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Study on Peptide-based High Density Lipoprotein (pHDL) targeting Atherosclerosis

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Atherosclerosis (AS) is a leading cause of death and loss of productive life worldwide. The immature form of High-density lipoprotein (HDL) has been shown advantageous in improving plaque targeting and antiAS efficacy. However, the prohibitive cost of ApoA-I protein used to generate functional HDL and the time-consuming procedure of HDL synthesis impeded its clinical application. Though HDL mimic peptides are capable of fulfilling HDL function with a dramatic low-cost, their instability in vivo failed to put their utilization into practice. Our current study was designed to synthesize peptide-based HDL (pHDL) in order to increase in vivo stability of peptides by incorporating with phospholipids. PHDL produced by microfluidics resulted in discoidal nano-scale particles, showing of 37.8 nm diameter, 0.275 PdI and -4.17 mV zeta potential. Using in vivo imaging system, FITC-labeled pHDL was highly recruited to the aorta of AS model ApoE-/- mice compared to C57BL/6 control mice 24 hrs post-intraperitoneal injection. Intraperitoneal administration of pHDL to ApoE-/- mice twice per week for 12 weeks reduced more than 40% plasma TG, TC and LDL-C, which leads to 40% reduction of aortic plaques. In addition, increase of plasma ALT, AST and creatinine in ApoE-/- mice were largely improved by pHDL treatment, indicating a general protective effect of pHDL. In conclusion, pHDL represents an affordable alternative of HDL, in terms of plaque-targeting and anti-AS effects.

Biography

Ning Li has completed her M.D. in 2009 from University of Geneva, Switzerland, where she obtained her postdoctoral training focusing on metabolic disorders. After 4- year working at Chinese Academy of Medical Sciences and Peking Union Medical College, Ning Li is currently the associated professor of China Academy of Chinese metabolic diseases, mitochondrial function and dysfunction, and host metabolism in viral infection.

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