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MEDICINAL CHEMISTRY STUDIES AGAINST NEURODEGENERATIVE DISEASES.

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Abstract:

Medicinal chemistry is an interdisciplinary area that involves organic chemistry, biochemistry, physical chemistry, pharmacology, informatics, molecular biology, structural biology, cell biology, and other areas. Moreover, it takes into account molecular aspects such as the mode of action of the drugs, the structure-activity relationship of the drugs, and pharmacokinetic aspects such as absorption, distribution, metabolism, excretion, and toxicity. Neurodegenerative diseases (NDs), which are characterized by the progressive loss of neurons, are on the rise. Oxidative stress, especially the overproduction of Reactive Oxygen Species (ROS), plays a pivotal role in the development of various diseases, as evidenced by the detection of protein, lipid, and Deoxyribonucleic acid (DNA) oxidation products in vivo. Since they are inherently fragile, most biological molecules are susceptible to ROS, even if they are involved in metabolic factors and cell signaling. Because of their high polyunsaturated fatty acid content, low antioxidant defense, and high oxygen consumption, neurons are inherently susceptible to oxidation. Consequently, the overproduction of ROS in neurons appears particularly toxic, and the mechanisms involved in biomolecule oxidative damage are complex and multiple. This review aims to highlight the generation and regulation of ROS, as well as their chemical properties (thermodynamic and kinetic), interactions, and implications in NDs.

Key words: neurodegenerative, defense, pharmacokinetics, oxidation, DNA