

Tentative Outline

Special Thematic Issue Anti-Cancer Agents in Medicinal Chemistry

Radioprotective agents in radiotherapy-induced cell and tissues toxicity

- **Scope of the Thematic Issue:** Cancer, one of the leading causes of death and morbidity in the world, can affect almost every organ in the body. Radiation therapy is widely used as a therapy to kill malignant cells as part of cancer therapy. However, radiation therapy involves the use of high doses of radiation and induces undesirable and side effects for the patients. The main cause for concern is that not only the tumor cells but also the surrounding normal healthy cells are also exposed to radiation during radiotherapy. So, oxidative stress and subsequent cellular toxicity and macromolecular damages such as DNA damage could occur, resulting in mutagenesis, carcinogenesis, and cell death. Therefore, for many decades, researchers have been working to develop novel and more effective radioprotectors with fewer side effects. In recent years, several herbal medicines have been developed for this purpose due to their unique properties, such as low toxicity, high availability, and potent antioxidant activity. Some experiments have demonstrated the natural products in herbal medicines are good a source as promising radioprotection against radiation-induced toxicity, mainly through their ability to stabilize the cell membranes, anti-inflammatory as well as antioxidant properties, and the prevention of DNA damages. These properties make them emerging supplements for patients undergoing radiotherapy to protect healthy cells from the harmful effects of radiation. Besides, researchers have studied to found suitable semi-synthetic or synthetic radioprotective agents.

Interestingly, some current medicines such as captopril, metformin, celecoxib, etc. have been shown that they have a radioprotective activity via different mechanisms like antioxidant activity, anti-inflammation, immunomodulation, etc. Hence, in this issue, recent studies about the radioprotective effects of different types of compounds against side effects of radiation, such as genetic damages, cell toxicity, tissue injures, and organ failures, will be reviewed. The mechanism of actions and structure relationship activity (SAR) of each group of the compound will also be discussed.

Keywords: Herbal medicine, Natural product, Semi-synthetic, Synthetic, Radioprotective, Radiation damages, Cell toxicity, Tissue injuries, Organ failure

Sub-topics:

- Radioprotective effects of **herbal medicines/natural products**.
- Radioprotective effects of **natural endogenous substances such hormones** (e.g., **Melatonin, Serotonin, Prostaglandins, Dihydrotestosterone**), **endogenous antioxidant enzyme** (e.g., **CAT, SOD, Vit E, Vit C**), **thiols** (e.g., **cysteine, cysteamine, cystamine**), **cytokines** (e.g., **interleukin-1 (IL-1), tumor necrosis factor-alpha (TNF- α)**), etc.
- Radioprotective effects of **current synthetic drugs such as Captopril, Celexib, Metformin**, etc.
- Radioprotection against radiation-induced **Macromolecules damage** like DNA damages, **Celular toxicity** like bone marrow cells, **Tissues injury** like oral mucositis, and **Organ failure** like heart failure, etc. .
- The mechanisms of actions and the structure-activity relationships (SAR) of each group of compounds

Schedule:

- ✧ Thematic issue submission deadline: **30 DeW2020**

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