

Commentary

Quercetin: An Emerging Natural Therapeutic Candidate for Neuroinflammatory Disorders

Tilan Aponso*

Gastrointestinal and Hepatology Unit, National Hospital of Sri Lanka

***Correspondence:** Tilan Aponso, Gastrointestinal and Hepatology Unit, National Hospital of Sri Lanka, E-mail: etaponso121@gmail.com, DOI: 10.1042/RMB.3.1.0007

Received date: Mar 9, 2026; **Accepted date:** Mar 16, 2026; **Published date:** Mar 24, 2026

Citation: Tilan Aponso (2026) Quercetin: An Emerging Natural Therapeutic Candidate for Neuroinflammatory Disorders. RMB, 4: 1

Copyright: © 2026, Tilan Aponso. All intellectual property rights, including copyrights, trademarks rights and database rights with respect to the information, texts, images, logos, photographs and illustrations on the website and with respect to the layout and design of the website are protected by intellectual property rights and belong to Publisher or entitled third parties. The reproduction or making available in any way or form of the contents of the website without prior written consent from Publisher is not allowed.

Introduction

The growing burden of neuroinflammatory and neurodegenerative diseases has intensified the search for safe and effective therapeutic agents capable of modulating immune responses while promoting neuronal survival and repair. Among naturally occurring bioactive compounds, quercetin has emerged as a particularly promising candidate due to its broad spectrum of biological activities, including antioxidant, anti-inflammatory, immunomodulatory, and neuroprotective effects.

Multiple Sclerosis (MS), a chronic autoimmune disorder characterized by demyelination and neuronal degeneration within the central nervous system, remains a major therapeutic challenge despite significant advances in disease-modifying treatments. Current therapies primarily focus on controlling inflammation and reducing relapse rates; however, they often fail to adequately address neurodegeneration and tissue repair. Consequently, there is increasing interest in identifying complementary therapeutic approaches that target both inflammatory and regenerative pathways.

Recent experimental evidence suggests that quercetin may fulfill this dual role. Studies using Experimental Autoimmune Encephalomyelitis (EAE), the most widely accepted animal model of MS, have demonstrated that quercetin reduces disease severity, suppresses inflammatory cytokine production, and improves functional recovery. These effects are thought to result from the compound's ability to inhibit oxidative stress, regulate immune cell activation, and modulate signaling pathways such as NF- κ B and JAK/STAT, which are central to autoimmune inflammation.

From a microbiological and biotechnological perspective, quercetin represents an intriguing example of how naturally derived molecules can be translated into therapeutic applications. Advances in biotechnology have enabled the development of novel delivery systems, including nanoparticles, liposomes, and polymer-based carriers, which may overcome the limitations associated with quercetin's poor bioavailability. Such innovations could significantly enhance its therapeutic efficacy and facilitate clinical translation.

Another important aspect is the growing recognition of the microbiome-brain axis in neuroinflammatory diseases. Emerging studies suggest that dietary flavonoids, including quercetin, may influence gut microbial composition and function, thereby indirectly affecting immune homeostasis and neurological health. This intersection between microbiology, immunology, and neuroscience presents exciting opportunities for future research.

Despite encouraging preclinical findings, several challenges remain. The optimal dosage, route of administration, long-term

safety, and efficacy of quercetin in human patients require further investigation through well-designed clinical trials. Moreover, mechanistic studies are needed to better understand how quercetin interacts with immune and neural cells within complex disease environments.

In conclusion, quercetin represents a promising natural compound with significant therapeutic potential for neuroinflammatory disorders such as Multiple Sclerosis. Continued interdisciplinary research integrating microbiology, biotechnology, pharmacology, and neuroscience may help unlock its full clinical value and contribute to the development of more effective and accessible treatment strategies.