

Nutritional Therapy as a Potent Alternate to Chemotherapy against Cancer

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Editorial

The spread of cancer in high intensity is a major cause of concern globally. It is developing in an alarming rate irrespective of age, sex, racial/ethnic group, geographic location and tissue invaded. It is marked by uncontrolled division of cells with the ability to invade other tissues, either by direct growth into the adjacent tissue through invasion, or by the migration into the distant sites by metastasis. According to the latest cancer statistics, there were 14.1 million new cancer related deaths which is expected to rise by 70% over the next two decades with nearly 22 million cases. The rate of cancer related incidence is almost 25% higher in men than in women (<http://www.who.int/mediacentre/factsheets/fs297/en/>) [1-3].

Cancer is the outcome of expression of multiple complex interplay of various non-genetic and genetic factors which may act in conjunction, or in succession to initiate or promote carcinogenesis. The non-genetic factors are carcinogens, tobacco, chemicals, radiations and infectious organisms whereas the genetic factors are inherited mutations, hormones, immune conditions and mutations that occur from metabolism; are responsible for cancer development. Cancer starts with the activation of oncogenes in the cells which is associated with the inactivation of tumor suppressor genes. However, the exact event of this genetic expression is a matter of debate even after decades of cancer research.

Cancers of breast, cervix uteri, lung, stomach, and mouth (lip, oral cavity) are top five causes of cancer related deaths in India. The origin of cancer is still a bone of contention among researchers, who firmly believe in opposing theories. The theories proposed to explain the origin of cancer are based on the premise, which believe that it is either cell-based or tissue-based phenomenon. The origin of cancer (carcinogenesis) is a complex phenomenon, which is poorly understood despite of research efforts spanning over a century. There have been several theories proposed to explain this complex phenomenon, the somatic mutation theory (SMT) being the most prominent and widely accepted among them. The SMT is based on premise that the cancer is a cell-based disease, and the mutation in the single somatic cell is regarded as the first step of carcinogenesis. SMT has dominated research scenario for over half of the century, however, other equally plausible theories have been proposed which believe cancer to be tissue based disease. The tissue organization field theory (TOFT) believes carcinogenesis is a result of defects in tissue architecture brought down by carcinogens [4]. Undoubtedly, it is the complex disease which might require multiple theories to explain its entire mechanism, however, the stand taken by proponents of TOFT wants to completely abdicate SMT, which could be the wrong approach to solve the puzzle of carcinogenesis. The SMT is the base of the present day cancer molecular biology.

Plant or microbial derived natural compounds constitute several clinically useful anti-cancer therapeutic candidates. Nearly 60% of the approved drugs are derived from natural compounds because of their immense chemical diversity distributed in millions of species.

The doctrine “Let food be the medicine....” Espoused by Hippocrates nearly 2500 years ago is now receiving renewed interest. Hippocrates clearly recognized the essential relationship between food and health and emphasized that “difference of disease depends on nutrition”. Development of cancer is critically linked with diet and low whole grains are regarded as main factor for development of various cancers. Chemo preventive compounds isolated and characterized from natural sources ‘green medicine’ are friendlier over synthetic chemotherapeutic compounds because of their efficacy and minimal side effects. Chemotherapeutic action of a drug is transmitted through regulation of molecular target(s) needed for the genesis and progression of disease. Anticancer natural compounds used in drug development need mechanistic understanding with respect to adverse drug reaction (ADR) and drug efficacy. Meticulous research is required to identify such compounds from natural sources having high nutritional value required by cancer patients along with chemoprevention unlike radiation and present way of chemotherapy. However, the methodological limitations make it difficult to establish to define the effect of each dietary ingredient separately and a possible interaction between them associated with cancer development. There are ample convincing evidences in epidemiological investigations on cancer that a high dietary intake of fruits and vegetables as well as whole grains is strongly associated with reduced risk of cancer and cardiovascular disease (CVD). There has been an increased interest in advancement of nutritional therapy concept which has resulted in significant scientific development in our understanding to characterize specific nutritional food having therapeutic value and attempts are being made to verify their health claims through modern bioinformatics tools (Nutritional informatics). Nutritional therapy improves nutrient absorption/assimilation from food and digestion, stimulate and balance the immune system. The bioactive compounds in the nutrition as functional food bring about restoration of deranged health in cancer patients in coordination. The nutritional therapy is already catching up with many countries and if proved unequivocally in many laboratories, the diet based therapy will make its place one day or the other at least in many developing countries as a viable alternate treatment for many lifestyle diseases such as cancer, obesity and CVD. The war against cancer cannot be won only by applying the conventional expensive research methodologies in research labs or hospitals; it requires enthusiastic participation with innovative methods from all corners of the society.

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Every one of us certainly has something to contribute in this war against cancer in various ways. In conclusion, nutritional therapy offers exciting promise for future therapies, but significant technical hurdles remain that will only be overcome through years of intensive research.

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