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## **Самойловские чтения**

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## SEROTONIN AND GLUTAMATE HAVE OPPOSITE ROLES IN AVERSIVE LEARNING IN TERRESTRIAL SNAILS

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Two series of experiments were performed on the terrestrial snail to study the influence of serotonin and the glutamatergic receptor NMDA on the processes of formation of an associative habit consisting of refusing a particular type of food (cucumber). After the animals were injected with para-chlorophenylalanine (p-CPA), a serotonin synthesis in-



hibitor [1], or the NMDA glutamate receptor antagonist MK-801 [2], they were introduced into a training scheme [3] involved coupling an unconditional stimulus US (electric shock) with conditional stimulus CS (presenting the food) along with 2 control groups. We found that the MK-80-injected snails became aversive (learned) faster than the control while p-CPA-injected snails did not learn. Furthermore, in order to investigate the underlying electrophysiological changes in the circuit involved in defensive reactions, we measured the electrophysiological properties of the giant premotor interneurons in that circuit [4,5]. The intracellular recording was conducted using sharp glass microelectrodes on preparations of the extracted nerve rings of the snails after training. In snails trained after p-CPA injection, a significant hyperpolarization shift in the membrane potential and an increase in the action potential generation threshold were observed in comparison to the control. On the other hand, MK801 snails and the control group had premotor interneurons with similar electrophysiological profile with lower membrane potential and smaller action potential generation threshold compared to naive snails (untrained).

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