Overexpression of stearoyl-coenzyme A desaturase 1 in macrophages leads to enhanced macrophage reverse cholesterol transport

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Abstract

Objective- The impact of Stearoyl-coenzyme A desaturase 1 (SCD1) on atherosclerosis remains unclear. The aim of this study was to determine whether SCD1 affects macrophages reverse cholesterol transport (RCT).

Methods and Results- Adenoviral-mediated SCD1 overexpression in RAW264.7 macrophages led to increased cholesterol efflux to HDL, but not to apoA-I, compared to the control. There were no differences in ABCG1 and SR-BI expression between the macrophages overexpressing SCD1 and control. Knockdown of ABCG1 and SR-BI also did not affect the SCD1-induced cholesterol efflux to HDL. SCD1-overexpressing macrophages promoted the formation of both normal- and large-sized HDL in media. Interestingly, media transfer assay revealed that HDL generated by SCD1 had the enhanced cholesterol efflux potential. To measure macrophage RCT in vivo, 3H-cholesterol-labeled RAW264.7 macrophages overexpressing SCD1 or control were intraperitoneally injected into wild-type mice and RCT study was performed. Supporting in vitro data, mice injected with SCD1-macrophages showed significant increases of 3H-tracer in plasma, liver, and feces compared to the control. Moreover,
kinetic studies demonstrated that SCD1 overexpression in the macrophages unaffected the excretion of cholesterol ester from plasma HDL to feces

**Conclusions**- These results demonstrated that overexpression of SCD1 in macrophages promotes *in vivo* macrophage RCT through increased HDL-mediated cholesterol efflux.