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Anti-proliferative Activity and HER2 Receptor Expression Analysis of MCF-7 (Breast Cancer Cell) Cells by Plant Extract Coleus Barbatus (Andrew)

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Abstract : Background: Among several, breast cancer has emerged as the most common female cancer in developing countries. It is the most common cause of cancer-related deaths worldwide among women. It is a molecularly and clinically heterogeneous disease. Moreover, it is a hormone–dependent tumor in which estrogens can regulate the growth of breast cells by binding with estrogen receptors (ERs). Moreover, the use of natural products in cancer therapeutics is due to their properties of biocompatibility and less toxicity. Plants are the vast reservoirs for various bioactive compounds. Coleus barbatus (Lamiaceae) contains anticancer properties against several cancer cell lines. Method: In the present study, an attempt is being made to enrich the knowledge of the anticancer activity of pure compounds extracted from Coleus barbatus (Andrew). On human breast cancer cell lines MCF-7. Here in, we are assessing the antiproliferative activity of Coleus barbatus (Andrew) plant extracts against MCF 7 and also evaluating their toxicity in normal human mammary cell lines such as Human Mammary Epithelial Cells (HMEC). The active fraction of plant extract was further purified with the help of Flash chromatography, Medium Pressure Liquid Chromatography (MPLC) and preparative High-Performance Liquid Chromatography (HPLC). The structure of pure compounds will be elucidated by using modern spectroscopic methods like Nuclear magnetic resonance (NMR), Electrospray Ionisation Mass Spectrometry (ESI-MS) methods. Later, the growth inhibition morphological assessment of cancer cells and cell cycle analysis of purified compounds were assessed using FACS. The growth and progression of signaling molecules HER2, GRP78 was studied by secretion assay using ELISA and expression analysis by flow cytometry. Result: Cytotoxic effect against MCF-7 with IC50 values were derived from dose response curves, using six concentrations of twofold serially diluted samples, by SOFTMax Pro software (Molecular device) and respectively Ellipticine and 0.5% DMSO were used as a positive and negative control. Conclusion: The present study shows the significance of various bioactive compounds extracted from Coleus barbatus (Andrew) root material. It acts as an anti-proliferative and shows cytotoxic effects on human breast cancer cell lines MCF7. The plant extracts play an important role pharmacologically. The whole plant has been used in traditional medicine for decades and the studies done have authenticated the practice. Earlier, as described, the plant has been used in the ayurveda and homeopathy medicine. However, more clinical and pathological studies must be conducted to investigate the unexploited potential of the plant. These studies will be very useful for drug designing in the future.

Keywords : coleus barbatus, HPLC, MPLC, NMR, MCF7, flash chromatograph, ESI-MS, FACS, ELISA.
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