



Endocrine, Metabolic & Immune Disorders - Drug Targets

Editor-in-Chief

ISSN (Print): 1871-5303

ISSN (Online): 2212-3873

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Review Article

Diabetic Neuropathy: An Overview of Molecular Pathways and Protective Mechanisms of Phytochemicals

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Volume 24, Issue 7, 2024

Published on: 20 October, 2023

Page: [758 - 776]

Pages: 19

DOI: [10.2174/0118715303266444231008143430](https://doi.org/10.2174/0118715303266444231008143430)

Price: \$65



Abstract

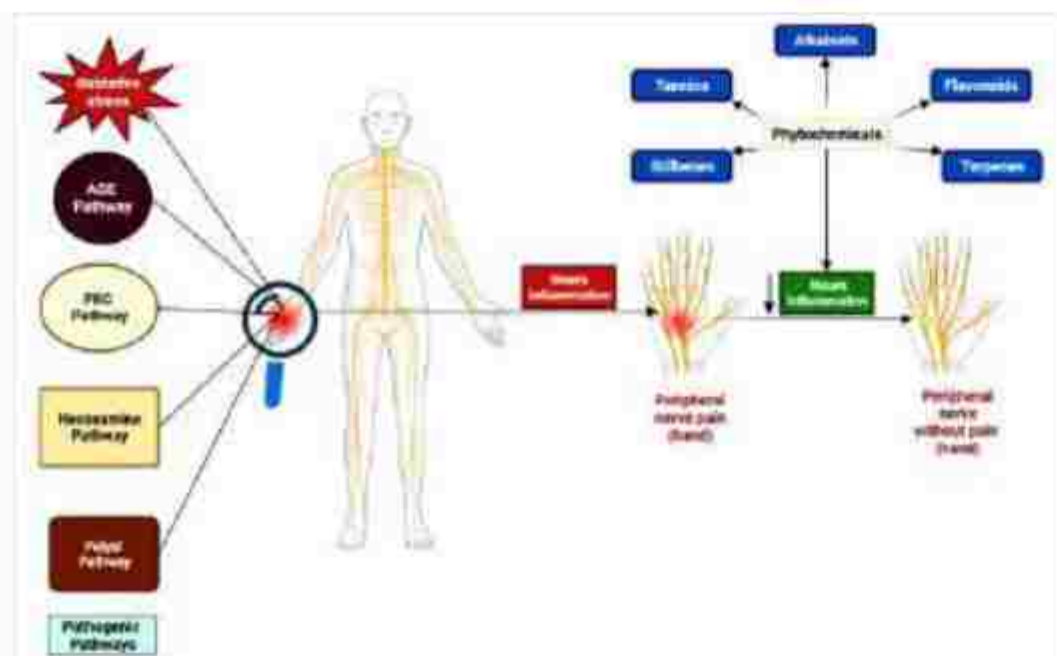
Diabetic neuropathy (DN) is a common and debilitating complication of diabetes mellitus that affects the peripheral nerves and causes pain, numbness, and impaired function. The pathogenesis of DN involves multiple molecular mechanisms, such as oxidative stress, inflammation, and pathways of advanced glycation end products; polyol, hexosamine, and protein kinase C. Phytochemicals are natural compounds derived from plants that have various biological activities and therapeutic potential. Flavonoids, terpenes, alkaloids, stilbenes, and tannins are some of the phytochemicals that have been identified as having protective potential for diabetic neuropathy. These compounds can modulate various cellular pathways involved in the development and progression of neuropathy, including reducing oxidative stress and inflammation and promoting nerve growth and repair. In this review, the current evidence on the effects of phytochemicals on DN by focusing on five major classes, flavonoids, terpenes, alkaloids, stilbenes, and tannins, are summarized. This compilation also discusses the possible molecular targets of numerous pathways of DN that these phytochemicals modulate. These phytochemicals may offer a promising alternative or complementary approach to conventional drugs for DN management by modulating multiple pathological pathways and restoring nerve function.

Keywords: [Diabetes](#), [neuropathy](#), [inflammation](#), [phytochemicals](#), [flavonoids](#), [alkaloids](#).

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Graphical Abstract



Molecular pathways of diabetic neuropathy and protective effects of various phytoconstituents.

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