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INTRA-DORSAL HIPPOCAMPAL MICROINJECTION OF LITHIUM AND SCOPOLAMINE INDUCE A CROSS STATE-DEPENDENT LEARNING IN MICE

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Background: Lithium a mood stabilizer may exert adverse effects on memory. We have previously shown that lithium induces state-dependent learning. Cholinergic systems of the brain may play an important role in memory function and mood regulation. In the present study, effects of intra-dorsal hippocampal (intra-CA1) injections of lithium and scopolamine on memory and cross state-dependent learning between two drugs were investigated.

Methods: For memory assessment, a one-trial step-down inhibitory avoidance task was used in adult male NMRI mice.

Results: Intra-CA1 administration of lithium (0.5 and 1 µg/mouse) after training or injection of the drug (0.5µg/mouse) before testing impaired memory when retrieval was tested 24 h later. The memory impairment by post-training lithium was reversed by pre-test administration of the drug (0.5µg/mouse, intra-CA1) suggesting lithium state-dependent learning. On the other hand, intra-CA1 administration of scopolamine (0.5, 1 and 2 µg/mouse) after training or injection of the drug (2µg/mouse) before testing impaired memory when retrieval was tested 24 h later. The impairment of memory by post-training injection of scopolamine (2µg/mouse) was restored by the pre-test injection of the drug (1 and 2 µg/mouse). Furthermore, memory impairment induced by post-training injection of lithium (0.5 µg/mouse) and scopolamine (2 µg/mouse) were reversed by pre-test administration of scopolamine (0.5, 1 and 2 µg/mouse) and lithium (0.5 and 1 µg/mouse) respectively. The impairment by lithium was also reversed by physostigmine.

Conclusion: The results suggest that microinjection of both lithium and scopolamine induce state-dependent memory and there may be a cross state-dependency between two drugs.