J Cancer Sci Ther 2013, 5:10
http://dx.doi.org/10.4172/1948-5956.S1.030

OMICS Group Conferences
Accelerating Scientific Discovery

3rd World Congress on
Cancer Science & Therapy

October 21-23, 2013 DoubleTree by Hilton Hotel San Francisco Airport, CA, USA

Anticancer activities and mechanisms of action of ten antioxidant rich Cameroonian medicinal plants and some of their isolated compounds

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Traditional remedies have a long-standing history in Cameroon and continue to provide useful and applicable tools for treating ailments. Here, we evaluate the anticancer activities and mechanisms of action of ten antioxidant-rich Cameroonian medicinal plants and some of their isolated compounds.

The plant extracts were prepared by maceration in organic solvents. Fractionation of plant extract was performed by column chromatography and the structures of isolated compounds (emodin, 3-geranyloxyemodin, 2-geranylemodin) were elucidated using spectroscopic data in conjunction with literature data. The antioxidant activity (AOA) was determined using the 1,1-diphenyl-2-picrylhydrazyl (DPPH) bleaching method, trolox equivalent antioxidant capacity (TEAC) and hemoglobin ascorbate peroxidase activity inhibition (HAPX) assays. The anticancer activity was carried out against A431 squamous epidermal carcinoma, WM35 melanoma, A2780 ovary carcinoma and cisplatin-resistant A2780 cis cells using direct colorimetric assay. The total phenolic content in the extracts was determined spectrophotometrically by the Folin-Ciocalteu method.

Rumex abyssinicus showed the best AOA among the three assays employed. The AOA of emodin was significantly higher than that of 3-geranyloxyemodin and 2- geranylemodin for both TEAC and HAPX methods. The most active extracts: *V. laurentii, F. asperifolia, P. febrifugum, P. butyracea,* which display the highest selectivity between the action against tumoral cells and normal lymphocytes are able to induce early apoptotic processes in treated cells, and this mechanism conducted later to a massive cell loss. *Ficus asperifolia and Psorospermum febrifugum* extracts are selective against cisplatin resistant ovary cells due to the faster translocation of the PS on the cell membrane, which activate the signaling pathway for cell recognition and immune reaction of macrophages in the human body. Emodin is more toxic compared to the whole extract, 3-geranyloxyemodin and 2-geranylemodin. Its selectivity against the platinum-resistant A2780cis cell line is highest.

The results of the present study provided evidence for the antioxidant and anticancer activities of the studied plant extracts/ isolated compounds, and bring supportive data for future investigations that will lead to their use in cancer and/or oxidative stress therapy.

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Some new anticancer drugs

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In this research, Au(III) and Pt(II) complexes of the compounds which are condensation products of 4-Dihydroxyboryl-DL-phenylalanine with 4,4'-dimethyl-2,2'-dipyridyl (L2)/ 1,10-phenanthroline-5,6-dion (L4) have been synthesized. The characterization of the intermediate and final compounds arising from this work was carried out by means of a variety of spectroscopic methods, which include 1H NMR, IR, MS, and elemental analysis. The *in vitro* activities of complexes were elucidated by MTT colorimetric assay [3-(4,5-dimethyl-2-thiazol)-2,5-diphenyl-2H-tetrazolium bromide], colony formation assay, tube formation assay and TRITC-phalloidin protocol on adenocarcinomic human alveolar basal epithelial cell line (A549) and/or human umbilical vein endothelial cell line (HUVEC). Most of the test compounds showed time and concentration dependent cytotoxic and anti-tumoral effects. Anti-angiogenic and f-actin alteration activities of the complexes were also observed with increasing treated concentration.

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