

Activity of neurotrophin 4 (NT-4) in the brain cortex and hippocampus in experimental acanthamoebiasis with regard to the immunological status of the host

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Acanthamoeba granulomatous encephalitis is a chronic, non-specific infection, with a mortality rate of ~98% in immunocompromised individuals. Trophozoites mostly frequently enter the CNS through the bloodstream from sites of primary lesions, including the cornea of the eye, skin (ulcers), and the respiratory system (lungs). They then enter the CNS by crossing the blood-brain barrier. The first line of defense against the invasion of these pathogens and resulting neuronal damage are microglia cells, whose rapid activation is linked to the pathogenesis of neurodegenerative diseases.

In this study, we investigated whether *Acanthamoeba* infection affects the activity of neurotrophin 4 (NT-4). NT-4 maintains proper neuronal structure and function and stimulates neurite growth under physiological conditions and in the event of damage to the nervous system. Neurotrophins are also indicated as biological agents with potential applications in the treatment of neurodegenerative diseases. Further investigation into such factors regulating the regeneration of nervous tissue in parasitic infections may be useful in the development of therapeutic algorithms.

The activity of NT-4 was determined in the cerebral cortex and hippocampus of mice infected with *Acanthamoeba* spp. taking into account their immunological status. The study involved Balb/c mice (n=96) divided into four groups: immunocompetent mice infected with *Acanthamoeba* (A); immunocompetent non-infected animals (C); immunocompromised infected animals (AS) and immunocompromised non-infected animals (CS). *Acanthamoeba* spp. strain (AM 22) was isolated from the bronchoaspirate of a patient with acute septic shock. The patient was in the blastic crisis phase of acute myelogenous leukemia and had also been diagnosed with pneumonia. Determination of NT-4 concentration was performed by immunoenzymatic assay (ELISA). The highest concentration of NT-4 was observed in the cerebral cortex and hippocampus of A and AS mice on the 8th day post *Acanthamoeba* spp. infection (dpi). NT-4 concentration in infected A mice at 16 dpi differed significantly between the cerebral cortex and hippocampus (p=0.02). Moreover, NT-4 concentration was significantly higher in the hippocampus of immunosuppressed infected mice (AS) at 8 dpi (p=0.02) than in the cerebral cortex. It was also shown that NT-4 activity in group A animals decreased with the duration of the infection.

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