INTRODUCTION

Cancer is becoming an increasingly important risk factor in the global burden of diseases. Deaths from cancer at global level are projected to continue rising, with an estimated 9 million people dying from cancer in 2015 and 11.4 million dying in 2030 [Ahmedin Jemal et al., 2007]

More than seven million people now die each year from cancer. Yet with the existing knowledge, at least one-third of cancer cases that occur annually throughout the world could be prevented [http://www.who.int/cancer/en/]

Cancer is caused due to abnormal growth of cells which tend to proliferate in an uncontrolled way and in some cases, to metastasize (spread). Cancer is also called malignancy. A cancerous growth or tumour is sometimes referred to as a malignant growth or tumour. A non-malignant growth or tumour is referred to as benign. Cancer is not contagious. Cancer can involve any tissue of the body. Most cancers are based on type of cell or organ in which they originate. If a cancer spreads (metastasizes), the new tumour bears the same name as the original (primary) tumour. Cancer is the Latin word for crab. The ancients used the word to mean a malignancy, doubtless because of the crab-like tenacity a malignant tumour sometimes seems to show in grasping the tissues it invades. Cancer may also be called malignancy, a malignant tumour or a neoplasm (literally, a new growth) [http://www.medicinenet.com/cancer/article.htm]

Natural products as anticancer agents

The effort to find anticancer agents from higher plants was launched by US National Cancer Institute (NCI) in 1957. So far plants have been a proven source of useful antitumour substances. Today, many of the most of the useful and curative anticancer drugs are derived from natural product sources. Since the initiation of the program by NCI, more than 35,000 plant species have been investigated. The investigation of plants by various groups has produced the discovery of anticancer drugs such as vincristine, vinblastine, taxol, indicine-N-oxide, etoposide and its analogs, camptothecin and its analogs, etc. Camptothecin, isolated from Camptotheca acuminata, is too insoluble for drug use, but its analogues Topotecan and Irinotecan are used to treat gastric, rectal, colon and bladder cancers [Wall M.E.; et al 1966 & Arun B., et al., 2001]
Vinblastine and vincristine, isolated from *Catharanthus roseus*, are used to treat leukemia, bladder and testicular cancers. Their mode of action is to bind to tubulin and stop its polymerization into microtubules, thus blocking the cell division [Ngan Vivian K.; *et al* 2001 & Dhamodharan R.; *et al* 1995]

Etoposide and its thiophene analog, teniposide are semisynthetic derivatives of the natural product epipodophyllotoxin and are used clinically to treat small cell lung cancer, testicular cancer, lymphomas and other cancers. They inhibit the enzyme DNA topoisomerase II and cause DNA cleavage. [Van Manen, J.M.S.; *et al* 1988 & Huff, Anne C.; *et al.*, 1990]

**Bioassays in the discovery of antitumour agents:**

**Role of assays:-**

Bioassays are required to select crude materials and isolate potential new antitumour agents from natural source. The assay must be reliable, reproducible and sensitive and predictive. [Harborne, J.B. *et al* 1991]

**Antitumour assays**

There are many bioassays available for the isolation and identification of potential antitumour substances. The most commonly used assays are cytotoxic, antimitotic and antimetastatic assays and also assays based on interactions with DNA. *Cytotoxicity assay*

In spite of the problems noted above, most of the research programs involving the isolation and identification of new anticancer agents use cytotoxicity for bioassay-directed fractionation. The procedure involves treating cancer cells with different concentrations of the test material, then assessing cell growth after 48 hours or 72 hours of incubation. [Stammati, A.; *et al* 1999]

The most common cell types used are human cell lines derived from various human tumour types. The science of Ayurveda is supposed to add a step on to the curative aspects of cancers that have resemblance with clinical entities of *arbuda* and *granthi* mentioned in *Sushrutha samhit* [Premalatha Balachandran *et al*, 2005]
Herbal medicines are playing major roles in the health of thousands of people worldwide. In spite of the vastly improved health and longevity in the United States and Europe, millions are turning back to traditional herbal medicines in order to prevent or treat many illnesses and a reasonable proportion of drugs dispensed in community pharmacies now contain drugs extracted from plants. Herbal medicines have good values in treating many diseases including infectious diseases, hypertension etc. That they can save lives of many, particularly in the developing countries, is undisputable. The major challenges of any pharmaceutical scientist are serious problems with the overall quality, safety and efficacy of herbal products [Patrick et al, 2002]