Huperzine A Reverses Cholinergic Dysfunction Induced by Acute Hypobaric Hypoxia in Rats

Qinghai SHI#, Qiong ZHANG#, Zhengxiang LIU, Jihua RAN, Di GE, Ting GAO, Wendi GUO, Lihong ZENG, Yingfang CHEN & Jianfeng FU*

Clinical Laboratory Diagnostic Center, Urumqi General Hospital of Lanzhou Military Command, PLA; Urumqi 830000, Xinjiang, China

SUMMARY. The protective effects of huperzine A on cholinergic dysfunction associated with acute hypobaric hypoxia were investigated in rats. Rats were exposed to simulated hypobaric hypoxia at 6,000 m in a specially fabricated animal decompression chamber while receiving huperzine A orally once per day at the dose of 0.1 mg/kg body weight. After exposure for 5 days, the animals were sacrificed and specific markers for the cholinergic neurons and their function, such as acetylcholine, choline acetyltransferase (ChAT), acetylcholinesterase and \( \alpha_7 \) nicotinic acetylcholine receptors (\( \alpha_7 \) nAChR), were studied in the cortex and hippocampus. Huperzine A was associated with increased levels of acetylcholine caused by the decrease in activity of acetylcholinesterase and the up-regulation of ChAT in the cortex and hippocampus of rats. There were also improvements in the efficiency of cholinergic synaptic transmission through the increased \( \alpha_7 \) nAChR. These results suggest that supplementation with huperzine A reversed cholinergic dysfunction induced by acute hypobaric hypoxia.