

## Tentative Outline

### Special Thematic Issue for the journal *Current Neuropharmacology*

#### Neuroprotective effects of plant origin compounds against radiation-induced neurodegeneration/CNS disorders

*Guest Editors: Dr. Amirhossein Ahmadi*

- **Scope of the Thematic Issue:**

Oxidative stress has primarily been indicated in several neurodegenerative disorders. Besides, oxidative damage has also been detected in the initial phases of these disorders, suggesting that their causes are directly connected with free radicals. Under physiological conditions, a cellular equilibrium occurs between ROS generation and removal. More specifically, mechanisms of antioxidative defense, including enzymes, and antioxidants take place in eukaryotic cells. However, overproduction of ROS not only leads to antioxidation disorders and oxidative stress, but also to the damage of the biomolecules of brain's cells and tissues. The deleterious effects of ionizing radiation is pronounced in brain, which is a radiosensitive organ because of its high O<sub>2</sub> utilization rate, its high content of polyunsaturated fatty acids that are prone to lipid peroxidation, and its high content of iron that increases the formation of free radicals through the Fenton reactions. Compared with other organs, brain consists of tissues with poor amounts of antioxidants. Because of this, increased ROS production can compromise essential cellular functions and probably contribute to brain injury. Experimental evidence revealed that the brain displays numerous biochemical and functional alterations after exposure to ionizing radiations, leading to the CNS disorders in long time. Therefore, many studies have been focused on identifying the effective and safe neuroprotective compounds to inhibit the radiotherapy-induced brain injuries in patients. The nonenzymatic antioxidant compounds are obtained mainly from plant material. Examples of these substances include phenolic compounds, vitamins C and E, and carotenoids. Among phenolic compounds, the most common antioxidants are flavonoids, phenolic acids, tannins, and tocopherols. The modulatory role of flavonoids and phenolic compounds might be due to its ability to consume superoxide, singlet oxygen, and hydroxyl radicals, and this property considerably contributes to the intracellular antioxidant defense system. In addition, flavonoids and phenolic compounds can act as a metal-chelating agent, and it inhibits the superoxide derived Fenton reaction. These natural compounds also significantly improve GDH and CPK activities and Ca<sup>2+</sup> level in the mitochondria, demonstrating their role in minimizing radiation-induced oxidative damage. Numerous experiments have shown that flavonoids and phenolic compounds administration significantly decreased MAO activity, which was associated with a significant increase in monoamine levels in the treatment group compared with those in the irradiated group. Thus, this issue will aim to publish the reviews that focused on the recent trends on the development of neuroprotective agents from natural origin compounds.

**Keywords:** Neuroprotective; radiation; oxidative damage; brain; CNS disorders; herbal medicine; natural compounds

#### Sub-topics:

Neuroprotective effects of herbal medicines against radiation-induced neurodegeneration/CNS disorders

Neuroprotective effects of plant origin compounds against radiation-induced neurodegeneration/CNS disorders

Neuroprotective effects of natural origin compounds against radiation-induced neurodegeneration/CNS disorders

Neuroprotective effects of antioxidants against radiation-induced neurodegeneration/CNS disorders.

#### Schedule:

31 Dec 2021

**Contacts:**

*Dr. Amirhossein Ahmadi*

*\*Pharmaceutical Sciences Research Center, Faculty of Pharmacy, Mazandaran University of Medical Sciences, Sari, Iran*

*Email: [amirhossein\\_pharma@yahoo.com](mailto:amirhossein_pharma@yahoo.com)*

Submission link

<https://mc04.manuscriptcentral.com/crn>