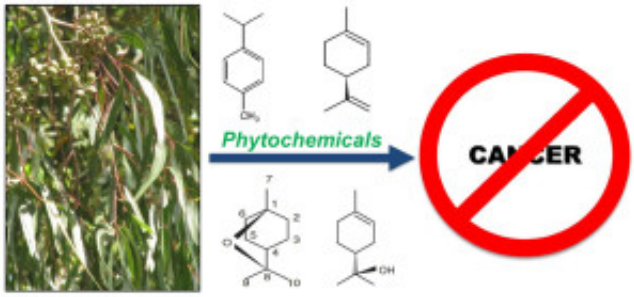
Compounds from Australian Eucalypts: the next wonder-drug for cancer?

If there is one tree that every Australian can relate to, then it would be the none other than the Eucalypt. No wonder they are considered as the only trees that have the power to unite the land of koalas. Australia is perhaps the only country in the world where such a single group of plants dominates most of the landscape, with around 800 species. They are also one of the world's most important plants with about 20 Eucalypt species exploited commercially for medicinal and pharmaceutical purposes, as well as for food additives. They also play an important role in indigenous Australian bush medicine for the treatment of various health related issues like cold, flu, fever, muscular aches, sores, internal pains, and inflammation. Essential oils from Eucalypts have been widely used in the pharmaceutical and cosmetics industries.



Unfortunately, around 7.6 million people die from cancer every year worldwide and although, many exciting breakthroughs are occurring in the world of cancer research, many types of cancers still lack effective treatment options. The “one-size-fits-all” approach is not always appropriate for cancer treatment as every cancer is different. Hence, the need for new treatment options for treating those “stubbornly lethal” cancers cannot be emphasized enough. Importantly, 60% of the anticancer drugs commercially available today are derived from natural sources. What is more interesting is that in the last 30 years, 45% of all anticancer drugs have been isolated directly or indirectly from plant-based natural products. Of note, only 10% of the total of 250,000 species of plants present on our planet have been studied for the discovery of novel chemical compounds.

Can we wish for a world where all types of cancers are curable? What if we could cure certain cancers using the chemical compounds present in the Australian Eucalypts? A number of studies have linked compounds from the Eucalyptus and their anticancer properties against cancers of the colon, liver, ovary, prostate, cervix, brain, lung and breast. The current scientific literature suggests that Eucalyptus species like E. globulus, E. camaldulensis, E. citriodora, E. maidenii and E. torquata have shown significant efficacy against different types of cancer cell lines in laboratory conditions. In general, two groups of chemical compounds are found in Eucalypts, one group is volatile in nature and other is not. In Eucalypts, volatile compounds mainly include essential oils whereas the non-volatile compounds comprise of polyphenolics. Both the categories of compounds

have been found to possess anticancer properties in numerous studies, however many overlook the necessity of optimized methods for extracting and isolating important volatile and non-volatile compounds from Eucalypts. It is important to first optimize the extraction method to pull out the maximal yield of chemical compounds from Eucalypts, and then testing those crude extracts against different cancer cell lines to determine whether it is worthwhile of further investigation. If the crude extracts show promising results in the preliminary tests, then they can be further studied for isolating and identifying the solitary compounds that have anticancer properties. Based on these individual compounds, synthetic studies can be designed using chemical and computational approaches to develop more effective compounds with greater potency and specificity against different types of cancer.

Publication

Botanical, Phytochemical, and Anticancer Properties of the Eucalyptus Species.
Vuong QV, Chalmers AC, Jyoti Bhuyan D, Bowyer MC, Scarlett CJ.
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