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In vitro Cytotoxic and Genotoxic Effects of Arsenic Trioxide on Human Keratinocytes

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Abstract : Although arsenic trioxide has been the subject of toxicological research, in vitro cytotoxicity and genotoxicity studies using relevant cell models and uniform methodology are not well elucidated. Hence, the aim of the present study was to evaluate the cytotoxicity and genotoxicity induced by arsenic trioxide in human keratinocytes (HaCaT) using the MTT [3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] and alkaline single cell gel electrophoresis (Comet) assays, respectively. Human keratinocytes were treated with different doses of arsenic trioxide for 4 h prior to cytogenetic assessment. Data obtained from the MTT assay indicated that arsenic trioxide significantly reduced the viability of HaCaT cells in a dose-dependent manner, showing a IC50 value of 34.18 ± 0.6 µM. Data generated from the comet assay also indicated a significant dose-dependent increase in DNA damage in HaCaT cells associated with arsenic trioxide exposure. We observed a significant increase in comet tail length and tail moment, showing an evidence of arsenic trioxide -induced genotoxic damage in HaCaT cells. This study confirms that the comet assay is a sensitive and effective method to detect DNA damage caused by arsenic.

Keywords : arsenic trioxide, cytotoxixity, genotoxicity, HaCaT
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