Macedonian Pharmaceutical Bulletin, 72 (Suppl 1) 429 - 430 (2026)
Online ISSN: 1857-8969
DOI: 10.33320/maced.pharm.bull.2026.72.03.207
Short communication

Short review of recent clinical evidence on the efficacy of herbal combination MLC901 in neurorehabilitation and neurological disorders

Elena Jovanova*, Elena Drakalska Sersemova, Viktorija Maksimova

Faculty of Medical Sciences, Goce Delcev University, Stip, Krste Misirkov 10-A, 2000 Stip, North Macedonia

Introduction

Neurological disorders represent a leading cause of disability and reduced quality of life worldwide. Stroke, dementia, traumatic brain injuries and other neurodegenerative conditions contribute to long-term disability, cognitive decline, and reduced quality of life. Aim of this study is to provide a brief review of the recent clinical evidence regarding the efficacy and therapeutic potential of MLC 901 in neurorehabilitation and neurological disorders.

MLC 901, also known as NeuroAiD II, is a traditional herbal combination composed of nine herbal components: *Salviae miltiorrhizae* Bunge, *(diterpens and polyphenolic acids), Paeoniae lactiflora* Pallas, *Ligusticum chuanxiong* Hort, *Angelicae sinensis* Diels, *Carthamus tinctorius* L., *Prunus persica* L., *Polygala tenuifolia Willd., Acorus tatarinowii* Schott, *Astragalus membranaceus* Bunge. These herbal substances provide rich composition of phenolic compound, terpenoids and alkaloids which given together act in improvement of cerebral microcirculation, promoting neuroprotective and neuro-regenerative activities and improvements in locomotor activity (Anjum et al., 2025).

Literature research was conducted using relevant databases, including PubMed, Web of Science, Scopus, Google Scholar and ClinicalTrials.gov to identify published clinical studies investigating the therapeutic effects of MLC 901, MLC 601, and NeuroAiD in neurorehabilitation and neurological disorders.

Clinical evidence in ischemic stroke

Early clinical evidence for MLC901 in ischemic stroke demonstrated limited statistical significance in therapeutic outcomes. The extension study CHIMES-E study evaluated the long-term therapeutic effects on patients' functional independence at 6, 12, 18, and 24 months after stroke onset (Venketasubramanian et al., 2015). It demonstrated that the odds of functional independence, defined as mRS ≤1, were significantly increased after 6 months, and this beneficial effect persisted up to 18 months following ischemic stroke. Glasgow Outcome Scale and modified Rankin Scale scales were significantly improved in the MLC901 group compared to the placebo after 6 months of treatment in post-ischemic brain injuries patients (Pakdaman et al., 2023).

Clinical evidence in traumatic brain injuries

While some clinical evidence indicates that this herbal combination has a potential role in improving functional and cognitive outcomes in patients with

*viktorija.maksimova@ugd.edu.mk

traumatic brain injuries, others are showing contradictory results. Randomized placebo-controlled clinical trial on cognitive functioning following traumatic brain injuries provided class I/II evidence that, for patients with mild to moderate TBI. They revealed that 6 months treatment with MLC901 improved cognitive functioning, by a significant improvement in complex attention and executive functioning (Theadom et al., 2018). Recent study from Pilipenko et al. (2025) have shown that authors did not find significant improvements in complex attention, but they provided results that showed significant improvements in RPQ, QOLIBRI, anxiety and depression in the MLC901 group compared to the placebo group at 6 and 9 months.

Clinical evidence in spinal cord injuries

A relatively limited number of studies have reported the efficacy of MLC 901 in promoting faster rehabilitation among patients with spinal cord injuries. Most of the available evidence has primarily focused on its tolerability and safety. The SATURN study demonstrated that the greatest improvement in the ASIA motor score was observed in patients with cervical spinal cord injuries; however, a major limitation of this pilot study was the small sample size (Kumar et al., 2023).

Clinical evidence in cognitive impairment, dementia and other neurological disorders

The ATHENE study demonstrated that MLC901 exhibited a favorable safety profile when administered as an adjunct to standard therapy, in patients with mild to moderate clinical manifestations of Alzheimer disease. Although the primary objective of the study was to assess safety, the findings also suggested a potential effect in slowing disease progression, indicating a possible disease-modifying role of MLC901. Important results were obtained in another study confirming the positive changes in cerebral blood flow velocity in the MLC601 treatment group. These results reveal the potential of MLC 901 can improve neuroplasticity in the central nervous system by an effect on stimulating cerebral microcirculation.

Conclusion

This review provides a comprehensive and critical overview of the existing literature on efficacy of herbal combination MLC901 showing that Current clinical evidence suggests that MLC901 is a promising adjunctive therapy in neurological rehabilitation due to its neuroprotective and neurorestorative properties. However, further large-scale randomized controlled trials are needed to confirm its long-term efficacy and clinical utility.

References

Anjum, A. et al., 2025. Evaluation of Neuroprotective and Neuroregenerative Potential of NeuroAiD™ II(MLC901) in a Rat Model of Kainic Acid-Induced Spinal Cord Injury Molecular neurobiology 62(10), 13060-13072.https://doi:10.1007/s12035-025-05064-4

Bavarsad Shahripour, R. et al., 2011. The effect of NeuroAiD™ (MLC601) on cerebral blood flow velocity in subjects' post brain infarct in the middle cerebral artery territory. Eur. J. Intern. Med. 22(5), 509-13. https://doi:10.1016/j.ejim.2011.01.002

Chen, C.L.H. et al., 2022. Alzheimer's Disease THErapy With NEuroaid (ATHENE): A Randomized Double-Blind Delayed-Start Trial. J Am Med Dir Assoc. 23,3: 379-386.e3. https://doi:10.1016/j.jamda.2021.10.018

Kumar, R. et al., 2023. Spinal cord injury - assessing tolerability and use of combined rehabilitation and NeuroAiD (SATURN) study - primary results of an exploratory study. J Spinal Cord Med. 46(4), 682-686. https://doi:10.1080/10790268.2022.2067972

Pakdaman, H. et al., 2023. MLC901 in hypoxic-ischemic brain injury patients: A double-blind, randomized placebo-controlled pilot study. Medicine. 102(23), e33914. https://doi:10.1097/MD.0000000000033914

Pilipenko, P.I et al., 2025. A double-blind, placebo-controlled, randomized, multi-centre, phase III study of MLC901 (NeuroAiDTMII) for the treatment of cognitive impairment after mild traumatic brain injury. PloS one 20, 7e0310229. https://doi:10.1371/journal.pone.0310229

Theadom, A. et al., 2018. MLC901 (NeuroAiD II™) for cognition after traumatic brain injury: a pilot randomized clinical trial. Eur. J. Neurol. 25(8), 1055-e82. https://doi:10.1111/ene.13653

Venketasubramanian, N. et al., 2015 CHInese Medicine NeuroAiD Efficacy on Stroke Recovery - Extension Study (CHIMES-E): A Multicenter Study of Long-Term Efficacy. Cerebrovascular diseases 39(5-6), 309-18. https://doi:10.1159/000382082