



Category: Miscellaneous

Induction of apoptosis by Fe(salen)Cl through caspase-dependent pathway specifically in tumor cells

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Abstract

Iron-based compounds possess the capability of inducing cell death due to their reactivity with oxidant molecules, but their specificity towards cancer cells and the mechanism of action are hitherto less investigated. A Fe(salen)Cl derivative has been synthesized that remains active in monomer form. The efficacy of this compound as an anti-tumor agent has been investigated in mouse and human leukemia cell lines. Fe(salen)Cl induces cell death specifically in tumor cells and not in primary cells. Mouse and human T-cell leukemia cell lines, EL4 and Jurkat cells are found to be susceptible to Fe(salen)Cl and undergo apoptosis, but normal mouse spleen cells and human peripheral blood mononuclear cells (PBMC) remain largely unaffected by Fe(salen)Cl. Fe(salen)Cl treated tumor cells show significantly higher expression level of cytochrome c that might have triggered the cascade of reactions leading to apoptosis in cancer cells. A significant loss of mitochondrial membrane potential upon Fe(salen)Cl treatment suggests that Fe(salen)Cl induces apoptosis by disrupting mitochondrial membrane potential and homeostasis, leading to cytotoxicity. We also established that apoptosis in the Fe(salen)Cl-treated tumor cells is mediated through caspase-dependent pathway. This is the first report demonstrating that Fe(salen)Cl can specifically target the tumor cells, leaving the primary cells least affected, indicating an excellent potential for this compound to emerge as a next-generation anti-tumor drug.

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