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### Evaluation of Anti Cancer Activity of Natural Health Products (Sage and Long-Pepper) against Hodgkin's Lymphoma

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**Abstract:****Importance of the Project:**

2/5 Canadians will develop cancer at some point in their lives, while 1/4 will die of the disease.

Current cancer therapies (chemotherapy, radiation and surgery) are effective in treating the majority of people diagnosed, however these treatments can cause severe side effects such as; organ damage, the formation of new cancers, and death.

We aim to find a viable alternative to widely accepted treatments by examining the effects of natural health products on hodgkin's lymphoma cells, in controlled laboratory studies.

Many cancer drugs are derivatives of natural health products; a major example being combretastatin, a small organic molecule found in the bark of the african bush willow tree. We aim to examine if we can use the whole natural extract and show anticancer and anti tumour benefits, specifically using sage and long pepper extracts.

This research will be done in an effort to develop safer, non toxic, cheaper alternatives to what is currently available for cancer treatment.

**Research Question:**

To determine if sage and long pepper extracts have any anti cancer properties, especially against hodgkin's lymphoma, by assessing the mechanism of action using in vitro and in vivo models, and determining the active components within these extracts.

**Methodology:**

Assesing cytotoxicity of these extracts in human hodgkin's lymphoma cell lines (L540), through WST1 metabolic activity assay. This will help narrow down the effective concentration at which cytotoxicity occurs. Following the determination of this the induction of programmed cell death (PCD) will be assessed using fluorescence microscopy and image based cytometry. The mechanism of action by which (PCD) occurs will also be assessed through fluorescence microscopy image based cytometry and western blotting analysis. Animal models of hodgkins lymphoma will be used to asses the toxicity and efficacy of these extracts bringing us one step closer to administering these extracts to humans. Finally, HPLC (High performance liquid chromatography), LC/MS(Mass Spectrometry) will be used in the fractionation and the determination of the active ingredients in these extracts.

**Your Findings:**

To date, for the duration of my study it has been observed that the ethanol extract of long pepper is effective in reducing the viability of L540 cells in a dose and time dependent manner. Similar results have been observed in the ethanol but not the water extracts of sage. These finding provide us with the background needed to further study these extracts, in order to determine whether they have the potential to be developed as anticancer agents and brought to market for human use.