



## Evidence for Olive Oil Supplementation as a Dementia Prevention Strategy

**Magda Tsolaki\****Emeritus Professor of Neurology, Aristotle University of Thessaloniki, Chair of Greek Federation of Alzheimer's Disease, Greece***\*Corresponding Author:** Magda Tsolaki, Emeritus Professor of Neurology, Aristotle University of Thessaloniki, Chair of Greek Federation of Alzheimer's Disease, Greece.**Received:** December 28, 2023**Published:** March 31, 2024© All rights are reserved by **Magda Tsolaki**.

Mild cognitive impairment (MCI) is considered a cognitive decline disorder that does not meet the clinical criteria for dementia. Currently, there is not an effective and approved pharmacological agent for MCI in Europe, while a limited number of existing options for symptomatic treatment efficacy [3] are being used in Alzheimer's disease (AD) with approval and in MCI without approval.

Prevention of neurodegenerative diseases is the best we must do now, while we know that following the current approved prevented strategies, we can decrease dementia about 40% until 2050 [1]. Prevention was Hippocrates's suggestion 25 centuries before, supporting that "Our body has the ability to auto-therapy. Very important protective factors are our diet, our body exercise, our environment, our lifestyle and the way we are thinking".

Studies in transgenic animals [2] but also in humans [3] showed that extra virgin olive oil (EVOO), a main substance of Mediterranean Diet, can be a very good dementia prevention strategy.

A recent review about prevention of AD describes the possible medication which can help people who are going to suffer from Alzheimer's Disease in future [4]. They report that seven are the possible pathogenetic mechanisms of AD: 1. inflammation, 2. vascular dysfunction, 3. aberrant proteostasis and autophagy, 4. mitochondrial oxidative stress, 5. metabolic dysfunction including insulin resistance, 6. cellular senescence and accumulation of senescent cells, and 7. epigenetic dysregulation. Also, they suggest possible medications which can protect people from all the above mechanisms.

For example, they suggest a combination of two senolytic therapies, dasatinib and quercetin, in older adults with biomarker-confirmed mild cognitive impairment (MCI) or early-stage AD. A Phase II randomized, double-blind, placebo-controlled clinical study, investigating the safety and efficacy of the combination NCT04685590) is running now.

However, in our randomized clinical study in patients with Mild Cognitive Impairment [3], we found that we can prevent people from AD with early harvest High Phenolic EVOO with its intervention in all the above pathophysiological mechanisms and even more [5]. It reduces IL-6 (interleukin 6) and TNF- $\alpha$  (Tumor necrosis factor- $\alpha$ ), (neuroinflammation), it decreases fibrinolytic factors PAI-1 (Plasminogen activator inhibitor-1) and  $\alpha$ 2 antiplasmin (vascular dysfunction) [6], it has a neuroprotective effect via restoration of BMI-1 (B lymphoma Mo-MLV insertion region 1 homolog) levels [7], it reduced Malondehyde, a biomarker of oxidative stress, and attenuates oxidative and nitrative stress reflecting on the reduction of the PARP (Poly ADP-ribose polymerase-1) levels and DNA damage [8].

Another recent clinical study showed that EVOO enhances the Blood-Brain Barrier Function in patients with Mild Cognitive Impairment (vascular dysfunction) [9].

Conclusively, we have today a valuable food which can be used as a protective medicine targeting all the recently described pathogenetic mechanisms of AD. Perhaps this is one of the reasons we have lower prevalence of dementia in Greece [10,11] in a country where EVOO is always in our meals.

**Bibliography**

1. Livingston G., *et al.* "Dementia prevention, intervention, and care: 2020 report of the Lancet Commission". *Lancet* 396.10248 (2020): 413-446.
2. Qosa H., *et al.* "Extra- virgin olive oil attenuates amyloid- and tau pathologies in the brains of TgSwDI mice". *The Journal of Nutritional Biochemistry* 26 (2015): 1479-1490.
3. Tsolaki M., *et al.* "A Randomized Clinical Trial of Greek High Phenolic Early Harvest Extra Virgin Olive Oil in Mild Cognitive Impairment: The MICOIL Pilot Study". *Journal of Alzheimer's Disease* 78.2 (2020): 801-817.

4. Fillit HM., *et al.* "The State of Alzheimer's Research and the Path Forward". *Journal of Prevention of Alzheimer's Disease* 4.10 (2023): 617-619.
5. Tzekaki EE., *et al.* "The multifunctional therapeutic potentiality of extra virgin olive oil administration through the intervention in pathophysiological mechanisms: Focus on Alzheimer's disease". *GSC Advanced Research and Reviews* 7.1 (2021): 101-113.
6. Tzekaki EE., *et al.* "The pleiotropic beneficial intervention of olive oil intake on the Alzheimer's disease onset via fibrinolytic system". *Experimental Gerontology* 150 (2021): 111344.
7. Tzekaki EE., *et al.* "Restoration of BMI1 levels after the administration of early harvest extra virgin olive oil as a therapeutic strategy against Alzheimer's disease". *Experimental Gerontology* 144 (2021): 111178.
8. Tzekaki EE., *et al.* "Extra Virgin Olive Oil consumption from Mild Cognitive Impairment patients attenuates oxidative and nitrate stress reflecting on the reduction of the PARP levels and DNA damage". *Experimental Gerontology* 156 (2021): 111621.
9. Kaddoumi A., *et al.* "Extra-Virgin Olive Oil Enhances the Blood-Brain Barrier Function in Mild Cognitive Impairment: A Randomized Controlled Trial". *Nutrients* 14.23 (2022): 5102.
10. Tsolaki M., *et al.* "Prevalence of Alzheimer's Disease and other dementing disorders in Pilea, Greece". *American Journal of Alzheimer's Disease* 14 (1999): 138-148.
11. Kosmidis MH., *et al.* "Dementia Prevalence in Greece: The Hellenic Longitudinal Investigation of Aging and Diet (HELIAD)". *Alzheimer Disease and Associated Disorders* 32.3 (2018): 232-239.