BASIC APOPTOTIC MECHANISMS OF Vernonia amygdalina IN HUMAN BREAST CANCER

Jessica J. Jenkins¹, Clement G. Yedjou¹, Ernest Izevbigie² and Paul B. Tchounwou ¹,3

¹Cellomics and Toxicogenomics Research Laboratory, NIH-Center for Environmental Health; ²Cellular Signaling, Phytoceuticals, and Cancer Prevention and Therapies; ³Environmental Toxicology Research Laboratory College of Science, Engineering and Technology, Jackson State University, Jackson, Mississippi, USA

Abstract: Breast cancer (BC) is the leading cause of death of women between 40 and 55 years of age and is the second overall cause of death of women. Fortunately, the mortality rate from BC has decreased in recent years due to an increased emphasis on early detection and more effective treatments. Despite early detection and conventional methods of treatment, about 7% of women diagnosed with BC still die every year. Previous studies from our laboratory show that a novel natural product, extracts of Vernonia amygdalina (VA) leaf exerts DNA-damaging anticancer activities against BC. Therefore, the central goal of this research was to determine the apoptotic mechanisms of VA leaf extracts in breast cancer cells. To achieve this goal, cell apoptosis was measured by flow cytometry analysis of phosphatidylserine externalization (Annexin V assay) and caspase 3 activity, and by DNA laddering assay. Flow cytometry data showed a strong dose-response relationship between VA exposure and Annexin-V positive MCF-7 cells. These results were confirmed by data of DNA laddering assay showing a clear evidence of nucleosomal DNA fragmentation in VA-treated cells. No statistically significant was recorded with regard to caspase 3 activity in MCF-7 cells, probably due the fact MCF-7 does not express caspase-3 protein. Taken together, our research demonstrated that VA represents an apoptosis-inducing agent and its apoptotic mechanisms involve phosphatidylserine externalization, and nucleosomal DNA fragmentation.

Keywords: Vernonia amygdalina, MCF-7 cells, breast cancer, apoptosis

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