

Anticancer Medication:A Review

Anmol Sharma*, Ramandeep Singh

Himachal Institute of Pharmacy, Paonta Sahib, Himachal Pradesh, India

*Correspondence

Anmol Sharma

Himachal Institute of Pharmacy Paonta Sahib, Himachal Pradesh, India

Email: anisharma478@gmail.com

Received: 15-08-2019 / Revised: 22-11-2019 / Accepted: 15-12-2019

Abstract

Cancer is one of the most life threatening disease that is associated with the uncontrolled growth of the cell. These uncontrolled growth of cells can take place anywhere in the body. The patients with cancer has to face a lot of problems during the progression of the cancer and has been found to kill the patients if left untreated. However, many medications are used to treat the medicines but due to there higher toxicities they produce, is also a great matter of concern for cancer treatment. So it is one of the most essential matter to produce drugs either synthetically or from the plant source that may produce less toxicities and treat the people with cancer most effectively and efficiently. In this review we are going to discuss about the some medicinal plants that are found useful in cancer treatment. Also we are going to discuss about some allopathic medication that are used till now in cancer treatment.

Key words: Cancer, Medication, Review.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

Introduction

Cancer is a well recognizable global health problem responsible for approximately 7.6 millions deaths worldwide, which is expected to increase to 13.1 millions by 2030. Despite the progress in the field of cancer research, both developing and developed countries are in the grip of this deadly disease and still there is a need to discover and develop anticancer therapeutic agents.[1]

Herbal medicines are being used by 75-80% of world population especially those living in developing countries. Herbal medicines include herbs, herbal substances and products, plants or combination of plants before the discovery of new drugs have been used for thousand of years.[2]

Medicinal plants relieve and treat cancer by making use of the compounds naturally present with antioxidant, anticancer activities that are known to inhibit or kill carcinogenic cells, some plants may contain properties that naturally have the ability to prevent the spread or risk of developing various forms of cancer. [3]

Significance of Herbs in Cancer Therapy

Plant derived phytochemicals possessing anticancer activities have received considerable attention in recent

years due to the adverse effects produced by chemotherapy and radiation therapy. Phytochemicals derived from traditional medicinal plants have been found to possess Anticancer and chemo protective effects. They are safer for long term use in cancer patients. They provide nutrition and reduce the side effects of conventional cancer therapy due to effective antioxidant activity. [4]

Types of cancer[5]

Cancer of blood and lymphatic system

- a) Hodgkins disease
- b) Leukemias
- c) Lymphomas
- d) Multiple myeloma
- e) Waldenstrom's disease

Skin cancer

Malignant melanoma

Cancer of digestive systems

- a) Esophageal cancer
- b) Stomach cancer
- c) Cancer of pancreas
- d) Liver cancer
- e) Colon and rectal cancer

f) Anal cancer

Cancer of urinary system

a) Kidney cancer

b) Bladder cancer

c) Testicular cancer

d) Prostate cancer

• Mouth sores

• Nausea, vomiting

• Loss of appetite

• Constipation or diarrhea

• Hair loss

• Skin changes or reactions

• Pain or nerve changes

• Changes in fertility and sexuality [7]

Common side effects of chemotherapy

- Low blood counts causes an increased possibility of developing infection or anemia
- Tiredness

Herbal plants having anticancer activity: Table 1
Shows plants having anticancer activity

Table 1: Shows plants having anticancer activity

Sr no	Scientific name	family	Part with extracted solvent	Experimental model	Mechanism of action
1	<i>Embelica officinalis</i>	Euphorbiaceae	Aqueous extract	Dalton's lymphoma bearing mice	Reduce ascitic volume and solid tumor growth
2	<i>Eugenia caryophyllata</i>	Myrtaceae	Eugenol from seeds	Human promyelocytic leukemia cells(HL-60)	DNA fragmentation and formation of DNA ladders, transduce the apoptotic signal via ROS generation
3	<i>Ferula asafoetida</i>	Umbelliferae	Asafoetida from seeds	N-methyl-N-nitrosourea(MNU)-induced carcinogenesis in Sprague-dawley rats	Reduce the level of cytochrome P450 And B5, enhance the activities of glutathione s-transferase
4	<i>Gardenia gummifera</i>	Rubiaceae	Dikamaliartane-A is from benzene gum resin extract	HeLa(cervical cancer) and MCF-7 (breast cancer) cell lines	Decreased the tumor volume, packed cell volume and viable tumor cell count. Increases the hemoglobin And red blood cell levels.
5	<i>Glycyrrhiza glabra</i>	fabaceae	Aqueous root extract	Ehrlich ascites tumor cell lines	In the levels of cytokine VEGF and micro vessel density count in the peritoneum of mice treated with plant extract decreases VEGF production.

Podophyllum peltatum (American may apple) and *Podophyllum hexadrum* (Himalayan may apple)

These contains podophyllin, which has similar therapeutic action on the dividing cancerous cells as that of the vinca alkaloids. Podophyllin arrests multiplication of cancerous cells by breaking down the microtubules into smaller subunits thus inhibiting the cell division. It is used in treatment of Hodgkin's

disease, non-hodgkin's lymphoma, leukaemia, bronchogenic carcinoma and cancer of ovary and testis.[8]

Allium sativum (garlic)

Garlic has been used for thousands of years to treat various diseases. The earliest use of garlic as a medicine has been recorded in ancient Egypt, Greece, India etc. Garlic contains more than 100

biologically active secondary metabolites as allin, allinase, allicin, S-allyl-cysteine etc. garlic oil prevents prostaglandin dependent cancers by inhibiting Lipoxygenase and cyclo-oxygenase enzyme also it contains some cellular oxidant.[9]

Asparagus racemosus (shatavari)

Shatavari or *Asparagus racemosus* is species which is belonging to Asparagaceae family. In addition to its traditional medicinal value, it has been documented that asparagine A which is isolated from *Asparagus racemosus* showed antitumor activity.[10]

Catharantus roseus (vinca)

It is 1 metre tall evergreen shrub belonging to family berberdaceae commonly known as vincarosea. Vinblastine is a vinva alkaloid and a chemical analog of vincristine and generated in plant by joining to of alkaloids catharanthine and vindoline. It is an antimicrotubule drug used in certain kinds of cancer, including Hodgkin's lymphoma, non, cell lung cancer, breast cancer, head and neck cancer and testicular

cancer. It is also used to treat Langerhans's cell histiocytosis.[11]

Corcus sativa (saffron)

It is 20-30 cm tall commonly known as saffron crocus belonging to family Iridiaceae. Stigmas of flower contain crocin, anthocyanin. Carotene and lycopene and these constituents have various pharmacological effects on different illness. Among all the constituents crocin have anticancer activity and basically used for colorectal cancer treatment.[12]

Glycyrrhiza glabra (liquorice)

Flavonoids derived from *Glycyrrhiza glabra* possess strong anticancer, antioxidant, antimutagenic, anti HIV and hepatoprotective properties. Licochalcone-A isolated from *Glycyrrhiza glabra*, inhibits growth and spread of various cancers particularly the androgen-refractory prostate cancer by inducing apoptosis and arresting cancer cell division. *Glycyrrhiza glabra* stimulates immune system response of the body and protects against colon cancer and oestrogen positive breast cancer.[13]

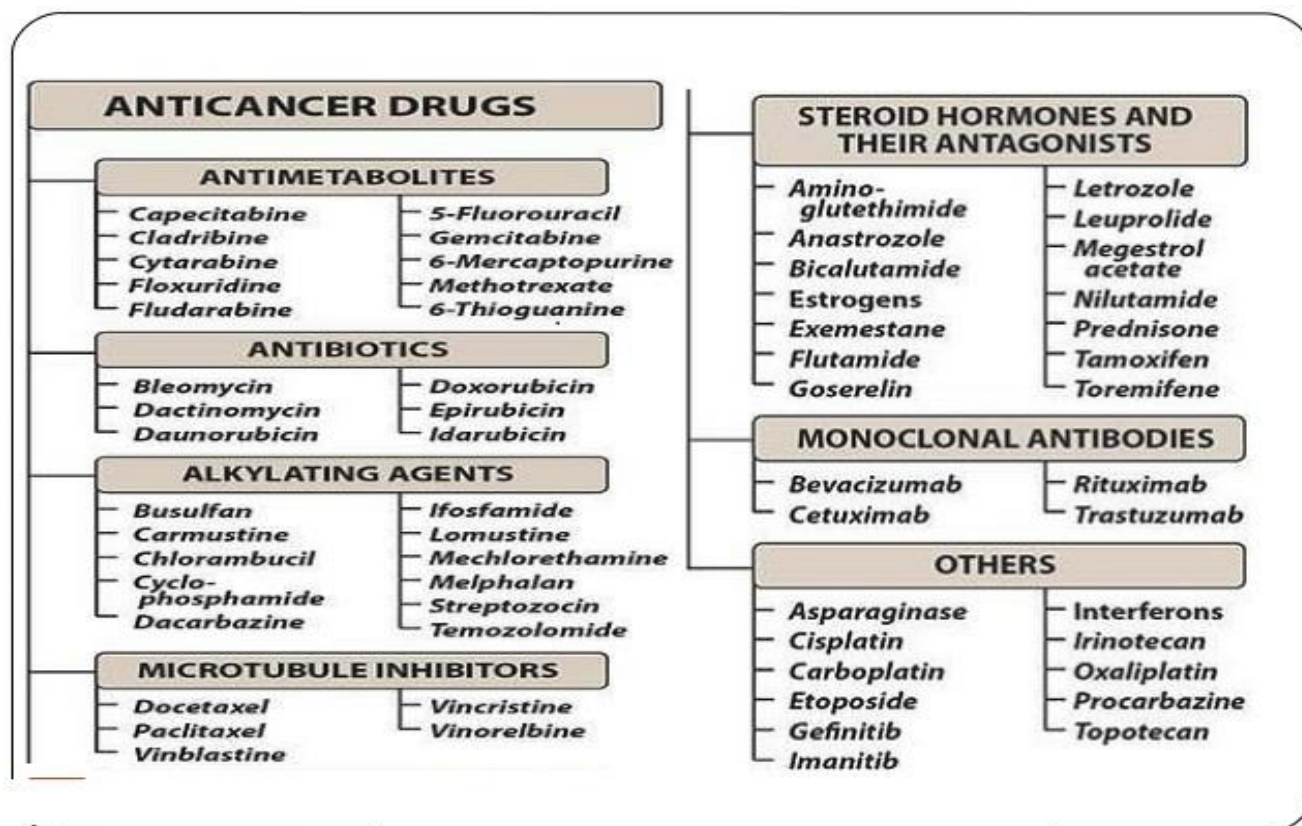


Fig. 1: Classification of drugs[14]

General Toxicity of Cytotoxic Drugs[15]

- **BONE MARROW** : depression of bone marrow results in granulocytopenia, agranulocytosis, thrombocytopenia, aplastic anemia.
- **ORAL CAVITY**: The oral mucosa is generally susceptible to cytotoxic drugs because of high epithelial cell turnover. Many chemotherapeutic drugs particularly flurouracil, methotrexate, daunorubicin, doxorubicin produce stomatitis.
- **GIT**: Diarrhoea, shedding of mucosa, haemorrhages occur due to decrease in the rate of renewal of gastrointestinal mucous lining. Drugs that prominently cause mucositis are bleomycin, actinomycin D, daunorubicin, doxorubicin, flurouracil and methotrexate.
- **SKIN**: Alopecia occurs due to damage to the cells in hair follicles. Dermatitis is another complication.
- **FOETUS**: Particularly all cytotoxic drugs given to pregnant women profoundly damage the developing foetus abortion, foetal death, teratogenesis.
- **CARCINOGENECITY**: Secondary cancers especially leukemias, lymphomas and histocytic tumpurs appear with grater frequency many year after the use of cytotoxic drugs. This may be due to depression of cell mediated and humoral blocking factors against neoplasia.
- **GONADS**: Inhibition of gonadal cells causes oligozoospermia and impotence in males;inhibition of ovulation and amenorrhoea are common in females

Conclusion

The herbal medicines has been found to produce less toxic or no toxic effects in the patients with cancer and has been found essential in contributing in the discovery of newer agents with less toxicities that can be used effectively and efficiently. Though as it is clear that most of the chemotherapeutic agents produce many side effects like alopecia, mucositis etc. which may be mild to severe however they are intended to relief the patients but in response they have general toxicities. Also these therapeutic agents have relatively higher cost as compared to herbal medicinal agents used in the cancer. So use of herbal medicinal agents in treatment of cancer may prove less cost effective and affordable by poor people also.

References

1. Madisetty Adi Lakshmi, M Vishnu Priya ,Chinta Sanjeeva kumari Human papilloma virus status in cervical cancer predictive and prognostic significance for chemo radiation treatment, Asian Pac. J. Health Sci., 2016; 3 (4):189-198.
2. Safarzadeh E, Sandoghchian s, Baradaran B, Herbal medicines as inducers of apoptosis in cancer treatment, Advanced pharmaceutical bulletein , 2014 oct;4; 421-427.
3. Lakshmi PriyaM.,BhanuPriyaK.,et.al. , herbal and medicinal plants molecules toward treatment of cancer: A mini review, American Journal of Ethnomedicine,2015;2:138.
4. Jeeva Gladys R, Kalaiarasi R, Elangovan S, Mubarak H.,Screening of Siddha Medicinal Plants for Anticancer Activity- A Review, Journal of Applied Pharmaceutical science 2013;3:176-182.
5. Shah Islam Tajamul, Ahmad Naseer, Ahmad Gowhar, Cancer and Natural Products, IOSR Journal of Pharmacy and biological sciences, 2017;12:71.
6. https://www.researchgate.net/figure/List-of-Medicinal-plants-for-anti-cancer-with-scientific-validation-Continued_tbl4_279891953
7. <https://uihc.org/health-topics/side-effects-anti-cancer-drugs>
8. Sanjaralam, Deepti katiyar, Richa Goel, Amita Vats, Ashu Mittal, Roles of herbals in cancer management, The journal of phytopharmacology”,2013;2(6):47.
9. Tamrat Tesfaye Ayele, A review on traditionally used medicinal plants/herbs for cancer therapy in Ethiopia current status, challenge and future perspectives,organic chemistry:current research, 2018;7:2-4.
10. Chaudhary Gulshan,Dewakar Kumar Manoj,International research journal of pharmacy 2014;5(4):264.
11. Dave Shreya, Modi HA,Jain NK, Assesment of anticancer properties of few medicinal plants, Journal of pharmacognosy and phytochemistry 2016;5(4):48.
12. https://www.google.com/search?q=anti+cancer+drugs+list&sa=X&hl=en&biw=1034&bih=620&tbm=isch&source=iu&ictx=1&fir=tC12hF2b7IJysM%253A%252CjOnLmYZXTd6MGM%252C_&vet=1&usg=AI4_-kThre4nRuZWNEqyebwf3wkCRudeg&ved=2ahUKEwjuxL-AzIjpAhVc63MBHUpZAJsQ9QEwEnoECAkQHw#imgsrc=u97tvvE7PwBJWM
13. Tripathi KD, Essential of Medical Pharmacology, Seventh edition 2013 reprint 2015, Jaypee Brothers Medical Publishers(P) Ltd,pp 859

Source of Support: Nil**Conflict of Interest: Nil**