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EDITORIAL

Zinc as a multipurpose trace element

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Zinc is an essential element with growing relevance in the fields of human health and disease. Therefore, the editors welcome the contribution of Maria Stefanidou and colleagues from the University of Athens on zinc and its influence on human health (Chasapis et al. 2011; this issue). The comprehensive review provides an update on the role of zinc:

- In *transcription control* mediated by the aptly named zinc finger transcription factors whose stability is mediated by zinc
- In *proliferation*, because zinc is required for the activity of enzymes involved in DNA synthesis, e.g., deoxythymidine kinase
- In *oxidative stress control*, because high levels of reactive oxygen species cause a release of zinc from metallothionein
- In *immune response*, primarily because zinc deficiency reduces the killing capacity of natural killer cells.
- In the pathogenesis of numerous diseases, including cardiovascular diseases, cancer, Alzheimer's disease, diabetes mellitus, Wilson's disease and depression.

A special focus of the review of Chasapis et al. (2011; this issue) is the role of zinc in apoptosis, which is particularly welcome, since the control mechanisms of apoptosis is critical for the fields of toxicology and cancer research (Lee et al. 2010, 2011; Kirsch-Volders et al. 2011; Yen et al. 2011; Wang et al. 2011; Fang et al. 2011; Cheng et al. 2011; Golka et al. 2011; Kunwar et al. 2011; Baird and Dinkova-Kostova 2011; Sun et al. 2011; Stewart et al. 2011; Zhao et al. 2011; Park et al. 2011; El Hakim et al. 2011; Ilowski et al. 2011; Godoy et al. 2009, 2010; Petry et al. 2010; Franke et al. 2009; Hardelauf et al. 2011; Cadenas et al. 2010). Zinc is a known inhibitor of apoptosis. One mechanism by which zinc influences apoptosis is through the modulation of P53 binding to DNA, occurring at physiological intracellular zinc concentrations. A second relevant mechanism is the inhibition of caspases by zinc. The present article by Maria Stefanidou gives a comprehensive summary of recent research and is highly recommended for all interested in the various biological processes controlled by this multipurpose essential element.

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