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A Current Update of Metallothionein and its Isomers

Thirumoorthy N
PPG College of Pharmacy Sathi Road, India Pharms med Dubai.

Abstract

This protein has several interesting biological effects including detoxification of heavy metals like mercury and cadmium, homeostasis of essential metals including copper and zinc, antioxidation against reactive oxygen species, protect against DNA damage, oxidative stress, cell survival, angiogenesis, apoptosis, as well as increase proliferation etc,. Numerous studies have been demonstrated increase focus on the role of MT in various biological systems in the past three decades. The studies on the role of MT were limited with few areas like apoptosis and antioxidants in selected organs even fifty years after its discovery. We now acknowledge the exploration of MT isomers such as MT-I, MT-II, MT-III and MT-IV in various biological systems and disease conditions like diabetic, kidney dysfunction, sclerosis, cancer, bone growth retardation, neuro toxicity etc in different organs (heart, CNS, kidney, etc) were established in recent years to research further.

Introduction: This article is an attempt to focus some of its important and current finding of isomers of metallothionein role in the biological system to explore in many new areas. The metallothionein (MT) was first isolated in 1957 from the cortex of horse kidney as a cadmium binding protein [1]. This protein was first reported by Kagi and Vallee in 1960 and by Kojima in 1976 as cysteine-rich (33 mol %), low molecular weight (7 kDa), heat-stable and metal binding protein.

Discussion: There are at least ten known closely related metallothionein proteins expressed in the human body. In humans, large quantities are synthesized primarily in the liver and kidneys, however they have been found at a number of other sites as well. Its production is dependent on availability of the dietary minerals zinc and selenium, and the amino acids histidine and cysteine present in the body. This article conclude that, many independent groups of investigators found direct casual relationships between MT and pathophysiology but more pronounced reasons among those was endogenous and exogenous stimuli including glucocorticoids, interferon, interleukin-1, progesterone, vitamin D3 endotoxins, serum factors, heavy metals, storage of metal ions and regulation of cellular zinc etc. may trigger the expression of MT in human and animal's body.

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