

Nutrition and ageing: from phenomenological observations to molecular mechanisms

João Laranjinha

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Understanding the nature of aging in connection with healthy extension of life has been a matter of intensive research over the years. This problem has been tackled from multiple viewpoints, ranging from behavioral and clinical to genetic and biological molecular approaches. Frequently, the studies focused on age-associated diseases, including chronic inflammatory, metabolic and neurodegenerative diseases, among others in which the incidence of the disease increases rapidly with aging.

In this regard, the influence of nutrition on health is unquestionable but while we know a great deal about risk factors and correlations between age and disease, the underlying processes only recently began to be known at the molecular level.

The present special issue contributes to this state of the art by addressing five interconnected lines of research in an attempt to bridge phenomenological relationships with underlying molecular mechanisms.

First, the chapter by Teodoro et al. describe the current understanding of the relationship among obesity, diabetes and aging, focusing on the role of mitochondrial impairment and generation of reactive oxygen species as well on the different pharmacological therapies used so far for the treatment of obesity. Life style closely associates with such

metabolic diseases, and the second chapter, by Polidori and Schulz, relates the lifestyle and nutrition with its impact on dementia. A critical appraisal on the use of compounds with antioxidant activity to counteract cognitive impairment is forward and reflection points for future research also included. Nutrition and aging in demyelinating diseases is then discussed in Ana Adamo's chapter, emphasizing mechanisms that support the failure of remyelination, such as nutrition and aging. The mechanistic connections of dementia with zinc homeostasis, including zinc and insulin signaling in diabetes, are addressed by Nuttal and Oteiza that, in view of the occurrence of gene polymorphisms in the population, also propose future research regarding zinc based therapies. Finally, Soares et al. discuss the cellular redox regulation in connection with cell polarity and introduce concepts on nutritional intervention with redox-active molecules in polarity-dependent processes that occur during aging.

Hopefully, this issue will be of help to critically integrate current knowledge in the field and to open new research trends.

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J. Laranjinha (✉)
Faculty of Pharmacy, Center for Neurosciences and Cell
Biology, University of Coimbra, Health Sciences Campus,
Azinhaga de Santa Comba, 3000-548 Coimbra, Portugal
e-mail: laranjin@ci.uc.pt