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Some pyrimidine derivatives has cytotoxic and anticancer properties against A549 lung adenocarcinoma

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Cancer is the second leading mortality cause all over the world. Treatments againsts cancer are drugs (chemotherapy), surgery, radiation and/or immunotherapy. However, an effective drug for therapy and prognosis after surgery still do not exist. Therefore, an effective new drug development process is seemed to be necessary. Pyrimidine ring is the building unit of DNA and RNA and thus pyrimidine based chemical architectures exhibit diverse pharmacological activities. Among the reported medicinal attributes of pyrimidines, anticancer activity is the most extensively reported . In this study, we aimed to investigate the cytotoxic and apoptotic properties of series of novel pyrimidine derivatives bearing various heterocyclic rings against A549 cells. A549 lung adenocarcinoma cell lines were used in the studies. The cytotoxic activities of the tested compounds were determined by cell proliferation analysis using standard (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. Detection of apoptosis was performed using Annexin V-FITC apoptosis detection kit BD, Pharmingen according to the manufacturer's instruction. All measurements were performed on a BD FACS Aria (I) cell sorter cytometer. The IC50 values of N'-(arylidene)-2-[(pyrimidine-5-yl)thio]acetohydrazide derivatives (1-12) were determined for A549 cell lines. Compounds 1, 2 and 9 which were including 2-pyridyl, 3-pyridyl and naphtyl moieties, had significant cytotoxic activity with IC50 values lower than 213.3±32.15 µg/mL. Compound 9 showed the highest cytotoxic activity with a IC50 value of 21.00±1.41 µg/mL, whereas, cisplatin IC50 values were 16.33±1.53 µg/mL against A549 cells. Compound 1 showed the highest population of early and late apoptotic cells (19.7%) of the tested compounds which was 3.94-fold higher than for cisplatin. Compound 2 and 9 did not induce apoptotic cell death. It was determined that synthesized compounds 1, 2 and 9 had considerable cytotoxic effects against A549 cell lines compared to cisplatin. Our study results demonstrated that compound 1 namely N'-(2-pyrilidene)-2-[(pyrimidine-5-yl)thio]acetohydrazide affected A549 cells by the apoptotic pathway. Also was evaluated LOX inhibition activity on compounds.

Biography

Bahar Demir has graduated from Eskişehir Osmangazi University Department of Biology. She is doing her Post-graduation at Anadolu University Department of Biochemistry. She is studying on anticancer agents for novel drug research and development. She has taken part in 2 projects and has attended more than 5 conferences.

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