Editorial

Phytoceuticals as radioprotectors and radiosensitizers in cancer control

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Cancer is the second largest cause of death in human beings. Over one million new cases of cancer are reported every year worldwide. In spite of the spectacular developments in biology and medicine the incidence of cancer is alarmingly on the rise. Radiotherapy is the most common modality of treatment for human cancers.[1] The success of radiotherapy of cancer depends on the radiosensitivity of the tumour cells.[2] In solid tumours cells in the hypoxic region exhibit resistance to ionizing radiation. One of the major problems encountered in radiotherapy of cancers is the radiation damage to normal cells surrounding the tumour. Yet another problem in cancer therapy is the induction of secondary tumours later as a consequence of radiation and chemo treatments, as they cause oxidative stress and genomic insults which can lead to cancer and there is a need to mitigate this. One of the approaches to circumvent this problem is the use of hypoxic cell radiosensitizers to enhance radiation damage to tumour cells and use of radioprotectors to preferentially reduce the deleterious effects of radiation and thereby imparting protection to the normal cells and tissues. The radiation protecting drugs and compounds are also of great importance owing to their potential application during planned radiation exposures such as radiotherapy, diagnostic scannings, undertaking cleanup operations in nuclear accidents, space expeditions etc and unplanned radiation exposures such as accidents in nuclear industry, nuclear terrorism, natural background radiation etc. Many natural and synthetic chemicals have been investigated for their efficacy to protect radiation induced damages in biological systems.[3] However, the inherent toxicity of most of the synthetic compounds at the radio-protective concentration warranted further search of safer and effective radio-protectors from natural products.

Phytomedicines derived from medicinal plants are used for treating various human diseases from ancient times. Ayurvedic system of medicine and treatments using medicinal plants are most popular in the Kerala State of India and the state is internationally famous for the Ayurvedic treatments for a variety of human ailments. With the vast herbal resources and wealth of traditional knowledge on herbal drugs it is possible to develop ideal radioprotecting drugs and tumour-radiosensitizing drugs.[4] Although herbal drugs and phytoceuticals have been used for treating various human ailments they are not used as prophylactics in preventing the incidence of cancer and as radiomodifiers during radiotherapy. Though there have been active research in the development of radiomodifiers for the last several decades, and large number of compounds have been synthesized for this purpose, an ideal radiation response-modifier for human application and use in radiotherapy of cancer is still a distant dream. Thus the search for phytopharmaceuticals for use in radiotherapy particularly for radiosensitizing tumours and for preventing deleterious effects of ionizing radiation preferentially to normal cells is of great importance in the area of cancer therapeutics.

The extracts of a few of the medicinal plants, poly herbal Ayurvedic preparations and the plant-derived compounds such as Asiaticoside, Glyzyrrhizic acid,, Gallic acid, acid, Feulic acid, Vanillin, Sesamol, Andrographolide, Troxerutin, Quercetin, Beriberin etc have shown promise in protecting normal tissues and radiosensitizing tumours in animal models.[4-6] However, in depth studies at cellular and molecular level are needed before transferring these promises from bench to bed side.

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Conflicts of interest

Author declare that there is no conflicts of interest.

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