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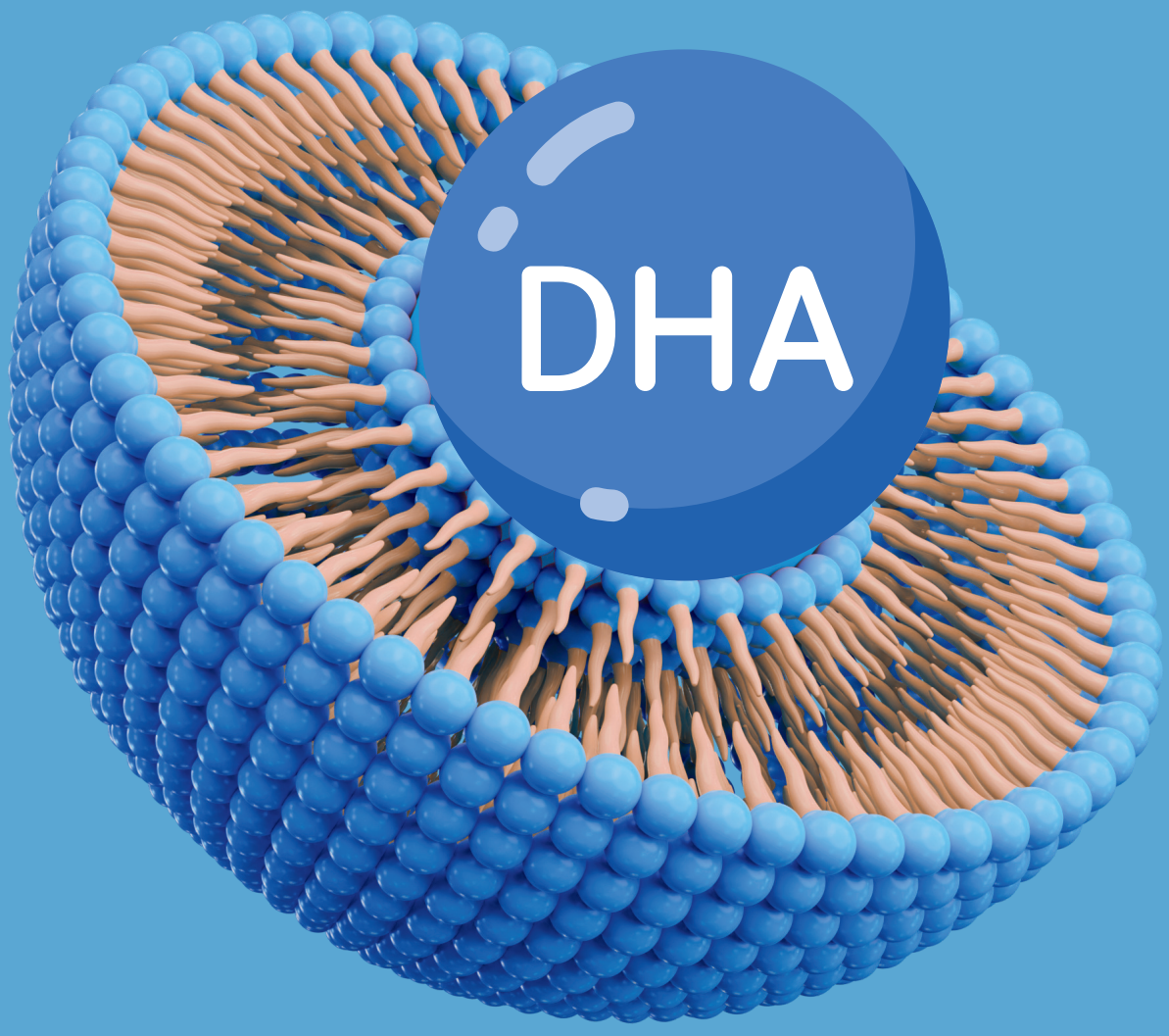
# Liposomal Docosahexaenoic acid (DHA)




Call Us
+91 6304249095
+91 9003069189

info@nrchembio.com

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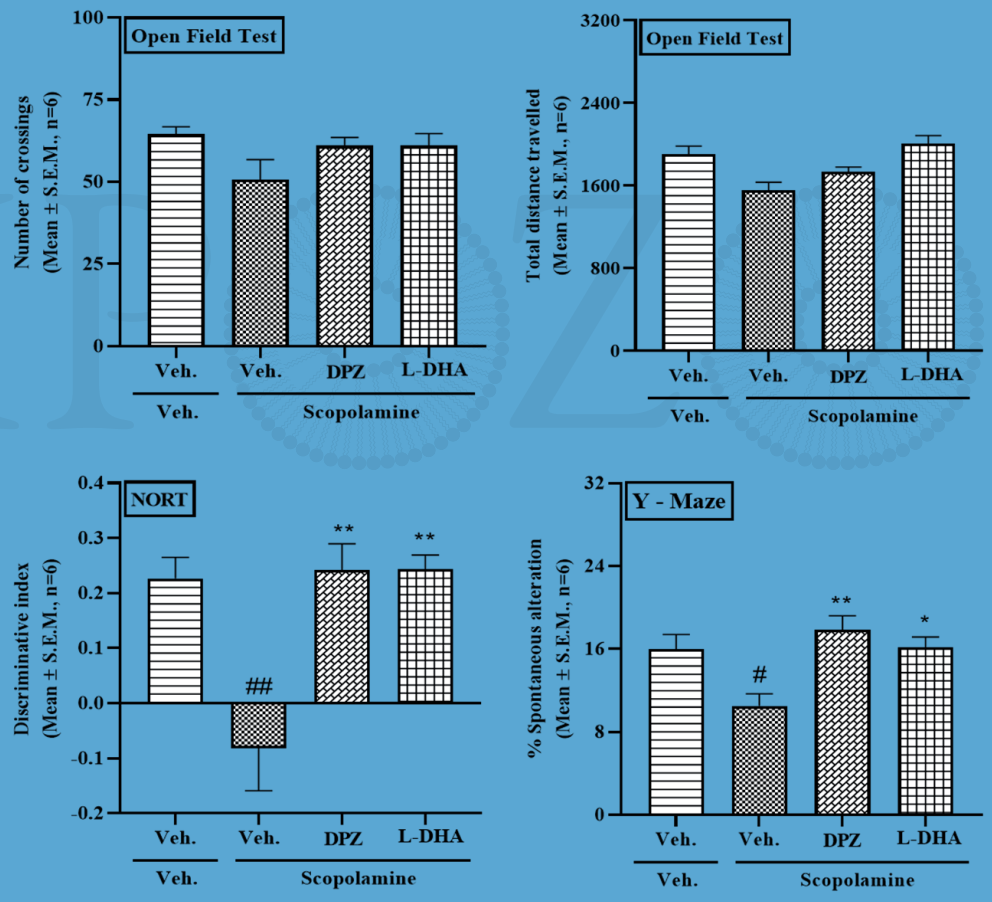
# LIPOSOMAL DOCOSAHEXAENOIC ACID-

# Cognitive Health Pre-Clinical study

Neuroprotective efficacy of liposomal DHA against scopolamine-induced cognitive deficits in male Wistar rats, evaluated through acetylcholinesterase activity, oxidative stress markers, ELISA-based assays, and behavioral assessments.

## Behavioural Tests

A series of behavioral tests were conducted to evaluate the neuroprotective and cognitive-enhancing effects of Liposomal DHA in a scopolamine-induced cognitive impairment model.




## Open Field Test

No significant differences in locomotor activity were observed among the groups, suggesting that the treatments had no effect on general motor function.

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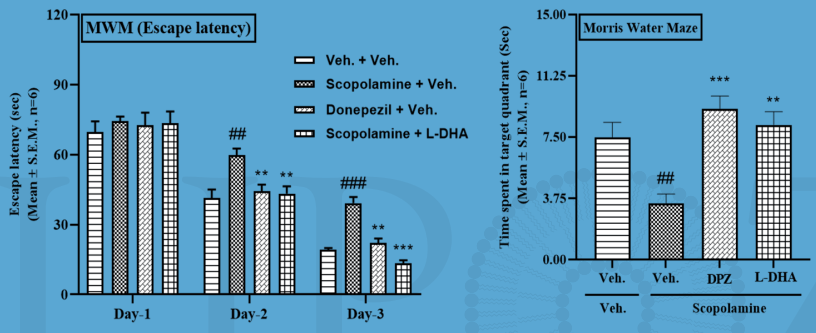
## Novel Object Recognition (NOR) Test

Scopolamine administration impaired recognition memory, as indicated by a decrease in the discrimination index. Treatment with liposomal DHA at 50 mg/kg markedly enhanced recognition memory, as reflected by a significant improvement in the discrimination index.

## Y-Maze Test

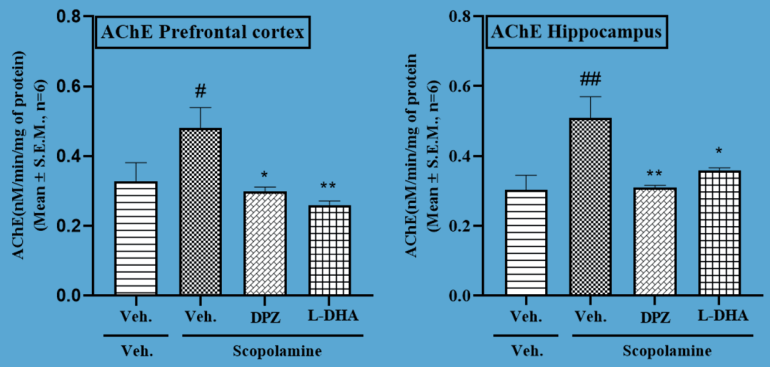
Scopolamine reduced spontaneous alternation behavior, indicating a decline in spatial working memory. Administration of liposomal DHA significantly restored alternation behavior, demonstrating an improvement in cognitive performance.

## Morris Water Maze Test




Scopolamine administration increased escape latency and decreased the time spent in the target quadrant, indicating deficits in spatial learning and memory. Treatment with liposomal DHA effectively counteracted these impairments, significantly reducing escape latency and increasing time spent in the target quadrant.

## Acetyl Cholinesterase Activity




Scopolamine administration significantly increased acetylcholinesterase activity in the prefrontal cortex and hippocampus. However, treatment with liposomal DHA significantly reduced acetylcholinesterase activity, thereby increasing acetylcholine availability and enhancing cholinergic transmission.

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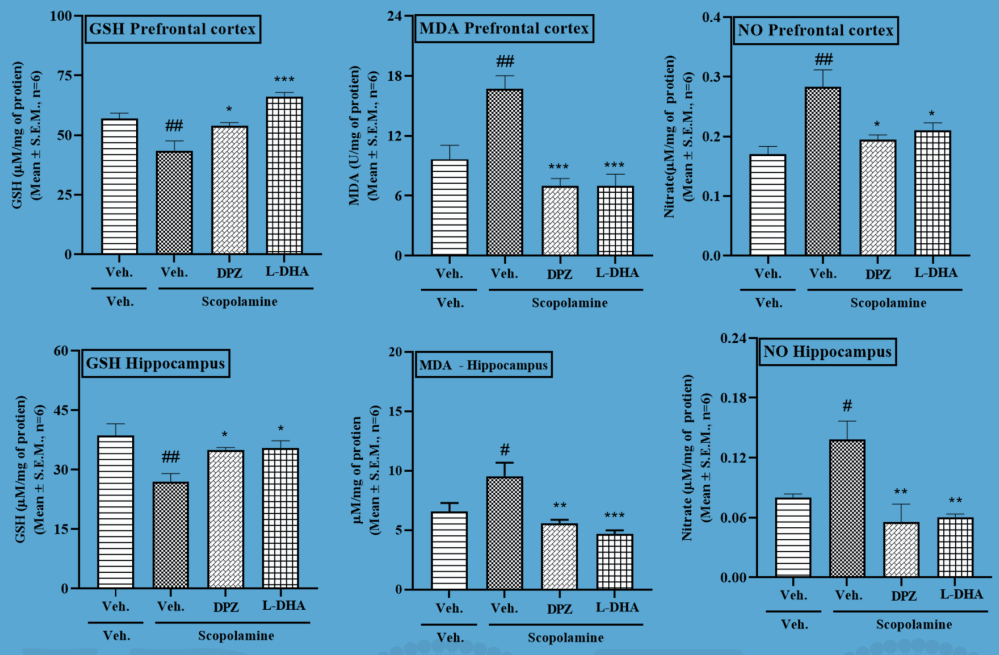
## Oxidative stress markers




Scopolamine administration typically results in significantly elevated levels of malondialdehyde (MDA) and nitric oxide, along with a marked reduction in glutathione (GSH) levels, indicating increased oxidative stress and compromised antioxidant defense in the prefrontal cortex and hippocampus. Treatment with liposomal DHA effectively restored GSH levels and significantly reduced MDA and nitric oxide concentrations, suggesting enhanced antioxidant defense mechanisms and a reduction in oxidative stress in these brain regions.

## Enzyme Linked Immuno Sorbent Assay

Scopolamine administration typically results in elevated levels of Amyloid beta and NF-κB, along with a significant reduction in Brain-Derived Neurotrophic Factor (BDNF) in the prefrontal cortex and hippocampus, indicating neuroinflammation and impaired neuroplasticity. Treatment with liposomal DHA effectively increased BDNF levels while significantly reducing Amyloid beta and NF-κB concentrations in these brain regions. This suggests that liposomal DHA helps restore neuroplasticity, supports neuronal health, and may exert cognitive-enhancing effects by mitigating scopolamine-induced neurodegenerative changes.

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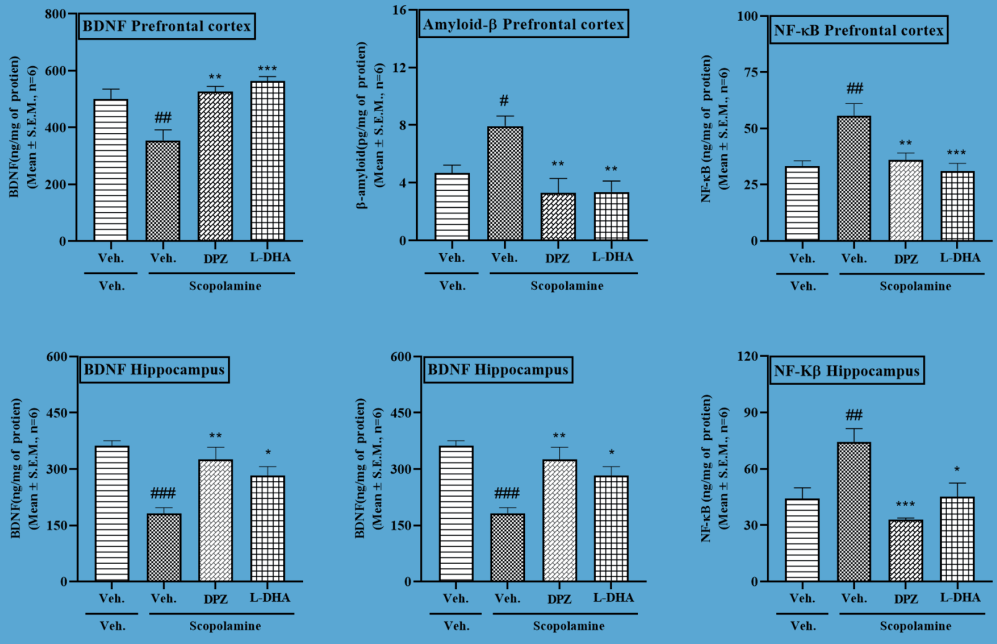
## Enzyme Linked Immuno Sorbent Assay




## Conclusion

This study evaluated the neuroprotective effects of liposomal docosahexaenoic acid (DHA) against scopolamine-induced cognitive impairment in rats. Scopolamine impaired recognition and spatial memory without affecting locomotor activity. Treatment with liposomal DHA significantly improved memory performance in the Novel Object Recognition, Y-Maze and morris water maze tests. Biochemical analysis showed that liposomal DHA reduced elevated acetylcholinesterase activity, restored glutathione levels, and lowered oxidative stress markers (MDA, nitric oxide). It also decreased Aβ1–42 and NF-κB levels while increasing BDNF expression, indicating reduced neuroinflammation and enhanced neuroplasticity. Overall, liposomal DHA demonstrated potent antioxidant and neuroprotective effects, highlighting its potential as a therapeutic agent for oxidative stress-related neurodegenerative conditions.

## Get in Touch with us


+91 6304249095

info@nrchembio.com