Genetics and Molecular Research

Expression of TRPM8 in diabetic rats and its relationship with visceral pain stimulation

J. Liu[1,3]*, S.L. Dong[2]*, N. Li[3], B.S. Ouyang[3] and F. Qi[1]

[1]Department of Anesthesiology, Qilu Hospital, Shandong University, Jinan City, Shandong Province, China
[2]Department of Anesthesiology, Haikou City People's Hospital, Haikou City, Hainan Province, China
[3]Department of Anesthesiology, Hainan Province People's Hospital, Haikou City, Hainan Province, China

*These authors contributed equally to this study.
Corresponding author: F. Qi
E-mail: tgzy15@163.com

Genet. Mol. Res. 15 (1): gmr.15017219
Received August 15, 2015
Accepted October 16, 2015
Published March 31, 2016
DOI http://dx.doi.org/10.4238/gmr.15017219

ABSTRACT. Transient receptor potential cation channel, subfamily M, member 8 (TRPM8) is a nonselective cation channel and a candidate for cold sensation signaling, but the relationship between TRPM8 and diabetes remains unclear. In the present study, we determined the expression levels of TRPM8 messenger RNA (mRNA) and the levels of the TRPM8 protein in the bladder tissue of diabetic rats. We also investigated the correlation between TRPM8 expression and the visceral pain stimulation-related factor, calcitonin gene-related peptide (CGRP) in diabetic rats. The rats were sacrificed 3, 5, 7, and 15 days after streptozotocin injection, and blood was collected from their tail veins to determine the blood glucose levels. Bladder tissue was removed to assess the expression of TRPM8 mRNA by reverse transcription-polymerase chain reaction, and the expression of the TRPM8 protein by western blotting. After administering electrical stimulation (5 V/1 Hz), the expression levels of TRPM8 and CGRP proteins were determined. Our results revealed that the blood glucose level, and TRPM8 mRNA and

TRPM8 protein expression levels increased significantly in the diabetic rats. Spinal tissue protein expression levels of both TRPM8 and CGRP also increased significantly following electrical stimulation. This possibly indicates that TRPM8 is closely associated with visceral pain stimulation, and could be an independent prognostic biomarker for diabetes.

Key words: Diabetic rats; TRMP8; Visceral pain stimulation; Bladder; Calcitonin gene-related peptide

