

海洋性棘皮動物グミ由来レクチン CEL-I 刺激による マウスマクロファージ株細胞 RAW264.7 からの一酸化窒素 及び腫瘍壊死因子 α 放出に対するリコペンの影響

(2013年6月10日受付)

(2013年8月7日受理)

上野幹憲^{a)}、山西智大^{b)}、島山智充^{c)}、山口健一^{a)}、小田達也^{a)}

a) 長崎大学大学院水産・環境科学総合研究科

b) ハウスウェルネスフーズ

c) 長崎大学大学院工学研究科

Effects of lycopene on the secretion of nitric oxide (NO) and tumor necrosis factor- α (TNF- α) from RAW264.7 cells stimulated with marine invertebrate Holothuroidea (*Cucumaria echinata*) lectin CEL-I

(Received June 10, 2013)

(Accepted August 7, 2013)

Mikinori Ueno^{a)}, Tomohiro Yamanishi^{b)}, Tomomitsu Hatakeyama^{c)}, Kenichi Yamaguchi^{a)}, Tatsuya Oda^{a)}

a) Graduate School of Fisheries Science and Environmental Studies, Nagasaki University

b) Technology Development Section, Production Department, House Wellness Foods Corporation

c) Graduate School of Engineering, Nagasaki University

Abstract

Lycopene existing in tomato is a nonprovitamin carotenoid with potent antioxidant properties. In addition to the antioxidant activities, lycopene is known to show anti-inflammatory effects through the inhibition of secretion of proinflammatory agents such as nitric oxide (NO) and cytokines from stimulated immune competent cells. In this study, we investigated the effects of lycopene on the secretion of NO and tumor necrosis factor- α (TNF- α) from mouse macrophage cell line RAW264.7 cells stimulated with CEL-I, a GalNAc-specific C-type lectin isolated from marine invertebrate Holothuroidea (*Cucumaria echinata*). Lycopene at 10 μ M showed significant inhibitory effect on the secretion of NO from CEL-I-stimulated RAW264.7 cells, and more potent inhibitory effects on NO and TNF- α secretions were observed at 100 μ M. Fluorescence microscopic observation using reactive oxygen species (ROS)-specific fluorescence probe suggested that lycopene effectively reduced intracellular ROS level in LPS-stimulated RAW264.7 cells, but it was less-effective on ROS level in RAW264.7 cells stimulated with CEL-I. These results suggest that the pathways leading to increase in intracellular ROS level and subsequent NO and TNF- α secretion may be somewhat different between LPS- and CEL-I-treated RAW264.7 cells. This is the first report indicating that lycopene can inhibit the secretion of NO and TNF- α from RAW264.7 cells stimulated with CEL-I.

Keywords: リコペン、抗酸化作用、一酸化窒素、CEL-I、腫瘍壊死因子 α
lycopene, antioxidant, nitric oxide, CEL-I, tumor necrosis factor- α

I 緒言

リコペンは、疎水性が高い炭化水素化合物で、分子中に複数の二重結合をもつ直鎖状のビタミン様活性を持たないカロテノイドの一種であり、トマトなどに含まれる赤色色素である。近年、その抗酸化作用に関する研究結果が多数報告さ

れており¹⁻³⁾、疫学調査では、リコペンを含む多様な野菜や果物を豊富に含む食事により、発ガンリスクの低下や慢性疾患の予防効果の可能性が確認され^{4,5)}、健康に有用な成分として注目されている。また、肥満、糖尿病、喫煙起因の疾病等に対するリコペンの効能についての研究も進んでいる⁶⁻⁸⁾。また、リコペンは生体防御として主要な役割を果た

連絡先: 〒 852-8521 長崎県長崎市文教町1番14号 長崎大学大学院水産・環境科学総合研究科 小田達也

Corresponding author: Tatsuya Oda, Graduate School of Fisheries Science and Environmental Studies, Nagasaki University, 1-14, Bunkyo-machi, Nagasaki, Nagasaki 852-8521, Japan