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Differential toxicity of rifampin on HepG2 and Hep2 cells using MTT test and electron microscope

Vahdati-Mashhadian, N.^a, Jaafari, M.R.^b, Nosrati, A.^a^a School of Pharmacy, Drug Research Center, Mashhad University of Medical Sciences, PO Box 91775-1365, Mashhad, Iran^b School of Pharmacy, Biotechnology Research Center, Mashhad University of Medical Sciences, PO Box 91775-1365, Mashhad, Iran

Abstract

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Background: Rifampin is an antibiotic widely used for the treatment of mycobacterial infections such as tuberculosis and leprosy. The drug produces hepatic, renal and bone marrow toxicity in patients. In this study, toxic effects of rifampin on cell proliferation and cellular organelles were investigated using cells with different metabolic activities. Results: Human hepatoma cells (HepG2) and human laryngeal carcinoma cells (Hep2) were cultured in 96-well plated and were exposed to 5, 10, 20, 50 and 100 μ M of rifampin. Toxicity of the drug was assessed by MTT assay. Toxicity was evident from 10 mg/ml upward on HepG2 cells with direct relationship with concentration: Electron microscopic survey showed broad disruption in the membranes of cell organelles including the nucleus. Hep2 cells were unaffected by the drug in all concentrations in MTT assay and electron microscopy survey. Conclusion: Rifampin is toxic to hepatic cells in cell culture even in the concentration that is very close to its C_{max} in clinical settings when it is used in usual doses in the treatment of various infectious diseases. Considering the result of the drug's exposure to Hep2 cells, it seems that hepatic metabolism is the main determinant of its toxicity. More studies using protective measures will clarify the mechanism of rifampin toxicity.

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Author keywords

Cell toxicity; Electron microscope; Hep2; HepG2; MTT test; Rifampin

Indexed Keywords

EMTREE drug terms: 3 (4,5 dimethyl 2 thiazolyl) 2,5 diphenyltetrazolium bromide; rifampicin

EMTREE medical terms: article; cancer cell culture; cell membrane; cell metabolism; cell nucleus; cell organelle; cell proliferation; cell strain HepG2; concentration response; controlled study; cytotoxicity test; drug cytotoxicity; electron microscopy; hepatoma cell; human; human cell; larynx carcinoma

Chemicals and CAS Registry Numbers: 3 (4,5 dimethyl 2 thiazolyl) 2,5 diphenyltetrazolium bromide, 298-93-1; rifampicin, 13292-46-1

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