World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 5.008

HERBAL DRUGS: A BOON FOR CANCER PATIENT

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Article Received on 24/10/2018 **Article Revised on 14/11/2018** **Article Accepted on 04/12/2018**

ABSTRACT

Cancer accounts for major deaths in the world. In 2016, 8.9 million people have died from various forms of cancer. Due to lack of full response in specific tissue that maintains cellular differentiation, proliferation, survival & death cancer causes local damage & inflammation of cells, hence it is a biological complex disease. In *Ayurvedic* classics it can be co-related with *Granthi* or *Arbuda*. Studies have suggested that bioactive photochemical present in *Ayurvedic* plants inhibits inflammatory pathways. This review will focuses on chemical compounds derived from plants which in recent years shows promise as anticancer agents and will outline their potential mechanism of action.

KEYWORDS: *Granthi*, *Arbuda*, photochemical.

INTRODUCTION

Cancer includes large number of diseases characterised by abnormal cell development that divide at uncontrolled rate & have capacity to destroy normal body tissue. It often spreads throughout the body.[1] It accounts for every sixth death in world & is second leading cause of death after cardiovascular diseases. In 2016, 8.9 million people have died from cancer. It is estimated by 2030, globally 21.7 million new cancer cases may exist & 13 million deaths occur due to the growth and aging of the population.[2] As per *Ayurvedic* concept, according to *'Charaka'*&'*Sushruta Samhitas'* cancer mentioned as '*Granthi'* (minor neoplasm) or '*Arbuda'* (major neoplasm) & described as inflammatory or non-inflammatory swelling.[3] The three basis of *Ayurveda* includes nervous system (*Vata* or air), the venous system *(Pitta* or fire) and the arterial system (*Kapha* or water) which are essential for normal body functions. In *Tridosha (*malignant tumours) all three system are uncontrolled that causes loss of mutual co-ordinates leading to tissue damage resulting in critical conditions. *Tridoshas* also leads to proliferation due to excessive metabolic crisis.[4] The *Ayurvedic* medicinal plants received particular interest & have special place in treatment of different types of cancer with established outcomes photochemical with pharmacologically important functions have been isolated from *Ayurvedic* herbs such as alkaloids, carotenoids, phenolics, organo sulphur compounds, non-protein amino acids, saponins, flavonoids.[5] For example, flavonoids such as apigenin and quercetin have been shown to inhibit melanoma cancer cell lines and metastasis.[6]

METHOD

***Amla* (Phyllanthus emblica):** It prevents carcinogenesis as it possess immuno- modulatory, anti- oxidative, anti-inflammatory and anti-mutagenic activities.[7] *In-vitro and In-vivo* experiments point out that fruit extract of P. emblica has anti-carcinogenic property. Recent study indicates that P. emblica extract inhibits ovarian cancer cell proliferation by inhibiting angiogenesis & inducing autophagy both *In-vitro* & *In-vivo*.[8] Gallic acid, bioactive compound present in it causes cell death through induction of apoptosis due to presence of bioactive compound.

***Haldi* (Curcuma longa):** since generations, it has been essential component of many Asian medicines. It is used in diet & preparation of curries due to its preservative, flavouring & colouring properties. It is also used in treatment of skin wounds, hepatic, biliary disorders & certain forms of cancer due to presence of curcumin which is potent antioxidant & thus, inhibits growth of cancerous cells. It can leads to DNA mutation by acting on various temporal stages of carcinogenesis through process of tumorigenesis, growth and metastasis. It can also have effect on various transcription factors, oncogenes and signalling proteins. Due to free radicals quenching properties it plays an important role in inhibitory effect of compound on initial stages of

carcinogenesis. Curcumin also has ability to suppress UV radiation induced DNA mutagenesis & induction of cellular SOS functions.[9]

***Lahsun* (Allium sativum):** Through study on laboratory animals it has been suggested to provide protection against cancer associated with skin, colon, breast, liver.[10] etc. It also prevents stomach cancer by acting against Helicobacter pylori.[11] Anti-carcinogenic mechanisms of garlic include inhibition of carcinogen activation.[12] the enhancement of detoxification[13] excretion[14] and the protection of DNA from activated carcinogens.[15] It blocks covalent binding site of carcinogenesis to DNA, enhances degradation of carcinogens, have anti-oxidative free radical scavenging properties. It also regulates cell proliferation, apoptosis & also induces apoptosis in human leukemic cells through stimulation of peroxide production, activation of caspase-3-like and caspase-8 activity. It also has synergistic effect of a breast cancer suppressor, eicosapentaenoic acid, and also has antagonizes effect on breast cancer enhancer, linoleic acid.[16]

***Neem* (Azadirachta indica):** Through study of aqueous extract of neem, it has been observed to prevent cancer development at extra hepatic areas (17) due to modulatory effect of neem leaf on hepatic & blood oxidant antioxidant status. Compounds isolated from neem shown to have impressive efficacy against wide variety of human cancer lines & also in animal models for human cancer that includes cancer of colon, stomach, lungs, liver, skin, oral, prostrate, and breast cancers (18). Its components exert anticancer effect by induction of apoptosis as well as other forms of cell death including autophagy. In leukaemia & prostate cancer.[20] extracts from leaves & seeds of neem induces apoptosis. Increasing number of less characterised limonoids has recently been isolated from different parts of neem & exhibits proapoptotic effects in leukaemia and stomach cancer cells.[19]

***Kalmeg* (Andrographis paniculata):** Its active compound Andrographolide possess anti-cancerous properties (21) revealed in several *in vitro* and *in vivo* studies against B16F0 melanoma syngeneic and HT-29 xenograft models , 2-cell line panel containing MCF-7 (breast cancer cell line) and HCT-116 (colon cancer cell line), multiple myeloma(22). In human study commenced by Darryl and co-authors, twice daily dose of 500 mg of *A. paniculata* along with other nutraceuticals by 20 patients showed significant improvement in the patients at last stage of cancer.[23]

***Mulethi* (Glycyrrhiza glabra):** Its aqueous extract inhibits *in-vivo* and *in-vitro* proliferation or Ehrlich ascites tumor cells and inhibits angiogenesis in *in-vivo assay*, peritoneal and choreoallantonic membrane assay.[24] The ethanolic extract of G. uralensis induces apoptosis and G1 cell cycle arrest in MCF-7 human breast cancer cells.[25] There are many studies about the anti-cancer effects of several derivatives of its components. Glycyrrhetic acid through induction of mitochondrial permeability triggers the pro-apoptotic pathway. This property finds uses for induction of apoptosis of cancer cells.[26] A new retrochalcone licochalcone E, from the roots of G. inflate, exhibits the most potent cytotoxic effect compared with the known antitumor agents, lichochalcone A and isoliquiritigenin.[27]

CONCLUSION

Consumption of diet rich in fruits, vegetables, grains and herbal extracts rich in neutraceuticals is a part of Ayurveda practise to bring about health benefits. The quest for pharmaceutical drug leads from Ayurvedic medicinal plants has been rapidly growing. Cost effectiveness, reliability and least side effects are prime reasons for interest in medicinal plant herbs describes above contain multiple active principles that produces therapeutic benefits & lowers risk of adverse effects, avoids need for supplemental therapy to manage cancer by working in synergistic manner. Implementation of Ayurvedic therapies to fight cancer & risk of awareness to suggest an integrated approach for management & treatment of cancer should be done.

REFRENCES

1. https://www.mayoclinic.org/diseases-conditions/cancer/symptoms.../syc-20370588.
2. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, et al. Global cancer statistics, 2012.
3. Bhishagratha KL. Sushruta samhita. Sushruta samhita. Varanasi: Choukhamba Orientalia, 1991.
4. Balachandran P, Govindarajan R. Cancer: An ayurvedic perspective. Pharmacol Res., 2005; 51: 19–30.
5. Dutta S Natural sources as potential anti-cancer agents: A review, 2015.
6. Caltagirone S, Rossi C, Poggi A, Ranelletti FO, Natali PG, et al. Flavonoids apigenin and quercetin inhibit melanoma growth and metastatic potential., 2000.
7. Nandi P, Talukder G, Sharma A. Dietary chemoprevention of clastogenic effects of 3, 4-benzo (a) pyrene by Emblica officinalis Gaertn. fruit extract. Br J Cancer, 1997; 76(10): 1279-1283.
8. Tan ML, Sulaiman SF, Najimuddin N, Samian MR, Muhammad TS Methanolic extract of Pereskia bleo (Kunth) DC. (Cactaceae) induces apoptosis in breast carcinoma, T47-D cell line. J Ethnopharmacol, 2005; 96: 287-294. doi:10.1016/j.jep.2004.09.025.
9. Oda Y. Inhibitory effect of curcumin on SOS functions induced by UV irradiation. Mutat Res., 1995; 348: 67–73. doi: 10.1016/0165-7992(95)00048-8.
10. Li. H., H.Q. Li, Y. Wang, H.X. Xu, W.T. Fan, M.L. Wang, P.H. Sun and X.Y. Xie, Anintervention study to prevent gastric cancer by micro-selenium and large dose of allitridum, 2004.

11. Chan, J.M., F. Wang and E.A. Holly, Vegetable and fruit intake and pancreatic cancer in a population-based case-control study in the San Francisco bay area. Cancer Epidemiology, Biomarkers& Prevention, 2005; 14(9): 2093-2097.
12. Amagase H, Milner JA Impact of various sources of garlic and their constituents on, 12-dimethylbenz[a] anthracene binding to mammary cell DNA. Carcinogenesis, 1993; 14: 1627-1631.
13. Sumiyoshi H, Wargovich MJ Chemoprevention of, 2- dimethylhydrazine induced colon cancer in mice by naturally occurring organosulfur compounds. Cancer Res., 1990; 50: 5084-5087.
14. Tadi PP, Lau BH, Teel RW, Herrmann CE Binding of aflatoxin B1 to DNA inhibited by ajoene and diallyl sulfide. Anticancer Res, 1991; 11: 2037-2041.
15. Wallace GC, Haar CP, Vandergrift WA, Giglio P, Dixon-Mah YN, et al. Multi-targeted DATS prevents tumor progression and promotes apoptosis in ectopic glioblastoma xenografts in SCID mice via HDAC inhibition. J Neurooncol, 2013; 114: 43-50.
16. Gonzalez FJ Human cytochrome P450: possible roles of drugmetabolizing enzymes and polymorphic drug oxidation in addiction. NIDA Res Monogr, 1991; 111: 202-213.
17. S. Arivazhagan et al. Effects of aqueous extract s of neem (Azadi rachta indica) leaf on hepatic and blood oxidant-antioxidant status during experimental gastric carcinogenesis. JMed Food, 2004; 7(3): 334-9. http://dx.doi.org/ 10.1089/1096620041938731 PMid: 15383228.
18. Sunday E. Atawodi et al. Azadirachta i ndica: A Plant of multiple Biological and Pharmacological Activities. Springerlink, 2009; 8(3): 601-620.
19. Kikuchi T, Ishii K, Noto T, Takahashi A, Tabata K, Suzuki T, Akihisa T. Cytotoxic and apoptosis-inducing activities of limonoids from the seeds of *Azadirachta indica* (neem) J. Nat. Prod, 2011; 74: 866.
20. Mahapatra S, Karnes RJ, Holmes MW, Young CY, Cheville JC, Kohli M, Klee EW, Tindall DJ, Donkena KV. Novel molecular targets of *Azadirachta indica* associated with inhibition of tumor growth in prostate cancer. AAPS J., 2011; 13: 365–377.
21. Lim JC, Chan TK, Ng DS, Sagineedu SR, Stanslas J, et al. Andrographolide and its analogues: versatile bioactive molecules for combating inflammation and cancer, 2012.
22. Gunn EJ, Williams JT, Huynh DT, Iannotti MJ, Han C, et al. The natural products parthenolide and andrographolide exhibit anti-cancer stem cell activity in multiple myeloma, 2011.
23. D, Mason S, Roshan R Increased tumor necrosis factor alpha (TNF-alpha) and natural killer cell (NK) function using an integrative approach in late stage cancers, 2002.
24. Sheela ML, Ramakrishna MK, Salimath BP, Angiogenic and proliferative effects of the cytokine VEGF in Ehrlich ascites tumor cells is inhibited by Glycyrrhiza glabra. Int Immunopharmacol, 2006; 6: 494–498.
25. Jo EH, Kim SH, Ra JC, et al. Chemopreventive properties of the ethanol extract of Chinese licorice (Glycyrrhiza uralensis) root: induction of apoptosis and G1 cell cycle arrest in MCF-7 human breast cancer cells. Cancer Lett., 2005; 230: 239–247.
26. Salvi M, Fiore C, Armanini D, Toninello A, Glycyrrhetinic acid-induced permeability transition in rat liver mitochondria. Biochem Pharmacol, 2003; 66: 2375–2379.
27. Yoon G, Jung YD, Cheon SH, Cytotoxic allyl retrochalcone from the roots of Glycyrrhiza inflate. Chem Pharm Bull, 2005; 53: 694–695.