Cyclic adenosine monophosphate-protein kinase A signal pathway may be involved in pulmonary aquaporin-5 expression in ischemia/reperfusion rats following deep hypothermia cardiac arrest

Z.Y. Wu[1]*, Y. Yao[2]*, R. Hu[1], F.F. Dai[1], H. Zhang[1] and Z.F. Mao[1]

[1]Department of Cardiovascular Surgery, Renmin Hospital of Wuhan University, Wuhan, China
[2]Division of Cardiology, Renmin Hospital of Wuhan University, Wuhan, China

*These authors contributed equally to this study.
Corresponding author: Z.Y. Wu
E-mail: zhiyongwu889@sina.com

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ABSTRACT. We investigated the effects of cyclic adenosine monophosphate-protein kinase A (cAMP-PKA) on the expression of aquaporin 5 (AQP5) in ischemia/reperfusion (I/R) rats following deep hypothermia cardiac arrest. Wistar rats were randomly divided into: a sham control group (subjected to a sham operation); an I/R group (subjected to occlusion of the bronchial arteries and the left inferior pulmonary artery); an H89 group (subjected to occlusion of the bronchial arteries and the left inferior pulmonary vein and artery, and treated with 5 mg/kg H89 for 2 days before the study); and a forskolin group (subjected to occlusion of the bronchial arteries and the left inferior pulmonary vein and artery, and treated with 5 mg/kg forskolin for 2 days before the study). Expression levels

of AQP5 mRNA and protein were determined using reverse transcription-polymerase chain reaction and western blotting. Decreased expression of AQP5 was noted in the pulmonary tissues of the I/R group compared with the sham controls. Compared to that in the control group, there was a notable decrease in AQP5 expression in the I/R group. After treating with forskolin, AQP5 expression increased in the forskolin group compared with the I/R group. In the H89 group, AQP5 expression decreased compared with the I/R group. The decreased expression of AQP5 was possibly associated with acute pulmonary injury induced by I/R. The cAMP-PKA signal pathway may be involved in the expression of AQP5 in I/R rats after deep hypothermia cardiac arrest.

Key words: Deep hypothermia; Ischemia/reperfusion; Aquaporin 5; cAMP

