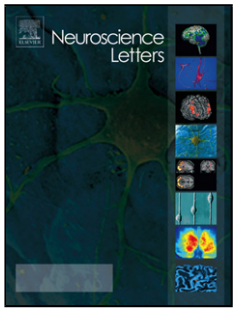

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Author: Bo Meng Lu-lu Shen Xiao-ting Shi Yong-sheng Gong Xiao-fang Fan Jun Li Hong Cao

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Effects of Curcumin on TTX-R Sodium Currents of Dorsal Root Ganglion Neurons in Type 2 Diabetic Rats with Diabetic Neuropathic Pain

Bo Meng[1], Lu-lu Shen[1], Xiao-ting Shi[1], Yong-sheng Gong[2], Xiao-fang Fan[2], Jun Li[1], Hong Cao[1*]

1. Department of Anesthesiology, The 2nd Affiliated Hospital of Wenzhou Medical University, No. 109, Xuyuanxi Road, Wenzhou 325027, China

2. Teaching Center of Medical Functional Experiment, Wenzhou Medical University

* Corresponding author. Tel: +86 577 86699767; fax: +86 577 86699767

E-mail address: caohongwz@163.com (Hong Cao)

Abbreviations: T2DM, type 2 diabetic mellitus; DNP, diabetic neuropathic pain; DRG, dorsal root ganglion; VGSCs, voltage-gated sodium channels; TTX, tetrodotoxin; STZ, streptozocin; HFD, high fat-fructose diet; ISI, insulin sensitivity index; MWT, mechanical withdrawal threshold; TWL, thermal withdrawal latency; I_{Na}, sodium currents; Cm, whole cell capacitance; RMP, resting membrane potential.

ABSTRACT

Type 2 diabetic mellitus (T2DM) has reached pandemic status and shows no signs of abatement. Diabetic neuropathic pain (DNP) is generally considered to be one of the most common complications of T2DM, which is also recognized as one of the most difficult types of pain to treat. As one kind of peripheral neuropathic pain, DNP manifests typical chronic neuralgia symptoms, including hyperalgesia, allodynia, autotomy, and so on. The injured dorsal root ganglion (DRG) is considered as the first stage of the sensory pathway impairment, whose neurons display increased frequency of action potential generation and increased spontaneous activities. These are mainly due to the changed properties of voltage-gated sodium channels (VGSCs) and the increased sodium currents, especially TTX-R sodium currents. Curcumin, one of the most important phytochemicals from turmeric, has been demonstrated to effectively prevent and/or ameliorate diabetic mellitus and its complications including DNP. The