

ENHANCED INTRATHECAL NEOPTERIN PRODUCTION AND TRYPTOPHAN DEGRADATION IN PATIENTS WITH LYME NEUROBORRELIOSIS

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ABSTRACT

Various immune system compartments respond to *Borrelia burgdorferi* infection. TH2-type and TH1-type immune responses seem to be important. It recently was found that surface proteins of *Borrelia burgdorferi* induce the formation of interferon- γ *in vitro*.

Upon stimulation with interferon- γ , monocytes/macrophages release large amounts of neopterin and degradation of tryptophan is induced in a variety of cells. In humans increased neopterin concentrations and tryptophan degradation in body fluids indirectly indicate the endogenous formation of interferon- γ and TH1-type immune response.

Using serum and cerebrospinal fluid from patients with Lyme neuroborreliosis and with late Lyme encephalopathy, we investigated neopterin concentrations by radioimmunoassay and tryptophan and kynurenine by HPLC.

Increased neopterin and kynurenine concentrations were found in cerebrospinal fluid but not in the serum of patients with Lyme neuroborreliosis, whereas tryptophan was decreased in cerebrospinal fluid. Abnormalities were related to the activity of the disease, during antibiotic treatment concentrations of neopterin and kynurenine tended to normalize. In patients with late Lyme encephalopathy the deviations of the analytes' concentrations from normal were only marginal compared to patients with acute Lyme neuroborreliosis.

Increased formation of neopterin and degradation of tryptophan suggest a pathogenetic role of intrathecally released interferon- γ and activated monocytic cells in patients with Lyme neuroborreliosis.

KEY WORDS

Borrelia burgdorferi infection, Lyme neuroborreliosis, neopterin, tryptophan, kynurenine, interferon- γ

INTRODUCTION

Infections with common bacteria lead to a cascade of immunological reactions. The front line of immune reaction to bacteria includes the immunological processing of pathogens by monocytes, the exchange

of signals between monocytes and lymphocytes and the formation of antibodies by activated B lymphocytes. The cytokines primarily involved in this so-called TH2-type immune response comprise mainly interleukins-4, -5 and -10. The situation is even more complex concerning intracellular bacteria or viruses.

