

**Title:** Polyphenols Targeting MAP Kinase Signaling Pathway in Neurological Diseases: Understanding Molecular Mechanisms and Therapeutic Targets

**Author:** Fahadul Islam, Sumon Roy, Mehrukh Zehravi, Shyamjit Paul, Hriday Sutradhar, Lavanya Yaidikar, B Raj Kumar, Lakshman Kumar Dogiparthi, S Prema, Firzan Nainu, Safia Obaidur Rab, Koula Doukani, Talha Bin Emran

**Abstract:** Polyphenols are a class of secondary metabolic products found in plants that have been extensively studied for how well they regulate biological processes, such as the proliferation of cells, autophagy, and apoptosis. The mitogen-activated protein kinase (MAPK)-mediated signaling cascade is currently identified as a crucial pro-inflammatory pathway that plays a significant role in the development of neuroinflammation. This process has been shown to contribute to the pathogenesis of several neurological conditions, such as Alzheimer's disease (AD), Parkinson's disease (PD), CNS damage, and cerebral ischemia. Getting enough polyphenols through eating habits has resulted in mitigating the effects of oxidative stress (OS) and lowering the susceptibility to associated neurodegenerative disorders, including but not limited to multiple sclerosis (MS), AD, stroke, and PD. Polyphenols possess significant promise in dealing with the root cause of neurological conditions by modulating multiple therapeutic targets simultaneously, thereby attenuating their complicated physiology. Several polyphenolic substances have demonstrated beneficial results in various studies and are presently undergoing clinical investigation to treat neurological diseases (NDs). The objective of this review is to provide a comprehensive summary of the different aspects of the MAPK pathway involved in neurological conditions, along with an appraisal of the progress made in using polyphenols to regulate the MAPK signaling system to facilitate the management of NDs.

**Keywords:** Alzheimer's disease; CNS damage; Cerebral ischemia; ERKs; JNKs; MAP kinase; Parkinson's disease; p38.

**DOI:** <https://doi.org/10.1007/s12035-023-03706-z>

<https://pubmed.ncbi.nlm.nih.gov/37922063/>