IN VITRO STUDY OF THE CYTOTOXIC POTENTIAL OF NOVEL HYDROXY-1,2,3-TRIAZOLES

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INTRODUCTION: Hydroxy-1,2,3-triazoles, a class of triazole-based compounds, have attracted growing interest due to their diverse biological activities. Drawing a parallel with thalidomide—whose R-enantiomer exhibits therapeutic effects while the S-enantiomer is teratogenic—highlights the importance of evaluating each enantiomer separately during drug development. Accordingly, resolving and testing individual isomers is a crucial step in assessing biological activity and safety. **OBJECTIVE:** To investigate the in vitro cytotoxic potential of a newly synthesized hydroxy-1,2,3-triazole derivative (LSO24) and its enantiomers. **MATERIALS AND METHODS:** LSO24 was synthesized via a metal- and solvent-free enaminone–azide cycloaddition between 4-bromoacetophenone and 4-bromoazidobenzene. Chiral preparative chromatography was used to isolate the R and S enantiomers of LSO24 in pure form. Cytotoxicity was assessed in H9c2 cardioblast cells using cell viability assays and biochemical analyses of reactive oxygen species (ROS) and lactate dehydrogenase (LDH) release at concentrations of 10, 50, and 100 μ mol L^{-1}. **RESULTS AND CONCLUSION:** LSO24 significantly reduced cell viability at 10 μM, while its R and S enantiomers showed similar effects only at 50 μ mol L^{-1}. Interestingly, LDH and ROS levels increased at lower concentrations (≥50 μ mol L^{-1}) for both enantiomers, whereas LSO24 induced increases only at 100 μmol L^{-1}. These findings suggest that LSO24 exhibits higher cytotoxicity at lower concentrations but may act through a mechanism not primarily associated with oxidative stress. Further studies targeting additional cellular pathways are needed to elucidate its mode of action in H9c2 cells.

Keywords: oxidative stress; cytotoxicity; hydroxy-1,2,3-triazole; enantiomers; cardiomyoblasts.