

ROLE OF VITAMIN K2 IN ALUMINIUM CHLORIDE ASSOCIATED COGNITIVE IMPAIRMENT IN MICE

Kaberi Chatterjee¹, Papiya Mitra Mazumder¹, Sugato Banerjee²

¹ Ph.D. Scholar of Dept. of Pharmaceutical Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi-835215

¹ Professor of Dept. of Pharmaceutical Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi-835215

³ Associate Professor of Department of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research, Kolkata- 700054

Background: Latest research shows that Aluminium toxicity may lead to cognitive impairment via neurodegeneration. Neurodegeneration is a common adverse effect of aging along with lifestyle and heavy metal toxicity. Literature reveals that Aluminium Chloride mediated cognitive impairment is an established animal model of Alzheimer's Disease (AD). Vitamin K2 (Menaquinones) helps to improve bone-health and prevent coronary calcification. When ingested in adequate amounts, it can decrease the oxidative stress and inflammation.

Aims and Objective: The objective is to do a preliminary determination of the use of Vitamin K2 as curative agent against Aluminium Chloride associated cognitive impairment.

Method: Swiss albino mice were treated with Aluminium Chloride for 3 weeks to induce Neurodegeneration in one group where another group receive vitamin K2 along with aluminium chloride for 3 weeks. Numerous behavioural investigations, including the Elevated Plus Maze (EPM), Passive Avoidance Test (PAT), Morris Water Maze (MWM), and Novel Object Recognition (NOR), were carried out after the dosing regimen to examine the change in cognition. Histopathological study of hippocampal area were prepared for all the animal groups using H & E staining.

Results: Vitamin K2 treatment on Aluminium Chloride administered animals led to significant decrease ($p < 0.001$) in transfer latency and increase ($p < 0.05$) in step down latency compared to only Aluminium Chloride treated animals. Additionally, the Vitamin K2 + Aluminium Chloride treatment group's duration spent in a particular zone in the MWM test and preference for novel item in the NOR test was considerably higher ($p < 0.001$) compared to the animals in the disease control group (Aluminium Chloride treated only).

Discussion and Conclusion: Administration of Vitamin K2 may improve mice's cognition by reversing the cognitive damage brought on by aluminium chloride,

according to neurobehavioural and histological slides. The findings imply that vitamin K2 may offer protection against neurodegeneration brought on by AD.

Keywords: Aluminium Chloride, Neurodegeneration, Cognitive impairment, Vitamin K2