

BEHAVIORAL REACTIONS OF WHITE NONBRED RATS AT THE EXPENSE OF A CRANIOCEREBRAL INJURY CAUSED AS A ROAD TRAFFIC ACCIDENT



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ЙЎЛ ТРАНСПОРТ ҲОДИСАСИ НАТИЖАСИДА КЕЛИБ ЧИҚҚАН БОШ МИЯ ШИКАСТЛАНИШИ ҲИСОБИГА ОҚ ЗОТСИЗ КАЛАМУШЛАРНИНГ ҲАТТИ ҲАРАКАТЛАРИ

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ПОВЕДЕНЧЕСКИЕ РЕАКЦИИ БЕЛЫХ БЕСПОРОДНЫХ КРЫС ПРИ ЧЕРЕПНО-МОЗГОВОЙ ТРАВМЕ, ВЫЗВАННОЙ В ВИДЕ ДОРОЖНО-ТРАНСПОРТНОГО ПРОИСШЕСТВИЯ

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Резюме. Тадқиқот каламушларда ҳатти-ҳаракатларнинг бузилишини, шу жумладан уларнинг фазовий хотирасидаги ўзгаришларни, йўл транспорт ҳодисаси шаклида экспериментал травматик миё шикастланишидан сўнг ўрганишга бағишланган. Кейинчалик, каламушларнинг шикастланишидан кейинги 1, 7, 14, 28-кунларида ҳатти-ҳаракатларини ўрганиш учун тест таҳлиллари ўтказилди.

Калит сўзлар: бош миё шикастланиши, ҳайвонларнинг хулқ-атвори, "Моррис сув лабиринти".

Abstract: The study is devoted to the study of behavioral disturbances in rats, including changes in their spatial memory, after an experimental traumatic brain injury in the form of a road traffic accident. After, the analysis of tests was carried out to study the behavior of rats on the 1st, 7th, 14th, and 28th days after injury.

Key words: traumatic brain injury, behavioral responses of animals, "Morris water maze".

Relevance. Traumatic brain injury is the most serious problem in modern medicine today. It plays a dominant role in the morbidity and mortality of the population of economically developed countries [1, 2, 3, 4, 5]. The use of TBI by the "Road Traffic Accident" method on white outbred rats after traumatic brain injury plays an important role in the process of understanding the complex of physiological and behavioral changes resulting from trauma [7].

Material and methods. This study was performed on 50 white random white outbred rats, bisexual, weighing from 100 to 120 g, which were kept in a vivarium. And also with a standard diet, free access to water and normal lighting. The first of them consisted of animals that did not inflict injury (control, n = 25). The second (experimental, n = 25) consisted of injured animals. In the experiment, the animals were fixed on a vehicle moving with wheels made by hand, the fixed experimental rats were accelerated on the vehicle at a speed of 6.7 km / h and hit a wooden barrier with the frontal part of the head and received a mechanical traumatic brain injury. For the analysis of TBI in the experiment, a model was

developed in the form of "Traffic accident". After inflicting mechanical trauma, the experimental animals were transferred to a special plastic cage, and they were monitored until normal behavioral reactions were restored. During the recovery time, the rats experienced asphyxia, convulsions, bleeding, etc.

Behavioral tests. Analyzes were performed to study the behavioral responses of animals after traumatic brain injury, using methods such as "Open Field", "Morris Water Maze".

Open field. The established test "Open field" is a brightly lit rectangular white area measuring 80 × 90 cm, it is limited by sides with a height of 35 cm. On days 1, 7 and 14, 28 after inflicting a traumatic brain injury, animals were placed in the center of the arena, and within 5 min studied the behavior of the rats in new conditions. At least 50 minutes before this experiment, the rats were transferred to a quiet, dimly lit room, and at the same time period, any allowable manipulations, such as feeding and picking up, were combined with the animal to a minimum.

Morris water maze. "Morris Water Maze", this test is designed to study the spatial memory of

animals. The Morris Water Labyrinth is a dark metal pool, 160 cm in diameter and 70 cm in height. The setting of the experimental room with marked visual markers - bright white geometric shapes located on the 4 cardinal points on the inner walls of this pool - acted. The labyrinth was filled with water at a temperature of 21 ± 1 °C to a level of 40 cm, which is 1 cm higher than the platform placed in the north-western sector. Every day for 4 days in a row, the rat was given 3 attempts, 1 min each, to find a platform hidden under water. The animals tested were randomly planted in each of the 3 sectors (except for the north-west). The direction of the rats was like this, head to the walls of the pool. For 4 days, the rats were accustomed to the experimental environment every day, and on the 5th day, they inflicted a head injury. The spatial memory of the animals was assessed on the 1st day after the application of TBI.

Results and discussion. Assessment of cognitive impairment using the Morris water maze. To assess cognitive impairment in experimental rats, the Morris Water Maze is a widely used test, in particular after traumatic brain injury [6]. In this study, it was shown that on day 1 after injury in rats, spatial memory mainly decreases, diagnosed by such indicators as the length of time spent in the sector of interest and latency - the time to reach the sector-platform. In this experiment, the percentage of time spent in the sector of interest was significantly reduced relative to the same indicator in control animals, but the time required to reach the sector-platform was increased.

Changes in emotional status in the Open Field test. The main component of the consequences of TBI is depression and changes in emotional status [6]. In order to deeply study the emotional and exploratory behavior of animals after the craniocerebral test, the "Open field" test was chosen, which allows us to assess the behavioral reactions of animals in a situation where there is no choice of comfortable conditions of stay. It was found that the number of visits to the regions of the open field, such as the periphery, 2/3 and the center of the field, was significantly reduced in animals that received a craniocerebral injury, starting from 1 day after injury, compared with the same indicators in control animals. In the experiment, the length of the total run of the animal in the open field was determined for the study period (5 min). It was found that after injury on the 1st, 7th and 14th, 28th days, the total run length was significantly reduced in rats that received cranial brain injury, compared with the same indicator in control rats that were not injured. Similar experimental data were obtained when studying the average movement speed of rats in an open field. In rats that have received a craniocerebral injury, the average travel speed is reduced. During the entire period of

the study, it was determined that the vertical locomotor activity was reduced, that is, such as stands both with an emphasis on the wall and without an emphasis in rats that received a craniocerebral injury.

Conclusions. The data obtained in the course of the experiment allow us to conclude that after traumatic brain injury in rats, the indicators confirming the exploratory activity decrease, which is manifested by behavioral changes during testing, and the degree of depression and anxiety increases.

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Резюме. Исследование посвящено изучению нарушений поведения крыс, включая изменения их пространственной памяти, после экспериментальной черепно-мозговой травмы в виде дорожно - транспортного происшествия. После, проводили анализ тестов изучению поведения крыс на 1-е, 7-е, 14-е и 28-е сутки после нанесения травмы.

Ключевые слова: черепно-мозговая травма, поведенческие реакции животных, «водный лабиринт Морриса».