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Acanthopanax sessiliflorus stem bark extracts induces non-apoptotic cell death in human breast cancer cells via ROS dependent and independent mechanisms

Young-Kyoon Kim

Kookmin University, Republic of Korea

Acanthopanax sessiliflorus, is a smaller woody shrub and has traditionally been referred to have anticancer activity, but it has not been scientifically explored so far. Therefore, the present study was aimed to elucidate the anticancer effect of *Acanthopanax sessiliflorus* stem bark extracts (ASSBE). The stem barks was extracted in methanol and then fractionated with hexane, butanol and water. Cytotoxicity of these fractions against MDA-MB-231 and MCF-7 human breast cancer cells was determined by MTT colorimetric assay. The hexane fraction of ASSBE showed greater activity towards both the human breast cancer cells compared to other two fractions at a minimal concentration of 50 µg/ml. Hence, we were further investigated the effects of this bioactive fraction, n-hexane (ASSBE-nHF) on breast cancer cells. ASSBE-nHF significantly reduced the proliferation of breast cancer cells assessed by counting cell numbers after 72 h treatment using hemocytometer. The Annexin V-FITC/PI, Hoechst 33342 staining, DNA fragmentation assays and immunoblotting of apoptosis markers like caspases showed ASSBE-nHF induces necrosis like cell death in MCF-7 and MDA-MB-231 cells. Further, ASSBE-nHF significantly increased the production of ROS and decreased the mitochondrial membrane potential (MMP) in MCF-7 cells. Similarly, it decreased the MMP in MDA-MB-231 cells, but had no effect on ROS production. The cytotoxic effect of ASSBE-nHF in MCF-7 cells was not significantly reversed even in the presence of n-acetylcysteine, an antioxidant. Moreover, ASSBE-nHF significantly decreased the levels of caspase 3, caspase 7, caspase 9, caspase 8, cyclin D1 and including the house keeping protein GAPDH represents the inhibition of protein synthesis in human breast cancer cells. Since, necrotic dying cells retain the process of protein synthesis, *Acanthopanax sessiliflorus* stem bark extracts induced cytotoxic effects in human breast cancer cells might be through endoplasmic reticulum stress response. In conclusion, the present findings provide evidence that ASSBE-nHF induces non-apoptotic cell death in human breast cancer cells via both ROS dependent and independent pathways associated with mitochondrial membrane depolarization.

Biography

Young-Kyoon Kim holds a PhD and is currently a Professor at department of Forest Products & Biotechnology in Kookmin University, Seoul, Republic of Korea.

hoyang@kist.re.kr

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