Chapter-36

# Current Perspective of Immune Enhancer Therapy in Cancer Patient W.S.R. Ayurveda


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## Abstract

As the global population grows, so does the prevalence of cancer. While progress in oncology has improved diagnosis and treatment, there's still room for advancement in cancer prevention. Beyond the physical toll of the disease, treatments like chemotherapy and radiation therapy can cause additional harm, impacting daily life and mental well-being. Research suggests that a comprehensive approach combining various medical systems can improve cancer outcomes. This study explores Ayurvedic perspectives on cancer and

how herbs, metals, Rasayana, and other substances may enhance immunity in cancer patients.

**Keywords:** Ayurveda, Cancer, Arbuda, Herbal medicine, Rasayana

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## 1. INTRODUCTION

Cancer, the second most severe disease after heart disease, presents significant challenges and side effects despite advanced treatments like surgery, radiation therapy, and chemotherapy. According to the GLOBOCAN project by the International Agency for Research on Cancer (IARC), there were 10 million cancer-related deaths and 19.3 million new cases globally in 2020. By 2040, it's projected that there will be 28.4 million new cancer cases worldwide. Cancer primarily arises from genetic abnormalities caused by DNA damage during cell division. Exposure to hazardous materials such as UV radiation, tobacco smoke, carcinogens, and certain diseases can lead to mutations and structural changes, contributing to tumor development. Such genetic differences may give rise to tumor antigens, which the immune system may identify as its own and trigger cellular immunity [1]. The death rate has decreased over the last three decades as a result of major advancements in the identification and treatment of cancers that have changed early diagnosis, prevention, and therapeutic approaches. Before the turn of the twenty-first century, radiation, chemotherapy, and surgical resection were the primary cancer treatments. High radiation dosages used in radiotherapy can kill the majority of tumor cells, however most tumor cells remain micro-metastases, which are difficult to completely remove. Even though chemotherapy is a highly effective treatment, it invariably weakens the patient's immune system and lowers their quality of life. A significant advancement in the treatment of cancer is immunotherapy, which stimulates the immune system in an effort to eradicate cancerous cells. Multiple cancer types have demonstrated durable clinical responses to immunotherapy, despite low response rates. Although a number of immunotherapies have produced encouraging outcomes, each has its own drawbacks when used in clinical settings. These include immune checkpoint inhibitors (ICIs), the cancer vaccine, adoptive cell transfer (ACT), and oncolytic virus therapy (OVT). The primary objective of Ayurvedic treatment is to identify the underlying cause of a disease. Ayurveda's therapeutic approach is classified into four categories: Roganashani chikitsa (disease cure), Rasayana chikitsa (restoration of normal function), and Naishthiki chikitsa (spiritual approach). Many herbs with significant potential for curing cancer are combined to make popular herbal decoctions as described in Ayurveda. Herbs aid in full recovery and lessen side effects and difficulties

related to cancer. Nowadays, it's critical to spread knowledge of Ayurvedic treatments for cancer, support their use, and advocate for an integrated approach to tumor management and treatment.

### Immune Checkpoints

Immune checkpoints are regulatory molecules and pathways in the immune system that help maintain self-tolerance and prevent the immune system from attacking the body's own cells. They play a crucial role in balancing the immune response to avoid excessive activation, which could lead to autoimmunity or immune-related damage. One of the key components of immune checkpoints is a class of proteins known as immune checkpoint proteins or molecules. These proteins are expressed on the surface of immune cells and interact with corresponding receptors on other immune cells. The interaction between these proteins and receptors either stimulates or inhibits the immune response. Two well-known immune checkpoint proteins are cytotoxic T-lymphocyte-associated protein 4 (CTLA-4) and programmed cell death protein 1 (PD-1), along with its ligand PD-L1 [2]. Inhibitors targeting these checkpoints have been successfully used in the treatment of various cancers, leading to durable responses in some patients.

## 2. IMMUNOTHERAPY

One kind of biological therapy is immunotherapy. Biological therapy is a kind of cancer treatment in which drugs derived from living things are used. Immunotherapy is a type of cancer treatment that stimulates the body's immune system to target and destroy cancer cells. Unlike traditional treatments such as chemotherapy or radiation therapy, which directly target cancer cells, immunotherapy works by enhancing the body's natural defenses to fight cancer. Immunotherapy can be broadly divided into active and passive [3].

**Active Immunotherapy:** It was common practice in active immunotherapy to used dendritic cells, NK cells, and cytotoxic T cells. The active strategy targets tumor-associated antigens on tumor surfaces, which can be particular proteins or carbohydrates that are expressed exclusively or excessively in tumor cells.

**Passive Immunotherapy:** Targeting cell surface receptors to strengthen the immune system is known as passive immunotherapy. The goal of passive immunotherapy is to use lymphocytes, cytokines, and monoclonal antibodies (MoAbs) to boost the immune system's natural anticancer response. This approach can result in antibody-dependent cell-mediated (immunity) cytotoxicity (ADCC), such as that caused by Ipilimumab.

There are several different types of immunotherapy approaches used in cancer treatment:

**Immune Checkpoint Inhibitors**

Immune checkpoint blockade (ICB), which targets regulatory pathways in T cells by immune checkpoint inhibitors (ICIs) to enhance anti-tumor immune responses, has shown improved survival over conventional cancer therapy for various cancers and provided a new weapon against tumors. ICIs lead to more durable anticancer response via boosting anti-tumor response of immune system [4]. These inhibitors work by targeting key molecules involved in immune response regulation, such as programmed cell death protein 1 (PD-1), programmed death-ligand 1 (PD-L1), and cytotoxic T-lymphocyte-associated protein 4 (CTLA-4)[5].

CTLA-4 and CD28 are homologous receptors expressed on the surface of CD4+ and CD8+ T cells that mediate opposite functions in T cell activation. A new era in immunotherapy was ushered in with the FDA approval of ipilimumab, an anti-CTLA-4 monoclonal antibody that targets metastatic melanoma. It competes with the co-stimulatory molecule CD28 for binding to B7 proteins on antigen-presenting cells. T cell activation is inhibited when CTLA-4 attaches to B7 [6].

Programmed death 1 (PD-1, also known as PDCD1 or CD279) pathway is the second immune checkpoint that has been identified. PD-1 contains two immunoreceptors: an immunoreceptor tyrosine switch motif (ITSM) and a conventional immunoreceptor tyrosine inhibitory motif (ITIM). The ITIM and ITSM of PD-1 bind the inhibitory phosphatase SHP-2 (SH2 domain-containing protein tyrosine phosphatase-2). We now know that the expression of PD-L1/2 on cancer cells or APCs suppresses CD8+ T cells (CTLs) and induces the function of T-regulatory (Treg) cells. Another anti-PD-1 mab is pidilizumab, which has been tested in B cell lymphoma following autologous stem cell transfer and in relapsed follicular lymphoma.

| Drugs | Target | Features | Indication |
|---|---|---|---|
| Ipilimumab | CTLA-4 | Fully Humanized IgG1k mAb | Melanoma |
| Nivolumab<br>Pembrolizumab | PD-1 | fully humanized IgG4 mAb | Classical Hodgkin's lymphoma Renal cell carcinoma |
| Relatlimab | LAG-3 | fully humanized IgG4 mAb | Melanoma |
| Tiragolumab | TIGIT | fully humanized IgG1 mAb with IgG1 backbone effect | Non-small-cell lung cancer |

## Monoclonal Antibodies

The passage describes Monoclonal Antibodies (MoAbs) as a form of active immunity that targets specific antigens present on cancer cells. MoAbs can be either unconjugated or conjugated with therapeutic drugs to produce a cytotoxic effect on cancer cells. In the context of Head and Neck Squamous Cell Carcinoma (HNSCC), the passage highlights the overexpression of epidermal growth factor receptor (EGFR) in up to 90% of cases. EGFR is involved in promoting tumor cell proliferation, angiogenesis, and metastasis when bound by epidermal growth factor (EGF). Two MoAbs, cetuximab and panitumumab, are mentioned as EGFR-targeted therapies for HNSCC. Cetuximab is described as a mouse–human chimeric IgG1 antibody, while panitumumab is a fully human IgG2 antibody. Both antibodies have proven to be effective against HNSCC, either when used alone or in combination with radiotherapy. Their effectiveness is attributed to their ability to target and inhibit EGFR, a key factor in the progression of HNSCC.

These are laboratory-made molecules that mimic the immune system's ability to fight off harmful pathogens. Monoclonal antibodies can be designed to target specific proteins on cancer cells, helping the immune system recognize and attack them.

**CAR-T Cell Therapy:** Chimeric Antigen Receptor T-cell therapy involves modifying a patient's own T cells (a type of immune cell) to express a receptor (CAR) that recognizes specific proteins on cancer cells. These engineered T cells are then infused back into the patient, where they can seek out and destroy cancer cells.

**Cytokines:** The passage provides information about cytokines, which are molecular messengers that enable communication among immune system cells, leading to a coordinated and effective response against target antigens. Cytokines are essential for regulating immune system homeostasis and are produced by cells of both innate and adaptive immunity in response to microbes and tumor antigens. Two cytokines mentioned in the passage that are currently approved by the FDA for clinical purposes are interferon α (IFN α) and interleukin-2 (IL-2).

**Interferon α (IFN α):** When injected subcutaneously in renal cell carcinoma, IFN α has demonstrated tumor regression. It has shown promising results in stage 3 melanoma. The combination of IFN α and IL-2 showed partial response but with higher toxicity. IFN α plays various roles in tumor control, including directly eradicating tumor cells by inducing senescence and apoptosis. It also

boosts antitumor immune responses by stimulating dendritic cell (DC) maturation and enhancing T-cell cytotoxicity.

**Interleukin-2 (IL-2):** IL-2 is an FDA-approved cytokine for metastatic melanoma. Administration of IL-2 increases the levels of natural killer (NK) cells and tumor-infiltrating lymphocytes (TILs) in the lesion. Perilymphatic IL-2 administration has increased the survival rate of patients with head and neck squamous cell carcinoma (HNSCC). Patients who underwent Monoclonal Antibody (MoAb) therapy after surgery showed increased tumor-reactive T cells.

IFN α has direct effects on tumor cells and enhances immune responses, while IL-2 stimulates immune cell activity and has been approved for use in metastatic melanoma. Combination therapies, such as IFN α and IL-2, are being explored for their potential benefits in cancer treatment, but they may come with increased toxicity.

Both IFN α and IL-2 play crucial roles in modulating the immune response against tumors. The information suggests that these cytokines have been studied and applied in the clinical setting, showing promise in the treatment of various cancers. The passage also highlights the potential benefits and challenges associated with combining these cytokines for therapeutic purposes.

## Cancer Vaccines

The FDA approved Gardasil, the world's first preventive tumor vaccine, for clinical use in 2006 to prevent uterine cancer caused by HPV16 and HPV18 infections (70). In 2010, the FDA approved PROVENGE (sipuleucel-T), a DC vaccine, to treat patients with advanced prostate cancer, especially those who are refractory to hormone therapy. Although the clinical application of ICIs has greatly facilitated cancer treatment, there are still limitations because tumor cells have intrinsic anti-ICIs mechanism and high levels of heterogeneity. Therefore, while tumor vaccines can meet these needs, it is important to explore tumorspecific antigens to provide more precise treatment approaches.

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cells have intrinsic anti-ICIs mechanism and high levels of heterogeneity. Therefore, tumor vaccines can meet these needs.

These vaccines stimulate the immune system to recognize and attack cancer cells. Some vaccines target specific cancer-related antigens, training the immune system to identify and destroy cancer cells expressing those antigens.

Immunotherapy has shown remarkable success in treating certain types of cancers, leading to durable responses and improved outcomes for some patients. However, it is important to note that not all patients respond to immunotherapy, and its effectiveness can vary depending on the type of cancer and individual patient factors.

Like any cancer treatment, immunotherapy may cause side effects, which can range from mild to severe. These side effects are often related to the immune system's activation and can affect various organs in the body.

Research in immunotherapy is ongoing, and new approaches are being explored to broaden its applicability and enhance its effectiveness across different types of cancer. It is always crucial for patients to discuss the potential benefits and risks of immunotherapy with their healthcare team to make informed treatment decisions based on their specific situation.

**Vyadhikshamatva in Cancer**

The Ayurvedic system not only treats diseases but also focuses on preventing them. In Ayurveda, the concept of Vyadhikshamatva, which is akin to immunity, plays a crucial role in the prevention and management of diseases. Vyadhikshamatva, derived from Sanskrit, combines "Vyadhi" meaning disease and "Kshamatva" meaning to suppress or overcome. According to Ayurveda, diseases arise from an imbalance among Doshas (physiological factors - vata, pitta, and kapha), Dhatus (tissue systems), and Malas (excretory products of the body), which are responsible for maintaining physical and psychological health when in equilibrium.

Chakrapani Datta, in his commentary on Charaka Samhita, delineated Vyadhikshamatva into two aspects:

1. **Vyadhi-Balavirodhitvam:** The ability to withstand or restrain the severity of diseases, essentially resisting their progression.
2. **Vyadhi-Utpadakapratibandhakatva:** The body's capacity to prevent the occurrence and recurrence of diseases.

These aspects collectively constitute what we now understand as immunity. In Ayurveda, Vyadhikshamatva is closely related to the balanced state of Kapha, Bala (strength), and Oja (essence of vitality). Oja, the ultimate product and excellence of Dhatus, plays a pivotal role in determining Vyadhikshamatva. The production of high-quality Rasayana formulations helps strengthen Ojas, Bala, thereby enhancing Vyadhikshamatva or immunity [25].

Vyadhikshamatva, synonymous with Swastha (health), Bala (strength), and Ojas (vitality), holds significant importance in today's world where new diseases are constantly emerging. The level of vyadhikshamatva varies among individuals and is influenced by several factors:

1. **Ojas:** Ojas represents the essence of vitality and immunity in Ayurveda. A strong Ojas is essential for robust health and resistance to diseases.
2. **Bala:** Bala refers to physical strength and resilience. Individuals with strong Bala are better equipped to withstand illness and recover quickly.
3. **Season:** Seasonal variations can impact one's immunity and susceptibility to diseases. Ayurveda considers seasonal regimens (Ritucharya) to maintain health and balance throughout the year.
4. **Diet and Regimen:** Proper diet and lifestyle practices play a crucial role in maintaining vyadhikshamatva. A balanced diet, adequate sleep, regular exercise, and stress management contribute to overall well-being[27].
5. **Anupana:** Anupana refers to the vehicle used to administer medicinal substances. The choice of Anupana can influence the efficacy of the treatment and enhance the body's ability to absorb nutrients.
6. **Rasa:** Rasa, or taste, is an important aspect of Ayurvedic nutrition. Consuming a variety of tastes in appropriate proportions helps maintain doshic balance and supports immunity.
7. **Jatakarma Sanskara and Karnavedhana Sanskara:** These are rituals or practices performed during childbirth and ear-piercing, respectively, which can influence the individual's constitution and immunity.
8. **Lehana Karma and Suvarna Prashana:** Lehana karma involves the administration of medicated gruel, while Suvarna prashana is the administration of gold-based formulations. Both are Ayurvedic practices aimed at enhancing immunity and promoting overall health.
9. **Various Dravyas:** Ayurveda offers a range of medicinal substances classified as Jivaniya (rejuvenating), Balya (strengthening), Vayahsthapana (anti-aging), Brimhaniya (nourishing), and Rasayana (rejuvenative) dravyas. These substances support vyadhikshamatva and promote longevity.

In summary, maintaining vyadhikshamatva is essential for preventing diseases and promoting longevity. Ayurveda offers holistic approaches including dietary and lifestyle recommendations, medicinal therapies, and

ritualistic practices to enhance vyadhikshamatva and support overall health and well-being.

**Rasayana in Cancer Patient:** Ayurvedic treatment for cancer encompasses several therapeutic approaches aimed at maintaining health, restoring balance, addressing spiritual well-being, and curing diseases. Here's an overview of these approaches:

1. **Prakritisthapani Chikitsa (Health Maintenance):** Focuses on maintaining overall health and preventing imbalances through lifestyle modifications, dietary habits, and holistic practices.
2. **Rasayana Chikitsa (Restoration To Normal):** Aims to restore the body to its optimal state by promoting vitality, rejuvenation, and longevity through the use of specific herbal formulations and lifestyle recommendations.
3. **Naishthiki Chikitsa (Spiritual Approach):** Incorporates spiritual practices such as meditation, prayers, and other forms of mindfulness to support emotional and mental well-being during the healing process.
4. **Roganashani Chikitsa (Disease Cure):** Targets the cure of specific diseases, including cancer, through various treatment modalities such as surgery, herbal remedies, dietary modifications, and spiritual therapies.

Rasayana, a unique branch of Ashtanga Ayurveda, plays a crucial role in achieving the two main aims of Ayurveda: maintaining the health of the healthy and treating diseases in the sick. The primary goals of Rasayana therapy are multifaceted:

1. **Preservation and Promotion of Health in Healthy Individuals:** Rasayana therapies aim to enhance overall health and well-being by rejuvenating the body at the cellular level, promoting longevity, and maintaining vitality.
2. **Maintenance of Equilibrium of Dhatus (Tissue Systems):** Rasayana treatments help balance the various bodily tissues (Dhatus), ensuring their optimal functioning and preventing imbalances that may lead to disease.
3. **Management of Diseases:** Rasayana therapies are used not only to treat existing diseases but also to prevent their recurrence and complications by strengthening the body's natural defense mechanisms.
4. **Prevention of Premature Aging and Provision of Longevity:** By promoting cellular rejuvenation and enhancing overall vitality, Rasayana therapies help delay the aging process and support longevity.
5. **Enhancement of Immunity:** Rasayana treatments bolster the body's immune system, making it more resilient against infections, diseases, and environmental stressors.

6. **Invigoration of the System:** Rasayana therapies rejuvenate and revitalize the entire body-mind complex, promoting physical strength, mental clarity, and emotional well-being.

Overall, Rasayana therapy offers a holistic approach to health promotion and disease prevention, focusing on optimizing the body's innate capacity for self-healing and resilience.

Rasayana therapies are integral to cancer treatment in Ayurveda, nourishing the body's tissues, promoting cellular rejuvenation, and enhancing vitality. They contribute to overall health, prolonging youthfulness, and supporting longevity.

Rasayana therapy has been shown to significantly enhance patients' tolerance to traditional cancer treatments and mitigate the negative side effects of chemotherapy, radiotherapy, and other interventions. Instead of interfering with the efficacy of these treatments, Rasayana acts as an adjuvant, complementing conventional therapies and improving their overall effectiveness. Moreover, Rasayana therapy helps improve the quality of life for cancer patients by reducing the severity of treatment-related side effects such as nausea, fatigue, and loss of appetite. By promoting cellular rejuvenation and bolstering the body's natural defense mechanisms, Rasayana therapy also plays a role in slowing down cancer progression.

Studies have indicated that Rasayana therapy can substantially increase overall survival rates in cancer patients by supporting their immune system, enhancing vitality, and promoting overall well-being. This integrative approach, combining traditional cancer treatments with Rasayana therapy, offers a promising avenue for improving outcomes and enhancing the overall care of cancer patients.

**Rasayana Drugs As Antimutagenic Agents**

Recent research indicates that the diverse phytochemicals, botanicals, and compound formulations present in Rasayana have the potential to inhibit the processes involved in carcinogenesis and mutagenesis. Studies by Yadav et al. found that Chyavanaprasha consumption by bidi smokers reduced their risk of genotoxicity from carcinogenic tobacco smoke. Chyavanaprasha intake was associated with reductions in satellite affiliations, chromosomal abnormalities, sister chromatid exchanges, and mitotic index compared to bidi smokers who did not consume it [28].

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**Ayurveda Herbs in Cancer**

| Agent | Ayurvedic Mode of Acton | Modern Facts |
|---|---|---|
| Mayapple (Podophyllum peltatum) *Giriparpati* | Have no reference in Ayurvedic text .is used by foreign doctors. (tincture is used) (Ni.Aa.pg 55) | Testicular and small cell lung cancer, aryltetralin lignans, due to its anticancer potential, is podophyllotoxin (PTOX; $C_{22}H_{22}O_8$) |
| Asparagus racemose (*Shatavar*i) | Rasayana. (Ni. Aa.pg 636) | Shatavarins (containing shatavarin IV) rich fraction AR-2B (containing 5.05% shatavarin IV) from Asparagus racemosus roots exhibited potent anticancer activity as demonstrated by in vitro cytotoxicity using MCF-7, HT-29, and A-498 cell lines as well as EAC induced tumor in mice. |
| *Boerhavia diffusa (Punarnava)* | Shophanashini (ni.aa.pg.293) | Based on the UHPLC-HRMS analysis, 37 specialized metabolites were dereplicated and identified in the studied extracts. Results revealed the presence of 15 hydroxybenzoic, hydroxycinnamic, acylquinic acids, and their glycosides, one rotenoid, seven flavonoids, 12 fatty acids and two other glycosides. Among the tested extracts, the methanol extract |

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| | | showed a stronger antioxidant ability compared with other extracts. The methanol extract also showed the best inhibitory effects on tyrosinase and glucosidase. In the anti-cancer evaluation, the methanol extract showed stronger anticancer effects compared with water extract. In summary, our observations can contribute to the establishment of *B. diffusa* as a potential candidate for functional applications in the preparation. |
| Andrographis penniculata *Kalmegh* | Believed as yavatikta i.e.Shankhini (.ni.aa.pg 230). Charak Kalpa 11/4 (gulma shopha har) | Methanolic extract of A. paniculata has shown significant toxicity against KB (human epidermoid leukemia) and P388 (lymphocytic leukemia) cell lines. Studies have showed that andrographolide effectively induces cell-cycle arrest in cancer cells at G0/G1 stage. |
| Centella asiatica *Mandukaparni* | Shothahari (ni.aa..pg.670) | Partially purified fractions of C. asiatica, dose-dependently inhibited the proliferation of transformed cell lines, including Ehrlich ascites tumor cells and Dalton's lymphoma ascites tumor cells |
| Curcuma longa *Haridra* | Shothahara(ni.Aa.pg560) | The anticancer potential of curcumin is associated with its ability to inhibit proliferation in a wide variety of tumor cell types. Scientific evidence over the past few decades have overwhelmingly shown that curcumin exhibits a multitude of anti-cancer activities orchestrated through key signaling pathways associated |

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| | | with cancer. Structurally, curcumin is a symmetric molecule with two similar looking aromatic rings. Due to the presence of conjugated double bonds, curcumin serves as an effective electron donor to counteract formation of reactive oxygen species in many redox reactions [9]; hence, acting as a potent anti-oxidant. In addition to its anti-oxidative potential, a plethora of other biological functions have been attributed to curcumin, including its role as an anti-inflammatory, anti-tumor, |
| Phyllanthus amarus *Bhumyamalaki* | | Inhibition of metabolic activation of carcinogen as well as the inhibition of cell cycle regulators and DNA repair. |
| Annona atemoya/ muricata *Sitaphal* | | The crude extracts from annona plants and the individual alkaloids have shown potent anticancer/ antitumour activities. Many crude extracts of Annona species showed significant anti-cancer activities |
| Cedrus deodar *Devdaru* | Shothajit(ni.aa.pg.542) | At low doses, the CTL (citrus deodar total lignans) effectively inhibited the growth of A549 cells. By comparison of $IC_{50}$ values, we found that A549 cells might be more sensitive to the treatment with CTL. In addition, CTL were also able to increase the population of A549 cells in G2/M phase and the percentage of apoptotic A549 cells. CTL may have therapeutic potential |

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| | | in lung adenocarcinoma cancer by regulating cell cycle and apoptosis |
| Boswellia serrata(*shallaki)* | | The mechanisms of activity of BAs (boswellic acid) comprise a variety of targets, including the enzymes of angiogenesis and others such as topoisomerases, 5-lipoxygenase (5-LO), cytochrome P450, and mitogen-activated protein kinase (MAPK, especially p38) which are either promoted or inhibited by BAs |
| Glycerrhzia glabra *Yashtimadhu* | Shothapaha(ni.aa.436) | Multiple licorice constituents have been shown to bind to and inhibit the activities of various cellular targets, including B-cell lymphoma 2, cyclin-dependent kinase 2, phosphatidylinositol 3-kinase, c-Jun N-terminal kinases, mammalian target of rapamycin, nuclear factor-κB, signal transducer and activator of transcription 3, vascular endothelial growth factor, and matrix metalloproteinase-3, resulting in reduced carcinogenesis in several in vitro and in vivo models with no evident toxicity. |
| Nano Swarna Bhasma particles | | Patients treated with NSB (nano Suvarna Bhasma) particles drug exhibited 100% clinical benefit with few other standard treatment care . |
| *Withania Somnifera Ashvagandha* | Shophahara(Ni.Aa.pg 135) | Earlier studies indicated that only the root extract of *Withania Somnifera* as a potential source of new molecules that can curtail |

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| | | cancer growth [15]. *Withania Somnifera* leaves have also been shown to inhibit the growth of human cancer cell lines comparable to that produced by adriamycin. The leaf extract produced antiproliferative activity on NCI-H460 (lung), HCT-116 (colon), SF-268 (central nervous system) and MCF-7 (breast) human tumor cell lines |

## 3. CONCLUSION

It's been noted that enhanced immunity correlates with a more favorable prognosis for cancer patients. Ayurvedic medication, whether composed of single or multiple extracts or combined with modern medical treatments, has shown efficacy in treating cancer. Utilizing herbs such as Shatavari, Mandukparni, Ashwagandha, Kalmegh, Haridara, Bhumyamalaki, Sitaphala, Shallaki, Gold etc and formulations like chyavanprash, along with treatments such as Vamana, Virechana and dietary adjustments, contributes a lot to strengthening immunity and potentially avoiding poor prognoses in diseases like cancer.

A comprehensive discussion of the concept of vyadhikshamatva is provided, emphasizing its importance in maintaining health and resisting disease. Further research into the factors that enhance or diminish immunity in patients, including lifestyle, dietary modifications, and Rasayana therapies, holds promise for improving cancer treatment outcomes. Continued exploration of these elements will likely yield valuable insights into optimizing immune function and enhancing overall health in cancer patients.

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