

당뇨병유발 쥐에서 토마토추출물의 신경성장인자 조절을 통한 청신경병증 억제 효능

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Tomato ameliorates auditory neuropathy *via* NGF regulation in diabetic mice.

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Objectives

Auditory neuropathy (AN) is a hearing disorder characterized by dysfunction of the auditory nerve and abnormal transmission of sound information to the auditory nerve and brainstem. Some studies have been reported that chronic diabetes can induce AN, and that neuronal abnormalities in diabetes can be ameliorated by treatment of neurotrophic factors such as nerve growth factor (NGF). The purpose of the present study was to evaluate the effect of tomato (*Solanum lycopersicum*) extract on auditory nerve conduction and hearing loss due to diabetic neuropathy *via* NGF regulation.

Materials and Methods

Tomato extract containing 9.7±4.8 µg/g dehydrotomatine, 86.7±27.1 µg/g α-tomatine and 3,355.0 ± 25.0 µg/g trigonelline was used.

In this study, we treated tomato extract in C6 cells, rat primary astrocytes, and

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PC12 cells, and investigated the effects of tomato on NGF production and neurite outgrowth. To examine the effect of tomato extract on peripheral and midbrain auditory pathway functions, we analyzed the auditory brainstem response (ABR) and the auditory middle latency response (AMLR) in diabetic mice.

Results

Extract of tomato increased NGF secretion in both C6 cells and rat primary astrocytes and also increased neurite outgrowth in PC12 cells. The hearing thresholds of ABR and Pa latencies of AMLR are increased in diabetic mice. Tomato extract suppressed the hearing threshold shift for clicks, 4 kHz and 8 kHz TBs, and recovered Pa latencies.

Conclusion

Taken together, these data indicate that auditory functional impairment from the peripheral nerve to the central nerve in diabetes is ameliorated by tomato extract, perhaps due to NGF-regulatory activities. Therefore, we suggest that tomato may be a potential natural source for regulation of AN.

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