FORTIFICATION PROTOCOL FOR VERNONIA AMYGDALINA EXTRACTS ANTI-CANCER ACTIVITY

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Abstract: It is estimated that 178,000 women will be diagnosed with invasive BC and 40,460 women will die from the disease this year in the U.S. According to the National Cancer Institute (NCI), although the breast cancer incidence rate has increased, the overall breast cancer mortality rate has dropped steadily since the early 1990s. The gains on breast cancer survival rate are attributed to the development of better chemotherapeutic drugs, and strategies for cancer treatment. The benefits of these drugs also come with some life-threatening side effects. Consequently, combination therapy (conventional drug: conventional drug) strategy is used to improve drugs efficacies in breast cancer treatment. Other reasons for combination therapy are to ameliorate the harsh side effects associated with some cancer drugs. Another type of combination therapy that is becoming increasingly popular in the U.S. is the “botanical: conventional drug” combination. Studies conducted in one of our nation’s largest cancer treatment centers demonstrate that 3 in 4 (75%) of cancer patients combine botanicals with conventional drugs. Furthermore, there are on-going investigations, including multiple NCCAM-funded clinical trials, on the benefits of botanicals with conventional drug combination. Considering the fact that VA has already been used by humans coupled with increasing evidence for VA anti-cancer benefits, it is very likely that VA usage as dietary supplements will grow significantly in the very near future. There is no standardization protocol in place to ensure consistent quality and unadulterated VA extracts from batch to batch. Therefore, this study sought to develop the standardization protocols for VA extracts. Bioassay-guided fractionation of the VA extracts resulted in fractions (4, A-2, A-3, B-2, B-3 and B-4) that were required for VA anti-proliferative activity in MCF-7 breast cancerous cells. Further analyses of the fractions by $^1$H- and $^{13}$C-NMR techniques revealed the presence of aromatic and aliphatic groups. Quantitative characterization of these fractions by LC-MS is currently under investigation. These data suggest that both the presence and quantities of these fractions are important for VA activities. Thus, these fractions may be used as markers for VA activity prediction.

Keywords: Vernonia amygdalina, standardization protocol, anti-cancer

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