

Synthesis of new 1,3,4-oxadiazole derivatives as anti-HIV agents

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Background and Aims: Acquired immunodeficiency syndrome (AIDS), which is caused by the human immunodeficiency virus type 1 (HIV-1) and results in life-threatening opportunistic infections and malignancies, has become a major worldwide pandemic. The increasing incidence of HIV drug resistance together with many serious side effects and long-term complications in patients diminish the action of current anti-HIV drugs, so there is an urgent need to identify new structural types of inhibitors. In this study new 1,3,4-oxadiazole derivatives were synthesized as triple inhibitors of HIV key enzymes (HIV protease, reverse transcriptase and integrase).

Methods: The compounds were designed based on docking studies and were synthesized in four steps. 5-hydroxyisophthalic acid was esterified at the first step. The product underwent etherification (with different alkyl and aryl halides) and then hydrazidation reactions. Finally, 1,3,4-oxadiazole compounds were synthesized by the ring closure reaction with cyanogen bromide.

Results: The designed molecules were synthesized and structurally elucidated by IR, NMR and Mass spectra. Docking studies showed that the designed compounds could favorably inhibit HIV key enzymes (HIV protease, reverse transcriptase and integrase).

Conclusions: The synthesized compounds are expected to have anti-HIV effects by their triple inhibitory properties according to docking studies. The biological tests are in process.

Keywords: Synthesis; 1,3,4-oxadiazole derivatives; Docking; Anti-HIV agents