The immunoinhibitory and apoptosis-inducing activities of Foeniculum vulgare on human peripheral blood lymphocytes


Abstract

Foeniculum vulgare (F. vulgare, Apiaceae) is an important plant currently used in folk medicine to treat various diseases including infections and inflammatory conditions. In this study we have investigated the immunomodulatory and apoptosis-inducing activities of the fractions from this plant. We prepared dichloromethane, hexane, butanol, and water fractions from the aerial parts of the plant. We examined the growth inhibitory effects of the fractions on proliferative lymphocytes by the BrdU incorporation assay. Cell viability was determined by the propidium iodide (PI) assay. AnnexinV/PI staining and cell cycle analysis by flow cytometry was performed to investigate the apoptosis-inducing effects of the plant fractions. Cytokine levels were measured by enzyme-linked immunosorbent assay. All fractions reduced cell proliferation of the activated lymphocytes. The dichloromethane fraction with the highest inhibitory effect (IC50, 19.8 μg/mL) significantly reduced cell viability. Although the butanol fraction inhibited cell growth (IC50, 88.2 μg/mL) it did not affect cell viability. Annexin V/PI and cell cycle analysis showed the maximum apoptosis-inducing effect of the dichloromethane fraction at 200 μg/mL. Cytokines, that included interleukin (IL)-4 (22.8 ± 0.9 pg/mL, P < 0.05) and interferon (IFN)-γ (651 ± 37.5 pg/mL, P < 0.01) reduced the activated lymphocyte levels in cultures in the presence of 100 μg/mL concentration of butanol fraction compared to the untreated control. In conclusion, the dichloromethane fraction of F. vulgare had the capability of inducing apoptosis in the activated lymphocytes, whereas the butanol fraction reduced cell activation and cytokine secretion. These data suggested the potential of these examined fractions for more studies in terms of their beneficial effects on immune-mediated diseases. © 2018 Medknow Publications. All rights reserved.