ANTICANCER, ANTIPROLIFERATIVE AND CELLULAR DNA FRAGMENTATION ACTIVITIES OF POMEGRANATE SEED OIL (*PUNICA GRANATUM* L.) ON HUMAN CANCER CELLS

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Background and Objective: Considering the side effects related with usage of synthetic chemotherapeutics and increase in incidence and mortality of cancer, use of anticancer agents from medicinal plants are gaining importance almost all over the world. Pomegranate seed and its other parts such as fruit, peel, juice etc. have been reported that they possess advantageous health benefits, owing to presence of wide range of phytochemicals, particularly punicic acid and punicalagins.

Material and Methods: In the current study, potential anticancer and antiproliferative activity of pomegranate seed oil (PSO) from *Punica granatum* L. were determined against human lung carcinoma (A549), human non-small lung cancer (H1299), and human glioma (C6) cancer cells, compared to the non-tumorous HUVEC cells. Cancer prevention and antiproliferative activities of the PSO were investigated using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and trypan blue exclusion assays. Apoptotic activity in cancer cell lines were analyzed using apoptotic DNA fragmentation method. Furthermore, thiobarbituric acid reactive substances (TBARS) assay was used for assessment the lipid peroxidase, and the release of the enzyme lactate dehydrogenase (LDH) activity assay was also performed for detection of necrosis in the cultured cells.

Results: The results revealed that the PSO exhibited significant anticancer and antiproliferative activity towards all treated cancer cells, in a concentration (0, 5, 10, 50 and 100 µg/mL) and time (24, 48 and 72h) dependently. In addition, the PSO-induced apoptosis was observed in the cultured cancer cells, which was detected by cellular DNA fragmentation even at minimum exposure time. The PSO also exerted remarkable decreases of cell growth in cancer cells through induction both apoptosis and necrosis even at very low concentration (5 µg/mL). In case of TBARS and LDH activities of the PSO were seem to be highly in correlation with anticancer activity.

Conclusions: In the light of the findings, it is noteworthy that pomegranate seed oil, with its rich punicic acid ingredients, can be used as a promising anticancer agent in alternative cancer therapy. Authors suggest that further in vitro

and in vivo studies should be conducted to ascertain its safety intake in order to develop functional food that includes the PSO at different concentrations.

Keywords: Pomagranate seed oil, *Punica granatum* L., anticancer, apoptosis, DNA fragmentation