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Improving HDL functions by interaction with novel bioactive lipids

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Atherosclerosis is a chronic disease characterized by an accumulation of lipids and oxidized lipids within the intima of the arterial wall, which leading to cardiovascular diseases (CVD) such as heart attacks and strokes. High density lipoprotein (HDL) with its complex structure, plays an important role in preventing atherosclerosis due to its antiatherogenic properties. Improving HDL function and quality are expected to attenuate atherosclerosis and reduce CVD risk. Methods: we isolated a novel active compound from *Nannochloropsis microalgae* (LysoDGTS), which increased activities of the main antioxidant enzyme associate to HDL, (paraoxonase 1-PON1). Our aim is to examine the effect of lyso-DGTS on rePON1 and HDL activities in vitro, in vivo and ex vivo. Results: Lyso-DGTS increased activities of PON1 and increased HDL cholesterol efflux from macrophages in a dose-dependent manner and significantly increased the ability of HDL to induce nitric oxide (NO) production from endothelial cells. In an ex-vivo experiment, HDL obtained from 5 patients, with plaque stenosis > 50% as determined by cardiac CT, was incubated with \ without lyso-DGTS and measured for its HDL efflux ability. In average, HDL efflux significantly increased in a dose dependent matter after incubation with lysoDGTS. In serum obtained from apoEKO mice treated with Lyso -DGTS for 28 days, LysoDGTS increased activities of PON1 and enhanced HDL cholesterol efflux. Conclusion: Novel bioactive lipids based on Lyso-DGTS derivatives interact selectively with HDL components and alter its structure and functions. Improving HDL functions using LysoDGTS and its derivatives might be a novel approach for reducing atherosclerosis development and decreasing CVD risk. Keywords: Atherosclerosis, HDL, lyso-DGTS, cholesterol efflux, nitric oxide, PON1.

Biography

Ali Khattib is currently working in the Department of Natural Compounds and Analytical Chemistry, MIGAL—Galilee Research Institute, Kiryat Shmona, Israel.

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