

Green Tea Improves Cognitive Function in Elderly Subjects

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Publishing their results in the journal *Nutrients* in May 2014, researchers showed that drinking the equivalent of 2-4 cups of brewed green tea (or bottled tea) daily improved cognitive function or reduced the progression of cognitive dysfunction in elderly subjects. To my knowledge, this is the first human intervention study suggesting a specific dose of green tea (and catechin / theanine content) can reverse the progression of cognitive dysfunction in elderly subjects.

Although this was a small pilot study, it provides insight that may be of great importance to an aging population - many of whom are or will soon be your patients.

Using the Mini-Mental State Examination (Japanese version) Ide, et al., recruited 12 elderly nursing home residents with cognitive dysfunction into the study. The subjects consumed 2 grams of green-tea powder per day for three consecutive months. In practical terms, this is equivalent to drinking 2-4 cups of brewed green tea (or bottled green tea) daily or ingesting green-tea supplements providing a daily dose of 227 mg of catechins and 42 mg of theanine.

After three months, Mini-Mental State Examination scores were significantly improved in subjects consuming the green-tea powder. In particular, short-term memory improved substantially. This has important implications in dementia and Alzheimer's disease, as short-term memory loss is a common finding in these conditions.¹

Green Tea, EGCG and Memory

Green tea is unique in that it contains between 30-40 percent water-extractable polyphenols, while black tea contains only 3-10 percent. Black tea is green tea that has been oxidized by fermentation. Oolong tea is semi-fermented green tea and has a polyphenol content somewhere between that of black tea and green tea. The four primary polyphenols found in fresh tea leaves include epigallocatechin-3 gallate (EGCG), epigallocatechin (EGC), epicatechin gallate (ECG) and epicatechin (EC).¹

Over the years, a number of epidemiological studies have correlated memory function and better cognition with frequent consumption of green tea. In recent years, researchers have begun to investigate components of green tea that may provide benefits to memory and cognitive function.

For example, an experimental study published in *Molecular Nutrition & Food Research* in 2012 showed that epigallocatechin-3 gallate (EGCG), a unique polyphenol found in high concentrations in green tea and decaffeinated green tea, increased neurogenesis (new nerve cell growth) within the hippocampus, which is an area of the brain impacted by Alzheimer's disease. In the Alzheimer's disease brain, the hippocampus atrophies to a significant degree, which is a common finding in this condition.

Researchers discovered that EGCG boosts the production of the rudimentary nerve cells (neural

progenitor cells) that morph into specialized brain cells in hippocampus area of the brain. Neural progenitor cells are similar to stem cells, which can mature into adult cells in various tissues or divide and produce more stem cells. The researchers went on to not only show that laboratory mice given EGCG [increased nerve cell production](#) in the hippocampus of the brain; they also demonstrated an advantage in memory or spatial learning (in maze tests), compared to mice not given EGCG.²

Other researchers have shown that tea catechins and theanine (also found in tea leaves) inhibit the breakdown of the memory chemical acetylcholine by inhibiting the enzyme acetylcholinesterase. Acetylcholinesterase inhibitor drugs are used in the management of Alzheimer's disease. As detailed by Ide, et al., other studies suggest tea catechins and theanine may support brain and memory function by acting as antioxidants and anti-inflammatory agents.¹

Clinical Applications

Health practitioners should consider encouraging patients to consume 2-4 cups of green tea per day and/or ingesting green tea supplements that provide at least 227 mg of catechins and 42 mg of theanine. For older patients, it would be worthwhile to record each patient's experience as to the impact of this intervention on their short-term memory function, with corresponding documentation in the patient's file.

References

1. Ide K, Yamada H, Takuma N, et al. Green tea consumption affects cognitive dysfunction in the elderly: a pilot study. *Nutrients*, May 2014; 6(10):4032-4042.
2. Wang Y, Li M, Xu X, et al. Green tea epigallocatechin-3-gallate (EGCG) promotes neural progenitor cell proliferation and sonic hedgehog pathway activation during adult hippocampal neurogenesis. *Molecular Nutr & Food Res*, 2012;56(8):1292.

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