



Asian Pacific Journal of Tropical Medicine

journal homepage: www.apjtm.org



doi: 10.4103/1995-7645.268165

Impact factor: 1.77

Alpinia oxyphylla alleviates diabetic nephropathy through the NLRP3 inflammasome pathway in rats

Mi Li[#], Kai Li[#], De-hui Yin, Ye Zhu, Yi-qiang Xie[✉]

College of Traditional Chinese Medicine, Hainan Medical University, Haikou 571199, China

Objective: Previous studies have confirmed that the tropical traditional Chinese herb-*Alpinia (A.) oxyphylla* are effective on diabetic nephropathy. The purpose of this experiment was to investigate whether *A. oxyphylla* could prevent and treat diabetic nephropathy by regulating *NLRP3* inflammasome pathway.

Methods: Male SD rats and *NLRP3* gene silencing rats were assigned into blank group, model group, *A. oxyphylla* group, valsartan group and *NLRP3* gene silencing group, with 8 rats in each group. The model was established by intraabdominal injection of streptomycin after feeding with high sugar and high fat diet for 6 weeks. Based on successful modeling, administration protocol for a period of 8 weeks were performed. *A. oxyphylla* group was given *A. oxyphylla* decoction (2.6g/kg/d), while the model group and *NLRP3* gene silencing group were given saline as the same dosage of *A. oxyphylla* decoction. The valsartan (10 mg/kg/d) was given to the valsartan group. After 8 weeks of treatments, blood glucose, 24 h urinary protein, creatinine, urea nitrogen levels were detected, and the pathological sections of the kidney were examined. The expression of *NLRP3* protein was detected by Western-Blot and PCR. *NLRP3* protein, caspase-1, IL-18 and IL-1 β in renal tubules were detected in each group by immunofluorescence and immunohistochemistry.

Results: Compared with the model group, *A. oxyphylla* significantly reduced blood glucose, 24 h urinary protein, creatinine, urea nitrogen levels (P all < 0.05) but the pathological injury in kidney was less. The expression of *NLRP3* protein was negative in *NLRP3*-/-group while positive in the model group, *A. oxyphylla* group and valsartan group. Expression of *NLRP3* protein, *NLRP3*, caspase-1, IL-18 and IL-1 β were also significantly lower in *A. oxyphylla* treated group compared with the model group (P all < 0.05).

Conclusions: *A. oxyphylla* could inhibit the expression of *NLRP3* protein, reduce IL-18 and IL-1 β and other inflammatory factors and alleviate the damage of kidney caused by inflammatory reaction. This is one of the mechanisms whereby *A. oxyphylla* prevents and treats diabetic nephropathy

Keywords: *Alpinia oxyphylla*; Diabetic nephropathy; Inflammation; *NLRP3*

Article history:

Received 4 September 2019

Revised 13 September 2019

Accepted 15 September 2019

Available online 7 October 2019

[#]These authors contributed equally to this work.

[✉]Corresponding author: Yi-qiang Xie, College of Traditional Chinese Medicine, Hainan Medical University, Haikou 571199, China.
E-mail: 13036001921@163.com

Foundation project: This study was funded by the Natural Science Foundation of Hainan Province (Grant No. 2019CXTD407, 819QN228), the National Natural Science Foundation of China (Grant No. 81860836), Scientific research Foundation of Hainan Medical University (Grant No. HYPY201924).

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

©2019 Asian Pacific Journal of Tropical Medicine Produced by Wolters Kluwer- Medknow. All rights reserved.

How to cite this article: Li M, Li K, Yin DH, Zhu Y, Xie YQ. *Alpinia oxyphylla* alleviates diabetic nephropathy through the *NLRP3* inflammasome pathway in rats. Asian Pac J Trop Med 2019; 12(Suppl 1): 14.