Therapeutic Efficacy of Neuro AiD™ (MLC 601), a Traditional Chinese Medicine, in Experimental Traumatic Brain Injury.

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Abstract

Traumatic brain injury (TBI) causes increased release of several mediators from injured and dead cells and elicits microglial activation. Activated microglia change their morphology, migrate to injury sites, and release tumor necrosis factor-alpha (TNF-α) and others. In this study we used a controlled fluid percussion injury model of TBI in the rat to determine whether early (4 h post-injury) or late (4 days post-injury) treatment with MLC 601, a Traditional Chinese Medicine, would affect microglial activation and improve recovery. MLC 601 was chosen for this study because its herbal component MLC 901 was beneficial in treating TBI in rats. Herein, rats with induced TBI were treated with MLC 601 (0.2-0.8 mg/kg) 1 h (early treatment) or 4 day post-injury (late treatment) and then injected once daily for consecutive 2 days. Acute neurological and motor deficits were assessed in all rats the day before and 4 days after early MLC 601 treatment. An immunofluorescence microscopy method was used to count the numbers of the cells colocalized with neuron- and apoptosis-specific markers, and the cells colocalized with microglia- and TNF-α-specific markers, in the contused brain regions 4 days post-injury. An immunohistochemistry method was used to evaluate both the number and the morphological transformation of microglia in the injured areas. It was found that early treatment with MLC 601 had better effects in reducing TBI-induced cerebral contusion than did the late therapy with MLC 601. Cerebral contusion caused by TBI was associated with neurological motor deficits, brain apoptosis, and activated microglia (e.g., microgliosis, amoeboid microglia, and microglial overexpression of TNF-α), which all were significantly attenuated by MLC 601 therapy. Our data suggest that MLC 601 is a promising agent for treatment of TBI in rats.