

## **COENZYME Q<sub>10</sub> AND ALPHA-TOCOPHEROL: CAN THEY IMPROVE BRAIN FUNCTION WHEN SUPPLEMENTED IN LATE LIFE?**

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An ongoing series of investigations has explored the possibility that the antioxidants  $\alpha$ -tocopherol and coenzyme Q<sub>10</sub> (CoQ), supplemented alone or concurrently, could retard or ameliorate age-associated losses of cognitive or psychomotor function in mouse models of aging. When  $\alpha$ -tocopherol alone was supplemented in the diets of mice beginning at 3 months of age, it had no effect on survival of the mice up to 18 months and did not prevent age associated cognitive impairment as measured by tests of spatial learning and working memory (McDonald & Forster, 2005). Similarly, intake of CoQ throughout life did not influence life span or cognitive decline, but had some beneficial effect on psychomotor function. When initiation of supplementation was delayed until early senescence (18 months) and maintained for up to 14 weeks, intake of  $\alpha$ -tocopherol alone was ineffective in improving spatial learning, working memory, or psychomotor deficits of the aged mice (Sumien et al., 2004; McDonald et al., 2005). However, an improvement of spatial memory, but not psychomotor dysfunction, was observed in the old mice after senescence-initiated intake of CoQ alone. When  $\alpha$ -tocopherol and CoQ were supplemented alone or concurrently beginning at 18 months, only the mice treated with CoQ in combination with  $\alpha$ -tocopherol showed improved learning and working memory (McDonald et al., 2005). Ongoing biochemical studies suggest that the effectiveness of  $\alpha$ -tocopherol or CoQ in preventing or reversing age-related cognitive deficits appears to be positively correlated with ability of the various treatment regimens to decrease protein oxidative damage in the brains of the aged mice. The apparent interaction of CoQ and  $\alpha$ -tocopherol is consistent with the previous suggestion, based on biochemical studies, that CoQ and  $\alpha$ -tocopherol act synergistically to scavenge radicals in cellular membranes (Lass et al., 1999). Overall, the findings suggest that concurrent supplementation of  $\alpha$ -tocopherol with CoQ, initiated in early senescence, is more likely to be effective as a potential treatment for age-related learning deficits than supplementation with CoQ or  $\alpha$ -tocopherol alone.

### References:

- McDonald SR, Forster MJ. (2005) *Age* 27: 5-16.
- Sumien N, Heinrich KR, et al. (2004) *Free Radic Biol Med* 36: 1424-1433.
- McDonald SR, Sohal, RS, Forster, MJ (2005) *Free Radic Biol Med* 38:729-736.
- Lass A, Forster MJ, Sohal RS (1999) *Free Radic Biol Med* 26: 1375-1382.