



**Biotica
Research
Today**

**Vol 2:11 1111
2020 1112**

Mechanism of Herbal Medicine for Treatment of Cancer

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Keywords

Anticancer compounds, Cancer, Herbal drug-interactions, Medicinal herbs

Article History

Received in 29th October 2020

Received in revised form 04th November 2020

Accepted in final form 05th November 2020

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How to cite this article?

Razzak *et al.*, 2020. Mechanism of Herbal Medicine for Treatment of Cancer. Biotica Research Today 2(11): 1111-1112.

Abstract

In this modern lifestyle, cancer is observed as one of the most extensive diseases in the world and it is increasing day by day. It is mandatory to identify new strategies to prevent and treat diseases more effectively. Herbal medicines can perform a significant role by blocking critical biomedical pathways converting normal cells into cancer cells for treatment. Signal-transduction is blocked by herbal medicine in cancer and it is called the primary channel. Activities such as controlling the nuclear factor-kB signaling pathway, mitogen-activated protein kinases signal pathways, and protein tyrosine kinase pathway. Herbal products prevent side effects on healthy cells. For this type of benefit, people with cancer commonly use herbal products. In various studies says herbal medicines are widely used medicine among cancer patients as an alternative therapy.

Introduction

The Greek physician Hippocrates, Father of Medicine, the first name applied Greek words “carcinoma” and “Karakinos” to describe a tumor. Cancer is the source of abnormal growth of the cell and it spreads to the other parts of the body which can cause many types of cancer disease. Cancer was given the name by the type of tissue from where they emerged. Tumors develop from epithelia that are called “carcinomas.” Over the past years, neither occurrence nor mortality of human cancer has been much-decreasing value by a conscious human intervention which is unfortunate.

In many cases of cancer, surgery and radiotherapy are successful treatment. On the other hand, chemotherapy is effective in some advanced type of cancers. But the modern therapy of cancer identifies that not all the available treatments can cure every malignant tumor. Cancer treatment is needed to choose very carefully to maximize the chance of cure so that it could keep maximum life quality. Successful treatments have significant steps in specific cancers. But those modifications occur a small effect on cancer in the overall population. It helped many individuals as frequently as young people and children. Consequently better knowledge of molecular and cellular sites can open the door to success in the treatment of primary carcinomas. Also, molecular biological research can develop new drugs and new therapies.

Interruption in Cell Signal Transduction Pathways

Cancer is vigorously related to the defects in signal transduction proteins which outcome is uncontrolled and abnormal cell growth. Signal transduction is blocked by herbal drugs in various ways as follows:

Nuclear Factor (NF- κ B) Pathways with Activator Protein (Ap-1)

Nuclear factor (NF- κ B) with activator protein-1 (AP-1) are transcription factors that regulate many gene expression involved in oncogenesis, apoptosis, etc. by extracellular signals. It is predominantly a protein complex. It regulates the transcription of DNA, cytokine production, and cell survival. Cancer is related to incorrect regulation of NF- κ B, inflammatory, and autoimmune disease. With this mechanism, medicinal herbs inhibit the growth of cancer cells. In lung cancer, a botanical extract of mountain ginseng inhibits growth by regulating the NF- κ B signaling pathway.

Protein Tyrosine Kinase (PTK) Pathway

Protein tyrosine kinase is an enzyme. It can transfer a phosphate group to a protein in the cell. It can also be called shortly PTK. PTK function as active or not active in many cellular reactions. Also causes growth in signal transduction to cells.

Modification in the Cycle of Cell

The cell cycle maintains a natural and constant balance and also ensures standard cell escalation. Also, the change in the cell cycle leads to the tumor. G1 and G2 phases are the control points. These two control points cause elongation of the cell cycle. In the case of cancer, neoplastic cells are not capable to stop cell division at the control points (G1/S and G2/M). Also, the growth of cells becomes deregulated.

Mitogen-Activated Protein Kinases (MAPK) Signal Pathways

Cell division persuades by the signals of the MAPK signaling pathway. Consequently, the deregulation of MAPK signal pathways leads the way to carcinogenesis. This type of technique is applied to persuade apoptosis.

Cyclooxygenase (Cox-2) Pathways

This pathway is known as Cox-2 inhibitor that catalyzes the prostaglandin synthesis. Cox-2 inhibitor affects the growth of tumor cells by inhibiting cell escalation.

Intervention with Microscopically Small Tubules

In the cell's cytoplasm, microscopically small tubules known as microtubules are present. To prevent alignment of the daughter chromosomes and consequently stop mitosis at

anaphase, which is finally followed by apoptosis, microtubules play a vital role. In the investigation shows that herbaceous plant phytochemicals such as vinca alkaloids (vincristine and vinblastine), and taxanes which are important microtubulin-binding factors.

Topoisomerase Inhibitor

Balancing the capacity of topoisomerases herbal drugs are playing a crucial role in cancer treatment. Topoisomerase-II inhibits by the Camptothecins inhibit topoisomerase-I and epipodophyllotoxin.

Future Perspective

The more development in herbal medicines can control the side effects of the usual method of cancer treatment such as radiotherapy and chemotherapy. Examining the factors like efficacy, safety, and the use of herbal products can improve the proper use of plants in cancer treatment.

Conclusion

The importance of medicinal plants in this field is felt more than ever. Some medicinal plants are the sources of adjuvant therapy in the health systems worldwide, not only to treat diseases but also to prevent them and maintain health.

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