

Guest editorial

## Introduction to special topic on exercise and oxidative stress

2095-2546/© 2020 Published by Elsevier B.V. on behalf of Shanghai University of Sport. This is an open access article under the CC BY-NC-ND license. (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

The discovery that endurance exercise is associated with oxidative stress was first reported in 1978. In the ensuing 4 decades, many studies confirmed this original observation. Recent investigations provided mechanistic insight into the sites of reactive oxygen species (ROS) production during exercise and the cellular consequences of an increase in ROS production. In this special topic of the *Journal of Sport and Health Science*, we feature 4 state-of-the-art reviews on key topics linking exercise and oxidative stress.

The first review by [Ji et al.](#) highlights the role of mitochondrial redox signaling in maintaining mitochondrial homeostasis in skeletal muscle fibers. Specifically, it is focused on how muscular exercise and prolonged periods of skeletal muscle inactivity activate and/or inhibit redox signaling pathways in muscle fibers. A central message of this review is the importance that mitochondrial homeostasis plays in skeletal muscle health.

The second review by [De la Rosa et al.](#) focuses on exercise and Alzheimer's disease (AD). It is widely agreed that the prevention and treatment of dementia is a global health challenge. AD is the most common form of dementia and an important risk factor associated for the development of AD is physical inactivity. [De la Rosa et al.](#) summarize the experimental evidence showing that regular aerobic and resistance exercise training is a promising intervention to reduce the risk of developing AD and to improve outcomes in patients suffering from AD. Specifically, [De la Rosa et al.](#) debate the mechanisms responsible for the exercise-induced protection against AD and discuss the role that regular exercise plays in controlling cellular redox balance, amyloid turnover, inflammation, synthesis and release of neurotrophins, and improvements in cerebral blood flow.

The third review by [Torma et al.](#) is focused on the redox regulatory roles of microRNAs (miRs) and highlights the emerging evidence that muscular exercise is associated with redox-sensitive miR regulation. miRs are small regulatory RNA transcripts capable of silencing mRNA messages. Emerging evidence reveals that these miRs are active players

in the control of numerous cell-signaling processes involved in redox homeostasis.

In the final review, [Powers et al.](#) address the key issue of whether exercise-induced production of ROS is beneficial or harmful to health. Specifically, they discuss the sites of oxidant production in contracting skeletal muscles and debate the implications for health of exercise-induced ROS production. Importantly, they identify gaps in knowledge in this area of research that need addressing.

The editors of this special topic of the *Journal of Sport and Health Science* anticipate that these 4 reviews provide a valuable resource for researchers in the field of exercise physiology and health. The authors who agreed to contribute to this special topic are leaders in the field of exercise and oxidative stress, and each review gives an accurate account of the state of the art in this field, indicates gaps in knowledge that need to be addressed, and provides insights into the thinking of these leading experts.

### Competing interests

The authors declare that they have no competing interests.

Zsolt Radak, Guest Editor  
*Research Center of Molecular Exercise Science,  
University of Physical Education, Budapest 1123, Hungary  
Faculty of Sport Sciences, Waseda University,  
Tokorozawa, Saitama 359-1192, Japan  
Institute of Physical Education and Sport Science, JGYPK,  
University of Szeged, Szeged 6726, Hungary  
E-mail address: [cix21@yahoo.com](mailto:cix21@yahoo.com)*

Scott K. Powers, Guest Editor  
*Department of Applied Physiology and Kinesiology,  
University of Florida, Gainesville, FL, 32608, USA  
E-mail address: [spowers@hhp.ufl.edu](mailto:spowers@hhp.ufl.edu)*

Accepted 7 April 2020  
Available online 18 April 2020

Peer review under responsibility of Shanghai University of Sport.

<https://doi.org/10.1016/j.jshs.2020.04.005>

Cite this article: Radak Z, Powers SK. Introduction to special topic on exercise and oxidative stress. *J Sport Health Sci* 2020;9:385.