OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Obesity & Weight Management
December 3-5, 2012 DoubleTree by Hilton Philadelphia, USA

Endoplasmic Reticulum stress is sufficient for the induction of IL-1β production via activation of the NF-κβ and inflammasome pathways

Hun-Taeg Chung

University of Ulsan, Republic of Korea

Abstract

The mechanisms underlying pathophysiological states such as metabolic syndrome and obesity are known to include endoplasmic reticulum (ER) stress and aberrant inflammatory responses. ER stress occurs as the result of accumulation of misfolded proteins during stress conditions. However, the precise mechanisms by which ER stress modulates inflammation remain incompletely understood. In this study, we hypothesized that ER stress alone could represent a sufficient signal for the modulation of inflammasome-dependent cytokine responses. We found that several ER stress-inducing chemicals (*e.g.,* tunicamycin) and the free fatty acid palmitate can trigger IL-1β secretion in various cell types including monocytic leukemia cells, primary macrophages and differentiated adipocytes. We show that ER stress primes cells for the expression of pro-IL-1β via NF-κB activation and promotes IL-1β secretion. Enhanced IL-1β secretion depended on the activation of the NLRP3 inflammasome through a mechanism involving reactive oxygen species (ROS) formation and activation of thioredoxin-interacting protein. Chemical chaperones (*e.g.* 4-phenylbutyric acid) as well as the pharmacological application of carbon monoxide (CO) inhibited IL-1β secretion in response to ER stress treatments. In conclusion, our results provide a mechanistic link between ER stress and the regulation of inflammation, and furthermore suggest that modulation of ER stress may provide a potential therapeutic opportunity to block progression of low grade chronic inflammation to metabolic syndrome.

Biography

Hun Taeg Chung graduated Chunnam National University Medical School and completed his Ph.D at the age of 33 years from Chunbug National University and postdoctoral studies from Utah University School of Medicine. He is the director of meta-Inflammation Research Center, Korean Basic Research Laboratory Program. He has published more than 200 papers in reputed journals and serving as an editorial board member of Nitric Oxide and Medical Gas Research. He has been working on the role of bioactive gases (NO, CO, H_2S) in metabolism and metabolic syndromes. He has much interest in the inhibitory effects of CO on the meta-inflammation.