

Hope for patients with HIV-associated cognitive impairment

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Current drug therapy for patients with HIV is unable to control the complete replication of the virus in the brain. The drugs therefore do not have any effect against the complications associated with neurocognitive impairment in patients with HIV. New research by Joseph Steiner and colleagues from Johns Hopkins University has discovered that a group of plant polyphenols known as catechins, which naturally occur in green tea and the seed of the cacao tree, may help in the prevention of these neurological complications. Their work is published online in Springer's *Journal of NeuroVirology*.

Previous research has established the critical role of a protein called brain-derived neurotrophic factor (BDNF) in supporting the survival and growth of neurons in the brain. This protein is active in areas of the brain vital to learning, memory and higher thinking. Patients with HIV have been found to have lower levels of BDNF in their brains than healthy individuals suggesting that this could be directly responsible for the cognitive impairment suffered.

In their research, Steiner and colleagues analysed the effects of 2000 compounds, containing both [natural substances](#) and FDA-approved drugs, on [brain cells](#) in the laboratory. They identified a series of compounds which had the potential to help protect neurons in the brain. Nine of these were related to epicatechin, which is found in cocoa and [green tea](#) leaves. Further screening and comparison with resveratrol, the antioxidant found in red wine, specifically identified epicatechin and epigallocatechin gallate (EGCG) as being the most effective at helping

protect neurons by inducing production of BDNF.

Although the antioxidant activities of epicatechin and [EGCG](#) are well documented, the discovery that they could be responsible for inducing production of BDNF is an exciting advancement in this area. The fact that these compounds readily cross the blood-brain barrier further increases their therapeutic potential, as this is often a major stumbling block in the development of therapies directed at the brain. This provides hope for patients with HIV as there is currently no neuroprotective therapy available for patients with HIV-associated cognitive impairment.

The authors conclude: "Due to its simpler structure and more efficient blood-brain barrier penetration properties, epicatechin might be the best therapeutic candidate for neurodegenerative diseases. These include HIV-associated cognitive disorders where oxidative stress is an important pathophysiological mechanism." Further research in patients with HIV is required to elucidate just how effective these naturally occurring compounds could be.

More information: Nath S, Bachani M, Harshavardhana D, Steiner JP (2012). Catechins protect neurons against mitochondrial toxins and HIV proteins via activation of the BDNF pathway. *Journal of NeuroVirology*. [DOI 10.1007/s13365-012-0122-1](https://doi.org/10.1007/s13365-012-0122-1)

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