The invariable discovery of potentiation of activity of the epileptic focus and the lengthening of its life after removal of the cerebellum indicate the importance of the study of natural pathways and mechanisms of activation of cerebellar antiepileptic structures. The results of this investigation on the whole are evidence that the cerebellum is an important component of the antiepileptic system of the brain and they confirm Kryzhanovskii's views [1] on the role of antisystems in depression of activity and in the prevention of formation of pathological systems.

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INHIBITION OF IMPRINTING BY BLOOD SERUM FROM SCHIZOPHRENICS

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KEY WORDS: imprinting; schizophrenia; blood serum.

At the present stage of the study of the pathogenesis of schizophrenia many workers [1, 4-8] have postulated the existence of toxic substances in such patients, whose effect on their brain is responsible for the mental disturbances. The chemical nature and sources of these abnormal metabolites are not yet known. Several hypotheses have been put forward, according to which the principal role in the pathogenesis of schizophrenia is played by disturbance of metabolism and functions of biogenic amines — the neurotransmitters of the brain [2, 4, 13, 15].

Much experimental evidence has now been obtained, on various biological objects, that the blood and CSF of schizophrenic patients has a toxic action [3, 5]. The object of this investigation was to study the effect of schizophrenic blood serum on the earliest form of learning and iconic long-term memory, namely imprinting, in chickens.

The essence of the imprinting phenomenon is that a special "attraction" arises in young birds or infants to the first moving object which they see after birth, and they will follow such an object everywhere. However, this is not the only possible form of manifestation of imprinting [9, 11, 12].

EXPERIMENTAL METHOD

Experiments were carried out on 62 White Leghorn chicks. The eggs were incubated at 37-38°C. A few hours before hatching, the eggs were wrapped in separate cardboard boxes so that after hatching imprinting in the chickens by each other would not take place. Imprint-

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ing in the chickens was carried out at the peak of the sensitive period, i.e., during the period of optimal imprinting (14-17 h after hatching) in Hess' apparatus. The sensitive period in chicks lasts 32-36 h after hatching. The imprinting object was a red ball 18 cm in diameter, which moved around a circular enclosure with a radius of 60 cm. The index of imprinting was a response of tracking the imprinting object, which was evaluated according to Hess' "law of strength" [9]. Blood was taken from 32 untreated patients with various forms of schizophrenia, with a continuous, progressive course, and with a duration of 1 to 5 years. Depending on the type of disease (the presenting syndrome) the patients were subdivided as follows: paranoid schizophrenia — 20; simple — 12. All patients were men aged from 25 to 40 years. Blood serum from 22 healthy donors was used in the control group. The serum was injected intraperitoneally into the chicks in a dose of 1.5 to 2 ml in the sensitive period. Schizophrenic blood serum was injected before imprinting into 20 chicks (group 1) and after imprinting into 12 chicks (group 2).

The experimental chicks were tested 15-25 min after injection of the serum.

It must be emphasized that the blood–brain barrier is not yet formed in chicks under 4 weeks old [14]; in adult chickens this barrier prevents the pentration of immune sera and biogenic amines into the CNS.

EXPERIMENTAL RESULTS

The results of the experiments on the chicks of group 1 showed that injection of schizophrenic blood serum inhibited the tracking response of the model, i.e., ability to learn was temporarily suppressed in the experimental chicks. On presentation of the imprinting object to the chicks they were completely indifferent: They did not approach it and did not produce any sounds of "satisfaction." From the time of presentation of the imprinting object the duration of inhibition of the tracking response in the chicks ranged from 1.5 to 4 h. It must be assumed that the duration of inhibition of the tracking response depends on the degree of toxicity of the patients' blood serum. Injection of the same volume of blood serum from clinically healthy subjects, or of physiological saline, into the 30 control chicks did not inhibit imprinting: On presentation of the imprinting object to the chicks a tracking response appeared just as quickly as in intact chicks and continued for a long time. Intact chicks usually developed the response of tracking the imprinting object 3-25 min after presentation of the model [10]. It can thus be concluded from the results of this series of experiments that injection of blood serum from schizophrenic patients into chicks inhibits imprinting in them.

In group 2, before injection of schizophrenic blood serum into 12 chicks in which imprinting had already occurred, the response of tracking the imprinting object took place rapidly. Injection of the serum in the sensitive period did not inhibit their tracking response. The results of these experiments show that schizophrenic blood serum does not affect consolidated memory traces.

It can thus be concluded from these experiments that blood serum from schizophrenics, injected into chicks before imprinting, inhibits the imprinting process for between 1.5 and 4 h but does not affect consolidated memory traces.

Finally, it must be pointed out that inhibition of the tracking response in chicks during the sensitive period in response to injection of schizophrenic blood serum can be used for clinical purposes as a sensitive indicator of toxicity of the patients' blood.

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SPIN PROBE STUDY OF THE ACTION OF CHOLERA TOXIN ON ENTEROCYTE BRUSH BORDER MEMBRANES

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KEY WORDS: cholera toxin; brush border of enterocytes; spin probe method; cyclic AMP.

The enterotoxin produced by *Vibrio cholerae*, if introduced into the lumen of the small intestine, causes diarrhea due to a sharp increase in permeability of the epithelium for water and electrolytes [6]. The mechanism of this process has not yet been adequately studied. It is not yet known, for instance, whether any structural changes take place in the membranes of the brush border (BB) of the enterocytes as a result either of direct interaction with cholera toxin (CT) or in the subsequent stages of its action as a result of activation of adenylate cyclase (AC), or how these possible changes are connected with disturbance of ionic transport through the epithelium.

The lysolecithin content in BB membranes is known to be increased in rabbits by the action of cholera toxin. Meanwhile, according to electronmicroscopic data, no significant changes are found in these membranes [11]. The object of this investigation was to make a spin probe study [3] of the physical state of BB membranes in experimentally induced cholera diarrhea. To characterize the state of the BB membranes under normal conditions and under the influence of CT, spin probes localized in different regions of the lipid bilayer of the membranes and also a spin label covalently bound with protein SH-groups were used.

EXPERIMENTAL METHOD

A model of cholera diarrhea *in vivo* was produced in rabbits aged 1-2 months. Under intravenous thiopental (1-2 ml of a 2% solution) anesthesia laparotomy was performed and one or two segments of small intestine 15-20 cm long were isolated by means of tied ligatures. CT (from Schwarz/Mann, West Germany) was then injected into the lumen of the intestine in a dose of up to 100 μg per animal, in medium containing 150 mM NaCl, 10 mM HEPES, pH 7.5 or (in the control experiment), the same volume of medium without toxin was injected. The abdominal incision was closed. The rabbits were killed after an exposure of 3 h.

A suspension of enterocyte BB fragments was obtained by the method in [10]. The preparation was electron-microscopically homogeneous and contained no characteristic extraneous inclusions. Activity of marker enzymes sucrose and alkaline phosphatase [10] was close to the values given in the literature.

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