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Preclinical Evaluation of the Anti-Cancer Activity of Natural Health Extracts in Non-Hodgkins Lymphoma Cells

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Preclinical Evaluation of the Anti-Cancer Activity of Natural Health Extracts in Non-Hodgkins Lymphoma Cells

Cancer is the leading cause of death in Canada and it is predicted that 2 out of 5 Canadians will develop the disease in their life time. Current cancer therapies include radiation, surgery, and chemotherapy. In most cases, chemotherapy is associated with severe side effects that include formation of secondary malignancies and even death.

As a result, many researchers have been studying various novel anti-cancer agents, in the hopes of discovering new therapies that are safer and more effective. A majority of anti-cancer agents have been obtained or derived from natural health products, however, anecdotal evidence indicates that benefits of the whole extract remains unexplored. Thus, it is important for scientific research to explore whether traditionally used natural extracts possess anti-cancer properties. This project aims to uncover natural health products, especially lemon grass and hibiscus extracts, as potential anti-cancer agents against Non-Hodgkin's Lymphoma. This project aims to explore the mechanism(s) of action and the pharmacologically active components within lemon grass and hibiscus extracts to investigate the anti-cancer properties of on U-937 lymphoma cells.

The extracts will be prepared with various solvents; hot water, cold water and ethanol. Preliminary screenings will be done using a WST-1 assay to determine cytotoxicity and effective doses of these extracts. This involves treating the cells with seven different doses of the drug, then observing the cell viability after 48 and 96 hours by recording the absorbance of WST-1 dye. Fluorescence microscopy and image based cytometry will be used to investigate the induction of programmed cell death. Apoptosis (cell suicide) will be assessed by Annexin-V staining, Necrosis will be assessed by propidium iodide staining, and autophagy (self eating) will be assessed by monodansylcadaverine. Chronology of biochemical events after treatment with these extracts will also be assessed through fluorescence microscopy, image based cytometry and western blotting analysis.

Lemon grass extracted in ethanol and hibiscus extracted in cold water have shown very promising results in preliminary WST-1 screenings. The most effective doses are currently being examined further to determine the mode of cell death being induced by the extracts. The selectivity and mechanisms of cell death will then be investigated. These results will help to determine if lemon grass and hibiscus can be used as safe and effective treatments for Non-Hodgkin's lymphoma.