THE ANTI-PROLIFERATIVE EFFECT OF VERNONIA AMYGDALINA EXTRACTS IN PROSTATE ADENOCARCINOMA IS MEDIATED BY MICROTUBULE DESTABILIZATION

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Abstract: Clinical studies show higher prostate cancer incidence rates with poorer prognosis in Western societies than in the rest of the world. The American Cancer Society (ACS) estimates 186,320 new prostate cancer cases in the U.S. in 2008. The ACS also estimates that there will be 28,660 deaths due to prostate cancer this year alone. While mortality rates steadily decline among the population due to the advances in treatment and diagnostic capabilities, the cancer incidence continues to grow. Mostly the taxane family of cancer treatment drugs targets the microtubules and aim to alter their functions by depolymerization or destabilization, thus arresting cancerous cell division. However, these drugs are also associated with a wide range of undesirable side-effects in non-cancerous cells. Therefore, more natural chemotherapeutic agents are sought to combat the cancer epidemic. The most recent study on Complementary & Alternative Medicine (CAM) use shows that 36% of Americans use some form of CAM. The survey also revealed that the most common answer by participants as to why they chose to use CAM in addition to modern medicine, is that they felt that alternative and herbal medicines could improve their health simply because they were derived from nature and have long histories of use in cultural remedies. Previous studies show that low concentrations of an edible Nigerian plant, V. amygdalina (VA), potently arrests the proliferative activities of estrogen-receptor positive (ER+) human breast cancerous cells (MCF-7). We hypothesized that the exposure of androgen-independent prostate cancerous cells (PC-3) to similar concentrations of VA extract could retard their proliferation as well as affect microtubule dynamics. Treatment of cells with concentrations (12.5 µg/ml, 25 µg/ml, 50 µg/ml, 100 µg/ml) of VA potently inhibited growth in a concentration-dependent fashion with an IC₅₀ value of 30 ±2 µg/ml, as determined by Sulforhodamine B (SRB) cytotoxicity assay. These finding were further confirmed by [³H]-thymidine incorporation assays. Further investigation using immunofluorescence microscopy revealed that the incidence of microtubule abnormalities increased with VA concentration, suggesting the microtubules as possible targets for the mechanism of action by VA.