Investigating the Cytotoxicity of Centella asiatica Methanolic Leaf Extracts on MDA-MB-231 Human Breast Cancer Cells

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This study evaluated the cytotoxicity of two Centella asiatica (CA) methanolic leaf extracts on the metastatic, triple negative breast cancer (TNBC) cell line MDA-MB-231. CA is a plant regional to the wetlands of Central Asia that has historically been ingested in order to boost the immune system (Gohil et al., 2010). Yet in recent years it has been investigated to possess antineoplastic effects (Babykutty et al., 2008 ; Babu et al., 2000). However, CA has not been conclusively evaluated on TNBC which accounts for 15-20% of all breast cancer diagnoses (American Cancer Society, n.d). In this study, two different extracts were produced using the same procedure, but with varying equipment. The purified extract (PE) was created using university lab equipment and was intended to possess a greater concentration of triterpene glycosides, particularly asiaticoside (Helan et. al, 2011), which has been shown to induce cell death by destroying membrane bilayers, thereby inhibiting protein-protein interactions and enhancing membrane permeability. The crude extract (CE) was instead created with financially accessible equipment. Each extract was tested at dilutions of 10%, 1%, 0.1%, 0.01%, and 0.001% at 60 and 96 hours. After evaluation, it was determined that CE possessed statistical significance in a concentration dependent manner at both time points by reducing cell viability. However, the PE induced no significant effects on the MDA-MB-231 cells. Therefore, CA CE may be a viable, cost-effective alternative treatment for those diagnosed with TNBC in developing regions in Central Asia, without access to traditional medical care.

Awards Won:

Second Award of $2,000