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Olive oil supplements may protect against the adverse vascular effects of air pollution

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Taking olive oil supplements may counteract some of the adverse cardiovascular effects of exposure to air pollution, according to a new study presented at the 2014 American Thoracic Society International Conference.

"Exposure to airborne particulate matter can lead to endothelial dysfunction, a condition in which the endothelium (inner lining) of blood vessels does not function normally, which is a risk factor for clinical cardiovascular events and progression of atherosclerosis," said lead study author Dr. Haiyan Tong, MD, PhD, a research biologist with the United States Environmental Protection Agency. "As olive oil and fish oil are known to have beneficial effects on endothelial dysfunction, we examined whether use of these supplements would counteract the adverse cardiovascular effects of exposure to concentrated ambient particulate matter in a controlled setting."

The study involved 42 healthy adults who were randomized to receive either 3 gram/day of olive oil, fish oil, or no supplements for 4 weeks before undergoing controlled 2-hour exposures to filtered air, followed on the next day by exposure to fine/ultrafine concentrated ambient particulate matter (CAP, mean mass concentration 253±16 μg/m3) in a controlled-exposure chamber.

Endothelial function was assessed by sonographic measurement of flow-mediated dilation of the brachial artery before, immediately after, and 20 hours after exposure to air and CAP. Blood markers of

vasoconstriction and fibrinolysis (a body process that keeps blood clots from growing) were also measured.

Immediately after exposure to CAP, significant particulate matter mass-dependent reductions in flow-mediated dilation were observed in the control (-19.4±8.4% per 100 μg/m3 increase in CAP concentration relative to pre-filtered air levels) and fish oil groups (-13.7±5.3%), while the decrease in the olive oil group was not significant (-7.6±6.8%).

Tissue plasminogen activator, a protein involved in the breakdown of blood clots, increased (11.6±5%) immediately after CAP exposure in the olive oil group, and this effect persisted up to 20 hours. Olive oil supplementation also ameliorated changes in blood markers associated with vasoconstriction and fibrinolysis, while fish oil supplementation had no effect on endothelial function or fibrinolysis after CAP exposure.

"Our study suggests that use of olive oil supplements may protect against the adverse vascular effects of exposure to air pollution particles," said Dr. Tong. "If these results are replicated in further studies, use of these supplements might offer a safe, low cost, and effective means of counteracting some of the health consequences of exposure to air pollution."

More information: Abstract 55100, Olive Oil Supplements Ameliorate Endothelial Dysfunction Caused By Concentrated Ambient Particulate Matter Exposure In Healthy Human Volunteers , Scientific Abstract ,)6.01 - Air Pollution: Epidemiology and Mechanisms (EOH) , H. Tong1, A.G. Rappold1, M. Caughey2, A.L. Hinderliter2, M. Case1, J. Berntsen3, W.E. Cascio1, D. Diaz-Sanchez1, R.B. Devlin1, J.M. Samet1; 1US Environmental , Protection Agency - Durham, NC/US, 2University of North Carolina-Chapel Hill - Chapel Hill, NC/US, 3TRC Environmental Corporation - Raleigh, NC/US

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