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Meal-induced oxidative stress in metabolic syndrome

T₂DM is associated with increased risk for cardiovascular disease. Oxidatively modified LDL (oxLDL) is the primary contributor. oxLDL have been measured in plasma but association with disease risk has been mixed. Plasma oxLDL are affected by pro- and anti-oxidant metabolites as well as circulating autoantibodies against oxLDL. Oxidative susceptibility of LDL to Cu⁺⁺ induced oxidation as measured by lag time (min) is a functional assay for oxLDL. We hypothesize that with meal consumption, oxidative susceptibility of LDL is increased and reduction of postprandial lipemia may reduce this susceptibility. Patients with metS participated in a randomized, double-blind, placebo-controlled study with cross-over with fenofibric acid (FA). After each treatment period, fasting (f) and postprandial (pp) plasma after a standardized mixed meal were collected for lipoprotein isolation. Both fasting (f) and postprandial (pp) LDL undergoes spontaneous oxidation (no Cu⁺⁺) with comparable lag times (169 and 172). With FA, ppLDL is more protected, i.e. longer lag time (212 vs 151). In the presence of Cu⁺⁺, lag times of fLDL are reduced for both periods (37 and 44). Compared to fLDL, reductions in ppLDL lag times were statistically significant only during placebo (37 vs 30) and not during FA (44 vs 38). Co-incubation with autologous HDL failed to protect LDL from oxidative modification. In summary, (1) ppLDL is more susceptible to oxidative modification, (2) treatment with FA reduced postprandial lipemia and oxidative susceptibility of ppLDL, and (3) HDL from metS appears to be dysfunctional and this was not normalized by FA therapy.

Biography

Ngoc-Anh Le completed his PhD in 1979 from University of California San Diego and his post-doctoral training with the SCOR-Atherosclerosis at Columbia University, NYC. He has served as laboratory director for several multicenter trials, including the Strong Heart Study, CARDIA, SAMMPRIS, and BIOSIS. He is currently the director of the Biomarker Core Laboratory, Atlanta Research and Education Foundation, Atlanta VAMC. He has published more than 90 papers in peer reviewed journals.

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