

The natural plant flavonoid apigenin is a strong antioxidant that effectively delays peripheral neurodegenerative processes.

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Abstract

Oxidative stress contributes to the progression of neurodegenerative diseases of the central and peripheral nervous systems, including Alzheimer's disease, Parkinson's disease, stroke, and diabetic neuropathy. Despite the greater capability of peripheral nerves to regenerate compared with those in the brain or spinal cord, chronic oxidative stress leads to irreversible neurodegeneration in peripheral nerves. Thus, many efforts have been made to defend against irreversible peripheral nerve degeneration and oxidative stress. Numerous phytochemicals have been revealed as antioxidants which neutralize free radicals and reduce peripheral neurocellular damage. Among them, polyphenols alleviate neurodegeneration by interacting with reactive oxygen species. Apigenin is a polyphenol found in plant-derived foods, including parsley, thyme, celery, and chamomile tea. Apigenin has been reported to exert antioxidative effects by scavenging free radicals. In particular, apigenin has a neuroprotective effect against oxidative stress in neurological disorders, such as cerebral ischemia. However, to date, no studies have shown an association of the inhibitory effect of apigenin with peripheral nerve degeneration. In this work, we showed that apigenin has a neuroprotective effect against peripheral nerve degeneration according to four key phenotypes: axonal degradation, myelin fragmentation, transdifferentiation, and proliferation of Schwann cells via Krox20- and extracellular signal-regulated kinase-independent processes. Thus, apigenin could be a good candidate to treat peripheral neurodegenerative diseases.

KEYWORDS: Antioxidant; Apigenin; Axonal degeneration; Demyelination; Schwann cells

PMID: 30949912 DOI: [10.1007/s12565-019-00486-2](https://doi.org/10.1007/s12565-019-00486-2)