

Synthesis and In Vitro Anticancer Evaluations of Deferasirox Iron Chelator

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Abstract

Many types of cancer cells reprogrammed iron metabolism in ways that result in net iron influx. They upregulate proteins that are involved in iron uptake, such as transferrin receptor 1 (TFR1), STEAP proteins and lipocalin 2 (LCN2), and decrease the expression of iron efflux proteins, such as ferroportin. Iron chelators are natural or synthetic small molecules that bind iron with a high affinity. The avidity of cancer cells for iron has led to the question of whether iron chelators could be used in cancer therapy. The aim of present study was to examine new role of Deferasirox as an important class of iron chelators as anticancer agents due to its ability to chelate with Iron. Deferasirox was prepared according to a known procedure by Steinhauser. Moreover, the cytotoxic activity of Deferasirox have been investigated by MTT assay, using cis-platin as comparative standard against human breast cancer cells (MCF-7), human cervix epithelial carcinoma (HeLa), human colon cancer cell line (HT-29), human leukemia cell line (K-562), bladder cancer cell line (T-24), non-small cell lung carcinoma (A-549), mouse neuroblastoma cell line (Neuro-2a) and mouse fibroblast L-929 cell lines. The results demonstrate that Deferasirox induce apoptosis in cancer cell lines. Deferasirox exhibits the highest selectivity against human breast cancer cells (MCF-7) and human colon cancer cell line (HT-29). Deferasirox showed a high population of apoptotic cell (69.3%), 1.2 times higher than cis-platin (58.1%) at the same concentration and can induce apoptosis in HT-29 cancer cells lines. It is important to notice that Deferasirox has no effect on the L-929 cell line which show Iron chelators could be consider as new target in cancer therapy in comparison with cis-platin.

Keywords: Iron Chelating Therapy, Deferasirox, Anticancer Activity, MTT Assay, Apoptosis, MCF-7

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