

A Review: Anticancer Activity of Vinca

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B PHARMACY FINAL YEAR

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Abstract:

Herbal anticancer drug are obtained from *Cantharanthus roseus* is mostly used because their mode of action of anticancer durg. The abnormal growth of cell occurs in body so that can leads to death. It is most important public health burden in developed and developing countries. Cancer are chemopreventive agent, many of which are natural products that are efficient to preventing carcinogenesis. There are various medicines available in the marketplace to delight the various types of cancer but there is no drug is establish to be fully active against cancer. Nowdays, there is tendency to use of conventional and herbal medicines in cancer treatment. Most of the currently use chemotherapy drugs for cancers are known to develop resistance, exibits non selective poisonousness against normal cells and restrict by dose limiting adverse effect. Hence, cancer cure and evolution of drugs for this disease remains a major clinical challenge however, plants are exceptionally viable source of biologically active natural products which may serve as commercially important beings in themselves or which may provide lead structures for evolution of modified by-products processing enhanced action and reduced toxicity in cure of cancer. Herbal medicines are now attracting attanention as prospective sources of anticancer agents and are widely used due to availability of the materials, affordability, relatively cheap and little or no side effects, wide significance and therapeutic efficacy which in turn has advance scientific research. In this review we have summarized vinca plant having anticancer action.

Keywords: Herbal medicines, Natural products, Chemotherapy, Anticancer drug, Cancer cell

Introduction:

Environmental products specially herbs have been used for the cure of several sicknesses for thousands of years. Native herbs have been recycled as medications in Egypt, China, India and Greece from olden times and a remarkable figure of current drugs have been advanced from them. The first written proceedings on the therapeutic usages of herbs looked in about 2600 BC from the Sumerians and Acedians. Among the human

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syndrome cancer is one, possibly the most significant genetic disease which can be cured with medicinal plants. Each year, millions of individuals are diagnosed with cancer, leading to demise in majority of cases. Cancer is the rare growth of cell in our bodies that can leads to death. Cancer cells typically invade and killed typical cells. These cells are born due to difference in the body and by correcting this difference, the cancer may be cured. Billions of dollars have been paid on cancer investigation and yet we do not recognise exactly what cancer. Every year, millions of people are examined with cancer, leading to demise. According to the American cancer society demises arising, from cancer constitute 2 3% of yearly deaths recorded worldwide. Thus cancer kills about 3500 million people yearly all over the world. Several chemopreventive agents are used to treat cancer, but they causes poisonousness that prevents their usage. The enhanced costs of conservative cures (chemotherapy and radiation) and deficiency of real drugs to cure solid tumours encouraged people in dissimilar countries to be determined by more on traditional medicine which is rooted in therapeutic herbs use. Such herbs have an almost infinite capacity to produce materials that attract investigators in the quest for new and noval chemotherapeutics. Of over 2069 anticancer clinical trials documented by National Cancer Institute as being in improvement as of July 2004, over 160 are drug groupings as well as these agents against a series of cancers.

Cancer:

Cancer is a universal term pragmatic series of malignant syndromes that man move different parts of body. These syndromes are categorised by a rapid and uninhibited formation of unusual cells, which may mass collected to form a growth or tumour, or proliferate throughout the body, starting unusual growth at other sites If the procedure is not prevented, it may development until it reasons the demise of the organism, the main procedures of cure for progress stage cancer in peoples are surgery, energy and drugs (cancer chemotherapeutic agents) Cancer chemotherapeutic causes can often provide impermanent relief of suggestions, prolongation of life, now and then cures. In current years, a lot of struggle has been applied to the production of potential anticancer drugs. Many hundreds of chemical variants of known class of cancer chemotherapeutic agents have been produced but have a more adverse effects. A successful anticancer drug should kill or incapacitate cancer cells without causing unnecessary destruction of usual cells. This ideal is difficult, or perhaps difficult, to attain and is why cancer patients frequently suffer unkind adverse effects when undergoing treatment. However, a waste amount of synthetic work has given relatively small improvements over the prototype drugs. There is a continued need for new prototype new templates to use in the design of potential chemotherapeutic agents: natural products are providing such templates. Recent studies of tumour inhibiting compound of plant origin have yielded an impressive array of novel structure.



Fig.: 1 Cancer cell

Types of cancer:

1) Cancer of body and lymphyatic Systems

- a) Hodgkin's Disease b) Leukaemia's c) Lymphomas d) Multiple myeloma,
- e) Waldenstrom'sdisease

2) Skin Cancers

a) Malignant Melanoma

3) Cancers of digestive system

a) Esophageal cancer b) Stomach cancer c) Cancer of Pancreas d) Liver cancer e) Colon and Rectal cancer f) Anal cancer

4) Cancers of urinary system

a) Kidney cancer b) Bladder cancer c) Testis cancer d) Prostate cancer

5) Cancer in women

a) Breast cancer b) Ovarian cancer c) Gynaecological cancer d) Choriocarcinoma

6) Miscellaneous cancers

a) Brain cancer b) Bone cancer c) Characinoid cancer d) Nasopharyngeal cancer e) Retroperitoneal sarcomas f) Soft tissue cancer g) Thyroid cancer

Advantages of herbal drugs over Allopathic drugs

Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. Recognition and development of the medicinal and economic benefits of plants are on the increase in both developing and industrialized nations. An herb (also called a botanical) is a plant or plant parts used for its scents, flavour, and/ or therapeutics properties. Products made from botanicals that are used to maintain or improve health have been called herbal supplements, botanicals, or phytomedicines. The pharmacological treatment of disease began long ago with the use of herbal medicines are "crude drugs of vegetables origin utilized for the treatment of disease states, often of a chronic nature, or to attain or maintain a condition of improved health" or the herbal medicines can be defined as finished labelled medicinal products that contain ingredients from aerial or underground parts of plants or other plant material or combination in the crude state or as plant preparations. It has been estimated that these medicines derived from plants constitute about 25% in modern pharmacopoeia. Traditional herbal medicines are naturally occur ring plant derived substance with minimal or no industrial processing that have been used to treat illness within local or regional healing practices. Common reason for use of herbal drugs include health promotion, disease prevention, poor outcomes and limited treatment options for a serious illness, exhaustion of conventional therapies, dissatisfaction with, or lack of efficacy of conventional therapies, significant side effects or risks associated with conventional medicines, belief that herbal and natural products are better or safer, preference for personal involvement in the decision making process, and cultural or spiritual preference. Whereas adverse effects of allopathic treatments vary broadly from mild to severe and there are various. They include insomnia, vomiting, fatigue, dry mouth, diarrhoea, constipation, dizziness, suicidal thoughts, hostility, depression, coma, hair loss, panic attacks, shoplifting, mania, anaemia, impotency, death and fainting. It is often tough for seniors to keep trace of numerous medications which further increase like hood of adverse effects due to allopathic medicines

Plant Derived Anti-Cancer drug

VINCA ALKALOID :

Catharanthus is a perennial tropical pharmaceutical herb belonging to the Family Apocynaceae which incorporates eight class, seven endemic to Madagascar (*C. longifolius, C. trichophyllus C. coriaceus C. lanceus, C. ovalis, C. roseus, C. scitulus,*), and one, *C. pusillus*, from India. Specifically, *C. roseus* is a decorative and curing herb of vast pharmaceutical curiosity because it is nonentity less than a chemical manufacturing works, creating more than 130 different terpenoid indole alkaloids (TIAS), some of which display strong and significant pharmacological actions. Vinca alkaloids are a subgroup of drugs obtained from the Madagascar heliotrope plant. They are naturally take out from the pink heliotrope plant *Catharanthus roseus*. It has hypoglycaemic as well as cytotoxic result. The vinca alkaloids are also significant for being cancer warriors. There are four chief vinca alkaloids in analytical use: Vinblastine (VBL), vinore Ibine (VRL), vincristine (VCR) and vindesine (VDS). VCR, VBL. and VRL have been accepted for use in the United States. Vinflunine is also a new synthetic vinca

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alkaloid, which has been accepted in Europe for the cure of second line provisional cell carcinoma of the urothelial is being established for other malignancies. Vinca alkaloids are the second most class of cancer drugs and will stay among the unusual cancer therapies. Vinca alkaloids were establish out in the 1950's by Canadian scientists, Robert Noble and Charles Beer for the first stage. Medicinal requests of this plant lead to the observing of these compounds for their hypoglycaemic action, which is of little significance linked to their cytotoxic special effects. The stems and leaves are the sources of dimeric alkaloids, vincristine and vinblastine that are necessary cancer drugs, while roots have, high blood pressure, ajmalicine and twisting. Alkaloids that are found to be hypotensive, calming and possess sedative and anti-cancerous characters.



Fig.: 2 Flowers of Catharanthus roseus. Vinca Alkaloids

Vinca alkaloids belong to an important class of anticancer drugs. The mechanism of action of Vinca alkaloids is that they inhibit the cell proliferation by affecting the microtubular dynamics during mitosis, and this causes a characteristic block during mitosis leading to apoptosis. Vinca alkaloid include, Vinblastine (VLB) and Vincristine (VCR), Vinorelbine (VRLE) and Vindesine (VDS) are obtained from the Madagascar periwinkle, *Catharanthus roseus* G. Don (Apocynaceae).

- I. Vinblastine: Vinblastine (VLB) is major naturally occurring active compounds Vinblastine sulphate is the salt of an alkaloid extracted from Vinca rosea Linn., a common flowering herb known as the periwinkle (more properly known as Catharanthus roseus G. Don). Previously, the generic name was vinca leukoblastine, abbreviated VLB. It is a stathmokinetic oncolytic agent. When treated in vitro with this preparation, growing cells are arrested in metaphase.
- II. Vincristine: Vincristine (brand name, Oncovin), formally known as leurocristine, sometimes abbreviated "VCR", is a vinca alkaloid from the Catharanthus roseus (Madagascar periwinkle), formerly Vinca rosea and hence its name. It is a mitotic inhibitor, and is used in cancer chemotherapy. Vincristine is created by the coupling of indole alkaloids vindoline and catharanthine in the vinca plant.

- III. Vinorelbine: Vinorelbine is the first 5 NOR semisynthetic vinca alkaloid. It is obtained by semi-synthesis from alkaloids extracted from the rosy periwinkle *Catharanthus roseus*.
- IV. Vinflunine: Vinflunine is one of a group of drugs known as the vinca alkaloids
- V. Vindesine: Vindesine is an anti-mitotic vinca alkaloid used in chemotherapy.

Mechanism of action of Vinca:



Fig: 3 Representative mechanism of Vinca Alkaloids

The vinca alkaloids inhibit mitosis with metaphase capture. Their antitumor action in based on their high binding sympathy to intracellular tubulin, which is the protein subunit of the spindle microtubules. The binding coefficients of vincristine, vinblastine, and vindesine for tubulin are 8, 6, and 3.3 nmol or 1 respectively [9, 10]. The creation of facilities between the vinca alkaloids and tubulin prevents the polymerization of the tubulin subunits to microtubules, which outcomes in depolymerisation of microtubules and reserve of microtubule assembly. based on the fact that microtubule associations also play a essential role in the movement of neurotransmitter materials along neuronal axons, vinca alkaloids can cause neurotoxicity, mainly at advanced attentions.

Research Through Innovation

Conclusion:

Therapeutic plants maintain the health and vitality of individual and also cure various diseases including cancer without causing toxicity. Natural products discovered from medicinal plants have played an important role in treatment of cancer. In this review vine alkaloid anti-cancer plants have been presented. These plants possess good antidiabetic and antioxidant properties leading to anticancer activity. In conclusion this article provides the knowledge about anticancer therapeutic Vinca plant of foreign origin which are used by people all over the world. Also it is of significance to exploit novel anticancer drugs from medicinal plants. Without this early warning system, the problem of overcoming development of chemo resistance is quite considerable. In an ideal situation,

therapy would be tailored to suit the individual at the outset; this is unlikely at least for the very near future, despite rapid progress in pharmacogenomics. In the meantime, a better understanding of the mechanisms of resistance will at least allow the physician to modulate the therapy on a need to do basis. Medicinal plants have contributed a rich health to human beings. Plant extracts and their bioactive compounds present in them which are responsible for anticancer activity have to be screened for their valuable information. This review had given vinca plant possessing anticancer activity for various types of cancer.

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