Assessment of the anti-cancer effects of the herbal medicine *Dodonaea viscosa* - strong antiproliferative activity shown against lymphoma cells

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Introduction: Cancer is a leading public health problem worldwide, and while modern treatments have undeniably improved the outcome of patients, many cancers remain refractory or untreatable. More effective treatment is clearly needed, and the use of natural phytochemical compounds is an emerging strategyto prevent, delay, or cure cancer. In South Africa, high HIV prevalence is a compounding factor to the development of cancer, with the incidence of certain cancers being disproportionately high among HIVpositive individuals. One such cancer is Burkitt lymphoma (BL), a highly aggressive B-cell derived malignancy. Increasingly, cancer patients, especially those from rural communities, are making use of traditional medicine (TM), as an alternative to chemotherapy. While conventional treatments are researched and tested before clinical approval, alternative treatments are not. One of these TM is extracts from the plant *Dodonaea viscosa* (DVE), which has not been widely tested and there is thus a need to comprehensively assess the clinical benefits of DVE as an anti-cancer agent so that it can be administered safely and effectively.

Methods: BL cell lines were exposed to aqueous *Dodonaea viscosa* extracts (DVE), and specific cellular effects were measured and compared to control cells. This included cell viability, proliferation, apoptosis, and morphology.

Results: DVE was found to potently and preferentially inhibit the proliferation of BL cells compared to a normal cell line. This was shown by cell viability and BrDU incorporation assays showing significantly reduced proliferation of extract-treated cancer cells. Using a caspase3/7 activity assay, DVE was shown to enhance apoptosis, which was corroborated using western blotting and Annexin V assays. Additionally, treated cancer cells displayed morphological characteristics typical of those undergoing apoptosis, as shown by microscopy, while normal cells were left mostly unaffected.

Discussion and Conclusion: Aqueous extracts from the *Dodonaea viscosa* plant have potent and specific anticancer properties against BL cells, as shown in *in vitro* assays. Future work will focus on identifying the mechanism of action of DVE, the identification of active compounds in the extracts, and using an *in vivo* mouse modelto further confirm the anti-tumour effects.

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