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Green tea extracts may slow smokers' lung damage

By Stephen Daniells, 14-Oct-2009

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Daily consumption of a Chinese green tea extract may slow the damage of cigarette smoke in the lungs, according to results from a rat study from Hong Kong.

Although expert advice is clearly to avoid tobacco smoke altogether, the results suggest smokers could benefit from upping their intake of green tea, particularly those rich in epigallocatechin gallate (EGCG), according to findings from the animal study published in *Respiratory Medicine*.

One in three Europeans are smokers, while the US figure is one in five. Tobacco smoke contains over 4,000 compounds, of which 60 are known carcinogens. The oxidative stress levels of smokers are significantly greater than non-smokers, and as such there is a bigger drain on the levels of antioxidants in the body.

The new study, led by Judith Mak from The University of Hong Kong, led to an enlargement in the airspace in the lungs of cigarette-smoke-exposed animals, as well as an increase in the number of mucus producing goblet cells. Such effects, however, were not observed in rats fed Lung Chen tea, report the Hong Kong-based scientists.

The study adds to the ever-growing body of science supporting the potential health benefits of green tea and its polyphenols, particularly for anti-cancer and weight loss.

Green tea contains between 30 and 40 per cent of water-extractable polyphenols, while black tea (green tea that has been oxidized by fermentation) contains between 3 and 10 per cent. Oolong tea is semi-fermented tea and is somewhere between green and black tea.

The four primary polyphenols found in fresh tealeaves are epigallocatechin gallate (EGCG), epigallocatechin (EGC), epicatechin gallate (ECG), and epicatechin (EC).

What's happening?

"The precise mechanisms of the protective role of green tea against cigarette smoking-induced lung injury are currently unclear," explained the researchers. *"Lung Chen tea contains the largest amount of EGCG when compared with other Chinese teas and EGCG has the highest antioxidant capacity among different catechins and dietary compounds such as vitamins C, E and black tea."*

Evidence to support the potential protective effects of EGCG was not presented by the researchers, and further study needs to be performed to elucidate the mechanism. It is also not known if such benefits would be repeated in humans.

Study details

Mak and her co-workers randomly divided Sprague-Dawley rats into four groups. One group was exposed to normal air, one to air with 4 per cent cigarette smoke, one to normal air and fed green tea, and one to cigarette smoke-containing air and fed green tea.

After 56 days, animals exposed only to cigarette smoke showed an enlargement in the airspace of the lungs, and increased numbers of goblet cells. Such effects were not observed when they were simultaneously fed green tea, added the researchers.

Furthermore, levels of 8-isoprostane increased in the cigarette smoke-only animals, but not so in the green tea fed animals. Isoprostanes are accurate markers of oxidative stress in humans.

"These results indicate that increased levels of systemic oxidative stress after cigarette smoke exposure play an important role in the induction of lung damage," wrote the researchers. *"Chinese green tea may have the ability to suppress cigarette smoke-induced oxidative stress that leads to protection of lung injury,"* they concluded.

Source: *Respiratory Medicine*
November 2009, Volume 103, Issue 11, Pages 1746-1754

"Chinese green tea ameliorates lung injury in cigarette smoke-exposed rats"
Authors: K.H. Chan, S.P. Ho, S.C. Yeung, W.H.L. So, C.H. Cho, M.W.L. Koo, W.K. Lam, M.S.M. Ip, R.Y.K. Man, J.C.W. Mak