rate of 0.1 sec, recorded bipolarly from the same nerve. The threshold for the response in the drowsy state before and after the paradoxical phase was stable and 0.78 V, which was taken as the standard in the abscissa axis.

In good agreement with LLOYD's results[5], obtained in a similar situation in the acute cat, this potential was identified as the monosynaptic reflex of Group Ia fibres for the following reasons. Firstly, the response was abolished by cutting the appropriate dorsal roots. Secondly, the threshold stimulus for evoking the response was small (about 0.4–0.8 V at 0.1 msec duration of the pulse) and only 1.1–1.3 times as large as the threshold for directly evoked conducting nerve potential. According to LLOYD, 4 msec latency of the tibial nerve is necessary and sufficient for the afferent conduction (1.4 msec), central delay including one synapse (1.1 msec), and efferent conduction (1.5 msec).

The monosynaptic reflex responses were elicited by repeating single shock stimulation at a frequency of 0.1 cps with varied intensity. Their amplitudes were compared between two states of sleep: the drowsy state (O), featured with the spindle burst in the neocortical EEG, and the paradoxical state (P), featured with the low voltage fast EEG, lack of neck muscle EMG and appearance of rapid eye movements. For each state of sleep, the average size of more than 5 responses of the tibial nerve is plotted in Figure 2 as a function of the stimulus intensity relative to the threshold at the drowsy state. It is remarkable that in the paradoxical phase the threshold of MSR is higher and the average size is smaller at any intensity than in the drowsy state. Records in Figure 1 illustrate samples of the MSR response of the tibial nerve at the two states of sleep, elicited by a single shock of an intensity slightly above the threshold ($1.1 \times T$). The upper two records (A) were taken when the animal was awake, both in EEG and behaviour. The third one (O) was taken in the drowsy state, and the fourth one(P) was from the paradoxical state in which disappearance of the reflex was demonstrated. Threshold increase and smaller sizes of the MSR were also observed in the peroneal nerve.

The supraspinal origin of this MSR depression of non-reciprocal nature was indicated by the fact that the depression was not observed in cats which had undergone complete spinal section at the lower thoracic level three weeks previously.

Whether the MSR depression observed is caused by reduction of the excitatory influences from higher structures to the motoneuron or by enhancement of the inhibitory influences, either presynaptic or postsynaptic, is a problem for the future.

Résumé. Le réflexe monosynaptique (MSR) du nerf tibial ou du péronier a été observé chez le chat intact en expériences chroniques et non-anesthesié au cours des deux différentes phases du sommeil; la phase de haut-voltage ou des fuseaux et la phase paradoxale de bas-voltage.

Au cours de cette dernière, le MSR diminue d'amplitude, souvent même disparaît, et le seuil est toujours haut placé.

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