

9-*cis* β -carotene Inhibits Atherosclerosis Development in Female LDLR-/- Mice

Noa Zolberg Relevy^{1,2}, Ralph Rühl³, Ayelet Harari¹, Itamar Grosskopf¹, Iris Barshack^{4,5}, Ami Ben-Amotz⁶, Uri Nir², Hugo Gottlieb⁷, Yehuda Kamari^{1,5}, Dror Harats^{1,5}, and Aviv Shaish¹

¹The Bert W. Strassburger Lipid Center; Sheba Medical Center, Tel-Hashomer, 5265601 Israel;

²The Mina and Everard Goodman Faculty of Life Science, Bar-Ilan University, Ramat-Gan, Israel; ³Department of Biochemistry and Molecular Biology, University of Debrecen, Debrecen, Hungary; ⁴Institute of Pathology, Sheba Medical Center, Tel-Hashomer; ⁵Sackler Faculty of Medicine, Tel-Aviv University, Israel; ⁶N.B.T Israel; ⁷Department of Chemistry, Bar-Ilan University, Ramat-Gan 52900, Israel.

***Corresponding author:** Aviv Shaish, The Bert W. Strassburger Lipid Center, Sheba Medical Center, Tel-Hashomer, 5265601 Israel

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ABSTRACT:

Background: Several epidemiological studies have shown that diets rich in carotenoids are associated with a reduced risk of cardiovascular disease. However, administration of synthetic all-*trans* β -carotene was reported to have no effect on cardiovascular disease. We previously showed that the 9-*cis* β -carotene-rich powder of the alga *Dunaliella bardawil* inhibits atherogenesis and reduces plasma non-HDL cholesterol levels in mice.

Context and purpose of this study: We sought to study whether isolated 9-*cis* β -carotene inhibits atherogenesis in a murine model of atherosclerosis.

Results: Twelve-week-old female LDL receptor knockout mice (LDLR-/-) were pretreated for 2 weeks with regular chow diet fortified with the alga *Dunaliella* powder, 9-*cis* β -carotene isomer, all-*trans* β -carotene isomer, or 9-*cis* retinoic acid, followed by 10 weeks of a high-fat diet with the same fortifications. In contrast to *Dunaliella*, 9-*cis* β -carotene did not inhibit the high fat diet-induced elevation of plasma cholesterol. In addition, diet fortification with *Dunaliella* powder, β -carotene isomers, or 9-*cis* retinoic acid did not change the plasma retinol or retinoic acid levels. Nevertheless, 9-*cis* β -carotene significantly inhibited atherogenesis compared to the control mice (39% reduction).

Conclusions: The results suggest that 9-*cis* β -carotene should be considered as an anti-atherogenic agent in the human diet.

Key words: Atherosclerosis, *Dunaliella*, 9CBC, LDLR-/- mice