Inhibitory effects of lycopene on the induction of NO; cytokines; and mitogen-activated protein kinase expressions by lipopolysaccharide in primary cultured microglia.

許準榕

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Abstract

Microglia are activated in response to brain injury and release neurotoxic factors including nitric oxide (NO) and proinflammatory cytokines such as tumor necrosis factor- (TNF-) and interleukin-1β (IL-1β). Lycopene, a potent antioxidant, is known to inhibit brain injury. In this study, we found that lycopene (5-20 μ M) significantly inhibited lipopolysaccharide (LPS)-induced NO release in primary cultured microglia. Lycopene (5-20 μM) also concentration-dependently diminished the LPS-induced production of proinflammatory cytokines such as TNF- and IL-1β in microglia. Further study of the molecular mechanisms revealed that lycopene markedly inhibited extracellular signal-regulated kinase (ERK1/2) but not c-Jun N-terminal kinase (JNK1/2) or p38 mitogen-activated protein kinase (MAPK) phosphorylation stimulated by LPS in microglia. These results suggest that microglial inactivation by lycopene is at least partially due to activation of ERK1/2 phosphorylation Therefore, inhibition of NO and proinflammatory cytokine production in activated microglia by lycopene may represent a powerful and potential therapeutic strategy for various neurodegenerative diseases including ischemia-reperfusion cerebral infarction.