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Usage of Plants in Treatment of Cancer Diseases

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Abstract—*Types of Cancer are a big problem which many people are struggling with in the current century all over the world. Developments in the cure of cancer diseases resulted in appearance of medicinal plants. The synthetic drugs have more side effects on animal bodies, and any side effects can not be found in natural plant drugs.*

Many plants and their extracts contain some of the ingredients which are effective on types of cancer cell lines such as colon(HT-29) and liver(HEP-2)(Singh et al,2017),cervical cancer (HPV 16 and 18(human population virus))(Waheed et al,2012),HeLa(Cervical cancer) and MCF-7(Breast cancer) cell lines (Kiranmayi et al,2011), Huh-7 (hepatic carcinoma cells), HTB-43 (oropharyngeal carcinoma cells) and ECV-304 (urinary bladder carcinoma cells) cell lines(Catalano et al.2013) and etc.

With the identification of the medicinal properties of plants and the use of their active ingredients in the manufacture of drugs and plant vaccines, it is hoped that in near future a definitive treatment of many cancerous diseases can be achieved.

Keywords *:Cancer, Plant drugs, cell lines cancer.*

1. INTRODUCTION

Cancer is an unusual growth of cells which resulted in formation of tumor cells (cell mass) in different tissues or organs of the body and they often tend to have metastasis in the body (move to the other side of the body).

Cancer is the leading cause of deaths worldwide after cardiovascular diseases [1]

About 30-40% of cancer diseases are directly or indirectly relevant to unsuitable diet and related factors[2].Epidemiological studies indicated positive association between intake of fruits and vegetables and reduced mortality from cancers, heart and other degenerative diseases[3-6].

Today, different methods are used to treat various types of cancer, one of which is the use of medicinal plants.

Many plants and their extracts contain some of the ingredients which are effective on types of cancer cell lines like liver cancer, colon cancer, cervical cancer and etc. Some of them are mentioned in this article.

The HeLa and MCF-7 cells were treated with Metabolic extract of *Argemone Mexicana* Linn[**7**]. The hydroalcoholic extract of roots of *Justiciatranquibariens*possessed a moderate amount of anticancer activity and the IC50 value was greater than 200 µg/ml.[8]. *AchyranthesasperaL.root extracts possess* anticancer activity against tow human cancer cell lines namely liver (Hep-2) and colon (HT-29)[9].

In contrast, plants offer a costeffective platform for the production of low-cost vaccines. Production of vaccines from plants has many advantages: low cost, scalability, low health risks.[10]

Plant extract from Arctiumlappa, Berberis vulgaris and Eschscholtiacalifornica exhibited a high level of cytotoxicity on MCF-7, Huh-7, HTB-43 and ECV-304 cancer cells[11].

2. CAUSES OF CANCER

Factors that affect to Create types of Cancer are very diverse, some of which can be mentioned in this study:

Different causes of cancer include chemical (tobacco smoke, arsenic), physical(UV, ionizing radiations) and biological (viruses, , parasites, bacteria) agents (12). Also, less than 3–10% of all cancer cases are related genetic mutation[13].

Physical and chemical agents

Tobacco smoking

80% of lung cancer is related tobacco smoking. Also smoking is assoisiated with other cancers like neck,larynx, stomach, head, bladder, pancreas and kidney[14,15,16].

Materials

Certain substances cause cancer such as benzene,cobalt,nickel, crystalline silica ,vinyl chloride, radon, cadmium ,radium, plutonium and etc.[17]

Biological agents:

A virus that can cause cancer is called an *oncovirus*. These include human papillomavirus(cervical carcinoma), Epstein–Barr virus (B-cell lymphoproliferative disease and nasopharyngeal carcinoma),

In Western developed countries, human papillomavirus (HPV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are the most common oncoviruses.[18] In the United States, HPV causes most cervical cancers, as well as some cancers of the vagina, vulva, penis, anus, rectum, throat, tongue and tonsils[19]. Certain bacterial infections also increase the risk of cancer, as seen in Helicobacter pylori-induced gastric carcinoma.[20]. Parasitic infections strongly associated with cancer include *Schistosomahaematobium* (squamous cell carcinoma of the bladder) and the liver flukes, *Opisthorchisviverrini* and *Clonorchissinensis* (cholangiocarcinoma).[12]

Life style

Some life style factor are related cancer diseases such as diet and alcohol.

For example Betel nut chewing has been shown to cause oral cancers and a high-salt diet is linked to gastric cancer .[21] The relationship between diet and the development of particular cancers may partly explain differences in cancer incidence in different countries. For example, gastric cancer is more common in Japan due to the frequency of high-salt diets and colon cancer is more common in the United States due to the increased intake of processed and red meats[22] .

Alcohol is an example of a chemical carcinogen. In particular, alcohol use has been shown to increase the risk of developing cancers of the mouth, esophagus, pharynx, larynx, stomach, liver, ovaries, and colon.[23] .Also alcohol causes changes in DNA methylation that is related to cancer diseases. [24]

3. USE OF MEDICINAL PLANTS IN CANCER THERAPY:

Chemotherapy is one of the methods for treatment of cancer which includes the high risk dosage of chemical drugs leading to high toxic cases at times. 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. The anticancer properties of plants have been recognized for centuries[25].

The chemical components of medicinal plants mainly possess antioxidant properties that contribute to their anticancer potential. Flavones, isoflavones, flavonoids, anthocyanins, coumarins, lignans, catechins, and isocatechins are the major classes of bioactive constituents responsible for the antioxidant action [26]

The market statistics mark the availability of approximately 60% plant-based anticancer drugs [27]. Cytotoxic screening of a number of plants has been done to correlate their anticancer activity and further expand their scope for drug development [28]

Compounds which have been identified and extracted from terrestrial plants for their anticancer properties include polyphenols, brassinosteroids and taxols.

a. Polyphenols

Polyphenolic compounds include flavonoids, tannins, curcumin, resveratrol and gallacatechins and are all considered to be anticancer compounds[29] Resveratrol can be found in foods including peanuts and grapes and red wine.

b. Flavonoids

Flavonoids are from the polyphenolic compounds and constitute a large family of plant secondary metabolites with 10,000 known structures .[30]

Purified flavonoids have shown anticancer activities against some human cancers including; hepatoma (Hep-G2), cervical carcinoma (Hela) and breast cancer (MCF-7)[31]

c. Brassinosteroids

Brassinosteroids (BRs) are naturally occurring compounds found in plants which play roles in hormone signaling to regulate growth and differentiation of cells, elongation of stem and root cells and other roles such as resistance and tolerance against disease and stress.[32] BRs are another naturally occurring compounds which have demonstrated therapeutic significance in the cause against cancer.

BRs have been used in investigations to treat a range of cancer cell lines which include; T-lymphoblastic leukaemia CEM, multiple myeloma RPMI 8226, cervical carcinoma HeLa, lung carcinoma A-549 and osteosarcoma HOS cell lines [33]

4. CONCLUSION

With the use of such plant drugs that do not have any side effects to the body, one can expect a clear venture for the definitive treatment of cancers.

With the identification of the medicinal properties of plants and the use of their active ingredients in the manufacture of drugs and plant vaccines, it is hoped that in near future a definitive treatment of many cancerous diseases can be achieved

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