times relative to the contralateral cornu. Significant increases in frequency of contraction of dioestrous uteri were observed similarly to those of the oestrous uteri. It significantly ($p < 0.01$) increased tension in both types of uteri at each of the time intervals. Results from this experiment are summarized in the Table. Preliminary studies indicate that this solution has similar effects on excised human myometrium.

It may be that this oxytocic agent is specific for the smooth muscle of the uterus since it was without effect on 10 samples of rat duodenal tissue. These intestinal segments were treated identically to the uterine strips and doses 10 times greater than those causing uterine stimulation were without effect on the intestinal preparations. Also the sensitivity of vascular smooth muscle to the decoction was tested. The right carotid arteries of 10 rats were cannulated, and blood pressure, pulse pressure and heart rate were monitered on a Grass polygraph. Injections of 1 ml of extract per 100 g of rat via the femoral vein produced no change in any of the measured parameters up to 1 h after the injections.

At the present time the decoction has resisted complete purification, but several observations have been noted with regard to properties of the active agent. It is stable at 100 °C, is not decomposed by light or upon drying, nor is it soluble in the fat solvents (petroleum ether, benzene, diethyl ether, acetone, heptane or methanol). It is not retained on Sephadex G-25 or G-50 but is trapped on an 18 · 1 inch column of G-100 grade Sephadex. Inorganic ion effects have been ruled out as both charring and treatment with acid (pH less than 2) cause loss of activity when the extract is returned to its original conditions[7].

Résumé. Un extrait aqueux de feuilles de *Robinia pseudoacacia* augmente la fréquence et la force de contraction de l'utérus isolé de rat. Cette action semble être spécifique pour le muscle utérin lisse, car l'extrait est sans effet sur des préparations isolées d'intestin et n'agit pas sur la pression artérielle du rat intact.

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Inhibition of Shivering Obtained by Peripheral Stimulation

Afferent input elicited by peripheral stimulation was shown to inhibit several functions of the central nervous system. Inhibitory behaviour with drowsiness was obtained by low rate stimulation of cutaneous nerves[1] and by repetitive isolated electrical pulses to the s.c. tissue[2].

Moreover, autonomic activities may also be inhibited by afferent stimulation, i.e. the inhibition of the skin galvanic reflex induced by faradization of cutaneous nerves[3], and the hypotensive reflex obtained by skin stimulation in the anaesthetized dog with chloralose (in preparation). It seemed probable that other activities of the central nervous system, such as shivering, might be inhibited by this form of stimulation; and, in view of the fact that there is no definite conclusion on the matter[4], this has been investigated.

Methods. 9 mongrel dogs weighing 7–18 kg were anaesthetized with nembutal (33 mg/kg, i.p.). Shivering was detected by the EMG activity registered from the extensor and flexor muscles of 1 leg. The electrodes were applied by visualization of the muscles after incision of the skin and secured by ligature to avoid any mobilization from the implanted place. Thin stainless steel needles or nichrome wire 0.2 mm width isolated except in 10–15 mm of length were utilized as electrodes. 2 electrodes were applied in each muscle separated by a distance of 10 mm. The electrodes were connected to the AC input of a 7 Model Grass Polygraph preamplifier with a time constant of 0.04 sec. The same leg implanted with the EMG electrodes was stimulated with pulses of 0.5 msec duration and 30 c/sec by means of needles introduced in the foot pad of the leg. Usually, the forelegs were preferred to register the EMG activity, but shivering could as well be detected from the hindlegs.

Results. EMG activity was poorly developed during the first hours of the experiments. After the first or second hour, before the appearance of shivering, it was possible to register some tonic EMG activity from the extensors. The definite figure of background EMG activity depended on the position of the leg, although a tonic flexor activity was always undetectable with the sensitivity used. Shivering started about 2–3 h after injection of the anaesthetic and was fully developed by 4–5 h, when signs of lighter anaesthesia level appeared. The rectal temperature was slightly subnormal (0.5–1 °C) at the beginning of shivering and thereafter higher values were recorded. Usually shivering attacks lasted no longer than 30 sec and began by tremor of the head muscles. Shivering activity was more evident during the inspiration. Figure (a) is a typical record where a tonic extensor activity is predominant. It is also shown that modifications occur on the EMG during shivering attack. The beginning of shivering is indicated at the arrow by an abrupt activation of flexor muscles concomitantly with an augmenta-

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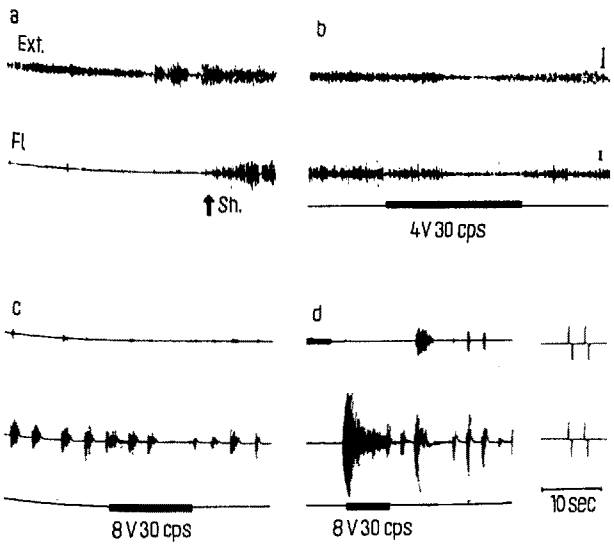
tion on the extensor activity. When the foot pad was stimulated during shivering, an inhibition was seen, demonstrated by a decrease activity of both types of muscles. The inhibitory effect was not fully developed until late in the period of stimulation, Figure (b). Figures (c) and (d) are examples from another experiment. In figure (c) is shown the inhibition of shivering when stimulated with 8 V. In Figure (d) the animal was stimulated in the absence of shivering as demonstrated by silence of flexor activity, against a slightly tonus of the extensors on the EMG record. In this situation the stimulation evokes a striking activation of the flexors without any response of the extensors. In a few cases there was a rebound effect with facilitation of shivering after the period of stimulation. This is also illustrated in the Figure (d).



EMG records from extensor (Ext) and flexor (Fl) muscles. Anaesthetized dog with nembutal (33 mg/kg, i.p.) (a) Note that silence of flexor muscles was present before shivering (Sh.). (b) Inhibition of shivering by stimulation of the foot pad. (c) The same inhibitory effect obtained in one other experiment. (d) Flexor reflex activation obtained by stimulating the foot pad as in (c) in the absence of shivering. (a, b) Recorded from the foreleg muscles; (c, d) recorded from the hindleg muscles. Calibration 100 μV.

Conclusions. It is concluded that peripheral stimulation inhibits the EMG activity produced by the shivering attack. This muscular influence is a generalized one and affects both flexor and extensor muscles. It differs from the flexor activation observed when stimulation was performed in absence of shivering. The characteristica of the late phenomenon suggest a process occurring at a spinal level and a simple reflex in nature. The inhibition of shivering, on the contrary, could be an inhibitory process set up by afferent inputs on the hypothalamus or the reticular formation[5].

Résumé. La stimulation de la patte chez le chien anesthésié, inhibe l'activité musculaire enregistrée pendant les attaques de frisson. Cet effet peut dépendre de l'action inhibitrice des influx nerveux agissant sur l'hypothalamus ou même sur la formation réticulaire, et peut se distinguer des influences inhibitrices d'origine médullaire qu'on observe quand la patte est stimulée en dehors des attaques de frisson.

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Mechanisms of Sympathetic Regulation of Arterial Smooth Muscle

According to recent data[1-3], sympathetic nerve endings have been shown at the border line between the adventitia and the media; only exceptionally do they penetrate into the superficial layers of the media. Several layers of vascular smooth muscle have been shown to be at a considerable distance from the adrenergic nerve endings. It has been evidenced[4-5], however, that conduit vessels with several smooth muscle layers, free of adrenergic nerve endings, constrict to sympathetic stimulation induced either reflectively or directly; and the range of the sympathetic control of the radius of the conduit vessel has been formulated[6].

The question then arose by which mechanism is excitation of the smooth muscle, particularly of the layers free of adrenergic endings, realized? Theoretically 2 possibilities must be considered: (a) conduction of excitation from cell to cell, or (b) diffusion of the transmitter released from nerve endings to the effective smooth muscles. The present study is designed as an attempt to prove the second possibility.

Method. In a series of tests on 7 dogs, anaesthetized with thiopental (70 mg/l kg b.w.) the range of the sympathetic control of the diameter of dorsal pedal artery was followed. The arterial diameter was recorded by means of a differential inductive transformer[7]. Stimulation of the peripheral stump of the cut sympathetic trunk by bipolar platinum electrodes was applied (between LG_3–LG_4) by means of square wave pulses of 5 msec duration, at a frequency of 0.5–15 c/sec. The reproduction of original recordings (Figure 1) represents contraction (diameter decrease) of the dorsal pedal artery at various frequencies of sympathetic stimulation.

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