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The function of Selenium in development of skin fibril

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Abstract

The essential micronutrient, selenium, is of fundamental importance to human health. Selenium has been reported to possess potent anti-oxidant, anti-hyperglycemic and anti-carcinogenic properties. However, the precise biological role of selenium in development of skin fibril remains unknown. In this study, we showed the potential role of selenium and its molecular mechanism underlying formation of skin matrix and fibril. Selenium exists in various forms. Among selenite, selenite, and methylseleninic acid (MSA), we found that selenite showed no effect on the viability of human skin fibroblast (HSF). Both selenite and MSA exerted cytotoxicity in HSF. We also found that selenate treatment dose-dependently enhanced mRNA expression levels of procollagen and collagen I and III. Type III collagen is the predominant collagen in the granulation tissue of skin health. Among such growth factors, transcriptional growth factor beta (TGF-β) has long been believed to be the most critical in the process of tissue remodeling. Upon TGF-β binding to its receptor at the cell surface, cytoplasmic transmitters (Smad2 or Smad3) are phosphorylated and then form a heterodimer with a common Smad (Smad4). A few studies have shown activation of TGF-β1 by nutrient in the formation of skin fibril. We found that selenate treatment in HSF increased TGF-β1 and its downstream such as TGF-β receptor 1, Smad4 and fibronectin. These results implicate that selenate could exert the development and formation of skin fibril and matrix through activating TGF-β signaling pathway. Our results reveal a novel function of selenate in formation of skin fibril. These evidences also provide useful information for the development of skin-related nutraceuticals and nutria-cosmetics design.

Biography

Gyo-Nam Kim has completed his Ph.D. from Hannam University, South Korea and postdoctoral studies from Purdue University, Department of Food Science. He is currently Assistant Professor in Department of Food Science and Biotechnology, Kyungnam University, South Korea. He has published more than 25 papers in reputed journals and has been serving as an editorial board member of The Korean Society for Aesthetics and Cosmetology.