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HERBAL TREATMENT OF CANCER

Abstract: -

This review article provides an overview of the advances in herbal treatments for cancer. The article summarizes the latest research on the use of herbal medicines in cancer treatment, including their mechanisms of action, efficacy, and safety. It covers a range of herbs commonly used in cancer treatment, such as turmeric, green tea, and ginseng. The article also discusses the potential benefits of herbal medicine as an adjunct to conventional cancer treatment and the challenges in integrating herbal medicine into cancer care. The review concludes by highlighting the need for further research to better understand the role of herbal medicine in cancer treatment and improve patient outcomes.Herbal medicines have been used for centuries in traditional medicine systems for their therapeutic properties, including anti-cancer effects. In recent years, there has been growing interest in the use of herbal medicine as an adjunct or alternative therapy to conventional cancer treatments, such as chemotherapy and radiotherapy. Advances in scientific research have helped to elucidate the mechanisms of action of herbal medicines and validate their anti-cancer effects.

This review article discusses some of the most promising herbal medicines for cancer treatment, including curcumin from turmeric, epigallocatechin-3-gallate (EGCG) from green tea, ginsenosides from ginseng, and resveratrol from grapes. It also explores the challenges in studying herbal medicine in cancer treatment, such as variability in the quality and composition of herbal products, and the need for standardized clinical trials to evaluate their efficacy and safety.The review also highlights the potential benefits of using herbal medicine in cancer treatment, such as reducing the side effects of conventional treatments, improving quality of life, and enhancing the body's immune response to cancer. However, it emphasizes

that herbal medicine should not be used as a substitute for conventional cancer treatments, but rather as a complementary therapy that can work in synergy with conventional treatments to improve patient outcomes.

Keyword: - Diet; Herbs; Spices; Cancer prevention

Introduction:-

Cancer is a complex disease that can occur anywhere in the body when cells begin to grow abnormally and out of control, often forming a lump or tumor. Cancer cells can spread to other parts of the body via the blood or lymphatic systems, a process called metastasis. There are many types of cancer, each with their own characteristics and treatment options. Some common cancers are breast cancer, lung cancer, prostate cancer, and colon cancer.Risk factors for cancer can include genetics, lifestyle such as smoking or poor diet, exposure to certain chemicals or radiation, and age.Cancer is usually diagnosed through a combination of physical exams, imaging tests such as CT or MRI scans, and biopsies to examine samples of cells or tissue. Treatment options may include surgery, radiation therapy, chemotherapy, targeted therapy, or a combination of these approaches, depending on the type and stage of the cancer.Prevention and early detection are important strategies in cancer treatment. Regular checkups, such as mammograms, colonoscopies, and Pap smears, can help detect cancer in its early stages, when it is most treatable. A healthy lifestyle such as regular exercise, a balanced diet, and avoiding excessive tobacco and alcohol consumption can also help reduce the risk of cancer.Cancer is a major public health problem worldwide. According to the World Health Organization (WHO), an estimated 19.3 million new cases and 10 million cancer-related deaths are expected worldwide in 2020. Cancers fall into two main categories: solid tumors and hematologic (blood) cancers. Solid cancers include those that form in organs or tissues such as the breast, lungs, colon, and prostate, while hematological cancers involve the abnormal growth of cells in the blood or bone marrow, such as leukemia, lymphoma, and multiple myeloma. Cancer can be caused by a variety of factors, including genetic mutations, exposure to carcinogens such as tobacco smoke, UV rays, or certain chemicals, and viral infections such as HPV or hepatitis B and C.Cancer symptoms can vary depending on the type and stage of the disease, but can include unexplained weight loss, fatigue, pain, changes in skin color or texture, and a persistent cough or hoarseness.In addition to traditional treatments such as surgery, radiation, and chemotherapy, new

therapies are emerging such as immunotherapy, which stimulates the body's immune system to attack cancer cells, and targeted therapy, which targets specific mutations in the genetics or proteins involved in growth are and spread of cancer cells. [23] Early diagnosis and treatment can significantly increase the chances of survival and the success of cancertreatment. It's important to see your doctor if you have any symptoms or risk factors for cancer. Regular cancer screening can also help detect the disease earlier, when it is most treatable.Morbidity and mortality from cancer have reached high levels in recent years and pose a major public health problem worldwide. The search for new compounds to treat cancer is the goal of many studies and many works focus on compounds of plant origin , which have healing potential and are widely used in traditional medicine [2].Most cancers are caused by environmental factors. The main causes of cancer are related to environmental exposure, lifestyle or behavior.Environmental factors that contribute to death from cancer include chemicals in tobacco smoke, radiation such as the sun's ultraviolet rays, obesity, stress, physical inactivity, and pollution. Exposure to substances associated with certain types of cancer, such as chemical, physical, or natural exogenous carcinogens

Classification of Human Carcinogen: -

a. Chemical carcinogens:

Nickel, cadmium, arsenic, nitrosamines, trichloroethylene, arylamines, benzopyrene, aflatoxins, and reactive oxygen species.

b. Physical carcinogens:

Ultraviolet irradiation (specifically UVB), ionizing radiation.

c. Biological carcinogens:

Human papillomavirus, EpsteinBarr Virus, hepatitis virus B, Helicobacter pylori, etc.

d. Endogenous processes:

DNA replication, metabolic reactions, and chronic inflammation. [18

Site of cancer origin: -

This classification describes the tissues in which the cancer cells begin to develop. Following are the examples of the location of tumorgenesis categorization.

- Adenocarcinoma (prostate cancer) - originates in gland cells.
- Blastoma (embryonal carcinosarcoma) - arises in fetal tissues.
- Carcinoma (cancer) - originates in epithelial tissue.
- Myeloblastic Leukemia - occurs in tissues which generate cells of blood.
- Lymphoma (malignant neoplastic disease) - occurs in tissue.
- Myeloma - a tumor of the bone marrow composed of cells normally found in bone marrow.
- Sarcoma - originates in connective tissue such as bone, cartilage, and muscle[19]

Types of Cancers: [26]

1) Cancers of Blood and Lymphatic Systems:

a) Hodgkin‟s disease

b) Leukemia‟s

c) Lymphomas

d) Multiple myeloma

e) Waldenstrom's disease

2) Skin Cancers:

a) Malignant Melanoma

3) Cancers of Digestive Systems:

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) Cancers in Women:

a) Breast cancer

b) Ovarian cancer

c) Gynecological 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

Ayurvedic Concept of Cancer:

Charaka and Sushruta Samhita both described the equivalent of cancer as “granthi” and “arbuda”. “Granthi” and “Arbuda” can be inflammatory or devoid of inflammation, based on the doshas involved . Three doshas “Vata, Pitta and Kapha” in body are responsible for disease and the balanced coordination of these doshas in body, mind and consciousness is the Ayurvedic definition of health. Tridoshicarbudas are usually malignant because all three major body humors lose mutual coordination, resulting in a morbid condition [27]

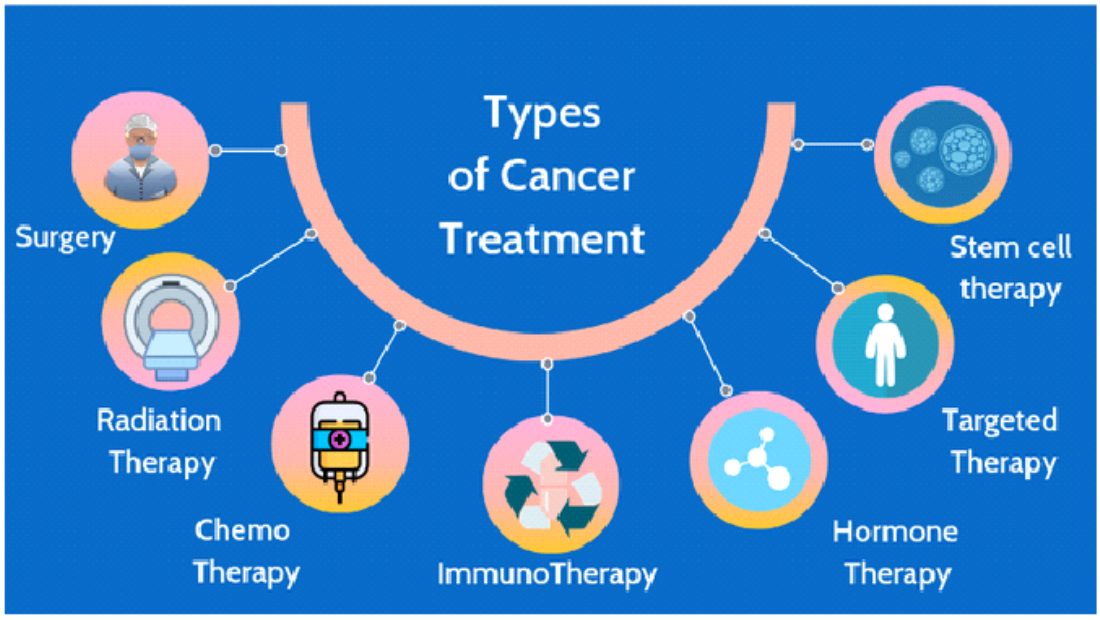

Figure 1: Types of Cancer Treatment [28

Effectiveness of Herbal Remedies for Cancer Treatment: -

Chemical drugs from natural resource consist a half number of drug armaments worldwide. Growing attentions were emphasized on this special type of chemical drug development, especially drugs against cancer and metastasis. Integrating strategies of cutting-edge routines and updating clinical evaluative system may improve pharmaceutical outcomes and drug developing. [34] To achieve this goal, medical knowledge of both eastern and western for cancer treatments must be united. This article addresses the landscape of herbal medicine and natural drug development for cancer treatments [20]

Most anticancer drugs undergo Phase I and/or II metabolism, yielding inactive or active metabolites [35]. Among all Phase I drug metabolizing enzymes, CYPs play a critical role in the metabolism of most anticancer drugs. In particular, CYP1A, 2C and 3A are involved in the metabolism of a number of anticancer drugs. The anticancer drugs metabolized by CYP3A4 include docetaxel, paclitaxel, cyclophosphamide, ifosfamide, etoposide, tamoxifen, irinotecan, vinblastine and vinorelbine. Many anticancer drugs undergo Phase II conjugating reactions, in particular glucuronidation, by various uridine diphosphate glucuronosyltransferases (UGTs) .[34] A number of CYPs and UGTs that metabolize anticancer drugs are subject to inhibition and/or induction by herbal compounds in vitro , and there is a potential for increased or decreased clearance of anticancer agents when patients also take herbal products[22]

TABLE 1 Herbal sources of anti-inflammatory compounds [6]

Common name	Botanical name
Blueberry	*Vaccinium myrtillus*
Devil's claw	*Harpagophytum procumbens*
Ginkgo	*Ginkgo biloba*
Ginger	*Zingiber officinale*
Green tea	*Camellia sinensis*
Milk thistle	*Silybum marianum*
Red grapes	*Vitus vinifera*
Stinging nettle	*Urtica dioica*
Turmeric	*Curcuma longa*
Willow bark	*Salix alba*
Yarrow	*Achillea millefolium*

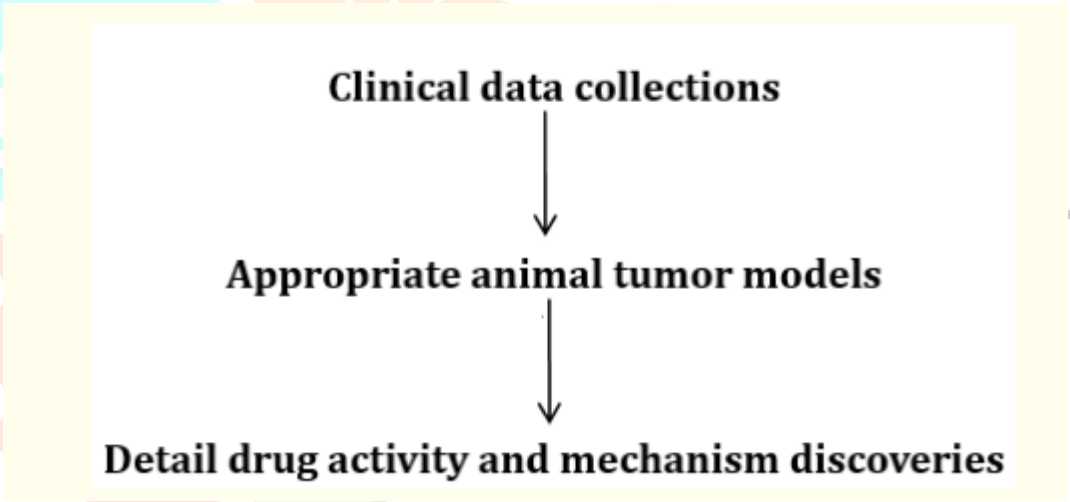

Figure 2: Anticancer drug discovery from herbal medicine.

Several herbal remedies have been investigated for their potential: -

anticancer properties. Some of the most commonly studied herbal remedies for cancer include turmeric, ginger, garlic, green tea, and milk thistle. These herbs have been shown to have a range of biological activities that could potentially inhibit tumor growth, including anti-inflammatory, antioxidant, and anti-proliferative effects. [35]

Herbal medicines have been used to treat malignant tumors in Asian countries since ancient times [9]. A link between dietary habits and breast cancer risk was also demonstrated in an Italian cohort, suggesting that a diet rich in raw vegetables and olive oil protects against breast cancer [10]. Additionally, those who consumed more raw vegetables, herbs, and

spices were associated with a lower risk of cancer [10]. Natural products are important for the development of new drugs and for unique ideas in the treatment of cancer. In fact, some herbs or spices have been approved as anticancer agents [11]. For example, consumption of curcumin, a component of turmeric curry, has been shown to be a factor associated with lower incidence of colon cancer [12].Cells resistant to certain inducers of apoptosis and/or radiation become susceptible to apoptosis when treated with curcumin. In addition, curcumin can also act as a chemopreventive agent for various cancers by inhibiting the formation of abnormal foci of the crypts and colon DNA adduct formation [12]. In addition, many cytotoxic chemotherapeutic agents, such as etoposide, are originally purified from herbs [13]. Two mechanisms have been proposed to be responsible for the anticancer effects of herbs and spices. One is a direct cytotoxic effect and the other is an indirect immunological effect. Many types of genes are involved in cell proliferation and/or regulation of apoptosis of cancer cells. Cancer cell proliferation and apoptosis is also influenced by many factors and pathways such as: B. Drugs, radioactive rays, medicinal herbs, the modulation of some oncogenes or tumor suppressor genes.In recent years it has been discovered that the agent responsible for immunomodulation of some herbs is a form of complex polysaccharides [14]. Because several herbs have potential medical and biological efficacy when used by cancer patients, more research is needed to evaluate this efficacy,basing the efficacy on molecular mechanisms [12].

Table 2 : The List of Herbal Products Presented to the Cancer Patients to Identify Herbal Use [15]

Herbal Product	Content
Natto K2	Fermented soy beans (*Glycine max* [L] Merr)
Agaricus	*Agaricus blazei Heineman*
Mistletoe	*Viscum album* L
Noni juice	*Morinda citrifolia* L
Golden root	*Rhodiola rosea* L
St Johns wort	*Hypericum perforatum* L
Valerian	*Vareriana officinalis* L
Shark cartilage	Cartilage from shark
Aloe vera	*Aloe vera* (L) Burm. f.
Green tea	*Camellia sinensis* Kuntze
Essiac	*Arctium lappa* L, *Ulmus rubra* Muhlenberg, *Rumex acetosella* L, *Rheum officinale* Baill
Nitter cure	Complementary cancer treatment introduced by the Norwegian medical doctor Lorenz Nitter
Ginseng	*Panax ginseng* C. A. Meyer
Ginkgo biloba	*Ginkgo biloba* L
Ginger	*Zingiber officinale* Roscoe
Echinacea	*Echinacea*[a]
Garlic	*Allium sativum* L
Avant-garden	Antioxidants with herbal origin
Immunoplex	Vitamins, oligosaccharides and soy
Other products	

Solanum nigrum L. (Black Nightshade): -

S. nigrum is one of the five most commonly used traditional Chinese herbal medicines in cancer treatment and has also been used as a key ingredient in folk recipes for cancer treatment in China. Various studies have demonstrated the cytotoxic activity of S. nigrum in vitro over othershuman cancer cell lines. Treatment of human colon cancer cells with S.nigrum significantly inhibited proliferation, adhesion, migration and invasion in these cells. An aqueous extract of S. nigrum induces autophagy in humanscolorectal and endometrial cancer cells. It also enhanced the cytotoxicity of chemotherapy drugs in these cancer cells. Significant cytotoxic effect of S.Nigrum leaf extract on breast cancer cells was mediated by autophagy andapoptosis. Polyphenol extract from ripe berries of S.nigrum induced cell cycle arrest and apoptosis in a variety of human prostate cancer cells without affecting normal prostate epithelial cells. This extract showed a similar effect in

hepatocellular carcinoma cells An animal study has demonstrated the potential of S. nigrum in the treatment of metastatic melanoma. An evidence-based approach to traditional herbal medicinal products for solamargine, a key steroidal alkaloid glycoside isolated from S. nigrum, has been documented to inhibit growth and induce apoptosis in a variety of cancer cells. Our recent research has shown that Solanum nigrum Aqueous Extract (AESN) is a key ingredient in some traditional Chinese medicine formulas used to treat various types of cancer patients and has anti-cancer effects. We examined EMT suppression in AESN-treated MCF-7 breast cancer cells.Mitochondrial morphology was examined using the stain Mitotracker Deep-Red FM. Our results demonstrate that AESN significantly inhibits MCF-7 breast cancer cell viability by inducing apoptosis and cell cycle arrest mediated by caspase-3 activation and reactive oxygen species production. In addition, mitochondrial fission was observed in AESN-treated MCF-7 breast cancer cells. In addition to upregulating E-cadherin, AESN-treated MCF-7 breast cancer cells were found to downregulate ZEB1, N-cadherin, and vimentin. These results suggest that AESN can inhibit EMT of MCF-7 breast cancer cells by attenuating mitochondrial function.AESN may potentially be useful in the treatment of breast cancer cells and could be of interest for future research to develop an integrative cancer therapy targeting breast cancer cell proliferation, metastasis, and migration.[14]

Curcuma longa Linn. (Haldi/Turmeric): -

Curcumin (Diferuloyl methane) and curcuminoids, isolated from C. longa rhizome (tuber) suppress cancer at every step, i.e., initiation, growth and metastasis. Curcumin (pigment colour of haldi) arrests the cancer cells proliferation in G2/S phase and induces apoptosis (programmed cell death). Curcumin has shown antiinflammatory, antitumour and antioxidant properties. It inhibits angiogenesis, a crucial step in the growth and metastasis of cancer. Curcumin and genistein (isolated from Glycine max) act synergistically to inhibit growth and spread of oestrogen-positive breast cancer. Curcumin acts even in multidrug-resistant breast cancers. Curcumin suppresses adhesion of cancer cells, thus preventing metastasis. It inhibits growth and spread of various cancers, including that of breast, lung, oesophagus, liver, colon, prostate, head, neck and skin. Curcumin is particularly effective in radiotherapy-resistant prostatecancer. It is effective even in advanced stages of cancer. Curcumin showed chemopreventive effect against N

nitrosodiethylamine/phenobarbital induced hepatocarcinogenesis in wistar strain male albino rats. It also protects from stomach and colon cancers. C. longa rhizome is also antimutagenic, antioxidant, immunostimulant, antiinflammatory, radioprotective, stimulant, carminative, alterative, blood purifier, hepatoprotective, antiperiodic and tonic. Rhizomes are also effective in colon, bladder and prostate cancers, intravesical tumour, fibrosarcoma, hepatocellular carcinoma, oesophagal carcinogenesis, leukaemia, stomach papilloma and solid tumours [3] The effect of curcumin on antigrowth action of epidermal growth factor receptor intrinsic kinase activity in the human epidermoid carcinoma A431 cells. The cells treated for very short duration with Curcumin inhibited EGF receptor intrinsic kinase activity in a dose- and time-dependent manner and also inhibited EGF-induced tyrosine phosphorylation of epidermal growth factor receptors [7]

Fig:3 Turmeric [29]

Curcumin has been found to possess anticancer activities via its effect on a variety of biological pathways involved in mutagenesis, oncogene expression, cell cycle regulation, apoptosis, tumorigenesis and metastasis. Curcumin has shown anti-proliferative effect in multiple cancers, and is an inhibitor of the transcription factor NF-B and downstream gene products (including c-myc, Bcl-2, COX- 2, NOS, Cyclin D1, TNF-a, interleukins and MMP-9).

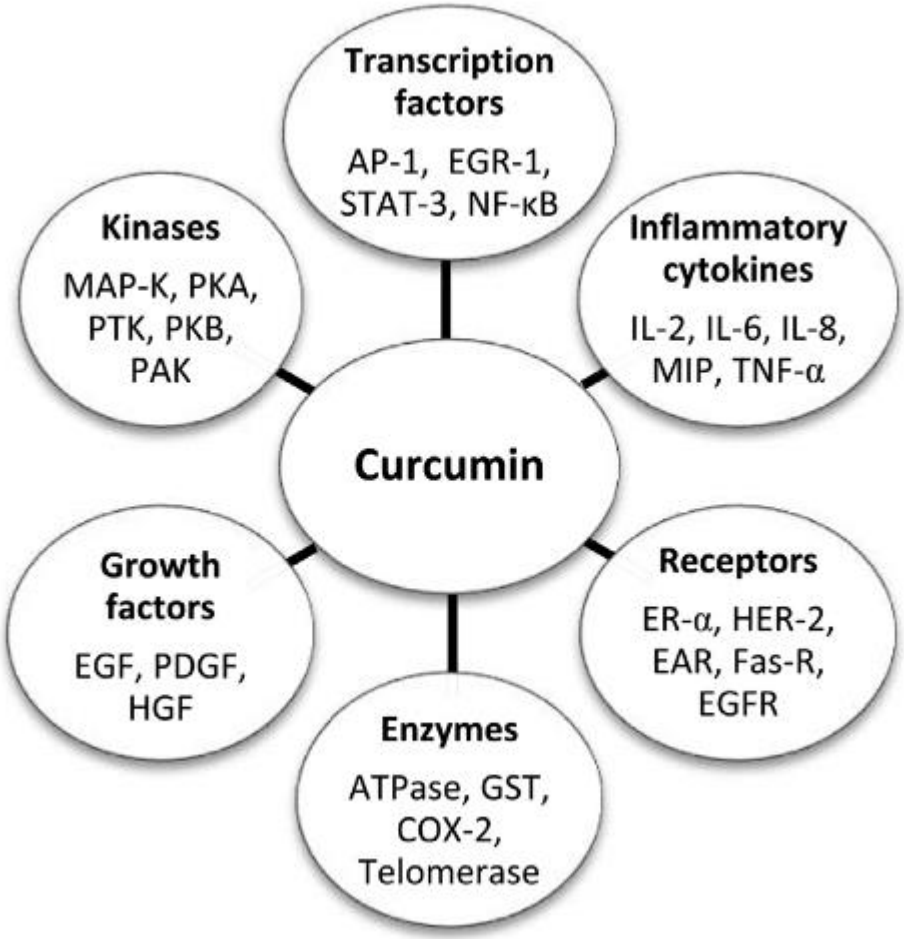

Fig. 4. Multiple molecular targets modulated by curcumin. [13]

Withania somnifera Dunal (Ashwagandha/Asgandh): -

Most phytonutrients in W. somnifera root are withanolides (steroidal lactones with an ergostanic backbone) and alkaloids. These include withanon, withaferin A and many other withanolides and withasonidienone. Much of the pharmacological activity of W. somnifera has been attributed to the two main withanolides, withaferin A and withanolide D.Apart from these, W. somnifera root also contains withaniol, acylsteryl glucosides, starch, glycosides reducing sugar, resins, saponins, fixed oils, hantreacotane, ducitol, anthraquinones, proteins, amino acids (e.g., aspartic acid, proline, tyrosine, alanine, glycine, glutamic acid, cystine and tryptophan) and high amount of iron, etc. Withaferin A and withanolide D have antioxidant, anticancer andimmunoenhancing activities, and act against various cancers.Withanolides are both structurally and similar to ginsenosides (active ingredients of P. ginseng).activities. Withanolides (including withaferin A, sitoindoside IX, fizagulin D, withanoside IV, and vicosalactone B) inhibit the growth and spread of various cancers such as breast, lung, colon,

and central nervous system tumors due to their antiproliferative and antiangiogenic properties. Withaferin A (the main withanolide) inhibits the growth and spread of various cancers including breast, cervical, colon, prostate, nasopharynx and larynx, malignant ascites and sarcoma by inducing apoptosis. Withaferin A is effective in androgen-sensitive and androgen-resistant prostate cancer.Sitoindosides VII-X and Withaferin A have powerful antioxidants, stress relievers, immunomodulators,anti-inflammatory and anti-aging properties. Withanolide D inhibits colony formation of metastases in malignant lung melanoma. Ashwagandhanolide, a novel dimeric withanolide isolated from W. somnifera, inhibits the growth and spread of breast, gastric, colon, lung and central nervous system tumors. IN.somnifera reduces tumor cell proliferation and increases overall survival. It increased the effectiveness of radiation therapy and reduced the side effects of radiation and chemotherapy. Given the broad spectrum of cytotoxic and anticancer activity, W. somnifera is being touted as a novel anticancer therapy.IN.Somnifera root also has other medicinal properties, such as hematopoietic, neuroprotective, antispasmodic, hypoglycemic, and lipid-lowering properties.

Coriandrum sativum L. (Coriander)

Aqueous extract of Coriander aerial parts has employed in TIM for treatment of cancer. Anti-proliferative activity of different extracts from various parts of coriander including roots, leaves and stems were investigated in human breast cancer MCF-7 cell line. The ethyl acetate extract of root with highest phenolic content showed the uppermost anti-proliferative and antioxidant activity. The caspase cascade signaling system as an important component in the process of apoptosis was also activated by this extract. Moreover, C. sativum root inhibited DNA damage and prevented MCF-7 cell migration induced by H2 O 2 suggesting its role in cancer prevention and suppression of metastasis. Linalool, the main constituent of coriander essential oil, seems to be responsible for antitumor activity of C. sativum

Fig:5 Coriander seeds

Anticancer Activities of Garlic: -

Sulphur compounds (diallyl sulphide, diallyl disulphide, allyl propyl disulphide) and allicin have been isolated from A. sativum bulb. Allicin inhibits growth of stomach, liver, colon, breast and endometrium cancers; while sulphur compounds inhibit the cancer cells [3]

One of the main active agents of garlic is DADS in colon carcinogenesis [25]. As a result, diallyl sulfide (DAS), which is the main factor in garlic use, may provide some form of protection against cancer cell regression in vitro and cancer development. Evolution of the immune response in vivo under experimental conditions. The research of various scientists confirmed that the study included research on the antitumor inhibitory effects of various chemical components of the action of DAS on human cervical cancer cells of HeLa and garlic on various carcinogens and mutagens, investigating the basic mechanisms in vitro. Apoptosis has shown that garlic plays an important role in anticancer and cytotoxicity in human cervical cancer.These garlic compounds cause viability examination, morphological changes, search for various carcinogenic compounds and comet test, DAPI staining, confocal microscopy, examination of various tumors such as buccal pouch, colon, skin, review and western transmission. Thus, a study on liver, stomach and lung cancer in animal models showed that DAS significantly induces growth and growth in rats, mice and hamsters, etc. . initiates apoptosis of human HeLa cervical cancer cells, precise mechanisms of cancer prevention in vitro. The effects are unclear, although a number of hypotheses have been proposed for another garlic-derived sulfur compound, diallyl. Several studies have shown that the organosulfur disulfide compound(DADS) regulates the activity of many

metabolizing enzymes that have a protective effect on colon carcinogenesis in activated carcinogens and disrupt the development of rodent DNA templates.On the other hand, the molecular mechanism starts in different target tissues. [17] The function of DADS in several cancer cells is still unclear. In this study, the antiproliferative activity of the line was described, aiming to confirm the authenticity of the antiproliferative agent DADS, possibly preceded by the stimulation of apoptosis and the activity and monitoring of cell cycle changes induced by DADS in various ways. Therefore, the genes expressed by garlic organosulfur compounds in human colon cancer cells are the best anticancer agents. Set a goal to study its promising anti-cancer mechanisms. Effective dose that does not cause toxicity in humans, the study found that a new gene and 49 high-level clinical trials were required. have been implicated in the antiproliferative effects of DADS. These genes have been implicated in cell proliferation and safety considerations of garlic: Garlic is an apoptotic and extracellular matrix protein and is rarely a source of allergies that can differ from light transduction. In summary, it can be said that DADS have an anti-irritant effect on life-threatening problems. In rare cases, it can have a proliferative effect on HT-29 colon cancer cells, and both can cause nausea, vomiting, diarrhea and heartburn when new cDNA libraries, DHUG and DHDG genes have been found in a head of garlic taken on an empty stomach was eaten.It can also decrease participation in the procedure. Further Research on Rising Blood Sugar and Insulin The description and identification of these genes will likely be explored in some human and animal studies. Garlic provided insight into protective function [5] The anti-carcinogenic effect of garlic is mainly related to its organosulfur compounds. S-allylmercaptocysteine, a water-soluble organosulfur derivative in garlic, is able to induce apoptosis in many types of cancer cells through the mitogen-activated protein kinase (MAPK) and tumor growth factor-beta (TGF-β) signalling pathways. Diallyl disulfide showed anticancer properties through immunomodulation). It induced cell death through induction of apoptosis in mice leukemia cells and promoted immune responses in leukemic and normal mice in vivo (Hung et al. 2014). Diallyl trisulfide inhibited estrogen receptor-α activity in human breast cancer cells and suppressed proliferation of human pancreatic cancer cells by inducing apoptosis [10]

Zingiber officinale Roscoe (Ginger): -

The rhizome of ginger has widely been used as a spice and condiment in different societies. Additionally, ginger has a long history of medicinal use in various cultures for treatment of common colds, rheumatic disorders, gastrointestinal complications and cancer. Preclinical studies have demonstrated chemopreventive and antineoplastic properties of ginger (Pereira et al. 2011). Since, inhibitors of COX and thus prostaglandin E2 (PGE2) are promising colorectal cancer preventives, ginger has been shown to inhibit COX and decrease PGE2 concentrations in subjects at normal risk for colorectal cancer. However, oral administration of 2 g per day of ginger for 28 days was not able to decrease eicosanoid levels in subjects at increased risk for colorectal cancer [16]. The most important chemical constituents with anticancer activity in ginger are gingerols and shogaols. 6-gingerol was effective in the suppression of the transformation and hyperproliferation of cells as well as inflammation that initiate and promote carcinogenesis, angiogenesis and metastasis. 6-gingerol suppressed growth of human colon cancer cells implanted in nude mice. 10-gingerol exerted a potent inhibitory effect on DNA synthesis and caused apoptosis in human promyelocytic leukaemia cells. It induced the formation of Ca +2 , which is cytotoxic to the colorectal cancer cell (Poltronieri et al. 2014). 6-shogaol is known to exhibit anti-proliferative, anti-metastatic, and pro-apoptotic activities through suppression of STAT3 expression-regulated gene products in tumor tissues. It effectively reduced survival and induced apoptosis in human and mouse prostate cancer cells via inhibition of STAT3 and NF-κB activity in these cells. It was more effective than two other compounds found in ginger, 6-gingerol and 6-paradol . 6-shogaol inhibited the growth of human pancreatic tumors and sensitized them to gemcitabine by suppressing inflammatory pathways linked to tumorigenesis. Cysteine-conjugated metabolites of shogaols can be presumed as novel dietary

colon cancer preventive agents (Fu et al. 2014). Ginger has also been found to be effective in reducing symptoms of chemotherapy-induced nausea and vomiting Furthermore, preclinical studies revealed that ginger and its constituents, dehydrozingerone and zingerone, have protective effects against radiation-induced sickness and mortality via several mechanisms including An Evidence Based Approach to Traditional Herbal Remedies for the. . . antioxidant, anti-inflammatory and anti-clastogenic activity. [10]

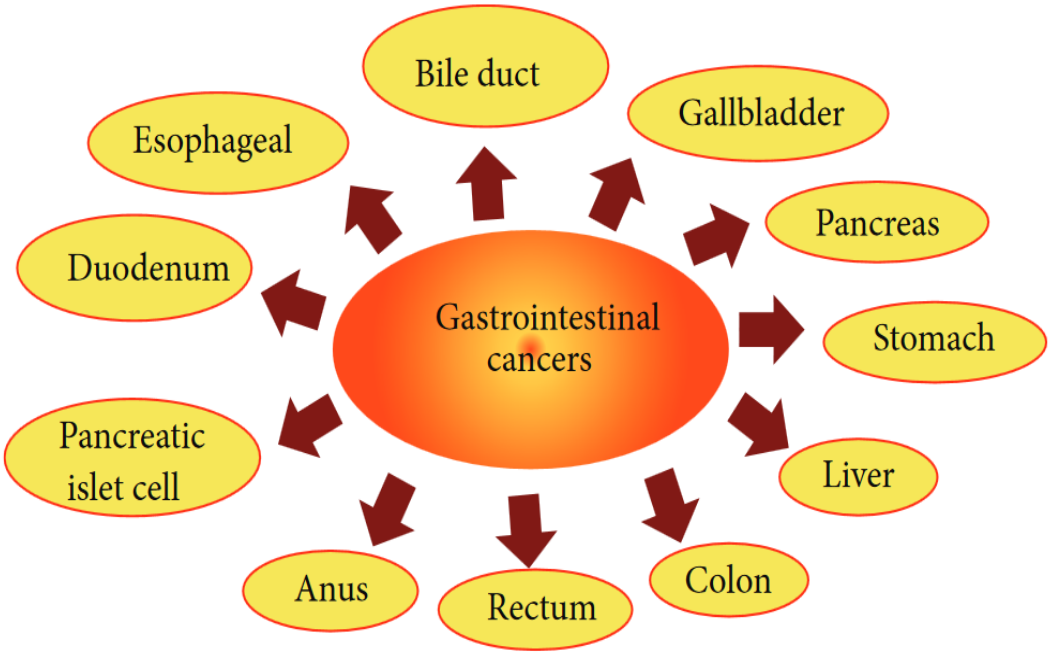

Figure 6: Different cancer types which are categorized under gastrointestinal cancer.

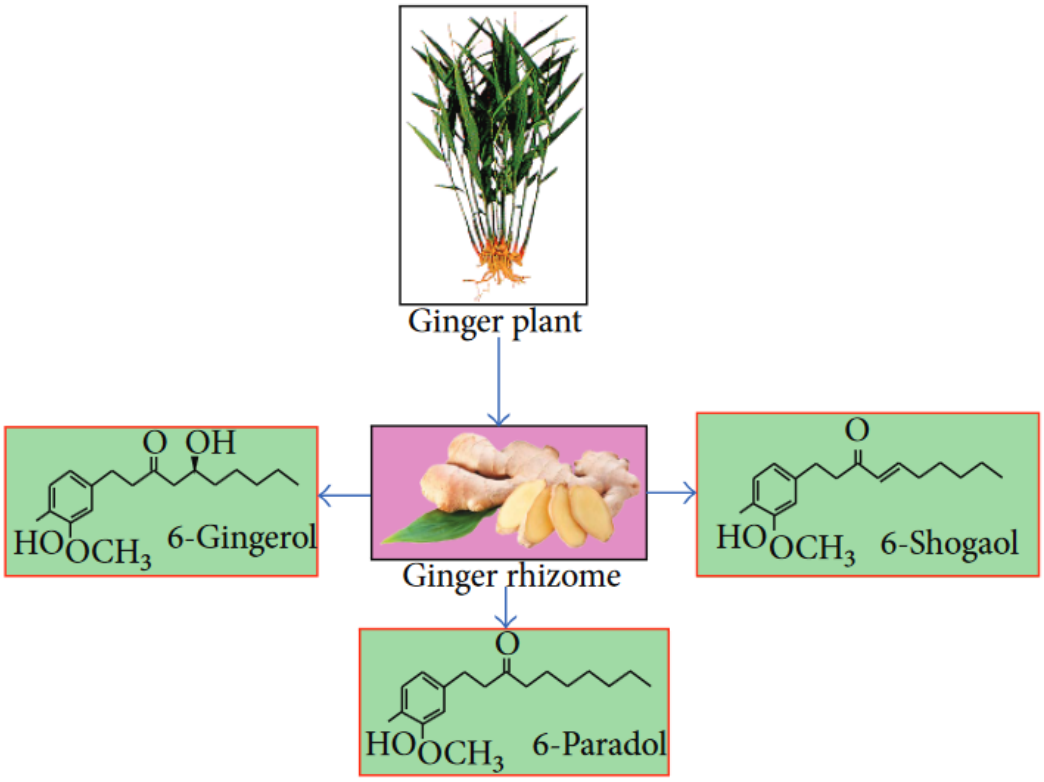

Figure 7: Ginger, ginger rhizome, and its major active components: 6-gingerol, 6-shogaol, and 6-paradol.

Sample preparation: -

Ginger leaves (Zingiber officinale, card number: PARK1003(ANH)) kindly provided by BonghwaAlpine Medicinal Plant Experimental Station, Korea. Akg ginger leaves extracted with 1000 ml 80% Methanolwith stirring for 24 hours. After 24 hours methanol the soluble fractionwas filtered and reduced to ca.then about 20ml from the vacuum evaporatorfractionated with petroleum ether and ethyl acetate in a Collector. The ethyl acetate fraction was separatedof the mixture, evaporated on a vacuum evaporator,and prepared and refrigerated under aseptic conditions[8]

Table 3: List of chemicals from garlic, experimental inhibition of cancer by garlic and antimutagenic activity of garlic constituents.

Chemicals	Carcinogen and Mutagens	Organ/Species
Fresh garlic extract	DMBA (7,12dimethylbenz(a) anthracene)	Buccal pouch/Hamster
Garlic oil	DMBA/PMA (phorbol myristate acetate)	Skin/Mouse
Diallyl sulfide (DAS)	DMH (1,2-dimethyl hydrazine),	Esophagus, Colon /Rat
	NMBA (N-nitrosomethyl benzylamine),	Lungs, Forestomach
	BP (benzo[a] pyrene), DMBA	Skin/Mouse
Allyl methyl sulfide	BP	Forestomach/Mouse
Diallyl trisulfide (DATS)	BP	Forestomach/Mouse
Allyl methyl trisulfide	BP	Forestomach/Mouse
Methanol extract of garlic	AFB1 (aflatoxin B1)	Liver/Rat
Fresh garlic powder	DEN (diethyl nitrosamine)	Liver/Rat
S-methyl cysteine (SMC)	DEN	Liver/Rat
Methanolic garlic extract	AFB1 (aflatoxin B1)	*Salmonella* TA98
Aqueous garlic extract	AFB1	*Salmonella* TA100 88
Aqueous garlic extract	4-NQO (4-nitroquinoline -1-oxide)	*E. coli*
Aqueous garlic extract	Gamma rays, Hydrogen peroxide	
	Cumene hydroperoxide, t-butyl hydroperoxide	*Salmonella* TA102
S-allyl cysteine (SAC)	DMBA	Buccal pouch/Hamster
Diallyl sulfide	PhIP (2-amino-1-methyl-6-phenylimidazo [4,5-b] pyridine)	Colon/ Rat
Garlic powder	PhIP	Colon/ Rat

Safety and Efficacy of Herbs: -

Herbs and spices are “generally recognized as safe” by the FDA, at least at concentrations commonly found in foods; however, many herbs, spices, and their bioactive components are being investigated for potential disease prevention and treatment at concentrations which may exceed those commonly used in food preparation. It is therefore imperative to identify any potential safety concerns associated with the use of various dosages which range from

doses commonly used for culinary purposes to those used for medicinal purposes since there are often unclear boundaries between the

various uses of herbs and spices. The NCI/NTP has reviewed several herbs and spices and their bioactive compounds using the Ames Salmonella/Mammalian-Microsome Mutagenicity assay and/or the L5178Y TK+/− Mouse Lymphoma assay to identify the lowest effective dose (LED) that resulted in a positive increase in mutant frequency [1] Another source of data on the safety and efficacy of herbs and spices comes from the body of knowledge related to herbal medicine. The German Commission E Monographs are probably the most widely known resource on herbal medicines. Although the Commission E monographs are based on a review of scientific and historical data, themonographs do not include references used to assess safety and efficacy. Despite this limitation, the Commission E monographs are highly regarded and provide guidance to the public, health professionals, and industry on herbal products. There are two general categories of monographs. The first category of monographs consists of those that are negative or "unapproved" for products where "no plausible evidence of efficacy" was available or when safety concerns outweighed potential benefits associated with the product's use. Basil, lemongrass, marjoram, nutmeg, and saffron were herbs and spices included in the unapproved monographs based either on documented and/or suspected risk or limited documentation of effectiveness for medicinal purposes. None of the purported uses of the unapproved herbs and spices in the Commission E monographs appears relevant to cancer [2]

Correlation between medicinal plants with epidermal growth factor receptor and tissue repair: -

Tissue repair involves many contractile eventsand chemicals, and hurt someone Surfacestimulates skin healing, which is a complex process characterized by itangiogenesis re-epithelialization, granulation tissueFormation and remodeling of extracellular cells Matrix. There are many host defenses, which quickly evolved to detect viruses orbacterial or fungal pathogens they produceharmless and eventually repairs the damaged tissue.This type of complex and highly regulated sequenceevents can also be triggered by environmental stimuli, such as harmful mechanical and chemical factors. Dueto the epidermal growth factor receptor becomes fastoverexpressed after tissue damage, iefollowed by a gradual decline parallel tore-epithelialization process17. The growth of the epidermis The receptor is

detected in fibroblasts, keratinocytes and endothelial cells, indicating formation autocrine and paracrine loops at the wound cell level. The were observed to recover from convulsions observed in older animals and humans may be related for loss of sensitive epidermal growth factor Expression of the receptor, particularly in fibroblasts. Greater The aim of wound care is to promote healing in no time with minimal pain and discomfort and scars in the patient and must occur in physiological environment, conducive to tissue repairand regeneration. Contains continuous cell cell interactions and cell-matrix interactions that make it possible proceed in several overlapping stages, e.g processes, including inflammation, wound shrinkage-epithelialization, remodelling and tissue formation granulation tissue with angiogenesis. India has a rich tradition of medicinal plants and These plant extracts are used by the tribes is commonly used to treat cuts, wounds, and burns. Most pharmacological reports are available from Indian Herbal Medicines different models of wound healing for complaints cellular and anatomical continuity of tissues e demonstrated its molecular mechanism19.Global Injury healing consists of integrated cells and biochemical events leading to reset structural and functional integrity with restoration Strength in Damaged Tissue20. There is a number of natural products served as structural resources in the history of drug discovery related to epidermal growth factor for tissue repair therapy. [7]

Developments Towards Newer Anticancer Agents: -

Sphaeranthus indicus (Compositae) is an herb found mostly in southern India. It is bitter stomachic, stimulant, alterative, pectoral, demulcent, and external emollient. The herb is an ingredient of certain proprietary marketed preparations in India, namely, “Prostabliss” used for the management of benign prostatic hyperplasia. screened S. indicus, Ganoderma lucidum and Urtica dioica for their cytotoxicity against human cancer cell lines and found S. indicus to be the most effective in inhibiting the proliferation of prostate cancer cell lines, that is, PC-3 and DU-145. The petroleum ether, ethanol and aqueous extracts of the test drugs were screened for their in vitro cytotoxicity. S. indicus proved to be the best in these studies and its petroleum ether extract exhibited inhibitory activity against most of the human cancer cell lines, namely, lung (A549), prostate (PC-3 andDU-145), colon (Colo-205), neuroblastoma (IMR-32), and breast cancer (MCF-7). It was concluded that S. indicus induces apoptosis through mitochondrial-dependent pathway in HL-60 Cells and exerts cytotoxic

potential on several human cancer cell lines [24]

The pomegranate Punica granatum and in particular its fruit has a rich ethnomedical history and represents phytochemistry Cal tank with heuristic healing value. A tree/fruit can be divided into several anatomical compartments: seed, juice, bark, leaves, flowers, bark and roots, each with interesting properties Macological Activity. For example, juices and peels have a powerful effect antioxidant property while juice, peel and oil are weak trogenic and heuristically interesting in the treatment of menopause Symptoms and Consequences of a Separation. Has the use of juice, peel and oil has also been shown to have anti-cancer effects, particularly under for cancer cell proliferation, cell cycle, invasion and emergence

Future direction: -

Ideology promotion

The qualities of natural drug developments can be improved by a deeper understanding of herbal medicine practice and theories. The investigation of herbal medicine looks like to translate eastern therapeutic legend into western medical paradigms. Natural chemical drugs are somewhat like gifts from god and we shall pass these gifts down to our future generations. It appears that nature is the greatest medicinal chemist in this very planet.

Genomic study

Apart from general pathway for pathogenesis and therapeutics, new generations of techniques may be borrowed for TCM and natural chemical drug developments, such as cancer genomic study. But these issues face ethical debates and regulatory challenges.

Treatment of neoplasm metastasis

Neoplasm metastasis is a multi-step and multi-level phenotype that is responsible 90% cancer mortality in the clinic more seriously, it has been found that many different states of metastatic cells/cluster (ever-changing character) in wide-ranges of human organs/tissues-now widely known as neoplasm plasticity. A lot of currently-licensed drugs only target narrow-range of these various metastatic states. Nevertheless, TCM is famous for solving whole-body disease and body/organ imbalance. The question of whether TCM can be an alternative solution for neoplasm metastasis is open to us now.

Anti-cancer drug evaluative routine updates

In anticancer drug development, compounds are evaluated from in vitro cancer cells to in vivo tumor models into human body. However, it may be changed from clinical data to animal tumor models to single or mixture of compounds.

Conclusion: -

In conclusion, the use of herbal treatments in cancer management has gained significant attention in recent years. Advances in research have led to the discovery of several herbal medicines with potent anticancer properties. These herbal treatments work by targeting multiple molecular pathways involved in cancer development and progression, with minimal side effects. However, further research is still needed to fully understand the mechanism of action, optimal dosage, and potential interactions with other medications. Despite the promising findings, herbal treatments should not be used as a substitute for conventional cancer treatments but rather as a complementary therapy. Integrating these herbal remedies with standard treatments may enhance therapeutic outcomes and improve the quality of life of cancer patients.

specifically, the review article highlights the potential of various herbal treatments such as curcumin, green tea, garlic, ginseng, and many others in cancer management. These herbal remedies have been found to exhibit antiproliferative, apoptotic, and antiangiogenic effects on cancer cells, as well as enhancing the immune system's ability to fight cancer. Furthermore, they have been found to improve the effectiveness of chemotherapy and radiotherapy while reducing their toxic side effects.

While the use of herbal treatments in cancer management shows promising results, caution should be exercised in their use. It is important to note that not all herbal remedies are safe, and some may interact with conventional cancer treatments or other medications, leading to adverse effects. Patients should consult with their healthcare providers before starting any herbal treatments to ensure safety and efficacy

References: -

1. Kaefer, C.M. and Milner, J.A., 2008. The role of herbs and spices in cancer prevention. *The Journal of nutritional biochemistry*, *19*(6), pp.347-361.

2.Blumenthal M. The complete German Commission E monographs: therapeutic guide to herbal medicines. Austin (Tex): American Botanical Council; 1998.

3.. Pandey Govind, Madhuri S. Some anticancer agents from plant origin. Pl Arch 2008; 8(2): 527-532.

4. Govind, P., 2011. Some important anticancer herbs: a review. *Int Res J Pharm*, *2*(7), pp.45-52.

5. Nouroz, F., Mehboob, M., Noreen, S., Zaidi, F. and Mobin, T., 2015. A review on anticancer activities of garlic (Allium sativum L.). *Middle East J Sci Res*, *23*(6), pp.1145-1151.

6. Wargovich, M.J., Woods, C., Hollis, D.M. and Zander, M.E., 2001. Herbals, cancer prevention and health. *The Journal of nutrition*, *131*(11), pp.3034S-3036S.

7. Gupta, A., Khamkar, P.R. and Chaphalkar, S.R., 2014. Review on medicinal plants to target and inhibit the epidermal growth factor receptor signaling in cancer and tissue repair therapy. *International Journal of Advances in Pharmacy, Biology and chemistry*, *3*(1), pp.210-213.

8. Park, G.H., Park, J.H., Song, H.M., Eo, H.J., Kim, M.K., Lee, J.W., Lee, M.H., Cho, K.H., Lee, J.R., Cho, H.J. and Jeong, J.B., 2014. Anti-cancer activity of Ginger (Zingiber officinale) leaf through the expression of activating transcription factor 3 in human colorectal cancer cells. *BMC complementary and alternative medicine*, *14*, pp.1-8.

9. Lee, J., Gupta, S., Huang, J.S., Jayathilaka, L.P. and Lee, B.S., 2013. HPLC–MTT assay: Anticancer activity of aqueous garlic extract is from allicin. *Analytical biochemistry*, *436*(2), pp.187-189.

10. Saeidnia, S., 2015. *New approaches to natural anticancer drugs* (No. 12036). Cham, Switzerland: Springer International Publishing.

11. Prasad, S. and Tyagi, A.K., 2015. Ginger and its constituents: role in prevention and treatment of gastrointestinal cancer. *Gastroenterology research and practice*, *2015*.

12. Kitagishi, Y., Kobayashi, M. and Matsuda, S., 2012. Protection against cancer with medicinal herbs via activation of tumor suppressor. *Journal of oncology*, *2012*.

13. Rodrigues, F.C., Kumar, N.A. and Thakur, G., 2019. Developments in the anticancer activity of structurally modified curcumin: An up-to-date review. *European journal of medicinal chemistry*, *177*, pp.76-104.

14. Lai, Y.J., Tai, C.J., Wang, C.W., Choong, C.Y., Lee, B.H., Shi, Y.C. and Tai, C.J., 2016. Anti-cancer activity of Solanum nigrum (AESN) through suppression of mitochondrial function and epithelial-mesenchymal transition (EMT) in breast cancer cells. *Molecules*, *21*(5), p.553.

15. Engdal, S., Klepp, O. and Nilsen, O.G., 2009. Identification and exploration of herb-drug combinations used by cancer patients. *Integrative cancer therapies*, *8*(1), pp.29-36.

16. Ghasemzadeh, A. and Jaafar, H.Z., 2011. Antioxidant potential and anticancer activity of young ginger (Zingiber officinale Roscoe) grown under different CO2 concentration. *J Med Plants Res*, *5*(14), pp.3247-3255.

17. Kaschula, C.H., Hunter, R. and Parker, M.I., 2010. Garlic-derived anticancer agents: Structure and biological activity of ajoene. *Biofactors*, *36*(1), pp.78-85.

18. Chandra, A., 2018. Overview of cancer and medicinal herbs used for cancer therapy. *Asian Journal of Pharmaceutics (AJP)*, *12*(01).

19. Schulz AW. Cancer Diagnosis. Molecular Biology of Human Cancers. The Netherlands: Springer-Verlag; 2007. p. 427-47

20. Lu, D.Y., Lu, T.R., Putta, S., Xu, B. and Wu, H.Y., 2019. Anticancer drug discoveries from herbal medicine. *EC Pharmacology Toxicology*, *7*(9), pp.990-994.

21. Krup, V., Prakash, L.H. and Harini, A., 2013. Pharmacological activities of turmeric (Curcuma longa Linn): a review. *J Homeop Ayurv Med*, *2*(133), pp.2167-1206.

22. He, S.M., Yang, A.K., Li, X.T., Du, Y.M. and Zhou, S.F., 2010. Effects of herbal products on the metabolism and transport of anticancer agents. *Expert Opinion on Drug Metabolism & Toxicology*, *6*(10), pp.1195-1213.

23. Huang, W.Y., Cai, Y.Z. and Zhang, Y., 2009. Natural phenolic compounds from medicinal herbs and dietary plants: potential use for cancer prevention. *Nutrition and cancer*, *62*(1), pp.1-20.

24. Nahata A, Saxena A, Suri N, Saxena AK, Dixit VK (2013) Sphaeranthus indicus induce apoptosis through mitochondrial-dependent pathway in HL-60 cells and exerts cytotoxic potential on several human cancer cell lines. Integr Cancer Ther. 12(3): 236-47.

25. Lanksy EP, Robert AN (2007) Punica granatum (pomegranate) and its potential for prevention and treatment of inflammation and cancer. J Ethnopharmacol. 109(2): 177–206

26. Mi-Ja C, Cha-Kwon C, Yoonhwa J and Seung-Shi H:nAnticancer activity of subfractions containing pure compounds of Chaga mushroom (Inonotus obliquus) extract in human cancer cells and in Balbc/c mice bearing Sarcoma-180 cells, Nutr Res Pract. 2010; 4: 177-182.

27. Singh RH: An assessment of the ayurvedic concept of cancer and a new paradigm of anticancer treatment in Ayurveda. Journal of Alternative and Complementary Medicine 2002; 8: 609

28. Kumar, S., Keshamma, E., Trivedi, U., Janjua, D., Shaw, P., Kumar, R., Kumar, R. and Saha, P., 2022. A Meta Analysis of Different Herbs (Leaves, Roots, Stems) Used in Treatment of Cancer Cells. *Journal for Research in Applied Sciences and Biotechnology*, *1*(3), pp.92-101.

29. Rajesh, V.M., Kumar, P.S., Kumar, T.P., Kumar, B.M., Kumar, V.M.S., Raja, R.R. and Sreenivasulu, M., 2017. Oral Cancer and Potential Medicinal Herbs-An Overview.

30. Tao, W., Li, B., Gao, S., Bai, Y., Shar, P.A., Zhang, W., Guo, Z., Sun, K., Fu, Y., Huang, C. and Zheng, C., 2015. CancerHSP: anticancer herbs database of systems pharmacology. *Scientific reports*, *5*(1), p.11481.

31. Shoemaker, M., Hamilton, B., Dairkee, S.H., Cohen, I. and Campbell, M.J., 2005. In vitro anticancer activity of twelve Chinese medicinal herbs. *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives*, *19*(7), pp.649-651.

32. Powell, C.B., Fung, P., Jackson, J., Dall'Era, J., Lewkowicz, D., Cohen, I. and Smith-McCune, K., 2003. Aqueous extract of herba Scutellaria barbatae, a Chinese herb used for ovarian cancer, induces apoptosis of ovarian cancer cell lines. *Gynecologic Oncology*, *91*(2), pp.332-340.

33. Jiso, A., Khemawoot, P., Techapichetvanich, P., Soopairin, S., Phoemsap, K., Damrongsakul, P., Wongwiwatthananukit, S. and Vivithanaporn, P., 2022. Drug-Herb Interactions among Thai Herbs and Anticancer Drugs: A Scoping Review. *Pharmaceuticals*, *15*(2), p.146.

34. Ho, J.W., Leung, Y. and Chan, C., 2002. Herbal medicine in the treatment of cancer. *Current Medicinal Chemistry-Anti-Cancer Agents*, *2*(2), pp.209-214.

35. Treasure, J., 2005, August. Herbal medicine and cancer: an introductory overview. In *Seminars in oncology nursing* (Vol. 21, No. 3, pp. 177-183). WB Saunders.

36. Sparreboom, A., Cox, M.C., Acharya, M.R. and Figg, W.D., 2004. Herbal remedies in the United States: potential adverse interactions with anticancer agents. *Journal of clinical oncology*, *22*(12), pp.2489-2503.

37. Agarwal, N., Majee, C. and Chakraborthy, G.S., 2012. Natural herbs as anticancer drugs. *Int J PharmTech Res*, *4*(3), pp.1142-53.