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Cytotoxic and apoptogenic properties of 2-phenylthiazole-4-carboxamide derivatives in human carcinoma cell lines

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Background and Aims: Apoptosis is an essential physiological process that plays a critical role in development and tissue homeostasis. Caspases, a family of cysteine-dependent aspartate-directed proteases, play a critical role in the initiation and execution of apoptosis. Here, we evaluated the cytotoxicity and apoptogenic effect of 2-phenyl 4-carboxamide derivatives were evaluated in SKNMC (human neuroblastoma), MCF-7 (human breast adenocarcinoma) and HT-29 (human colon cancer) cell lines.
Methods: Cell viability was determined by MTT.Cells were plated into 96-well plates at a density of 2.0×104 cells/well. Stock solutions of of 3-F,2-F,4-Cl and 2-Cl, 4-Br 2-Phenylthiazole-4-carboxamide derivatives were prepared in dimethyl sulfoxide (DMSO). The activity of caspase-3,8,9 was determined by the sigma colorometric caspases kit according to manufactur's instrument. The mitochondrial membrane potential was measured by using rhodamine 123 fluorescent dye by fluorescence microplate reader.
Results: Cytotoxicity results showed that 3,2-F , 4-Br and 4-Cl Derivatives (2.5-20 μM) caused to cell death in SKNMC, MCF-7, HT-29 cell lines. Moreover, the overall activity profiles of derivatives demonstrated that the HT-29 cell line has more sensitivity respect to other cell lines. On the other hand, these derivatives -mediated cytotoxiocity are executed by inducing apoptotic cell death. They induced apoptosis through increase of caspase-3,8,9 activity. Consequently, mitochondrial membrane potential ($\Delta\Psi m$) is significantly decreased upon treatment with these Derivativess in MCF-7 cell lines.
Conclusions: The results demonstrated that 2-phenylthiazole-4-carboxamide derivatives exerts its anticancer and cytotoxic effect by inducing apoptotic cell death. Finally, we are sugessted these new analogs can be used as potential anticancer agents.

Keywords: 2-Phenylthiazole-4-carboxamide derivatives; Apoptosis; Human carcinoma cell lines