

SYSTEMATIC REVIEW OF SEVERAL OF ANTICANCER PLANTS

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ABSTRACT: Cancer is a multistage process in which the uncontrolled development of cells results into collection of lumps of cells in a specific tissue which may further metastasize. Cancer is the second cause of mortality after cardiovascular diseases. There are different synthetic drugs which are known to have potent anticancer movement yet they have different side effects. Along these lines, there is requirement of those drugs which shows good anticancer movement however with lesser side effects. Plants have a long history of use in the treatment of cancer.

I. INTRODUCTION

Cancer is a term used for diseases in which anomalous cells divide without control and are able to invade other cells. Cancer is characterized by strange proliferation of cells. Cancer is one of the most serious health problem worldwide, affecting people from different sexes, ages, and races. It arises from brokenness of many basic cellular checkpoints (Maddika et al., 2007). The signs of cancer are the uncontrolled proliferation of cells and suppression of apoptosis (Liu et al., 2011; Ghavami et al., 2009; Evan and Vousden, 2001).

Cancer diseases constitutes the second leading cause of mortality after cardiovascular diseases in developed countries and the third after infectious and cardiovascular diseases in developing countries (Bieche, 2004; Mbaveng et al., 2011). Cancer is an illness which can originate from many different organs of the human body, for example, prostate, breast, lung colorectal, esophagus, stomach, pancreas, etc. (WHO, 2006-Fact sheet, 297). The following reference is taken from the WHO project outline: Cancer affects everyone – the youthful and old, the rich and poor, men, women and children – and represents a tremendous burden on patients, families and societies. Cancer is one of the leading causes of death on the planet, especially in developing countries.

The recent WHO insights suggests that there might be about 45% increase in the worldwide cancer deaths by 2030, of which 70% would be contributed from developing countries like India (WHO, 2012, Cancer-reality sheets). The all out number of new cancer cases were 1,665,540 and the cancer deaths happens in the United States in 2014 were 585,720. During the recent 5 years for which there are data (2006-2010), delay-adjusted cancer incidence rates declined somewhat in men (by 0.6% per year) and were stable in women, while cancer death rates decreased by 1.8% per year in men and by 1.4% per year in women. The combined cancer death rate (deaths per 100,000 populace) has been persistently declining for 2 decades, from a peak of 215.1 in 1991 to 171.8 in 2010. This 20% decline translates to the avoidance of approximately 1,340,400 cancer deaths (387,700 among women and 952,700 among men) during this time period. The degree of the decline in cancer death rates from 1991 to 2010 varies significantly by age, race and sex, extending from no decline among white women aged 80 years and older to a 55% decline among individuals of color aged 40 years to 49 years. Individuals of color experienced the largest drop inside every 10-year age gathering. Further progress can be accelerated by applying existing cancer control knowledge over all segments of the populace (Siegal et al., 2014).

II. REVIEW OF LITERATURE

Chemotherapy

Although, adjuvant CTX is frequently used for essential tumors, its primary use is to control overt disseminated disease. The excessively active development flagging pathways in cancer cells makes them susceptible to a wide range of drugs which target development flagging molecules and additionally processes involved in cellular replication and expression. However, as these processes additionally drive ordinary cells, the effect is preferential and not exclusive, which results in the unwanted side effects seen with these agents. Cells which are typically actively isolating, specifically the bone marrow constituents and those of the intestinal covering, are

especially susceptible. Disregulated cell cycle events, due to transformations in cancer cells, do sometimes offer opportunities to target those cells without affecting ordinary cells. The relatively wide spectrum of movement of cytotoxic drugs makes them a rather unforgiving and vague type of treatment that must be tolerated for brief periods. Indeed the effects of the treatment may sometimes cause more distress than the disease. These side-effects include dry flaky skin, loss of hair, nausea and regurgitating, changes in taste and appetite, blood thickening problems, fatigue, depressed immune system and possible sterility.

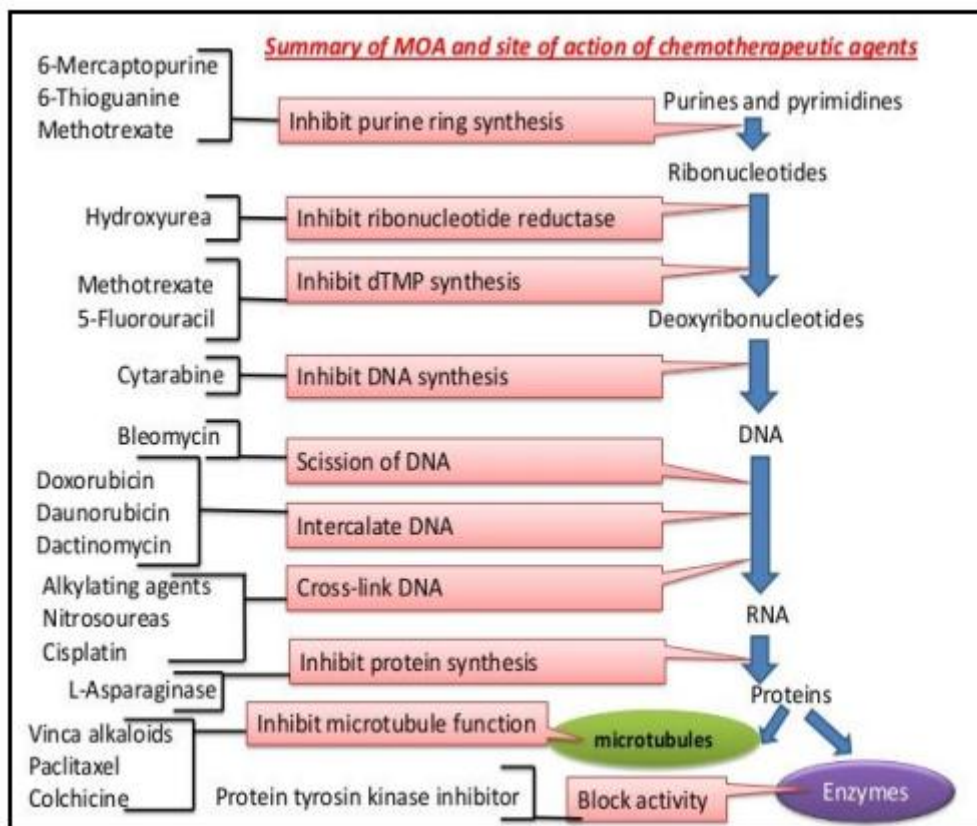


Figure 1. Mechanism of cancer therapy

Oncogenes and tumor suppressor genes

Two sets of genes are controlling cancer development. Oncogenes are the primary set of genes and are involved in different cell activities including cell division. However, over expression of these genes changes an ordinary cell into a cancer cell. Then again, the second set of genes (tumor suppressor genes) hinders cancer cell arrangement by different mechanisms. Tumor suppressor genes are under expressed in cancer cells while, oncogenes are over expressed. Oncogenes and their products represent good targets for Cancer therapy. Other targets include enzymes involved in cell division like topoisomerases that loosen up the DNA during replication. The diversity of plant derived common products can provide therapeutic products assaulting different targets in cancer cells.

Plant Derived Anti-Cancer drugs

Vinca Alkaloids: The principal agents introduced in clinical use were vinca alkaloids, vinblastine (VLB) and vincristine (VCR), isolated from the Catharanthusroseus. (Apocynaceae).These drugs were discovered during an investigation for oral hypoglycemic agents. While research investigators couldn't affirm this movement, it was noted that plant extracts reduced fundamentally white platelet checks and furthermore caused bone marrow depression in rats¹³. Plant extract additionally draw out the life of mice bearing a transplantable lymphocytic leukemia. The plant was initially endemic to Madagascar, yet the samples used in the discovery of vincristine and vinblastin were collected in Philippines and Jamaica. Recently semi-synthetic analogs of vinca alkaloids are vinorelbine (VRLB) and vindesine (VDS). These are fundamentally utilizing alone or in mix with other chemotherapeutic drugs to battle a variety of cancers. VLB is utilizing for the treatment of lymphomas,

leukemias, breast cancer, testicular cancer, cellular breakdowns in the lungs, and Kaposi's sarcoma. VCR had likewise showed efficacy against leukemia, especially acute lymphocytic leukemia in adolescence.

Podophyllotoxin Derivatives: The species of Podophyllaceae family, for example, Podophyllumpeltatum Linn., Podophyllum emodii have been reported with a long history of therapeutic use, including the treatment of skin cancers and moles. Podophyllumpeltatum have been used by the Native Americans for the treatment of "cancer". The interest was promoted by the observation during the 1940s that a liquor extract of the dried roots (called podophyllin) cures venereal moles by topical application. The chief cytotoxic therapeutic constituents were identified as podophyllotoxins and have been first isolated in 1880, yet its correct structure must be elucidated during the 1950s with the advancement in spectroscopic techniques. Other closely related podophyllotoxins like lignans were additionally isolated during this period and became introduced into clinical preliminaries, yet they were dropped due to absence of efficacy and unacceptable poisonousness. Extensive research studies at Sandoz Laboratories in Switzerland during the 1960s and 1970s led to the development of etoposide and teniposide as clinical agents which are being used in the treatment of lymphomas and bronchial and testicular cancers. Of 2069 enemy of cancer clinical preliminaries recorded by the NCI as being in progress starting at July 2004, over 150 are drug blends including etoposide against a range of cancers.

Allium Sativum (Allicin): Allium sativum (garlic, lasun) is used to treat a wide variety of diseases in India. Allicin is a significant component of crude garlic and ajoene is a product of the rearrangement of allicin. Its cytotoxic effect has been tested utilizing human essential fibroblasts, a permanent, nontumorigenic cell line derived from child hamster kidney cells and a tumorigenic lymphoid cell line derived from a Burkitt lymphoma. The cytotoxic activity was in the range 2-50 µg/ml¹⁷. Some organo-sulfur mixes from garlic, like S-allylcysteine, are reported to retard the development of chemically induced and transplantable tumors in several creature models. Organization of garlic (250 mg/kg, p.o., thrice a week) in male wistar rodents, has been significantly suppressed 4-nitro quinoline-1-oxide induced tongue carcinogenesis as revealed by the absence by the carcinomas in the inception phase and their reduced incidence in the post commencement phase. Along these lines the utilization of garlic may be beneficial giving some sort of protection from cancer.

Andrographis Paniculata: Phytochemical investigation of the ethanol extract of the aerial pieces of Andrographis paniculata has been reported the seclusion of 14 intensifies; a lion's share of them are flavonoids and labdanedieterpenoids. The cytotoxic activities of these mixes have been evaluated against different cell lines and found that these isolates have a potent tumor inhibitory movement against all investigated cell lines. The methanol extract of Andrographis paniculata was fractionated, dichloromethane portion reported to possess three active constituents which were further tested and exhibited cytotoxic movement and furthermore potent immunostimulating action. However, there were likewise its adverse side effects were additionally reported which may include gastric upset, headache, bitter taste and fatigue. High doses of Andrographis paniculata may have affect the ordinary elements of liver.

Annona Muricata: Graviola is known by its scientific name, Annona muricata. The significant class of medicinal components found in graviola is acetogenins. Acetogenins was found in the organic product, seeds, leaves, and bark of the graviola plant. Preliminary research showed that acetogenins square production of adenosine triphosphate, which hinders the siphon that removes cancer drugs from the cell, allowing chemotherapy to be more effective. Furthermore, research suggested that acetogenin may have chemotherapeutic potential, especially against cancer that resistant to multiple drugs. Parkinson like indications can happen on oral ingestion of graviola. Some specific acetogenins have been reportedly identified to be poisonous for different cancer cell lines like lung strong human-breast cancer, tumor carcinoma, pancreatic carcinoma, prostatic adenocarcinoma, colonic adenocarcinoma, human lymphoma, liver cancer, and multiple-drug resistant human-breast adenocarcinoma.

Apis Mellifera: Apis mellifera is the scientific name of honey bee, from which honey is produced. Honey is used to hasten healing of skin wounds, ulcerations, and consumes in Indian system of medicine. A protein of the honeybee Apis mellifera has been reported to enhance proliferation of essential cultured rodent hepatocytes and furthermore suppresses apoptosis. It has likewise showed cytotoxicity in ordinary human lymphocytes and HL-60 cells. Hamzaoglu et al. (2000) implanated cancer cell into neck injuries of mice, then divided mice into two gatherings. A critical decrease in wound cancer tumors were observed in the gatherings of mice that were treated with careful injuries coated with honey pre and postoperatively. This finding may have some application in human surgery.

Bidens Pilosa : *Bidens pilosa* is a society medicine reported with the presence of polyacetylenes, flavonoids, terpenoids, phenylpropanoids and others. An extensive research chip away at different sextracts of *Bidens pilosa* and further fractionation led to the confinement and characterization of potential marker compound phenyl-1,3,5-heptatriyne. This marker mixes revealed the harmfulness profile on typical platelets in erythrocyte osmotic delicacy experiments alongside other extracts. Hexane, chloroform and methanol extracts of *Bidens pilosa* and their divisions were tested on different cancer cell lines. Results exhibited the antitumor action of extracts among which hexane extract pronounced the most remarkable movement.

Cannabis Sativa: In vitro studies of components of maryjane (*Cannabis sativa*) indicate a potential to repress human breast cancer cells and to produce tumor eradications. In experiments acquainting maryjane with harmful cerebrum tumors, it was discovered that endurance of creatures was increased essentially. The active components of *Cannabis sativa* are cannabinoids. Cannabinoids and their derivatives exert palliative effects in cancer patients by preventing nausea, regurgitating and torment and furthermore stimulated the appetite. These mixes have additionally been demonstrated enemy of tumor action in cell culture and creature models by balancing key cell-flagging pathways.

Daphne Mezereum : *Daphne mezereum* is a plant widely used as a folklore remedy for treating cancer like indications. A hydro liquor extract of *Daphne mezereum* has exhibited a potent antileukemic action against lymphocytic leukemia in mice. Further fractionation studies on the extract resulted in the detachment and characterization of mezerein as a potent antileukemic compound.

Gossypium Hirsutum : *Gossypium hirsutum* or *Gossypium herbaceum* also called as Gossypol or cottonseed oil and used as a male contraceptive, in the treatment of metastatic carcinoma of endometrium or ovary and furthermore used in HIV. Some in vivo and in vitro studies revealed the antitumor properties of gossypol on many cytosolic and mitochondrial enzyme systems that is fundamental for tumor cell development, including melanoma, endometrial, colon, lung, prostate, breast, cerebrum, and adrenocortical cancer³¹. However no ordinary dose is yet suggested for the treatment of cancer and self-medication with gossypol isn't safe because of its potential harmfulness.

Nervilia Fordii : *Nervilia fordii* is a drug used in China as a folklore remedy. Petroleum ether and ethyl acetate extracts of *Nervilia fordii* has been screened out for its anticancer properties utilizing mice models. The two extracts have indicated prominent anticancer effects when administered to S-180 mice and H-22 mice models; additionally delay the life of cancer bearing mice. This investigation suggests, *Nervilia fordii* can exploit as cancer restraining agent and further research work is required to isolate active constituent/s present in drug.

Salvia Miltiorrhiza : Tanshinone-I was isolated from traditional herb *Salvia miltiorrhiza*, was investigated on the expression of intercellular adhesion molecule. The investigation revealed a potential anticancer effect of tanshinone-I on breast cancer cells, suggesting that tanshinone-I may serve as an effective drug for the treatment of breast cancer. Tanshinone II-An, isolated from *Salvia miltiorrhiza*, induced apoptosis which was linked to proteolytic cleavage of a significant component in apoptotic cell death mechanism.

Terminalia Chebula : *Terminalia chebulis* is a source of hydrolysable tannis and its antimutagenic action in *Salmonella typhimurium* has been documented. Phenols like chebulinic corrosive, tannic corrosive, ellagic corrosive are the cancer development inhibitors found in the products of *Terminalia chebula*. *Terminalia chebula* natural products powder and its acetone extract of bark have been reported with promising antimutagenic and anticarcinogenic movement.

III. CONCLUSION

In this review some enemy of cancer plants have been presented. These plants possess good immunomodulatory and cell reinforcement properties leading to anticancer action. In conclusion this article provides the knowledge about anticancer medicinal plants of foreign cause, which are used by people everywhere on over the world. Additionally it is of significance to exploit novel anticancer drugs from medicinal plants. Without this early notice system, the problem of overcoming development of chemoresistance is quite considerable. In an ideal circumstance, therapy would be tailored to suit the person at the outset; this is unlikely in any event for the very near future, despite quick progress in pharmacogenomics. Meanwhile, a better understanding of the mechanisms of resistance will at any rate allow the doctor to modulate the therapy on a need to do premise. Medicinal plants have contributed a rich health to human beings. Plant extracts and their bioactive mixes present in them which are responsible for anticancer action have to be screened for their valuable information. This review had given some of the plants possessing anticancer movement for different types of cancer.

IV. REFERENCES

- [1] Kharb M., Jat R.K. and Gupta A., A review on medicinal plants used as a source of anticancer agents, *Int. J. Drug Res. Tech.*, 2012, (2), 177-183.
- [2] Kaur R., Singh J., Singh G., kaur H., Anticancer plants:A Review, *J. Nat. Prod. Plant Resour.*, 2011, 1 (4): 131-136.
- [3] Prakash O., Kumar A., Kumar P., Ajeet., Anticancer Potential of Plants and Natural Products, *American J. Ph.cological Sci.*, 2013, 1: 104-115.
- [4] Wamidh H.T., Anticancer and Antimicrobial Potential of Plant-Derived Natural Products, *Phytochemicals – Bioactivities and Impact on Health.*, Dec.2011, 142-158.
- [5] Bhutani K.K. and Gohil V M., Natural product drug discovery research in India:Status& appraisal, *Ind. J. Exp. Bio.*, 2010, 48: 199-207.
- [6] Dholwani K.K., Saluja A.K., Gupta A.R., Shah D.R., A Review on Plant – derived natural products & their analogs with antitumor activity, *Ind. J. Pharmacol.*, Apr. 2008, 40(2), 49-58.
- [7] Merina N., Chandra K.J. and KotokyJibon., Medicinal plants with potential anticancer activity: A Review, *IRJP.*, 2012, 3:6, 26-30.
- [8] MiJa Chung., Cha-Kwon Chung., YoonhwaJeong., Seung-Shi Ham., Anticancer activity of subfractions containing pure compounds of Chaga mushroom (*Inonotusobliquus*) extract in human cancer cells and in Balbc/c mice bearing Sarcoma-180 cells, *Nutr Res Pract.*, 2010, 4, 177–182.
- [9] Srinivas K. and Afolayan. A.J., Anticancer drug design based on plant-derived natural products, *Current Science*, 2007, 92, 906-8.
- [10] Chorawala M.R., Oza P.M. and Shah G.B., Mechanisms of Anticancer Drugs Resistance: An Overview, *International Journal of Pharmaceutical Sciences and Drug Research.*, 2012, 4(1), 1-09.
- [11] Ghosh A., Das B., Roy A., Mandal B., and Chandra G., Antibacterial activity of some medicinal plant extracts, *Journal of Natural Medicines*. 2008, 62, 259–262.
- [12] Grayer R. and Harborne J., A survey of antifungal compounds from plants, *Phytochemistry*. 1994, 37, 19-42.
- [13] Lemkebthomas L., Williams D. A., Roche V. F., William Z. S., Foye's principles of medicinal chemistry., 6th edition, 2008, 1147-1148.
- [14] Z., Michael S., Eran Ben-A., and Bashar S., Greco-Arab and Islamic Herbal-Derived Anticancer Modalities: From Tradition to Molecular Mechanisms, *Evidence-Based complementary and Alternative Medicine.*, 2012,13.
- [15] Wen T., Jinjian L., Mingqing H., Yingbo Li., Meiwan C., Guosheng W., Jian G., Zhangfeng Z., Zengtao X., Yuanye D., Jiajie G., Xiuping C., and Yitao W., Anti-cancer natural products isolated from chinese medicinal herbs, *Chin Med.*, 2011, 6, 27 .