probably connected with its direct stimulating effect on memory processes. This view is supported by the effectiveness of sydnocarb on all three stages of memory tract formation.

After analysis of data in the literature on the possible neurochemical mechanisms of action of sydnocarb [12] and also of the results of the writers' recent investigation [5], it is logical to suggest that the stimulating effect of sydnocarb on CPAR may be based on its activating effect on monoaminergic (and, in particular, catecholaminergic) systems of the brain, which have an important functional role in the mechanisms of memory formation [8]. Our hypothesis on the mechanisms of the facilitatory effect of sydnocarb on CPAR in poorly trained animals is in agreement with the results of investigations [14] which shows that amphetamine has a similar effect, due to its action on the activating monoaminergic systems of the brain. However, this interpretation of the mechanism of action of sydnocarb on CPAR does not rule out the possibility that other mechanisms may be involved and, in particular, weakening of GABA-ergic control [4].

LITERATURE CITED

1. R. A. Al'tshuler, M. D. Mashkovskii, and L. F. Roshchina, Farmakol. Toksikol., No. 1, 18 (1973).
2. V. A. Baturin, Farmakol. Toksikol., No. 6, 691 (1977).
3. Yu. A. Belozertsev, Byull. Éksp. Biol. Med., No. 1, 53 (1984).
4. M. M. Ganiev, A. N. Kharlamov, and O. V. Shumkova, Farmakol. Toksikol., No. 3, 30 (1984).
5. M. M. Ganiev, V. S. Kudrin, and K. S. Raevskii, Farmakol. Toksikol., No. 2, 27 (1985).
6. E. V. Gubler, Computerized Methods of Analysis and Diagnosis of Pathological Processes [in Russian], Leningrad (1978), pp. 68-91.
7. E. B. Katkova, R. S. Bystritskii, and A. R. Martynikhin, The Psychopharmacology of Emotional Stress and of Zoosocial Interaction [in Russian], Leningrad (1975), pp. 91-97.
8. R. I. Kruglikov, Neurochemical Mechanisms of Learning and Memory [in Russian], Moscow (1981).
9. B. I. Lyubimov, Farmakol. Toksikol., No. 4, 399 (1985).
10. M. D. Mashkovskii, R. A. Al'tshuler, G. Ya. Avrutskii, et al., Zh. Nevropatol. Psikhi. im. S. S. Korsakova, No. 11, 1704 (1971).
11. J. V. Brady, Science, 123, 1033 (1956).
12. S. L. Erdö, B. Kiss, and B. Rosdy, Pol. J. Pharmacol. Pharm., 33, 141 (1981).
13. J. A. Krivanek and L. L. McGaugh, Agents and Actions, 1, 36 (1969).
14. D. Quaterman and M. E. Judge, Physiol. Psychol., 11, 166 (1983).

EFFECT OF BEMITIL ON PERCEPTION OF VISUAL STIMULI

Yu. G. Bobkov, A. I. Machula, and É. G. Dvalishvili

UDC 615.232:547.781.1/015.4:612.833.843.7

KEY WORDS: bemitil; visual stimuli; conditioned defensive reflex.

The effect of bemitil on various aspects of activity of man and animals has now been investigated. In particular, its effect has been studied on physical working capacity [5], processes of mental fatigue [4], and actinoprotector activity [3].

Meanwhile a comprehensive analysis of the action of drugs affecting the CNS cannot be undertaken without a study of their effect on the components of organization of behavioral responses and, in particular, on visual perception of the surrounding world. This enunciation of the problem is determined by the fact that there is no single mental manifestation which can be independent of information processes [8].

Research Institute of Pharmacology, Academy of Medical Sciences of the USSR. All-Union Research Center for Medico-biological Problems of the Prevention of Drunkenness and Alcoholism.

(Presented by Academician of the Academy of Medical Sciences of the USSR G. N. Kryzhanovskii.) Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 104, No. 10, pp. 455-456, October, 1987. Original article submitted February 20, 1987.

TABLE 1. Effect (in %) of Bemitil on Parameters of Conditioned Reflex (M ± m)

Parameter	Background	Bemitil, mg/kg	
		15	30
DSS	55±3,4	54±2,1	65±3,4
DLS	85±2,7	86±1,4	86±2,67
LPD	7,78±0,055	7,41±0,08	7,29±0,056
LPS	5,6±0,075	5,1±0,08	5,0±0,1
DMT	2,18±0,061	2,31±0,19	2,29±0,44
ITR	2,3±0,095	2,4±0,071	1,1±0,15

To analyze the effect of bemitil on a goal-directed behavioral response we used a series of behavioral parameters reflecting components of the formation of a behavioral act. As the experimental model we chose a conditioned-defensive reflex of recognition of structured visual stimuli.

EXPERIMENTAL METHOD

Experiments were carried out on cats weighing 3-3.5 kg, previously trained by the conditioned-defensive reflex method to differentiate two lines oriented in different directions, and presented for different exposures (300-5000 msec). Training was considered to be complete if differentiation of stimuli with a duration of 3000 msec was performed correctly in almost 100% of cases. The visual stimuli were applied in random order. The following conditioned reflex parameters were taken into consideration: differentiation of a short (500 msec) stimulus (DSS), differentiation of a long (3000 msec) stimulus (DLS), the latent period of the conditioned reflex to differentiated (LPD) and single (LPS) stimuli, the decision making time (DMT), and the number of intertrial responses (ITR). Bemitil was injected intraperitoneally.

EXPERIMENTAL RESULTS

During training of the animals the level of correct identification of visual stimuli presented with an exposure of 3000 msec or more gradually increased up to 90-95% of correct responses after 25-30 training sessions. Meanwhile the level of recognition of visual stimuli presented with shorter exposures still remained at a lower level, and in the case of exposures of under 300 msec, differentiation of the visual stimuli was completely disturbed. An increase in the duration of training was not followed by improvement of the level of differentiation of short visual stimuli.

To determine whether the level of differentiation of short visual stimuli depends on the learning time, the experimental data were subjected to regression analysis. Approximation of the experimental curves, done by solving a system of equations by the method of least squares, demonstrated the complex character of the experimental and theoretical curves. Thus, to analyze the action of bemitil, we adopted a background of independence of learning time.

The experiments conducted against this background showed that bemitil, in a dose of 15 mg/kg (Table 1), did not change DSS or DLS, reduced LPD and LPS, and did not change DMT or the number of ITR.

Different results were obtained if the dose of bemitil was increased. It was found, in a dose of 30 mg/kg, to improve DSS, not to change DLS, to shorten LPD and LPS, not to change DMT, and to reduce the number of ITR (Table 1).

The experimental data and their mathematical analysis showed that within a certain time interval recognition of visual stimuli by the animals depended on their exposure to them. Meanwhile, if the duration of exposure to the visual stimuli was lengthened, no correlation was observed between their duration and the animal's response to them. In this case the final response thus depended on analysis, not of the physical parameters of the visual stimuli, but on their biological significance. Thus bemitil, in a dose of 15 mg/kg, did not affect the construction of a physical model of the visual stimulus or assessment of its biological significance. In both doses, however, bemitil shortened LPS and LPD, evidence of a general elevation of the level of function of the CNS and the speed of complex information processing [2, 4].

In a dose of 30 mg/kg bemitil lowered the level of anxiety, as shown by a decrease in the number of ITR [1]. Consequently, a change in recognition of visual stimuli after

administration of bemitil may be associated with a change in the emotional level under its influence. Thus bemitil modifies several processes connected with behavior formation. Meanwhile analysis of the internal structure of states arising under the influence of bemitil requires the use of additional experimental methods and also of methods of analysis of experimental data.

LITERATURE CITED

1. K. V. Bardin, The Problem of Thresholds of Sensitivity and Psychophysical Methods [in Russian], Moscow (1976).
2. Yu. G. Bobkov, V. N. Vinogradov, and A. V. Smirnov, Abstracts of Proceedings of the 4th All-Union Symposium on the Goal-Directed Search for Physiologically Active Substances [in Russian], Riga (1981), p. 57.
3. Yu. G. Bobkov and V. M. Vinogradov, Pharmacological Regulation of Fatigue Processes [in Russian], Moscow (1982), pp. 7-33.
4. A. D. Vladimirov, Psychophysiological Principles Governing Perception and Memory [in Russian], Moscow (1985), pp. 190-199.
5. A. I. Leont'ev, Vopr. Filos., No. 2, 28 (1972).
6. Yu. G. Bobkov, V. M. Vinogradov, V. F. Katkov, et al., Pharmacological Correction of Fatigue [in Russian], Moscow (1984).

CUCURBITACIN R GLUCOSIDE AS A REGULATOR OF STEROID AND PROSTAGLANDIN E_2 PRODUCTION AND SPECIFIC MODULATOR OF THE HYPOTHALAMO–HYPOPHYSEO–ADRENOCORTICAL SYSTEM

A. G. Panosyan, M. A. Dadayan, and É. S. Gabrielyan

UDC 612.826.4.018:/577.175.82+577.175.859/.014.46:615.322:582.982

KEY WORDS: adaptogens; corticosteroids; cucurbitacin; prostaglandins; stress.

The writers showed previously that one of the most active components of an extract of the roots of *Bryonia alba* L., exhibiting adaptogenic properties, is the glucoside cucurbitacin R [2β-25-di(O-β-D-glucopyranosyloxy)-16α,22-dihydroxycucurbit-5-ene-3,11,22-trione] (CRG) [3], which increases the working capacity of mice during physical exertion [5]. Endurance is known to be increased as a result of the adaptive response of the hypophyseo-adrenocortical system, resulting in increased formation and secretion of corticosteroids by the adrenal cortex [1]. The possibility of enhancing endurance and resistance of the body when there is insufficiency of this system, by inducing the synthesis of endogenous corticosteroids through the use of adaptogens of plant origin, notably CRG, as inducers, is of great interest. The biochemical targets for factors influencing this process are probably icosanoids and, in particular, prostaglandin E_2 (PGE_2), which acts as specific modulator of activation of the hypothalamo-hypophyseo-adrenocortical system at all its levels [6-12].

The aim of this investigation was to study the effect of CRG on steroid production and on the formation of PGE_2 and prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) in the adrenal cortex during stress.

EXPERIMENTAL METHOD

Noninbred albino rats weighing 160-180 g were used. Daily for 14 days the animals were given an intramuscular injection of 0.2 ml of a 0.1 mM solution of CRG in a 0.15 M NaCl. Control animals received the same volume of physiological saline. Stress was induced by immobilization once for 2.5 h. Blood containing EDTA (10 mg/ml) was centrifuged at 800g for 15 min, plasma was separated, and hydrocortisone was added (0.8 μg to 1 ml of plasma). To one volume

Research Institute of Medical Radiology, Ministry of Health of the Armenian SSR, Erevan.

(Presented by Academician of the Academy of Medical Sciences of the USSR A. V. Val'dman.) Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 104, No. 10, pp. 456-457, October, 1987. Original article submitted July 28, 1986.

0007-4888/87/0010-1417$12.50