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Research Article

STUDY OF PSYCHOACTIVE ACTIVITY POTASSIUM SALT 5-(O-AMINOPHENYL)-1,3,4- OXADIAZOLE-2-THION (D-361)

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ABSTRACT

These papers present a study of the synthetic compound potassium salt 5-(o-aminophenyl)-1,3,4-oxadiazol-2-thione (D-361) at doses of 10; 30 and 60 mg/kg by oral administration on motor activity, locomotor action of phenamine, haloperidol catalepsy and M-cholinergic receptors in experimental animals. Based on the results of the experiment, it was found that psychostimulating, partially dopamine-blocking, M-cholinergic blocking action.

KEYWORDS

Potassium salt 5-(o-aminophenyl)-1,3,4-oxadiazol-2-thione, haloperidol, psychostimulant, phenamine.

INTRODUCTION

Psychotropic drugs are psychoactive substances used to influence the chemical composition of components of the brain and nervous system. In most cases, they are created from synthetic chemical compounds. They are usually used for the treatment of mental disorders and are often prescribed by attending physicians in psychiatric medical institutions during involuntary hospitalization. In the middle of the XX century, such drugs became the leading methods of treating a wide range of mental illnesses: because of this, the need for long-term hospitalization decreased, which lowered the cost of psychiatric care [1-3]. However, in many countries, the rate of relapses or re-hospitalization of mentally ill patients remains high, and the reasons for this are under investigation [4-6]. In the department of organic synthesis, a new chemical compound has been synthesized, which has psychotropic activity.

Purpose of the study: To study the psychotropic activity of 5 potassium salt 5-(o-Aminophenyl)-1,3,4-oxadiazole-2-thion (D-361).

MATERIALS AND METHODS

The effect of substances on the motor activity of white mice with a single injection. The experiments were conducted on white mice where motor activity (further MA) was estimated by the number of intersections of the floor lines by mice in 1 min. Psychopharmacological effects of phenamine are caused mainly by stimulation of central α-adrenergic receptors according to R.Rothman at al., 2001 [7]. The effect of substances on the severity of the locomotor action of phenamine was studied. An increase in the severity of the locomotor action of phenamine against the background of the administration of the studied substances compared with control mice was assessed as an increase in the sensitivity of central α-adrenergic receptors, and a weakening of the locomotor action was assessed as their blockade. The effect of substances on haloperidol catalepsy [8]. As is known, neuroleptics, including the D-blocker haloperidol, cause catalepsy, mainly due to the blockade of D-receptors. The blockade of D-receptors manifests itself in the form of immobilization of mice and the ability to maintain an unusual pose - the

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"lecturer's pose", expressed in standing on the hind legs, and the front paws on the crossbar. The average duration of standing on the hind legs in seconds was recorded for the group. Shortening the catalepsy time was evaluated as a D-positive effect, and lengthening as a D-blocking effect. Haloperidol was administered at a dose of 0.25 mg/kg s/c, causing catalepsy from 60 to 120 seconds. The study of the effect of substances on M-cholinergic receptors was carried out on white mice with the introduction of arecoline 10.0 mg/kg s/c. Description of the method in Khabriev's manual [9].

Statistical processing of the results was carried out by the tabular method proposed by R.B. Strelkov [10].

RESULTS AND CONCLUSIONS

The effect of substances D-361 on the motor activity of white mice with a single injection. Doses of 10, 30 and 60 mg/kg orally were used for study MA substances. In mice, against the background of D-361 administration at doses of 10 and 30 mg/ kg, it was 30-45% higher than in control mice. At a dose of 60 mg/kg with a 5-hour follow-up, MA decreased to 35% (see. tab-1).

Table-1. The effect of substances D-361 on the motor activity of white mice with a single injection.

№	Substances	Source	1 hour	3 hour	5 hour
1.	Control	15,6±4,2 (100%)	14,8±2,3 (95%)	12,4±1,7 (79%)	9,6±1,1 (61%)
2.	D-361 10 mg/kg p.o.	12,4±2,7 (100%)	17,4±2,6* (140%)	18,0±2,3* (145%)	17,6±2,1* (141%)
3.	D-361 30 mg/kg p.o.	15,8±2,1 (100%)	18,6±3,2* (118%)	20,8±2,6* (133%)	17,1±0,4* (108%)
4.	D-361 60 mg/kg p.o.	16,4±3,2 (100%)	14,8±4,1* (90%)	12,1±2,1* (74%)	10,5±0,2* (64%)

Note.*P≤0.05 comparison with the control group

Motor activity in white mice was monitored for several hours by oral administration of 10-60 mg/kg. Compared with the control group, the activity of D-361 at a dose of 10-30 mg/kg is 30-45% higher than in control mice. At a dose of 60 mg/kg, the activity decreased compared to the control group.

The effect of D-361 substances on motor activity against the background of phenamine hyperreactivity in white mice with a single injection.

In experiments on mice, D-361 was administered in doses of 10, 30 and 60 mg/kg orally and after 1 hour phenamine 7.0 mg/kg s/c was administered. As experiments showed, 5 hours after administration of phenamine, there was an increase in motor activity in both control mice and experimental mice, and against the background of 10 mg/kg doses of D-361, respectively, from 21 to 143% ($p < 0.05$), and from a dose of 30 and 60 mg/kg, respectively, 61 and 15% ($p \leq 0.05$), in all experiments there was a clear tendency to increase motor activity compared to the control group (see. tab-2).

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Table-2. The effect of substances D-361 on the motor activity of white mice with a single injection.

№	Substances	Source	1 hour	Phenamine 1 hour	Phenamine 2 hour	Phenamine 3 hour	Phenamine 4 hour
1.	Control (phenamine 7 mg/kg s.c.)	12,0±1,9 (100%)	14,2±2,9 (118%)	14,7±3,8 (122%)	17,2±4,7 (143%)	16,6±4,1 (138%)	14,7±3,9 (122%)
2.	D-361 10 mg/kg p.o.	12,4±2,2 (100%)	16,4±2,7 (132%)	21,8±3,8* (175%)	30,2±4,1* (243%)	28,6±3,9* (230%)	20,6±2,6* (166%)
3.	D-361 30 mg/kg p.o.	20,8±2,1 (100%)	22,4±2,4 (107%)	30,2±4,7* (145%)	33,6±2,6* (161%)	31,2±0,4* (150%)	24,7±0,4* (118%)
4.	D-361 60 mg/kg p.o.	17,8±2,7 (100%)	15,4±3,4 (86,5%)	20,5±2,6* (115%)	19,6±2,3* (110%)	10,4±2,1* (58,4%)	10,4±2,1* (58,4%)

Note.*P≤0.05 comparison with the control group

Based on the results obtained, it can be concluded about the real potentiation of small doses of D-361 of the locomotor action of phenamine.

The effect of substances D-361 on haloperidol catalepsy. In the experiments conducted on mice, D-361 was administered in doses of 10, 30 and 60 mg / kg orally 1 hour before the administration of haloperidol 0.5 mg/kg s/c. The study showed that haloperidol itself caused catalepsy lasting more than 140 seconds for 5 hours, while against the background of D-361, the duration of catalepsy was less pronounced by 10-15%. It can be concluded that the compound in doses of 10 and 30 mg/kg partially blocks the action of haloperidol.

The effect of D-361 on the resorptive effect of arecoline. When studying the mechanism of action of psychotropic substances on the central nervous system, identifying the features of their effect on central and peripheral M-cholinergic receptors is mandatory. Experiments on the effect of M-cholinergic receptors were carried out on 36 white male mice. Arecoline was administered at a dose of 10.0 mg/kg, causing salivation (peripheral effect) and tremor (central effect). Attention was paid to the duration of salivation and tremor. D-361 in all studied doses 10; 30 and 60 mg/kg reduces both the central and peripheral M-cholinopositive effects of arecoline.

CONCLUSIONS

Synthetic compound 5 potassium salt 5-(o-Aminophenyl)-1,3,4- oxadiazole-2-thion (D-361) has a

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psychostimulating, partially dopamine-blocking, M-choline-blocking effect.

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