Chapter 8
Role of Nutraceuticals in Cancer

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ABSTRACT

Nutraceuticals are increasingly becoming popular for prevention and treatment of cancer. Association of adverse effects with standard treatment modalities of cancer has led to consideration of safer approaches. Nutraceuticals may help in prevention of cancer as well as in treatment and avoidance of side effects associated with chemo-radiation. The active components of nutraceuticals are known as phytochemicals. Many mechanisms have been put forward for the actions of these phytochemicals but an exact mechanism for a well defined role of a particular phytochemical in a specific type of cancer is yet to be elucidated. Thus, nutraceutical industry has emerged as a research oriented sector. It is important for the healthcare professionals to understand the categories, research developments, mechanism of action and areas of concern in the field of nutraceuticals.

INTRODUCTION

Food and nutrients play a vital role in maintaining the normalcy of body functioning. They are required to provide important biomolecules which participate in various biochemical and physiological processes and help in reducing the risk of adverse health conditions. Nutraceuticals are medicinal foods that play a significant role in maintaining well being of the body, boosting health, modulating immunity and hence, preventing as well as curing a number of diseases. These are able to reduce the suffering besides being able to provide nutrition to the body and are devoid of side effects. Therefore, there has been a surge in the last few years regarding the general interest of public and clinicians towards use of these compounds in medicine (Chintale, Kadam, Sakhare, Birajdar & Nalwad, 2013).

Cancer is one of the major burdens of disease worldwide. The enormity of this statement can be sensed by the fact that there are around ten million people being diagnosed with cancer each year around the world and more than fifty percent of these patients eventually succumb to this disease. It is the second most common cause of death following cardiovascular diseases as per the statistics provided.
by a number of countries. With significant improvement in treatment modalities and general awareness regarding cardiovascular diseases about modifiable factors, this disease will be superseded by cancer which has or will soon become the number one killer in many parts of the world. The burden of cancer around the globe is increasing at an alarming speed and the situation will worsen if measures are not taken at this stage to curtail its spread (Xiaomei & Herbert, 2006). As per the latest reports projected by National Cancer Institute, there will be 1,685,210 new cancer cases and 595,690 cancer deaths in 2016 in the United states. It projects that the most common cancers in 2016 are going to be breast cancer, lung and bronchus cancer, prostate cancer, colon and rectum cancer, bladder cancer, melanoma of the skin, non-Hodgkin lymphoma, thyroid cancer, kidney and renal pelvis cancer, leukemia, endometrial cancer and pancreatic cancer in that order (Siegel, Miller & Jemal, 2016).

In India, as per the report of news agency Press Trust of India (PTI) published on 19.05.16, the Indian Council of Medical Research (ICMR) has projected that in 2016, the total number of new cancer cases in India is expected to be around 14.5 lakhs and the figure is likely to reach nearly 17.3 lakhs new cases in 2020. According to this report, among females, breast cancer topped the list and among males, mouth cancer is at the top in the Indian population. This gives an idea about the enormity of the problem and that cancer is proving to be one of the major public health concern both country and worldwide.

Even with latest advancement in diagnostic and therapeutic techniques, it is still one of the major causes of mortality around the world. Standard available cancer treatment modalities are associated with a variety of side effects and lead to significant morbidity in cancer patients. The best approach to address this problem will be prevention of the disease. New avenues need to be explored for prevention of the disease, improving the outcome of treatment and to decrease the adverse effects associated with the treatment so as to increase the compliance and acceptability of treatment. This fact has led to an increased interest of both patients and treating clinicians in the field of alternative medicine in the form of nutraceuticals.

BACKGROUND

Cancer

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. Any abnormal growth of a tissue is known as a tumor. Tumors may be benign or malignant. Benign tumors do not spread to other parts of the body and are not life threatening. The malignant tumor is known as cancer. Possible signs and symptoms of cancer include a lump, abnormal bleeding, prolonged cough, unexplained weight loss and a change in bowel movements among many others depending upon the site of cancer and tissue involved. Over 100 types of cancers affect humans. The etiology is multifactorial including genetic predisposition, modern lifestyle, environmental pollution, some infections, food adulteration, liberal use of pesticides and insecticides for household purposes or in farming etc. The tumor may be classified into different stages depending upon its size and spread beginning from pre-malignant stage to advanced stage or stage IV or metastatic tumor ((Xiaomei & Herbert, 2006).