"Vitamin D, Ginkgo Biloba, ginsenosides could be used as memory enhancers in neurodegenerative disorders"

OPINION ARTICLE

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Introduction

Ginkgo Biloba, *Ginseng Panax*, *Panax Quinquefolius* and *Ginseng Japonicus* from which extracts are obtained (via dilution) and ultimately sold over the counter (OTC) as homeopathic products, belong to the class of integrative medicines in conjunction with supplements such as vitamin D.

Ginkgo Biloba which is procured from the leaves of the *Gingkoephyta* genus (maidenhair tree) native of China was first described by Swedish botanist Linnaeus in the 18th Century however it had been employed in Chinese traditional medicine already in the 15th Century. Since, it has become an OTC homeopathic product and advised by practitioners worldwide as a memory inducer.

Similarly, ginsenosides jointly with gintonin, acquired from the roots of the *Panax* genus, comprising American Ginseng (*Panax quinquefolius*), Japanese Ginseng (*Ginseng japonicus*) and the Chinese-Korean Ginseng (*Ginseng Panax*), which are triterpenic saponins, also have displayed beneficial advantages in ameliorating working memory although their effects in Parkinson's (PD) and Alzheimer's disease seem to be due to antioxidant activity. Like *Ginkgo*, *Ginseng* also is used in homeopathic medicine as well as in the food industry mixed with coffee, which is also a neuroprotective agent thanks to the caffeine content known to be a prophylactic in Alzheimer's disease (AD).

On the other hand, Cholecalciferol commonly known as Vitamin D is notable for its multiple health benefits, not only as a wonder vitamin, but especially in the prevention of dementia and AD, yet vitamin d can be bought as a OTC supplement but is also prescribed at higher dosages.

Methods (Rationale)

Catechol-O-Methyltransferase (COMT) is the main enzyme involved in the catabolism of catecholamines. Its inhibition obviously leads to higher intrasynaptic catechol-neurotransmitter availability and thus inhibitors can be and have been used to regulate and balance a healthy 'memory neurotransmitter' biosynthesis and metabolism. It has been shown that both *Ginkgo Biloba*[1] and Vitamin D improve memory by inhibiting COMT activity in the brain. Another way they could exert their neuroprotective effects is via their antioxidant activity, particularly Ginseng which has already demonstrated a role in preventing the formation of reactive oxygen species (ROS) that are important in provoking mutations. COMT genotypic mutations have shown involvement in the development of neurodegenerative disorders as well as in schizophrenia, thus antioxidants are beneficial across different 'mutants'.

Conclusion

Integrative medicine as well as supplements in the form of Vitamin D, *Ginkgo* and *Ginseng* could help the prevention of neurodegenerative disorders and partially treating symptoms related with hypothalamic and thalamic memory loss caused by neuronal loss in neurodegenerative disorders featured in not only PD or AD but also in Fatal Insomnia (FI). The potential achievement of neuroprotective action will be due to a dual action of not just COMT inhibition but also of antioxidant and thus 'genoprotective' activity.

References

1. Diamond BJ, Shifflett SC, Feiwei N, et al. Ginkgo biloba extract: mechanisms and clinical indications. Arch Phys Med Rehabil 2000; 81: 668–78