Oxidative Stress in Disease and Aging: Mechanisms and Therapies 2016
Claudio Cabello-Verrugio, Felipe Simon, Capucine Trollet, Juan F. Santibañez

To cite this version:

HAL Id: hal-01485278
http://hal.upmc.fr/hal-01485278
Submitted on 8 Mar 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
Oxidative stress (OS) is an imbalance between the formation of reactive oxygen species (ROS) and antioxidant defense mechanisms. This phenomenon increases with age and affects the normal functioning of several tissues. Furthermore, numerous chronic diseases associated with older age, such as diabetes and cardiovascular, renal, pulmonary, and skeletal muscle disorders, are also directly related to OS. Considering this relationship, the aim of many ongoing studies is to elucidate the underlying mechanisms and role of OS in disease onset and development. In particular, there is considerable emphasis on finding new therapeutic strategies for decreasing OS.

This special issue presents new and relevant research regarding the mechanisms by which OS induces oxidative damage in the contexts of chronic disease and aging. Focus is given to the use of novel antioxidant strategies. The manuscripts within this special issue are all equally recommended by the editors, but the following contain especially interesting points worth comment.

X. H. Yang et al. evaluated the effect of epigallocatechin-3-gallate (EGCG), a component derived from green tea, on OS in the kidney of diabetic db/db mice. They demonstrated that EGCG ameliorated the levels of several parameters associated with OS and of signaling pathways related to oxidative damage and renal fibrosis (e.g., RAS axis, NOX, MAPK, TGF-b, and a-SMA). Overall, a renoprotector effect was found in diabetic mice.

N. Mihailev-Stanojevic et al. studied the effect of wild thyme, a spice plant rich in polyphenolic compounds, on the development of hypertension. The authors demonstrated that wild thyme decreased OS and blood pressure in hypertensive rats, probably by increasing heme oxygenase 1.

E.-M. Noh et al. investigated how ROS production in senescent fibroblasts is generated by the modulation of phosphatidylinositol 3,4,5-triphosphate metabolism. The study showed in replicative senescent cells that increased ROS production was blocked by inhibiting three key signaling pathways: PI3K, protein kinase C, and NADPH oxidase. Additionally, the results indicated that a reduction in PTEN levels is important for abolishing increased ROS levels in human dermal fibroblasts.

J. Abrujo et al. studied the effect of mesenchymal stem cell administration on skeletal muscle damage induced by a high fat diet. The authors demonstrated that muscle wasting was produced by activating the ubiquitin proteasome pathway increased OS levels and myonuclear apoptosis. The main
finding was that mesenchymal stem cells abolished these three mechanisms involved in the muscle damage induced by a high fat diet.

All of these highlighted studies, as well as the other manuscripts contained in this special issue, advance improvements on pathological statuses by using diverse antioxidant strategies. We firmly believe that these findings will be of relevance to research concerning OS, chronic diseases, and aging.

Acknowledgments

The editors thank all of the authors who submitted their research to this special issue. The editors also thank each reviewer for their valuable contributions. The lead guest editor thanks all of the collaborating guest editors for their critical and exhaustive reviews and support, which were critical for the successful publication of this special issue.

Claudio Cabello-Verrugio
Felipe Simon
Capucine Trollet
Juan F. Santibañez