Vernonia amygdalina extracts may decrease paclitaxel, doxorubicine, and vincristine therapeutic dosage

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Abstract: Breast cancer (BC) is the most commonly diagnosed non-skin cancer and second leading cause of cancer-related deaths in women. Breast cancer represents 15% of all cancers. An estimated 178,000 women will be diagnosed with invasive BC and 40,460 women will die from the disease this year in the U.S. [Paclitaxel (PAC), Vincristine (VIN) and Doxorubicin (DOX)] are three widely used, effective anti-cancer drugs. The effectiveness of these drugs is also accompanied by some unwanted side effects such as: low blood cell counts, fatigue, nausea, diarrhea, hair loss, and more. Therefore, there are needs for discovery and development of novel anti-cancer and/or adjuvant agents to ameliorate the unwanted side effects of these chemotherapies. Plant-derived agents represent excellent sources for such novel and patient-friendlier anti-cancer and/or adjuvant agents. There is increasing evidence to show that Vernonia amygdalina (VA) may be one of such agents. The objectives of these studies were to assess the abilities of VA to synergize with known anti-cancer drugs (PAC, VIN and DOX) on MCF-7 breast cancerous cell growth inhibition. MCF-7 cells were propagated in RPMI-1640 medium, supplemented with 10% fetal bovine serum and 1% penicillin-streptomycin. Cell growth or inhibition was determined by DNA synthesis assays and confirmed by cell counts using a hemacytometer. PAC (100 nM), DOX (100 nM) and VA (100 µg/ml) inhibited DNA synthesis, on average of three independent experiments, by 50, 1600, and 364% respectively. Vincristine (100 nM) did not affect DNA synthesis. Interestingly, PAC, DOX, and VIN (10 nM) alone had no effects on DNA synthesis, but inhibited DNA synthesis significantly (P<0.5) in the presence of VA in a VA concentration-dependent fashion. Upon further studies, these finding may translate to patients as a regimen with a reduction in the dosage of currently used breast cancer drugs. Thus, fewer side effects, improve quality of life (QOL) and better survival rates.

Keywords: MCF-7 cells, Paclitaxel, Doxorubicin, Vincristine, Vernonia amygdalina, Breast cancer

Acknowledgements: This research was supported in part by Research Centers in Minority Institutions (RCMI)/NIH grant # G12RR13459-07S1; National Center for Minority Health Disparities (NCMHD)/NIH grant # P20MD000534-01.