ORAL PRESENTATION

Synthesis, Characterization, and Cholinesterase Inhibition Activities of a 2-(1H-Pyrrol-1-yl)benzenamine-Derived Schiff Base and Their Si/Zn Phthalocyanine Derivatives with Potential Anti-Alzheimer's Activity

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Abstract

Schiff bases containing heteroaromatic moieties have attracted considerable attention because the incorporation of heterocyclic rings can provide additional electronic, structural and biological features to the azomethine framework [1]. Among the various heterocyclic scaffolds are particularly attractive owing to their distinct electronic characteristics and broad range of biological activities [2]. Phthalocyanines are highly conjugated, macrocyclic compounds with remarkable chemical and thermal stability, intense absorption in the visible and near-infrared regions, and tunable electronic and photophysical properties. These characteristics have made phthalocyanine derivatives attractive for applications in catalysis, sensing, optoelectronics, photodynamic therapy, bioimaging, and medicinal chemistry. Their properties can be modified by changing the central metal ion and introducing suitable peripheral or axial substituents [3,4]. In this study, a novel pyrrole- containing Schiff base ligand and their corresponding di-axially substituted silicon(IV) and peripherally tetra-substituted zinc (II) phthalocyanine derivatives were synthesized, characterized, and evaluated for their cholinesterase inhibitory activities. The biological activities of the Schiff base ligand, phthalonitrile compound, silicon phthalocyanine, and zinc phthalocyanine derivatives were investigated against acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), which are important therapeutic targets associated with cholinergic dysfunction in Alzheimer's disease. The obtained results revealed that the synthesized compounds exhibited inhibitory activity toward AChE and BChE, with differences in their inhibitory profiles depending on the molecular structure and central metal ion. The influence of the extended π-conjugated phthalocyanine system, as well as the zinc and silicon centers, on cholinesterase inhibition was evaluated. Overall, this study highlights the potential of pyrrole-containing Schiff bases and their zinc and silicon phthalocyanine derivatives as promising molecular scaffolds for the development of new cholinesterase inhibitors.

Keywords: Alzheimer's disease, cholinesterase, Schiff base, phthalocyanine, pyrrole

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