
EDITORIAL



Free Radicals in Chemical Biology

The continuous increase in interest in *free radicals* associated with life sciences is motivated by the discovery of numerous processes in biology that make use of these species as key intermediates in their mechanisms. Important links have also been found with medicine since many physiopathological conditions and aging processes are correlated with free radical formation and reactivity.

In the last decade, it became clear that for an in-depth understanding of biological processes, a molecular approach, based on chemical

principles and tools, was necessary. Therefore, the discipline of *chemical biology* was born with the scope of creating an interface between chemistry and biology, in terms, not only of methodologies, but of language and mutual comprehension as well.

The interface between free radicals and chemical biology became valuable in view of the fact that several free radical-based processes are known from the molecular point of view, and which have allowed biomarkers as well as pharmacological and biological tools to be identified. Examples include lipid peroxidation and oxidative damage to DNA and proteins; processes that are currently recognized as the molecular basis of several diseases and of aging.

Nevertheless, there is still a wide gap between chemical and mechanistic knowledge and their use for the investigation of biological problems. There is a need to integrate methodologies in chemistry and biology in order to apply chemical tools to the complexity of living organisms. In addition, sharing a common language among scientists with different backgrounds has proven difficult.

The COST Action 'Free Radicals in Chemical Biology' intends to fill these gaps, with four working groups dealing with the main radical processes in biomolecules such as lipids, proteins, nucleic acids and the effects of small, biologically relevant free radicals. Radical species are considered either as part of the normal metabolic functioning, or as responsible for the attack on molecules, thereby causing the onset of biological damage. Preventive and repair strategies against radical-based damage are also included in the scenario of the biological effects. The Action is open to a variety of scientists spanning from chemistry to medicine, who have contributed to the articles in this issue of CHIMIA, providing an overview of the main subjects and tasks of the Action. The general aim is to address physiologically and pathologically relevant processes based on free radicals, in an effort to improve quality of life and health.

I hope that the field of Free Radicals in Chemical Biology inaugurated by our COST Action will also represent the ideal scientific environment for the new generation of researchers and an important opportunity for achieving excellence of European science in the direction of multidisciplinary and basic and applied research.

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