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Synthesis and characterizing radiosensitizing effect of nitroimidazole derivatives and 5-FU in hypoxic HT-29 cell

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Background and Aims: Of the 1.3 million new patients diagnosed with cancer each year, two-thirds of them will receive some form of radiotherapy (RT) as a part of their treatment regimen. The radiosensitizer are compounds which increase effects of radiation. These compounds form free radicals upon interaction with radiation and resulting radicals react with different component observe and damage cell functions. This mechanism action is very important for to more cells which are hypoxic because in normal cells radical chain reaction occur throw reaction of radiation with oxygen.
The Purpose of this study was to synthesize the 2-(2-methyl-5-nitro-1H-imidazol-1-yl)ethyl 2-(5-fluoro-2,3-dihydro-2,6-dioxopyrimidin-1(6H)-yl)acetate and 2-(2-methyl-5-nitro-1H-imidazol-1-yl)ethyl 2-(5-fluoro-2,3-dihydro-2,6-dioxopyrimidin-1(6H)-yl)propionate which has shown rediosensytizing activity and minimum toxic effects on normal cells and to determine their rediosensitizing activity on hypoxic cells. The cytotoxic effect and radiosensitizing activity of the synthesize compounds (2-200 µM) on HT29 cells was determined in normal and hypoxic cells upon irradiation with gamma ray (60Co, 2-12 Gy) was determined by MTT test. The results of the investigations showed that compounds have low toxicity on the normal cells and have a good radiosensitizing effects on hypoxic cells after irradiation.

Keywords: Nitroimidazole; Radiosensitizer; Hypoxic; HT-29