

## **Antioxidant and oxidative stress: a mutual interplay in age-related diseases**

### **ABSTRACT**

Aging is the progressive loss of organ and tissue function over time. Growing older is positively linked to cognitive and biological degeneration such as physical frailty, psychological impairment, and cognitive decline. Oxidative stress is considered as an imbalance between pro- and antioxidant species, which results in molecular and cellular damage. Oxidative stress plays a crucial role in the development of age-related diseases. Emerging research evidence has suggested that antioxidant can control the autoxidation by interrupting the propagation of free radicals or by inhibiting the formation of free radicals and subsequently reduce oxidative stress, improve immune function, and increase healthy longevity. Indeed, oxidation damage is highly dependent on the inherited or acquired defects in enzymes involved in the redox-mediated signaling pathways. Therefore, the role of molecules with antioxidant activity that promote healthy aging and counteract oxidative stress is worth to discuss further. Of particular interest in this article, we highlighted the molecular mechanisms of antioxidants involved in the prevention of age-related diseases. Taken together, a better understanding of the role of antioxidants involved in redox modulation of inflammation would provide a useful approach for potential interventions, and subsequently promoting healthy longevity.

**Keyword:** Age-related diseases; Healthy longevity; Inflammation; Oxidative stress; Oxidative damage