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The Cytogenetic Effects of Silibinin Alone and in Combination with Methotrexate in Mouse Bone Marrow

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Abstract

The use of herbal drugs for disease treatment has increased worldwide. Flavonolignan silibinin, the major biologically active component of milk thistle (*Silybum marianum*), has various biological effects. This study is designed to evaluate the cytogenetic effects of flavonolignan silibinin in mouse bone marrow cells alone and in combination with methotrexate. In this study, the cytogenetic effects of flavonolignan silibinin were observed in mouse bone marrow cells after five days of treatment with a single intraperitoneal (IP) dose of either 50, 100 or 150 mg/kg body weight of silibinin hemisuccinate (SHS), alone or in combination with a single dose of 20 mg/kg methotrexate (MTX). The end-points were chromosomal aberrations (CAs) and a mitotic index (MI) study 24 hours after the last dose. SHS (100 mg/kg or 150 mg/kg) could significantly reduce the MI ($P < 0.05$) in a dose-dependent manner. CAs significantly increased when SHS was administered at 150 mg/kg. Moreover, the MI significantly increased when SHS was administered prior to MTX at 50 mg/kg or 100 mg/kg. However, the MI was further reduced at a dose of 150 mg/kg. Additionally, SHS could significantly reduce the CAs that were induced by MTX. As a conclusion, Silibinin has a weak clastogenic effect, and in combination with MTX, it can enhance MTX's inhibitory effect on the MI and reduce CAs in bone marrow cells. This finding may direct attention to the beneficial effects of using SHS in chemotherapeutic approaches.

Keywords:

Silibinin; Methotrexate; chromosomal aberrations; mitotic index

1. Introduction

Cancer chemotherapy remains an intriguing area of pharmacology, and some types of cancer are only minimally affected by currently available drugs (Trevor et al., 2010). Chemotherapy is one of the main strategies used to eliminate residual cancer cells

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