Design, synthesis and Anti-cholinesterase activity of indole-Isoxazole carbohydrazide derivatives

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Abstract

A novel series of carbohydrazide indole-isoxazole hybrid derivatives have been synthesized. All the title compounds were characterized by ^{1}H NMR, ^{13}C NMR, MS and IR spectral data. The *in vitro* anti-cholinesterase activity of all the compounds were evaluated.

Introduction: Alzheimer disease (AD) has emerged as the most prevalent age-related neurodegenerative diseases and the main cause of dementia, which is very common in elder population with high morbidity in such a manner that the daily activity of patients is completely affected by the resulting cognitive impairments. In recent years, most of therapeutic treatments for AD has focused on the inhibition of acetylcholinesterase (AChE) to increase the level of ACh in cholinergic synaptic cleft. Indole and its derivatives are very important heterocyclic compounds in drug-discovery studies that exhibit diverse range of biological activities like antimicrobial, anticancer, anti-Alzheimer and anti-platelet aggregation activity.

Herein, in this study on the synthesis of bioactive compounds, we describe design, synthesis and anti-cholinesterase activity of *N*-benzylidene-5-(1-methyl-1H-indol-3-yl)isoxazole-3-carbohydrazide.

Methods and Results: The title compounds were prepared *via* the 5-(1-methyl-1H-indol-3-yl)isoxazole-3-carbohydrazide which is key intermediate for the production of the desired compounds. Condensation with carbaldehydes in water and acetic acid afforded the title compounds. All the synthesized compounds were characterized by ^{1}H NMR, ^{13}C NMR, MS and IR spectral data. The *in vitro* anti-cholinesterase activity of all the compounds were evaluated.

Conclusions: The target compounds were obtained from proper aldehydes and *N*-benzylidene-5-(1-methyl-1H-indol-3-yl)isoxazole-3-carbohydrazide condensation with good to excellent yields. The AChE and BuChE inhibition activity of the synthesized compounds were evaluated.

Key words: 3-Acetylindole, AChE and BuChE inhibitors, Alzheimer's disease, Isoxazole.