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TOCOTRIENOL-RICH FRACTION SUPPLEMENTATION REVERSES AGE-RELATED COGNITIVE DECLINE IN AGED RATS

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Background:

Brain aging is associated with a decline in motor performance and cognitive function. The decline may be due to neurodegeneration caused by increased oxidative stress. Thus the use of antioxidant as supplements to preserve brain functions has gained popularity. Vitamin E, in the form of either tocopherol or tocotrienol, or in combination, has been shown to exert neuroprotective effects in vitro. However whether this could be translated into better preservation of brain integrity is not known. Therefore, this study aims to evaluate the effect of tocotrienol-rich fraction (TRF) supplementation on the cognitive function in aged rats.

Materials and Methods:

Thirty-six male Wistar rats were divided into two groups: young (aged 3 months) and old (aged 21 months). Each group was further subdivided into control and supplemented groups. The supplemented groups receive 200mg/kg TRF via oral gavage continuously for three months. At the end of the three months period, cognitive functions test were carried out using the Morris water maze to evaluate spatial learning and memory functions. Two versions of the test were carried out i.e. the reference memory (requiring rats to learn one target location) and working memory version (requires the rats to learn many different target locations).

Results:

In the reference memory version test, data showed that control aged rats displayed slower spatial learning compared to supplemented aged rats and young rats. When the platform was removed (probe test), control aged rats spent less time in the target quadrant after 180s delay in the final training. This result indicated that aged rats have poorer spatial memory as compared to supplemented aged rats and young rats. In addition, the unsupplemented aged made fewer platforms crossing during probe test showing that they could not locate the platform as accurately as the supplemented aged rats or the young rats. Result also indicated that the working memory of the aged rats was markedly impaired as compared to young but this was not reversed with the TRF supplementation.

Conclusion:

In conclusion, aging resulted in decline in the reference as well as working memory affecting spatial learning abilities. TRF supplementation was able to prevent decline in spatial learning and reference memory in aged rats.

Keywords:

Tocotrienol-rich fraction, brain aging, cognitive function