Special Issue

The Role of Molecular Hydrogen in Mitigating Oxidative Stress and Radiation Damage: Mechanistic Insights, Biological Effects, and Therapeutic Applications

Message from the Guest Editor

Molecular hydrogen (H2) has emerged as a promising antioxidant and radioprotector with diverse therapeutic potential for mitigating oxidative stress and radiation-induced damage. This Special Issue aims to gather contributions that explore the latest insights into the mechanisms through which H2 exerts its protective effects across various biological contexts, including neuroprotection, cancer therapy, radiation protection, and disease management. A particular emphasis will be placed on H2's ability to selectively scavenge reactive oxygen species (ROS), such as hydroxyl radicals (•OH) and peroxynitrite (ONOO−). The biological effects of H2, including its potential to cross the blood–brain barrier and mitigate radiation-induced injury, will be thoroughly examined. In addition, the therapeutic applications of hydrogen-rich water, hydrogen inhalation, and intravenous H2 as delivery methods will be discussed. This Special Issue will also explore the integration of molecular hydrogen into clinical practices, particularly in radiotherapy, where it holds promise for enhancing treatment outcomes.

Guest Editor

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