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Schedule E1 Medicines Utilised in Ayurveda Formulations have Anti-Cancer Properties

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Abstract

A significant section of the Substances and Cosmetics Act (Government of India) is Schedule E1, which contains a list of toxic drugs with animal, plant, and mineral origins that must be consumed under medical supervision. The world's oldest medical system, Ayurveda, has a list of medications included in category E1 that have been in use for a very long time. This review details the anti-cancer properties of fifteen poisonous ayurvedic medicines derived from plants that are listed under the 1940 Drugs and Cosmetics Act [1-15]. The data was gathered from a variety of reliable sources, compiled, and summarised. extracts from plants, Mammary carcinoma, neuroblastoma, non-small cell lung carcinoma, lymphocytic leukaemia, colorectal adenocarcinoma, Ehrlich ascites carcinoma, prostate adenocarcinoma, glioblastoma asterocytoma, and other malignancies have been successfully treated with formulations, phytoconstituents, and other preparations of these drugs. They work by a number of different methods, including as upregulating Bax and downregulating Bcl2, causing cell cycle arrest during the S and G2/M phases, inhibiting vascular endothelial growth factors, and inhibiting Akt/mTOR signalling, among others. These herbs are used in several traditional ayurveda remedies, which have been reported to have positive effects. These medications have been discussed as adjuvant and alternative treatment agents in the context of current cancer care. According to the findings, these medications may one day be used to treat cancers urgently.

Introduction

Even when patients receive cutting-edge treatments for cancer including chemotherapy, radiation therapy, and surgery, the disease still has many comorbidities and bad consequences. It can simply be described as a genetic disorder that mostly develops as a result of DNA damage, followed by cell division.Injurious agents including tobacco smoke, ultraviolet radiation, chemicals that cause cancer, and some illnesses can damage DNA and produce mutations that may lead to the growth of malignancies. The main factor contributing to an increased risk in older people is a loss in the body's capacity to eradicate cancer cells with age.

The names of the more than 100 different forms of cancer are primarily based on the organ in which they first appeared. Carcinoma (formed by epithelial cells), leukaemia (formed in bone marrow's blood-forming tissue), sarcoma (forms in bone and soft tissue), lymphoma (begins at lymphocytes), multiple myeloma (begins at plasma cells), melanoma (forms at melanocytes), and other types of cancer, including tumours of the brain and spinal cord, tumours of germ cells, and neuroendocrine tumours According to statistics, cancer causes 9% of all fatalities in India, with 1,392,179 cases reported for the year 2020.More than 1.7 million new cases and 1.2 million cancer-related fatalities were projected to occur in India in 2035, up from 1 million and 680,000, respectively, in 2012.According to the project GLOBOCAN of the International Agency for Research on Cancer, there were approximately 19.3 million new cases of cancer and 10 million cancer-related deaths in the world in 2020. In 2040, there will likely be 28.4 million new instances of cancer worldwide.

Subjective Heading

In the USA alone, there will likely be 1,898,160 new cases of cancer and 608,570 deaths from it in 2021. Prostate cancer is predicted to account for 26% of new cases in men and 30% of cases in women, followed by lung and bronchial cancer in both sexes.

Researchers from all over the world are actively looking for alternative and adjuvant treatment agents with a primary focus on natural sources like medicinal plants and conventional medical systems in order to reduce cancer-related morbidity and mortality. Ayurveda is a conventional medical system that was first used in India more than 5000 years ago.and is now a popular trend for treating a variety of health issues worldwide across the board for patients of all ages. The tumours and cancers are referred to as "Granthi" or "Arbuda" in the classical ayurvedic texts "Sushrutha Samhita" and "Charaka Samhita." However, despite their well-known medical benefits, several nations have laws that restrict the use of Ayurvedic medications.

Discussion

The Government of India's Substances and Cosmetics Act of 1940 and Drugs and Cosmetics Rules of 1945, as specified in Rule 161contain an essential section called Schedule E1 that identifies many toxic drugs based on the origin of such drugs under various medical systems. To reduce the risk of toxicity, these medications should only be taken as directed by a doctor and with a prescription. The system of Ayurveda covers 15 drugs under the heading of "vegetable origin," 1 drug under the heading of "animal origin," and 9 pharmaceuticals under the heading of "mineral origin," according to schedule E1 of the D&C Act 1940 (added under G.O.I. Notification No. 1-23/67-D dated 2-2-1970). Ahipena, Arka, Bhallataka, Bhanga, Danti, Dhattura, Gunja, Jaipala, Karaveera, Langali, Parasika Yavani, Snuhi, and others are among the listed medications of vegetable origin. Shringivisha and Vishamushti. Only the snake poison known as Sarpa Visha comes from

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animals. Hartala (arseno sulphide), Gauripashana (arsenic), Parada (mercury), Manahashila (arseno sulphide), Tuttha (copper sulphate), Rasa Karpura (hydrargyri subchloridum), Sindura (red oxide of lead), Hingula (cinnabar), and Girisindura are among the minerals that come from this (Red oxide of mercury).

The list of Schedule E1 medications was changed in the D&C rules of 1945, which led to the removal of some drugs. Snuhi was taken out of the list under "Ayurvedic medications of vegetable origin" and 14 other substances were added. Only the seeds were included in Gunja and Jaipala, whereas Ahipena and Bhanga were exempt. Acontium chasmanthum Stapf ex Holm is referenced in the D&C Act of 1940 and the Rules of 1945. Aconitum ferox, however, is referred to as Vatsanabha because this is how it was described in numerous texts. As it covers the list of medications in the subsequent revisions, this evaluation covers the drugs as defined by the D&C Act of 1940. also.

The fifteen Schedule E1 medications of vegetable origin have been subjected to varied anti-cancer actions in the study done so far. Some substances demonstrated the activities against the cancer cell lines represented by the glioma, neuroblastoma, ovarian, colon, cervical, oral, gastric, prostate, breast, kidney, and brain cancers as well as the human lymphoblast, lung adenocarcinoma, human cervical, leukaemia, and some other cancer cell lines.

S. anacardium, a deciduous tree from the anacardaceae family, is found in hotter regions of India and the sub-himalayan region. It is also known as a varnish tree and a marking nut tree. Bhallataka's ripe accompanying fruit is delicious and delectable, while the black fruit is regarded as toxic. When the resin from the black fruit and its skin come into touch, it produces severe allergies. When the seed is properly prepared, it is regarded as edible. According to the Formulary of Siddha Medicinethe milk extract of S. anacardium nuts that had been refined was found to have anti-hepatocellular carcinoma activity in experimental rats

India has employed C. sativa, a member of the Cannabaceae family, since the beginning of Ayurveda. This plant, often known as ganja, is a major source of phytocannabinoids that interact with the endocannabinoid system, a human neurotransmitter system. In cancer patients, it is used to reduce pain and nausea and to increase appetite. According to reports, cannabinoids' activation of cannabinoid receptors has anti-tumorigenic properties. According to reports, it can stop angiogenesis, reduce tumour cell growth, and trigger apoptosis. Cannabinoids' antitumor effects are more complicated since they can manifest through a variety of Cb receptor-independent pathways, including TRPV1, 5-HT3, and nicotinic acetylcholine receptor. routes for (nAChR) [43]. Non-small cell lung cancer, hepatocellular carcinoma, chronic lymphatic leukaemia, pancreatic cancer, prostate cancer, and breast cancer all have considerable expression of the cannabinoid (CB1 and CB2) receptors. Breast cancer cell line HER-2 increases CB2 expression, which activates the c-Src and ELK (ERK/MAPK cascade) tyrosine kinase family of pro-oncogenes.

Conclusion

The actions of the Ayurvedic Schedule E1 dugs of plant origin have been extensively investigated in several cancer models. They can be used in clinical settings and have a wide range of anti-cancer effects if raw drug evaluation is done correctly and dosage forms are standardised. Despite these research, additional analysis is still needed in the areas of cultivation and collecting, variance in phytochemicals, formulation creation, quantification of effective dosage, and clinical utilisation. To investigate the potency in various aspects of contemporary chemistry, the semisynthetic and synthetic derivatives of the active principles may be developed. Studies at the molecular level are possible. This can offer a more in-depth perspective on how numerous active principles interact both inside and outside the biological system. In addition to study and exploration, the current trend is shifting towards the use of natural treatments as adjuvant therapies since they help patients recover more quickly. A similar action might be taken to pave the way for lowering chemotherapy-related side effects and the occurrence of drug resistance in cancer patients.

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Conflict of Interest

The authors declare that they are no conflict of interest.

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