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Acquiring technical skills to study anti-cancer activity of Zambian medicinal plants to develop lead drug molecules against cancer

Cancer is a life-threatening disease caused by changes (mutations) to the DNA within cells. The DNA inside a cell is packaged into a large number of individual genes, each of which contains a set of instructions telling the cell what functions to perform, as well as how to grow and divide.

Summary statistics 2020 published by the International Agency for Research in cancer reveals 8,672 people died because of cancer out of the total population of 18,383,956 and the number of new cases recorded was 1,3831.

The major types of cancers are breast 972 (7%), prostate 1546 (11.2), Kaposi sarcoma 2210 (16%), cervix uteri 3161 (22.9%), oesophagus 506 (3.7%) and other cancers 5436 (39.3%).

Yet, the prevalence of cancer is increasing every year in Zambia causing several fatalities. There is no specific research institution in Zambia to carry out research in cancer. This country, however, is endowed with a lot of medicinal plants.

Therefore, it is important to bio prospect various diversity of medicinal plants in Zambia to develop anticancer drugs. In order to study the efficacy of plant based bioactive compounds in treating cancer, it is necessary to have skills in bioassays such as MTT assay, mitochondrial membrane potential assay, EtBr/AO staining, cell cycle analysis, apoptosis detection assay, ROS generation assay, COMET assay, DNA fragmentation assay, cell migration assay, cell cycle analysis, Hoechst 33342 staining to analyse cell death ,TUNEL assay to study the induction of apoptosis, CAM assay , Caspase 3 expression and determination assays ,Clonogenic survival assay, and suppression of apoptosis genes.

Despite having the basic skills in compound extraction from plant materials using various extraction methods (Soxhlet and cold extraction), I still need to develop my skills in separation of bioactive compounds using various chromatography, operation UV and FTIR spectroscopy, performing MTT assay and other cancer related assays in order to implement the learnt skills in our institution to start cancer research using bioactives and develop novel anticancer drugs.