Synthesis and Cytotoxic Activity of New Quinazolinone-Based Compounds against Human Breast Cancer Cell Line MCF-7

Authors : Maryam Zahedifard, Fadhil Lafta Faraj, Maryam Hajrezaie, Nazia Abdul Majid, Mahmood Ameen Abdulla, Hapipah Mohd Ali

Abstract : In the current study, we prepared two new quinazoline schiff bases through condensation reaction of 2-aminobenzhydrazide with 5-bromosalicylaldehyde and 3-methoxy-5-bromosalicylaldehyde. The chemical structures of both newly synthesized compounds (1 and 2) were confirmed by FT-IR and X-ray crystallography studies. The cytotoxic effect of compounds was investigated against MCF-7 human breast cancer cells. MTT results showed that (1) and (2) decreased the viability of MCF-7 cells in a time-dependent manner, exhibiting an IC50 value of 3.23 ± 0.28 µg/mL and 3.41 ± 0.34 µg/mL, respectively, after a 72-hours treatment period. In contrast, they did not show significant anti-proliferative effect towards MCF-10A normal breast cells and WRL-68 normal liver cells. We found a perturbation in mitochondrial membrane potential and increased cytochrome c release from the mitochondria to the cytosol, suggesting an activation of apoptosis by compounds, which was confirmed by activation of the initiator caspase-9 and the executioner caspases-3/7. (1) was also able to trigger extrinsic pathway via activation of caspase-8 and inhibition of NF-κB translocation. The acute toxicity test showed no toxicity effect of the compounds in rats. Our results showed that the selected synthesized compounds are highly potent to induce apoptosis in MCF-7 cells via either intrinsic or extrinsic mitochondrial pathway.

Keywords : Quinazoline Schiff base, apoptosis, MCF-7 human breast cancer cell line, caspase, NF-κB translocation
Conference Title : ICPPS 2014 : International Conference on Pharmacy and Pharmacological Sciences
Conference Location : Osaka, Japan
Conference Dates : October 12-13, 2014