

Responses of microglia in vitro to the gram-positive bacterial component, lipoteichoic acid

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摘要

Abstract

An increase in incidence and severity of gram-positive infections has emerged in the past decade. In this regard, attention has been focused recently on immune responses of microglial cells in the central nervous system to gram-positive bacteria. The underlying immunological and cellular events in microglial activation induced by specific bacterial toxin of gram-positive bacteria, however, have not yet been clarified fully. This study reports that a simple cell wall product, lipoteichoic acid (LTA), derived from gram-positive bacteria (*Staphylococcus aureus*) could trigger microglial activation in vitro. Microglia challenged with LTA showed intense ruffling of plasma membrane in the form of lamellipodia or rounded up forming cell aggregates. MTT assay and Western blot analysis with anti-proliferating cell nuclear antigen antibody showed a significant microglial proliferation that may be induced at the later phases of LTA treatment with low doses but at the early period with a high dose. Concentrated LTA also caused apoptotic death of cultured microglia showing fragmented nuclei and increased expression of annexin V or caspase 3. In response to LTA, isolated microglia increased the expression of inducible nitric oxide synthase and major histocompatibility complex class II antigen. Microglial LTA receptors such as CD14 molecule, complement receptor type 3, and macrophage scavenger receptor were upregulated concurrently. In conclusion, staphylococcal LTA can exert an immunomodulatory effect on microglial morphology, cell cycle, and immunomolecules, including its receptors.