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Formulation and Evaluation of Rivastigmine and Curcumin Microemulsion for Alzheimer's Diseases

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Abstract: *Alzheimer's disease is the most common type of neurodegenerative dementia and causes health problems for patients and their families. Rivastigmine is a potent, slowly reversible, noncompetitive carbamate cholinesterase inhibitor approved for the treatment of mild Alzheimer's disease. A randomized, double-blind, placebo-controlled study lasting up to 6 months showed that rivastigmine was more effective than placebo on measures of cognition and general functioning. Anecdotal but growing evidence suggests that beneficial effects may last up to 5 years, extend across multiple stages of Alzheimer's disease, and occur across cognitive domains such as activities of daily living and behavioral symptoms.*

Alzheimer's disease. Evidence from controlled studies also supports the use of rivastigmine in the treatment of cognitive and behavioral disorders such as Alzheimer's disease, dementia with Lewy bodies, and Parkinson's disease dementia associated with vascular involvement. Early and continued use of rivastigmine in the treatment of Alzheimer's disease may lead to the best results

The most serious side effects of rivastigmine are moderate cholinergic gastrointestinal events; This can be reduced by slow dosing and administration with a full meal. Clinical dosage is 6-12 mg/day twice daily, with higher doses providing greater benefit.

Worldwide, Alzheimer's disease (AD) is the most common multifactorial neurodegenerative disease affecting the elderly. Today, many drugs, including curcumin, are used in the treatment of AD. Curcumin is the main component of turmeric and is effective in preventing or treating AD. Over the past few years, research in the scientific community has focused in optimizing curcumin's therapeutic properties and improving its pharmacokinetic properties. This review includes literature from 2009 to 2019 on curcumin analogues, derivatives, and compounds and their therapeutic, preventive, and diagnostic properties in AD. Recent advances in this field suggest that phenolic hydroxyl groups may be anti-amyloidogenic. The phenylmethoxy group appears to contribute to the inhibition of amyloid-β peptide (Aβ42) and amyloid precursor protein (APP), and hydrophobic interactions also play an important role. Additionally, the flexibility of the linker is important to prevent Aβ aggregation. The inhibitory activity of these derivatives increases with the expansion of the aromatic ring. The important role of curcumin-based drugs has been demonstrated in clinical studies. Keto-enol tautomerism appears to be a novel change in the formation of amyloid binders. Molecular docking results, (Q)SAR, and in vitro and in vivo assays to evaluate structure and chemical properties are relevant to specific activity. Therefore, information obtained from existing studies should enable the design and development of multipurpose curcumin analogs, derivatives, or curcumin hybrids that could be useful drugs and clinical tools in the diagnosis and treatment of AD.

Keywords: Alzheimer's disease, rivastigmine, curcumin, sign and symptoms, mode of action

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