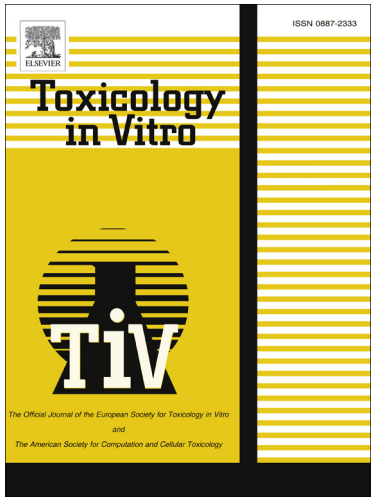

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Toxicity of cylindrospermopsin in human lymphocytes: proliferation, viability and cell cycle studies

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Abstract

The global expansion of cylindrospermopsin (CYN) producing cyanobacteria in surface freshwater increases the risk of human exposure and poisoning. Following ingestion, CYN is transported with blood in general circulation to the liver and kidneys, and can potentially interact with immune system cells. In the present study, we investigated whether CYN (0.01 – 1.0 µg ml^{-1}) can alter the function of human peripheral blood lymphocytes isolated from healthy donors. It was found that CYN demonstrates significant antiproliferative activity in lymphocytes during different phases of their activation. The most remarkable effects (decrease by > 90%) were observed in lymphocytes exposed to 1 µg ml^{-1} CYN at the beginning of activation. Further analyses revealed a cell-cycle arrest at G0/G1 and prolonged S phase in lymphocytes undergoing activation and significant apoptosis inducement in activated cells. Reduced abilities to fight pathogenic microorganisms or malignant cells should be taken into consideration in CYN exposure and risk assessments.

Keywords: cylindrospermopsin; toxicity; lymphocyte; immune system