

Olive extract may protect against AMD

By Stephen Daniells 13/02/2008-

A polyphenol from olives may protect against macular degeneration associated with age or the damaging effects of chemicals in tobacco smoke, suggests a new study.

The potential benefits hydroxytyrosol (HTS) for eye health were demonstrated in an *in vitro* lab study using cells from the human retina, with mitochondria - the cell's power stations - shown to benefit most, report the researchers in the *Journal of Neurochemistry*.

"The protective effect of HTS in this model was as potent as that of established mitochondria-targeting antioxidant nutrients," wrote the researchers from the Chinese Academy of Sciences, DSM Nutritional Products, and the University of California, Irvine.

"These results suggest that HTS is also a mitochondrial-targeting antioxidant nutrient and that dietary administration of HTS may be an effective measure in reducing and or preventing cigarette smoke-induced or age-related retinal pigment epithelial degeneration, such as age-associated macular degeneration."

Age-related macular degeneration (AMD) is the leading cause of legal blindness for people over 55 years of age in the Western world, according to AMD Alliance International.

Despite the fact that approximately 25 to 30 million people worldwide are affected by AMD, awareness of the condition is low, according to AMD Alliance International. And as the generation of Baby Boomers gets older, the Alliance expects incidence to be on the rise and triple by 2025.

AMD is a degenerative retinal disease that causes central vision loss and leaves only peripheral vision. Early detection is cited as a means of prevention so that treatment or rehabilitation can be undertaken early enough. However, links to diet have also been underscored.

The researchers used the cell line ARPE-19, said to be a model of smoking- and AMD, to test if HTS could protect against the damaging effects of acrolein, a major component of cigarette smoke.

Incubating the cells with acrolein (75 micromoles per litre) for 24 hours in the absence of the olive extract resulted in a significant loss of viability for the cells, as well as increases in oxidative damage and detrimental effects to the functioning of mitochondria, report the researchers.

However, pre-treating the cells with HTS (from DSM Nutritional Products) at doses of 0.1, 1, 5, 10, 20, 50, 75, 100 micromoles per litre was found to protect against the

acrolein-induced oxidative damage and mitochondrial dysfunction in a dose-dependent manner.

"In the present study, we have demonstrated that HTS, a natural polyphenol and a rich component in olive oil, significantly protected acrolein-induced cellular toxicity in ARPE-19 cells, a cellular model for smoking- and age-related macular degeneration," wrote lead author Zhongbo Liu.

Commenting on the mechanism behind the benefits, the researchers suggested that HTS may enhance antioxidant defences by activating the Keap1/Nrf2 pathway.

"Nrf2 is known as a key regulator of antioxidant response element-mediated gene expression and the induction of phase 2 detoxifying enzymes and antioxidant enzymes such as superoxide dismutase and glutathione S-transferase," they added.

Corresponding author Jiankang Liu, from the Institute for Brain Aging and Dementia at the University of California, Irvine told NutraIngredients.com: *"This work is a collaborative project with DSM and is still undergoing. We will try to go further with in vivo animal models and also possible for clinical trial in the future."*

Hydroxytyrosol is thought to be the main antioxidant compound in olives, and believed to play a significant role in the many health benefits attributed to olive oil. Previous research by a team from the University of Barcelona found that LDL or 'bad' cholesterol levels could be cut substantially after consuming just 25 millilitres of virgin olive oil daily for one week. Other studies have suggested that it could also protect against cancer.

The study was funded by National Eye Institute, the Chinese Academy of Sciences, and DSM Nutritional Products.

Source: *Journal of Neurochemistry*

December 2007, Volume 103, Issue 6, Page 2690-2700, doi: 10.1111/j.1471-4159.2007.04954.x

"Hydroxytyrosol protects retinal pigment epithelial cells from acrolein-induced oxidative stress and mitochondrial dysfunction"

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