

CURCUMIN AND RESVERATROL IN COGNITIVE DECLINE: MOLECULAR MECHANISMS AND NEUROPROTECTIVE EFFECTS

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RESUMO

Introduction: Cognitive decline and neurodegenerative disorders are increasing worldwide, driven by population aging and the growing prevalence of metabolic and vascular risk factors. Accumulating evidence indicates that oxidative stress, chronic low-grade inflammation, mitochondrial dysfunction, and impaired neuroplasticity are central mechanisms underlying cognitive impairment. In this context, dietary strategies and bioactive compounds have emerged as promising, non-pharmacological approaches to support brain health. Among these, curcumin and resveratrol have attracted attention for their pleiotropic biological effects and potential neuroprotective properties. **Objective:** To examine the role of curcumin and resveratrol in the prevention and attenuation of cognitive decline, focusing on their molecular and functional mechanisms.

Methods: This narrative review was based on literature searches conducted in PubMed, Scopus, and Web of Science using descriptors such as “curcumin,” “resveratrol,” “cognitive decline,” and “neuroinflammation,” combined with Boolean operators. Experimental, clinical, and review studies published in English were selected based on relevance to molecular mechanisms and neuroprotective effects. Data were qualitatively synthesized to provide an integrated overview of current evidence.

Discussion: Curcumin, a polyphenol derived from *Curcuma longa*, exhibits potent antioxidant and anti-inflammatory effects, modulating key signaling pathways such as NF- κ B and reducing the production of pro-inflammatory cytokines, including TNF- α , IL-6, and IL-1 β . It has also been associated with decreased amyloid-beta aggregation and improved synaptic plasticity. Resveratrol, a polyphenolic compound found in grapes and berries, activates sirtuin-1 (SIRT1) and AMP-activated protein kinase (AMPK), promoting mitochondrial biogenesis, enhancing cellular energy metabolism, and reducing oxidative stress. Both compounds contribute to improved endothelial function and cerebral blood flow, which are critical for maintaining cognitive performance. In experimental and clinical studies, supplementation with curcumin and resveratrol has been associated with improvements in memory, executive function, and overall cognitive performance, though results vary by dosage, bioavailability, and study design. Importantly, these bioactive compounds may also interact with the gut-brain axis, modulating microbiota composition and reducing neuroinflammation. **Conclusion:** Curcumin and resveratrol represent promising nutritional strategies for the prevention and management of cognitive decline through their combined anti-inflammatory, antioxidant, and mitochondrial-modulating effects. However, further well-designed randomized controlled trials are needed to confirm their efficacy, optimize dosing strategies, and clarify their long-term clinical impact. Integrating bioactive compounds into preventive approaches may contribute to reducing the growing burden of neurodegenerative diseases.

Palavras-chave: Curcumin Resveratrol Cognitive Decline Neuroinflammation Oxidative Stress.