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THE MANIFESTATION OF "LEARNED HELPLESSNESS" IN RATS WITH VARIOUS CAPACITIES FOR ACTIVE AVOIDANCE

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A riddance deficit in the shuttle chamber after unavoidable and avoidable stressor influences has been recorded in rats of two lines that differ in the capacity to form active avoidance: the KHA line - rats with a high rate of learning, and KLA - rats which learn poorly. Unavoidable stress leads to a riddance deficit only in KHA rats, whereas avoidable stress forms it only in KLA rats. It is hypothesized that "learned helplessness" represents a pathology of adaptive behavior, if unavoidable stress is applied to KHA rats, while in KLA rats., it is one of the forms of adaptive behavior as a result of avoidable stress.

The theory of "learned helplessness" is complicated by the fact that this state develops in far from all the rats subjected to an unavoidable stress. The capacity for learning is not only not disturbed in resistant rats, but in fact no changes of any kind take place in the neurochemical and endocrine reactions as compared with rats subjected to the action of an unavoidable stressor effect [9]. The per cent of resistant rats varies significantly in a population and depends on sex [9], complexity of the response [15], the type of conditioned reflex task [11], and the line of animal [20]. At the present time there are no methods making it possible to determine the predisposition of an animal to "learned helplessness". It should be noted that the question of the lineal predisposition of rats to this state has not been discussed much in the literature.

The preservation of the capacity of avoidance and (or) riddance in the shuttle chamber is routinely used as a test for the development of "learned helplessness". Taking this account, in the present study we investigated the influence of unavoidable stress on rats of two lines, genetically selected for the capacity to develop active avoidance in a two-sided shuttle chamber: KLA rats and KHA rats.

The KLA and KHA rats are selected at the I. P. Pavlov Institute of Physiology over 30 generations for the rapid development of conditioned reflex of avoidance in a two-sided shuttle chamber (KHA rats) and the absence of capacities for the development of such a response (KLA rats) [4]. The comparison of these lines in various tests revealed differences in the motoric and investigatory activity in the "open field" test [1] and capacities for learning [4]. In the main KLA rats are less active than KHA rats, and the differences in their behavior are similar to those which have been described for the well-known Roman lines, RLA and RHA [8].

A deficit in riddance reactions in the shuttle chamber can be obtained as a result of an unavoidable stressor effect. In this case the state of "learned helplessness" develops when an avoidance conditioned reflex is produced in the absence of a pause between realizations [6]. The absence of an interstimulus interval during the development of one-sided avoidance in the shuttle chamber complicates learning. Non-riddance reactions develop in some rats as a result of this procedure [5]. Only 20-25% of Wistar rats demonstrate the symptom of "learned helplessness" as the result of such an unavoidable stressor effect [5]. Many neurotic symptoms are manifested by such animals, including reduced aggressivity, submissive behavior, sleep disturbance, and ulceration of the gastric mucosa [6].

Taking all of this into account, the aim of the present study was the comparison of the effects of unavoidable and avoidable stressor effects on the shuttle chamber behavior of KLA rats and KHA rats.

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