The protective effect of astaxanthin on fetal alcohol spectrum disorder in mice
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Background: Astaxanthin (AST), known as a carotenoid pigment, is a strong antioxidant which protects membranous phospholipids and other lipids against peroxidation. Evidences showed that astaxanthin had up to several-fold stronger free radical antioxidant activity than vitamin E and carotene. In double-blind, randomized controlled trial, astaxanthin was found to lower oxidative stress in several human health conditions. Moreover, it is known that ROS up-regulate pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α), interleukin-1 (IL-1), and IL-6. High levels of these cytokines are associated with neurotoxicity whereas, astaxanthin has been found to reduce the causatives of inflammation like TNF-α. Thus, astaxanthin has been deemed to be safe and has potential as a therapeutic antioxidant and anti-inflammation agent for further testing in human diseases.

Objective: To explore the protective effect of astaxanthin on fetal alcohol spectrum disorder in mice, and to investigate the underlying mechanisms.

Methods: We detected the morphology, expression of neural marker genes, oxidative stress indexes, and inflammatory factors in mice model of fetal alcohol spectrum disorder with or without astaxanthin pretreatment.

Results: Our results showed that astaxanthin blocked maternal ethanol induced retardation of embryonic growth, and the down-regulation of neural marker genes, Otx1 and Sox2. Moreover, astaxanthin also reversed the increases of MDA, H2O2, and the decrease of GPx in fetal alcohol spectrum disorder. In addition, maternal ethanol induced up-regulation of TLR4, and the down-streaming MyD88, MyD88, NF-κB, TNF-α, and IL-1β in embryos, and this was inhibited by astaxanthin pretreatment.

Conclusions: Our results demonstrated a protective effect of astaxanthin on fetal alcohol spectrum disorder, and suggested that oxidative stress and toll-like receptor signaling associated inflammatory reaction were involved in this process.

Biography
Dong Zheng has completed his PhD at the Department of Neurology, Sun Yat-Sen Memorial Hospital, Sun Yat-Sen University, 2012. He is now the director of Department of Neurology, Guangzhou Brain Hospital, Guangzhou, China. He has shown great expertise in the area of toxic encephalopathy and fetal alcohol spectrum disorder for many years, and has published a number of articles in reputed international journals.

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