Abstract

Multiple myeloma is of great concern since existing therapies are unable to cure this clinical condition. Alternative therapeutic approaches are mandatory, and the use of plant extracts is considered interesting. *Punica granatum* and its derived products were suggested as potential anticancer agents due to the presence of bioactive compounds. Thus, polypenolic-rich extracts of the non-edible parts of *P. granatum* were investigated for their antiproliferative and apoptotic effects on U266 multiple myeloma cells. We demonstrated that there were dose-dependent decreases in the proliferation of U266 cells in response to *P. granatum* extracts. Also, exposure to the extracts triggered apoptosis with significant increases in loss of mitochondrial membrane potential in U266 cells exposed to the leaves and stem extracts, while the flower extract resulted in slight increases in loss of MMP. These results were confirmed by Annexin-V analysis. These results documented the cytotoxic and apoptotic effects of *P. granatum* extracts on human U266 multiple myeloma cells via disruption of mitochondrial membrane potential and increasing cell cycle arrest. The data suggest that the extracts can be envisaged in cancer chemoprevention and call for further exploration into the potential application of these plant parts.