



**REVIEW ARTICLE**

**Management of Cancer with Herbal Remedies**

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**ABSTRACT**

Cancer is the major public health problem worldwide. One in eight deaths occurs worldwide due to cancer. Worldwide, cancer cause more deaths than AIDS, tuberculosis and malaria combined. Cancer is the second leading cause of death in economically developed countries following heart diseases and the third leading cause of death in developing countries following heart diseases and diarrheal diseases. Complete removal of the cancer without damage to the rest of the body is the goal of treatment. This can be accomplished by surgery, chemotherapy, radiation therapy or other methods but having various side effects which leads towards Herbal remedies which are more safe and effective as compare to other. This article deals with pathogenesis, statistics and herbal aspects of treatment of cancer.

**KEYWORDS**

Cancer Management, Herbal Remedies

**INTRODUCTION**

Cancer is group of disease characterized by uncontrolled growth (division beyond the normal limits) and spread of abnormal cells (metastasis). If the spread is not controlled it can result in death. Cancer is caused by both external factor (tobacco, chemicals, radiation and infectious organism) and internal factor (inherited mutations, hormones, immune conditions and mutation that occur due to metabolism). These causal factors may act together or in sequence to initiate or promote carcinogenesis. The development of cancer requires multi steps that occur over many years. Certain types of cancer can be prevented by eliminating exposure to tobacco and other factors that accelerates this process. Other potential malignancies can be detected before cells become cancerous, when the disease is most treatable.

Cancer is treated by surgery, radiation, chemotherapy, hormones and immunotherapy.<sup>1</sup>

*Charaka* and *Sushruta* samhitas, two well-known Ayurvedic classics, describe cancer as inflammatory or non-inflammatory swelling and mention them as either *Granthi* (minor neoplasm) or *Arbuda* (major neoplasm). Ayurvedic literature defines three body-control systems, viz., the nervous system (*Vata* or air), the venous system (*Pitta* or fire), and the arterial system (*Kapha* or water) which mutually coordinate to perform the normal function of the body. In benign neoplasm (*Vataja*, *Pittaja* or *Kaphaja*) one or two of the three bodily systems are out of control and is not too harmful because the body is still trying to coordinate among these systems. Malignant tumours (*Tridosaja*) are very harmful because all the three major bodily systems lose mutual coordination and thus cannot prevent tissue damage, resulting in a deadly morbid condition.<sup>2</sup> Cancer is the major health disaster globally which cause more

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deaths than AIDS, tuberculosis and malaria collectively. Cancer is the second principal reason of fatality in developed countries following heart diseases and the third in developing countries following heart diseases and diarrheal diseases. Although cancer is second most killer disease worldwide, but can be cure by various ways. Cancer can be treated by surgery, chemotherapy, radiation therapy, immunotherapy, or other methods. Complete removal of the cancer without damage to the rest of the body is the goal of treatment. Sometimes this can be done by surgery, but the chances of cancers to invade adjacent tissue or to spread to distant sites by microscopic metastasis often limits its effectiveness. The effectiveness of chemotherapy is often limited by toxicity to other tissues in the body. Radiation can also cause damage to normal tissue. i.e. Allopathic treatment have more side effects.

### Carcinogenesis

Carcinogenesis or oncogenesis means mechanism of induction of tumours (Pathogenesis of cancer); agents which can induce tumours are called carcinogens (etiology of cancer). The subject of etiology and pathogenesis of cancer is there for classified under the four broad headings.

- A. Molecular pathogenesis
- B. Chemical carcinogenesis
- C. Physical carcinogenesis
- D. Biological carcinogenesis

The mechanism as to how a normal cell is transformed to cancer cell is complex. At different times, attempts have been made to unravel this mastery by various mechanisms. In the last decade, there has been vast accumulation of literature to explain the pathogenesis of cancer at molecular level. It is very clear that genes control the normal cellular growth, while in the cancer these controlling genes are altered, typically by mutation. A large number of such cancer associated gene have been described, each with a specific function in cell growth. Some of these genes are commonly

associated in many tumours, while others are specific to particular tumours.<sup>3</sup>

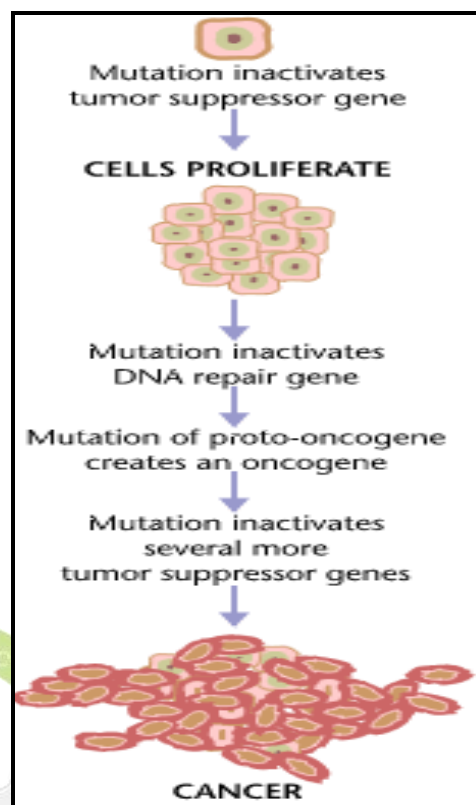


Figure 1: Mechanism of carcinogenesis

### Statistics of Cancer

Cancer is the major public health problem worldwide. One in eight deaths worldwide due to cancer. Worldwide, cancer cause more deaths than AIDS, tuberculosis and malaria combined. Cancer is the second leading cause of death in economically developed countries following heart diseases and the third leading cause of death in developing countries following heart diseases and diarrhoeal diseases.

It is estimated that there will be more than 12 million new cancer cases in 2007 worldwide, of which 5.4 million will occur in developed countries and 6.7 million in developing countries. The corresponding estimates for total cancer deaths in 2007 are 7.6 million (About 20,000 cancer death a day), 2.9 million in developed countries and 4.7 million in developing countries. By 2050 the global burden is expected to 27 million new cancer cases and 17.5 million cancer deaths simply due to the growth and aging of the population.<sup>4</sup>

Table 1: Worldwide cancer statistic in 2007

	Estimated new cases		Estimated death	
Lung and bronchus	1,108,731	440,390	974,624	376,410
Prostate	782,647	--	253,906	--
Colon and rectum	630,358	536,662	318,798	284,169
Esophagus	361,931	167,352	300,034	142,228
Non-Hodgkin lymphoma	196,298	--	111,126	--
Oral cavity	200,774	--	--	--
Cervical and uterine	--	555,094	--	309,808
Corpus uterine	--	226,787	--	--

### Management of Cancer Treatment<sup>6-7</sup>

- Inhibiting cancer cell proliferation directly by stimulating macrophage phagocytosis, enhancing natural killer cell activity.
- Promoting apoptosis of cancer cell by increasing production of interferon, interleukin-2 immunoglobulin and complement in blood serum.
- Enforcing the necrosis of tumor and inhibiting its translocation and spread by blocking the blood source of tumor tissue
- Enhancing the number of leukocytes and platelets by stimulating the hemopoietic function.
- Promoting the reverse transformation from tumor cells into normal cells.
- Promoting metabolism and preventing carcinogenesis of normal cells.
- Promoting antioxidant ability of cell
- Anti-inflammatory agent
- Angiogenesis inhibition
- Modulation of signal transduction pathway

- Stimulating appetite, improving quality of sleep, relieving pain, thus benefiting patient's health.

### Plant – Derived Anti-Cancer Agents in Clinical Use<sup>8</sup>

The first agents to advance into clinical use were the so-called vinca alkaloids, Vinblastine (VLB) and vincristine (VCR), isolated from the Madagascar periwinkle, *Catharanthus roseus*. (apocynaceae). More recent semi-synthetic analogues of these agents are vinorelbine (VRLB) and vindesine (VDS). These agents are primarily used in combination with other cancer chemotherapeutic drugs for the treatment of a variety of cancers. VLB is used for the treatment of leukemias, lymphomas, advanced testicular cancer, breast and lung cancers, and Kaposi's sarcoma, and VCR, in addition to the treatment of lymphomas, also shows efficacy against leukemias, particularly acute lymphocytic leukemia in childhood. VRLB has shown activity against non-small-cell Lung cancer and advanced breast cancer.

The two clinically-active agents, etoposide (VM 26) and teniposide (VP 16-213), semi-synthetic derivatives of the natural product,

## Herbal Formulation for Treatment of Cancer

Sr. No	Name of Formulation	Name of Ingredients
1	<b>United States Patent 6780441</b> Sahajanand Biotech Private Limited (Gujarat, IN)	<i>Withania somnifera, Chlorophyton borivilianum, Boerhavia diffusa, Elephantopus scaber, Moringa oleifera, Tecoma undulata, Bauhinia purpurea, Ficus racemosa, Cyperus rotundus, Sphaeranthus acmella and Tinospora cordifolia.</i> <sup>9</sup>
2	<b>Immunotone</b> Sino-Vedic Cancer Research Centre	Immunotone herbal formulation contains active principles isolated from selected antimutagenic and immunoenhancing herbs such as <i>Aegle marmelos, Aloe vera, Alpinia galanga, Andrographis paniculata, Azadirachta indica, Berberis vulgaris, Curcuma domestica, Emblica officinalis, Glycine max, Morinda citrifolia, Ocimum sanctum, Tinospora cordifolia, Trigonella foenum-graecum, Viscum album, Withania somnifera</i> and <i>Zingiber officinale</i> . <sup>10</sup>
3	<b>Cancertame</b> Sino-Vedic Cancer Research Centre	Cancertame herbal formulation contains active principles isolated from <i>Bauhinia variegata, Catharanthus roseus, Curcuma longa, Glycine max, Glycyrrhiza glabra, Gossypium hirsutum, Nigella sativa, Phyllanthus emblica, Plumbago zeylanica, Rubia cordifolia, Solanum indicum, Zingiber officinale, Aloe vera, Amoora rohituka</i> and <i>Azadirachta indica</i> . <sup>10</sup>
4	<b>Oncotame</b> Sino-Vedic Cancer Research Centre	Oncotame herbal formulation contains active principles isolated from <i>Ginkgo biloba, Oldenlandia diffusa, Podophyllum emodi, Prunella vulgaris, Psoralea corylifolia, Saussurea lappa, Solanum nigrum, Withania somnifera, Panax ginseng, Catharanthus alba, Curcuma aromatica, Andrographis paniculata, Aloe barbadensis, Emblica officinalis</i> and <i>Viscum album</i> . <sup>10</sup>
5	<b>Chen Pi</b> Ageless Herbs	<i>Citris reticulata, Astragalus membranaceus, Arctium lappa, Ganoderma lucidum, Trifolium pretense, Eleutherococcus senticosus, Rumex crispus, Atractylodes macrocephala, Spatholobus suberectus, Ascophyllum nodosum, Prunella Vulgaris, Salvia miltiorrhiza, Carthamus tinctorius, Rumex acetosella, Foeniculum vulgare, Althaea officinalis.</i> <sup>11</sup>
6	<b>Caractol</b>	<i>Blepharis Edulis, Piper Cubeba Linn, Smilax China Linn, Hemidesmus Indicus, Tribulus Terrestris, Ammania Vesieatoria, Lepidium Sativum Linn, Rheum emodi wall.</i> <sup>12</sup>
7	<b>Triphala</b>	<i>Terminalia chebula, Embelica officinalis, Terminalia bellerica.</i> <sup>13</sup>



epipodophyllotoxin (an isomer of podophyllotoxin), may be considered as being more closely linked to a plant originally used for the treatment of “cancer”. The *Podophyllum* species (*Podophyllaceae*), *P. peltatum* Linnaeus (commonly known as the American mandrake or Mayapple), and *P. emodii* Wallich from the Indian subcontinent, have a long history of medicinal use, including the treatment of skin cancers and warts.

A more recent addition to the armamentarium of plant -derived chemotherapeutic agents is the class of molecules called taxanes. Paclitaxel (taxol) initially was isolated from the bark of *Taxus brevifolia* Nutt. (*taxaceae*). Paclitaxel, along with several key precursors (the baccatins), occurs in the leaves of various *Taxus* species, and the ready semi-synthetic conversion of the relatively abundant baccatins to paclitaxel, as well as active paclitaxel analogs, such as docetaxel (Taxotere), has provided a major, renewable natural source of this important class of drugs. Paclitaxel is used in the treatment of breast, ovarian and non-small-cell lung cancer (NSCLC), and has also shown efficacy against Kaposi sarcoma. Paclitaxel has also attracted attention in the potential treatment of multiple sclerosis, psoriasis and rheumatoid arthritis. Docetaxel is primarily used in the treatment of breast cancer and NSCLC.

Another important addition to the anti-Cancer drug armamentarium is the class of clinically-active agents derived from camptothecin, which is isolated from the Chinese ornamental tree, *Camptotheca acuminata* Decne (*nyssaceae*), and known in China as the tree of joy. Extensive research was performed by several pharmaceutical companies in a search for more effective camptothecin derivatives, and Topotecan (Hycamtin), developed by Glaxo SmithKline, and Irinotecan (CPT-11; Camptosar), originally developed by the Japanese company, Yakult Honsha, are now in clinical use. Topotecan is used for the treatment of ovarian and small-cell lung cancers, while Irinotecan is used for the treatment of colorectal cancers. Other plant -derived agents in clinical use are homoharringtonine, isolated from the

Chinese tree, *Cephalotaxus harringtonia* var. *drupacea* (Sieb and Zucc.) (*Cephalotaxaceae*), and elliptinium, a derivative of ellipticine, isolated from species of several genera of the *Apocynaceae* family, including *Bleekeria vitensis*. A racemic mixture of harringtonine and homoharringtonine (HHT) has been used successfully in China for the treatment of acute myelogenous leukemia and chronic myelogenous leukemia. Purified HHT has shown efficacy against various leukemias, including some resistant to standard treatment, and has been reported to produce complete hematologic remission (CHR) in patients with late chronic phase chronic myelogenous leukemia (CML). Elliptinium is marketed in France for the treatment of breast cancer.

### List of Some Plants having Anti-Cancer Property

#### *Allium Sativum*

It inhibits genesis as well as growth of cancer by enhancing activity of the natural killer cells and the macrophages. Studies have revealed that *Allium sativum* increases count of the suppressor T cells and makes the lymphocytes more cytotoxic to cancerous cells.<sup>14</sup> Inhibit cancer growth by inducing differentiation and apoptosis and scavenging carcinogen-induced free radicals.<sup>15</sup>

#### *Aloe Vera*

It contains aloe-emodin, which activates the macrophages to fight cancer also contains acema-nnan, which enhances activity of the immune cells against cancer *Aloe vera* is found to inhibit metastases.<sup>14</sup>

#### *Azadirachta Indica*

Aqueous extract of neem leaf shows anticancer activity which is induced by 7, 12-dimethylbenz ( $\alpha$ ) anthracene (DMBA). Neem may exert its chemopreservative effect in the oral mucosa by modulation of glutathione and its metabolizing enzymes. Methanol extract obtained from leaves of neem exerts antipyretic effect in male rabbits. Chloroform extract of stem bark found effective against carrageenin induced paw oedema in rat

and mouse ear inflammation. It also cures inflammatory stomatitis in children's.<sup>16</sup>

Recent studies indicated that an ethanolic extract of neem has been shown to cause cell death of prostate cancer cells (PC-3) by inducing apoptosis as evidenced by a dose-dependent increase in DNA fragmentation and a decrease in cell viability.<sup>17</sup>

### ***Curcuma Longa***

It contains curcumin, which inhibits the growth of cancer by preventing production of harmful eicosanoid such as PGE-2. The anticancer effect of curcumin has been demonstrated in all the steps of cancer development, i.e. initiation, promotion and progression of cancer. It act on various parameter i.e. Growth factor [Epidermal growth factor (EGF), Transforming growth factor b, Her2/neu etc.], Receptors [Androgen receptor, EGF-R, Estrogen receptor a], Inflammatory cytokines [Tumor necrosis factor a, Interferon-c, Interleukin (IL)-1, IL-4, IL-6, IL-8]<sup>14,18</sup>

### ***Kalanchoe Pinnata***

Supertman and et al isolated Bufadienolides from *Kalanchoe pinnata* and were examined for their inhibitory effects on Epstein Barr virus early antigen activation in Raji cells induced by the tumor promoter, all bufadienolides shows good activity, while Bryophyllin A shows highest activity.<sup>19</sup>

### ***Mentha Species***

*Mentha species* such as *Mentha piperita*, *Mentha longifolia* and *Mentha aquatica* contain phenolic antioxidants that prevent recurrence of cancer. The essential oils of exhibited OH-radical scavenging activity reducing OH-radical generation in the Fenton reaction by 24%. The most powerful scavenging compounds in *Mentha piperita* oil were monoterpene ketones. Spearmint tea causes inhibition of carcinogen activation by direct effects on the activated.<sup>14</sup>

### ***Panax Ginseng***

Studies suggest that ginseng may lower the risk of cancer in humans. Ginseng inhibits growth of cancer by interfering with the DNA synthesis.

*Panax ginseng* regenerates the natural killer cells, which are damaged by chemotherapy and radiotherapy, stimulate the macrophages and promote production of the antibodies.<sup>14</sup>

### ***Zingiber Officinalis***

Ginger rhizomes offer a rich package of gingerols-phenolic antioxidants that possess pronounced anti-inflammatory activity-that inhibit various cancers. Ginger also contains curcumin which assists in the elimination of cancer causing substances from the body.<sup>14</sup>

## **CONCLUSION**

Cancer is the major public health problem worldwide. One in eight deaths worldwide due to cancer. Worldwide, cancer cause more deaths than AIDS, tuberculosis and malaria combined. Cancer can be treated by surgery, chemotherapy, radiation therapy, immunotherapy, monoclonal antibody therapy or other methods, but the propensity of cancers to invade adjacent sites by metastasis, toxicity to other tissues often limits effectiveness. On other hand plants are safe as anti-cancer agents. Numbers of active phytochemicals are isolated from different plant having anticancer activity, which will be enhanced by combination as formulation. Various herbal formulations were patented by China, US, and India but this area of research required further more exploration.

## **REFERENCES**

1. Garcia, M., Jemal, A. W. E. C. M. H. Y. S. R. T. M. J., Ward, E. M., Center, M. M., Hao, Y., Siegel, R. L., & Thun, M. J. (2007). Global cancer facts & figures. *Atlanta, GA: American cancer society*, 1(3).
2. Bhalchandran, P., & Rajgopal, G. (2005). Cancer an Ayurvedic prospective. *Pharmacol Res*, 51, 19-30.
3. Harshmohan. (2005). Text Book of Pathology. 5<sup>th</sup> edition, Jaypee publication, 197-240.
4. Garrett, M. D. (2001). Cell cycle control and cancer. *Current Science-Bangalore*, 81(5), 515-522.

5. Collins, K., Jacks, T., & Pavletich, N. P. (1997). The cell cycle and cancer. *Proceedings of the National Academy of Sciences*, 94(7), 2776-2778.
6. Zaid, H., Rayan, A., Said, O., & Saad, B. (2010). Cancer treatment by Greco-Arab and Islamic herbal medicine. *The Open Nutraceuticals Journal*, 3, 203-212.
7. Sakarkar, D. M., & Deshmukh, V. N. (2011). Ethnopharmacological review of traditional medicinal plants for anticancer activity. *International Journal of Pharma Tech Research*, 3, 298-308.
8. Cragg, G. M., & Newman, D. J. (2005). Plants as a source of anti-cancer agents. *Journal of Ethnopharmacology*, 100(1), 72-79.
9. [www.freepatentsonline.com/6780441.html](http://www.freepatentsonline.com/6780441.html)
10. [www.cancercliniconline.com/985/index.html](http://www.cancercliniconline.com/985/index.html)
11. [www.agelessherbs.com/CancerSupport.html](http://www.agelessherbs.com/CancerSupport.html)
12. <http://www.carctolhome.com/introduction.php>
13. Sandhya, T., Lathika, K. M., Pandey, B. N., & Mishra, K. P. (2006). Potential of traditional ayurvedic formulation, Triphala, as a novel anticancer drug. *Cancer Letters*, 231(2), 206-214.
14. Sakarkar, D. M., & Deshmukh, V. N. (2011). Ethnopharmacological review of traditional medicinal plants for anticancer activity. *International Journal of Pharma Tech Research*, 3, 298-308.
15. Qi, F., Li, A., Inagaki, Y., Gao, J., Li, J., Kokudo, N., & Tang, W. (2010). Chinese herbal medicines as adjuvant treatment during chemo-or radio-therapy for cancer. *Biosci Trends*, 4(6), 297-307.
16. Kshirsagar, A., and Dhanwe, V. (2011). Nature's drug store: Neem: A Review. *Indian Streams Research Journal*, 1(4).
17. Teja, R. S., & Nayak, B. P. (2011). Anti-cancer property of plant products, *IJRAP*, 2(1), 111-113.
18. Garodia, P., Ichikawa, H., Malani, N., Sethi, G., & Aggarwal, B. B. (2007). From ancient medicine to modern medicine: ayurvedic concepts of health and their role in inflammation and cancer. *J Soc Integr Oncol*, 5(1), 25-37.
19. Supratman, U., Fujita, T., Akiyama, K., Hayashi, H., Murakami, A., Sakai, H., & Ohigashi, H. (2001). Anti-tumor Promoting Activity of Bufadienolides from *Kalanchoe pinnata* and *K. daigremontiana* × *butiflora*. *Bioscience, Biotechnology, and Biochemistry*, 65(4), 947-949.