

## A Brief Review on Anticancer Drugs

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### ABSTRACT

Conventional anticancer medications have certain limitations linked to their poor water solubility and poor pharmacokinetics, which can result in serious unpleasant side effects and multidrug resistance in patients, which has hampered the development of chemotherapy. By enhancing medication delivery, nanocarriers were created to alleviate these issues, ushering in the age of nanomedicine in cancer. However, several carefully developed nanodrugs fell short of expectations when tested on patients, demonstrating the gap between nanoparticle design and their clinical translation, despite appealing findings being produced in preclinical trials. This review's objective is to assess how widely oncology uses nanotherapeutics. The barriers that hinder the use of nanodrugs in clinical settings are examined, and steps that must be made to fully realise the enormous promise of nanomedicine are underlined.

**KEYWORDS:** Cancer, Anticancer, Nanoparticles

### 1. INTRODUCTION

Cancer is a condition in which the body's own cells multiply and spread abnormally out of control. Oncology is the area of medicine that deals with understanding, diagnosing, treating, and preventing cancer. Even foetuses can get cancer, however the danger of the majority of kinds rises with age. Cells, the basic unit of life in the body, are where all malignancies start. Various cell kinds make up the body. As more of these cells are needed to maintain the body's health, they expand and divide in a regulated manner to create new ones. ones that are injured or old die and are replaced by fresh ones. But occasionally, this systematic procedure fails. A cell's genetic material, or DNA, may sustain damage, leading to mutations that interfere with normal cell development and division. When this occurs, cells do not decompose as they ought to and develop new cells when the body does not require them. A tumour is a lump of tissue that can be created by the excess cells. Targeted drug delivery is regarded as a technique in which a drug-carrier combination specifically distributes the medication to the preselected cell. The medicine should have the greatest concentration or impact when it reaches the target cell [1].

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Cancer is an unchecked cell proliferation that causes a lack of differentiation, the capacity to infect nearby tissues, and metastases that spread independently throughout the body. Cancer cells enter the bloodstream during metastasis and are transported to other areas of the body where they develop other, related growths. There are synthetic medications for the treatment of cancer, but they have side effects as well. Major therapeutic treatments for the early phases of tumour management include chemotherapy and radiation therapy, however these techniques have negative side effects. Humans have access to a wide range of beneficial sources from nature, mostly plants, for the discovery and development of medications to treat terrible diseases. Traditional herbal medicine is a successful cancer therapy method. There is evidence that drugs derived from medicinal plants are less harmful and have fewer adverse effects [2, 3].

### 2. Nanotechnology

The creation of API-containing nanoscale structures is known as nanotechnology. Nanotechnology is described as the study and application of structures between 1 and 100 nm in size. By adopting a

regulated and targeted medicine delivery strategy, nanotechnology aims to diagnose patients as correctly and quickly as possible and to treat them as effectively and without any side effects as feasible. Nanoparticles, Solid Lipid Nanoparticles, Nanosuspension, Nanoemulsion, and Nanocrystals are some significant Drug Delivery Systems created employing the concepts of nanotechnology. Pharmaceutical substances are transported via nanoparticles to provide better or more potent pharmacological effects. Combining nanotechnology and chemotherapy results in more effective medication delivery [4].

### 3. Plant as a Source of Anti-cancer Compounds:

Plant-derived chemicals have been proven to offer potential for the treatment or prevention of cancer in humans and are a significant source of therapeutically viable anti-cancer drugs. Plants have been used to cure cancer for a very long time; according to Hartwell, more than 3000 plant species are utilised to treat cancer. Many of the clinically utilised anticancer medicines today were developed with the help of plants and chemicals derived from plants. Chemotherapy, which is a common treatment for advanced cancers and a preventative measure against potential metastases, is extremely harmful to normal organs. Various human and animal ailments have been treated using plants. They support people's health and vigour while also curing illnesses like cancer without producing harm. Over 50% of all currently prescribed medications come from natural sources, many of which have the power to inhibit the growth of cancer cells [5].

### 4. Influence of Aging on Drug Pharmacokinetics

Numerous physiological factors change as we age, and these changes may have a significant impact on the PK of anticancer medicines. Changes in distribution, metabolism, and elimination factors can affect the PK profile in older individuals, but variations in absorption seldom result in alterations that are clinically significant. Tyrosine kinase inhibitors and endocrine medicines are examples of Class II oral therapeutic pharmaceuticals whose absorption increases with rising stomach pH, but changes in gastric pH may have varying effects on the absorption of anticancer treatments. Another illustration is capecitabine, which has a greater absorption in senior people with higher stomach pH, comparable to a higher absorption when fed than fasting [6].

It is challenging to estimate the overall impact of ageing on the PK profile of a particular medicine when it is given to older breast cancer patients due to

these multiple and complicated alterations. In addition to these physiological changes, a number of additional variables also add to the aged patient's anticancer medication treatment's difficulty. First off, older individuals frequently have several comorbidities and use medications that may impair anticancer therapy. For instance, after undergoing adjuvant chemotherapy for breast cancer, individuals with diabetes mellitus experienced greater toxicities associated with the chemotherapy regimen than the non-diabetic control group. An older patient's larger proportion of fat may lead to altered anticancer medication distribution and increased toxicity from different chemotherapy regimens. Additionally, it was shown that comorbidities had a substantial impact on the death rates of older cancer patients.

### 5. Factors Influencing Cancer:

#### 5.1. Age:

Older adults are more likely to get cancer; 78% of all cancer diagnoses are made in patients 55 years of age or older. Cancer may strike anybody. But as you become older, your chances of getting cancer greatly rise.

#### 5.2. Obesity and Physical Activity:

Obesity and inactivity are linked to an increased risk of developing cancer at a number of different cancer sites, including breast and endometrial cancer.

#### 5.3. Tobacco and Smoking:

The primary risk factor for cancer is tobacco usage. Regular tobacco use, including smoking, chewing, and snuffing, is to blame for 65% to 85% of cases of cancer in men and women, respectively.

#### 5.4. Alcohol consumption:

According to a new WHO monograph, alcohol usage is one of the leading causes of colon cancer. Globally, alcohol intake is thought to be a contributing factor in roughly 9.4% of new instances of colon cancer each year [7, 8].

### 6. Radiation

The radiations are well-known carcinogens in both industrialised and developing nations. Ionising and non-ionizing radiation effects contribute around 10% of cancer cases. Radiation is primarily produced by radioactive substances, ultraviolet radiation, and pulsed electromagnetic fields.

The mechanism behind cancer therapy includes: promoting apoptosis of cancer cells by increasing interferon-I, interleukin-2, immunoglobulin and complement production in blood serum; forcing the necrosis of tumour and preventing its translocation and spread by blocking the blood supply of tumour tissue [9].

## 7. Conclusion

The second greatest cause of death is cancer, behind cardiovascular disease. Cancer is an aberrant cell development that can be fatal in our body. There are numerous synthetic chemicals available for the treatment of cancer, but they are more harmful than medicinal plants with anticancer action. The use of medicinal plants with anticancer properties for both chemoprevention and therapy of cancer. Curcumin, vincristine, vinblastine, taxol, and other anticancer classes of constituents like vitamins, flavonoids, phenolic compounds, anthraquinones, carotenoids, diterpenoids, coumarins, tannins, saponins, and other miscellaneous compounds play important roles in the treatment and prevention of cancer. These medicinal plants include turmeric, vinca, taxus, neem, aloe vera, and broccoli.

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## References

- [1] Roger Walker, Clive Edwards. Cancer disease. In Roger Walker, The Textbook of Clinical pharmacy and Therapeutics, Third Edition. New Delhi, Jaypee Brothers Medical Publishers [P] Ltd 2003; 265-353.
- [2] Peppia LB, Blanchette JO, Nanoparticle and targeted system for cancer therapy. Adv Drug Deliv Rev. 2004; 56:1649-59.
- [3] Lee RJ, Low PS. Folate-mediated tumor cell targeting of liposome-entrapped doxorubicin in vitro. Biochem Biophys Acta 1995; 1233:134-144.
- [4] S. Rajeshkumar, M. Nagalingam, M. Ponnanikajamideen, M. Vanaja, C Malarkodi, "Anticancer11. Sinha R, Anderson DE, McDonald SS, Greenwald P, "Cancer Risk and Diet in India" J Postgrad Med., 2003; 49: 222-228.
- [5] Kreuter J, Nanoparticles-a historical perspective. Int J Pharm. 2007; 331:1-10.
- [6] Mohanraj VJ, Chen Y. Nanoparticles – A Review. Trop J Pharm Res. 2006; 5 [1]:561-73.
- [7] Soppimath KS, Aminabhavi TM, Kulkarni AR. Biodegradable polymeric nanoparticles as drug delivery devices. J Control Release 2001; 70: 1 –20.
- [8] Gelperina S, Kisich K, Heifets L. The Potential Advantages of Nanoparticle Drug Delivery Systems in Chemotherapy of Tuberculosis. Am J Respir Crit Care Med. 2005; 172[12]: 1487–1490.
- [9] Marcato PD, Duran N. New Aspects of Nanopharmaceutical Delivery Systems. J Nanosci Nanotechnol 2008; 8[5]:1-149.