

# Polymerized Nano-Curcumin Attenuates Neurological Symptoms in EAE Model of Multiple Sclerosis Through Down Regulation of Inflammatory and Oxidative Processes and Enhancing Neuroprotection and Myelin Repair

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## ABSTRACT

Multiple Sclerosis (MS) is an inflammatory demyelinating disorder of central nervous system (CNS). Polyphenol curcumin has been used in traditional medicine as an effective drug for a variety of diseases. Different formulations of curcumin are introduced to increase its stability and effectiveness. Here we have examined the effect of polymerized form of Nano-Curcumin (PNC) on experimental autoimmune encephalomyelitis (EAE) as an animal model of MS. EAE was induced in female Lewis rats and PNC or curcumin was daily administrated intraperitoneally from day 12 to 29 post immunization. When the prophylactic effect of PNC was under investigation, rats received PNC from the first day of immunization.

Treatment with PNC resulted in decreased scores of disease in therapeutic and prophylactic administration when compared with control group. Staining by luxol fast blue and H&E and immunostaining of lumbar spinal cord cross sections, confirmed a significant decrease in the amounts of demyelination, inflammation and BBB breaking down. Gene expression studies in lumbar spinal cord showed a corrected balance of pro-inflammatory and anti-inflammatory genes expression, decreased oxidative stress, improved remyelination and increased progenitor cell markers after treatment with PNC. Our results demonstrated an efficient therapeutic effect of PNC as an anti-inflammatory and antioxidative stress agent, with significant effects on the EAE scores and myelin repair mechanisms.

**Keywords:** Polymerized Nano-Curcumin; Experimental Autoimmune Encephalomyelitis (EAE); Multiple Sclerosis (MS); Oxidative Stress; Myelin Repair.