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Euphorbia hirta induces S and G₂/M cell cycle arrest and apoptosis in MCF-7 breast cancer cells

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Euphorbia hirta species has been used as a folk remedy in Southeast Asia for the treatment of various ailments. The purpose of this study was to evaluate the inhibitory effect of *E. hirta* extract on human breast cancer MCF-7 cells and investigate the possible mechanism of *E. hirta*. Various cytotoxicity assays, microscopes method and flow cytometry study was conducted to study the anticancer activity of *E. hirta*. The MTT assay showed that *E. hirta* inhibited MCF-7 cell viability in a dose and time-dependent manner. Microscopic studies showed that *E. hirta* treated cells exhibited marked morphological features characteristic of apoptosis. *E. hirta* extract also had an ignorable influence on the LDH leakage and generating intracellular ROS. The Annexin V/Propidium Iodide flow cytometry study confirmed that *E. hirta* extract induced apoptosis in MCF-7 cells. *E. hirta* extract treatment also resulted in DNA fragmentation in MCF-7 cells. Moreover, *E. hirta* treatment resulted in the accumulation of cells at the S and G₂/M phases as well as apoptosis. The caspase activity study revealed that *E. hirta* extract induced apoptosis through the caspase-3 independent pathway by the activation of caspase-2, 6, 8 and 9. To identify the cytotoxic fraction, *E. hirta* extract was subjected to bioassay-guided fractionation. *E. hirta* hexane fraction, namely EH Hex 4 demonstrated highest activity among all the fractions tested. This study revealed that *E. hirta* induced apoptotic cell death and suggests that *E. hirta* could be used as an apoptosis-inducing anti-cancer agent for breast cancer treatment with further detailed studies.

Biography

Sreenivasan Sasidharan has completed his PhD from Universiti Sains Malaysia in 2007. He is the Senior Lecturer in Institute for Research in Molecular Medicine of Universiti Sains Malaysia, a public University in Malaysia. He has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member and Reviewer of international journals.

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