# Exploring the molecular mechanism of *Pandanus tectorius* fruit extract in treating diabetic peripheral neuropathy via the Nrf2/Keap1 signalling pathway

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**Diabetes is a global epidemic, and its pathogenesis involves multiple factors. Diabetic peripheral neuropathy (DPN) is one of its clinical complications, which brings a serious burden to the lives of patients. *Pandanus tectorius* fruits (PTF) extract has attracted much attention due to its rich bioactive components and is considered to have potential effects in treating DPN. The present study aims to deeply explore the molecular mechanism of PTF extract in treating diabetic peripheral neuropathy, focusing on the regulatory effect of the Nrf2/Keap1 signalling pathway. The blood glucose changes and behavioural changes of DPN rats before and after PTF treatment were detected. Histological myelin staining was performed using Luxol fast blue (LFB) staining. TUNEL staining was used to observe the apoptosis of sciatic nerve cells. TEM observation of the ultrastructure of dorsal root ganglion. ELISA and kits detect NGF, IGF-1, VEGF, SOD, GSH-Px, and malondialdehyde (MDA). Western blot detects Nrf2, Keap1, HO-1 and NQO1. This experiment found that PTF extract has significant blood glucose control and analgesic effects on DPN rats. PTF extract can also inhibit the apoptosis of sciatic nerve cells in DPN rats and protect the structural integrity of myelin sheaths. The ultrastructure of dorsal root ganglia was improved after PTF treatment. The neuroactive factors (IGF-1, VEGF) in rats with DPN under a high-fat diet were significantly reduced, NGF was overexpression, the oxidative stress-related factors SOD and GSH-Px were reduced, and the levels of MDA were increased. After treatment with PTF, the positive drug $\alpha$-lipoic acid reversed these abnormalities, enhanced levels of neuroactive factors, and mitigated oxidative stress. Western blot analysis showed that in DPN, the expression of Nrf2, HO-1 and NQO1 proteins in the sciatic nerve was down-regulated, Keap1 was overexpression, while PTF and $\alpha$-lipoic acid treatment led to their up-regulation. Adding the Nrf2 inhibitor Brusatol to the DPN + PTF group inhibited the up-regulating effect of PTF on these proteins. In summary, PTF extract can effectively reduce blood glucose and pain perception in DPN rats, promote antioxidant capacity, and protect the sciatic nerve through the Nrf2/Keap1 signalling pathway, thereby achieving the purpose of treating DPN.**