

Table. Corn Oil: Effects on Atherogenicity/Oxidative Modification of LDL, Design Type 1 and Design Type 3 Studies

Author/ Year	De- sign Type	Class	Quality (+,-,Ø)	Purpose/ Population Sample Size	Regimen	Primary Outcome Measures Results	Author's Conclusions/ <i>Reviewer's Comments (Italicized)</i>
Schwab et al., 2000	RCT	A	Ø	<p>Purpose: To examine effect of supplemental dietary chol added to reduced fat diets (30% energy from fat) enriched with either corn oil (high in PUFA) or beef tallow (high in SFA) on in vitro susceptibility of LDL to oxidation</p> <p>Sample: 13 subj (7 females, 6 males)</p> <p>Inclusions: LDL chol conc >3.36 mmol/L while consuming habitual diets</p> <p>Exclusions: Evidence of chronic illness; smoker; use of DS; use of meds known to affect plasma lipid conc</p>	<p>Run-in Period: None</p> <p>TX/Duration: Subj consumed test diets in following order: 1) Corn oil-enriched diet 2) Beef tallow-enriched diet 3) Beef tallow-enriched diet with supplemental chol 4) Corn oil-enriched diet with supplemental chol</p> <p>Supplemental chol provided in form of cooked egg yolk</p> <p>4 diet periods for 32 d each</p> <p>Dose/Form: Corn oil – 2/3 of total fat (20% of total kcals)</p> <p>Dietary Intake During Study: Total fat: 30% TE with 2/3 fat from corn oil or beef tallow PUFA (% TE): Corn oil: 11.2±0.5 Corn</p>	<p>Outcome Measures: Lipids, lipoproteins and apolipoproteins LDL lag time, particle score and LDL α-tocopherol conc Plasma antioxidant content</p> <p>Results: Lipid values higher after corn oil + chol diet compared with corn oil diet: TC (mmol/L; <i>P</i><0.05) Corn oil + chol: 5.29±0.67 Corn oil: 5.01±0.53 LDL (mmol/L; <i>P</i><0.05) Corn oil + chol: 3.48±0.63 Corn oil: 3.24±0.54 HDL (mmol/L; <i>P</i><0.05) Corn oil + chol: 1.21±0.29 Corn oil: 1.14±0.25 TG (mmol/L; <i>P</i><0.05) Corn oil + chol: 1.12±0.32 Corn oil: 1.24±0.36 LDL ApoB (mmol/L; <i>P</i>=0.07) Corn oil + chol: 90±17 Corn oil: 80±18</p> <p>Effect of fat type (corn oil vs beef tallow) NS on susceptibility of LDL to oxidation, but addition of moderate amt of chol resulted in incr susceptibility of LDL to oxidation (decr lag time): 69±22</p>	<p>Author's Conclusions: "In conclusion, a moderate amount of dietary cholesterol added to diets high in both saturated and polyunsaturated fatty acids resulted in an increase in the susceptibility of LDL to oxidation in middle-aged and elderly subjects with moderate hypercholesterolemia. These data suggest that within the context of normal variations in dietary patterns small but potentially significant alterations in the susceptibility of LDL to oxidation can occur..."</p> <p>Reviewer's Comments: <i>None</i></p>

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					<p>oil + chol: 11.9±0.2 Beef tallow: 2.6±0.4 Beef tallow + chol: 3.4±0.2 Chol (mg/4.2 MJ): Corn oil: 85±4 Corn oil + chol: 197±13 Beef tallow: 109±12 Beef tallow + chol: 226±21</p> <p>Dietary Intake Assessment/Frequency: Meals provided by metabolic research unit</p> <p>Study Visits/ Measurements: Fasting blood samples collected</p> <p>Washout Period: Consumed habitual diet</p>	<p>min vs 96±24 min in corn oil diet with vs without supplemental chol, respectively, <i>P</i>=0.006</p> <p>82±20 min vs 96±26 min in beef tallow diet with vs without supplemental chol, respectively, <i>P</i>=0.025</p> <p>Stepwise equation indicated that as plasma oleic acid conc incr and/or linoleic acid conc decr, lag time incr (decr susceptibility to oxidation), whereas as dietary chol conc incr, lag time decr (incr susceptibility to oxidation)</p> <p>% change and absolute change not provided</p>	
Schwab et al., 1998	RCT	A	Ø	<p>Purpose: To examine effect of FA composition of reduced-fat diet on in vitro oxidation of LDL</p> <p>Sample: 14 moderately hypercholesterolemic middle-aged and</p>	<p>Run-in Period: None</p> <p>TX/Duration: 5 reduced-fat diets enriched with test oils provided in randomized order for 32-d each</p> <p>Each diet separated by</p>	<p>Outcome Measures: Lipids LDL lag time Antioxidant constituents in LDL particles Plasma FA patterns</p> <p>Results: Plasma TC conc sig higher after beef tallow (5.63 ±0.79 mmol/L;</p>	<p>Author's Conclusions: "In conclusion, in middle-aged and elderly moderately hypercholesterolemic subjects, the consumption of reduced-fat diets enriched in animal fat</p>

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				<p>elderly subj (8 females, 6 males)</p> <p>Inclusions: LDL chol conc >3.36 mmol/L</p> <p>Exclusions: Evidence of chronic illness; smoker; use of meds known to affect plasma lipid levels; use of DS or HRT</p>	<p>washout period in which habitual diet consumed</p> <p>Dose/Form: 1) Corn oil 2) Canola oil 3) Olive oil 4) Rice bran oil 5) Beef tallow</p> <p>Dietary Intake During Study: Total fat: 30% TE; 2/3 fat from experimental fats PUFA (% TE): Corn oil: 11.21±0.52 Canola oil: 6.69±0.17 Olive oil: 3.85±0.34 Rice bran: 8.83±0.43 Beef tallow: 2.62±0.35 SFA (% TE): Corn oil: 6.90±0.60 Canola oil: 5.40±0.67 Olive oil: 6.90±0.66 Rice bran: 7.44±0.61 Beef tallow: 13.69±0.58 Chol (mg/4.2 MJ): Corn oil: 85±4 Canola oil: 81±5 Olive oil: 84±3 Rice bran: 83±7 Beef tallow: 109±12</p> <p>Dietary Intake</p>	<p><i>P</i><0.05 compared to all other oils except olive oil), intermediate after olive oil (5.32±0.51 mmol/L) and lowest after canola- (5.05±0.53 mmol/L), corn- (5.00±0.51 mmol/L) or rice bran- (5.00±0.49 mmol/L) enriched diets</p> <p>Plasma LDL conc sig higher after beef tallow (3.62 ±0.70 mmol/L; <i>P</i><0.05 compared to all other oils except olive oil), intermediate after olive oil (3.42±0.51 mmol/L) and lowest after canola- (3.24±0.51 mmol/L), corn- (3.24±0.49 mmol/L) or rice bran- (3.16±0.44 mmol/L) enriched diets</p> <p>HDL and TG levels similar among diet phases</p> <p>NS diff among diet phases in in vitro susceptibility of LDL to oxidation; however mean data suggested that LDL isolated after subj consumed diets higher in MUFA (e.g., canola and olive oils) had longer lag times than LDL isolated after subj consumed other test diets (e.g., corn and rice bran oils)</p>	<p>or vegetable oils with a relatively wide range of fatty acid profiles did not alter the in vitro susceptibility of LDL to oxidation. The advantages of reducing the saturated fat content of the diet were reflected in lower total and LDL cholesterol levels”</p> <p>Reviewer's Comments: <i>None</i></p>

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					Assessment/Frequency: Meals provided by metabolic research unit Study Visits/ Measurements: Subj reported to research unit ≥ 3 x/wk for measurement of BP and wt and to consume 1 meal	Resistance of LDL to oxidation sig correlated with LDL α -tocopherol conc ($r=0.30$, $P=0.01$), and correlation with plasma 18:1/18:2 ratio approached sig ($r=0.22$, $P=0.08$) % change and absolute change not provided	
Cuchel et al., 1996	Non-ran-dom-ized trial, CO	C	+	Purpose: To determine whether consumption of stick oil margarine impacts endogenous chol synthesis rates and susceptibility of LDL to oxidation in humans Sample: 14 middle-aged and elderly hypercholesterolemic subj (8 females, 6 males) Inclusions: LDL >3.36 mmol/L Exclusions: Smoking; chronic illness; use of meds	Run-in Period: Baseline diet: 15% PRO, 49% CHO, 36% fat (15% SFA, 15% MUFA, 6% PUFA), ~128 mg chol 32 d TX/Duration Two 32-d diet phases; 1/5 or 2/3 total fat energy provided as corn oil or corn oil margarine in stick form Dose/Form: 1) TX 1: Corn oil-enriched diet (7% SFA, 9% MUFA, 11% PUFA) 2) TX 2: Stick corn oil margarine-enriched diet (8% SFA, 12% MUFA, 8% PUFA)	Outcome Measures: Serum lipids Chol synthesis rates Susceptibility of LDL oxidation Results: % change in lipid values following corn margarine diet compared with corn oil diet: TC: 5.5 ± 11 ($P=0.039$) LDL: 9 ± 16 ($P=0.058$) TC/HDL: 9 ± 14 ($P=0.37$) NS diff in HDL or TG bet diets Proportion of rapidly cycling pool of chol synthesized/d higher after corn oil diet vs corn margarine diet ($P=0.80$) Susceptibility of LDL to oxidation NS diff bet diets	Author's Conclusions: "In summary, our data suggest that replacing corn oil with corn oil margarine in the stick form impaired the clearance of endogenously synthesized cholesterol. Additionally, within the content of the low-fat diet, the one-to-one substitution of hydrogenated fat for unhydrogenated oil did not significantly impact the susceptibility of LDL to oxidation" Reviewer's

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				affecting lipids	<p>Dietary Intake During Study: Total fat: 30% TE PUFA (% TE): Corn oil: 11.21±0.52 Corn oil margarine: 8.30±0.16 SFA: ≤8% TE Chol: <85 mg/4.2 MJ Isocaloric</p> <p>Food supplied by researchers</p> <p>Dietary Intake Assessment/Frequency: None</p> <p>Study Visits/ Measurements: 4 fasting blood samples collected during final wk of each dietary phase</p> <p>Washout Period: Subj ate normal diets, duration not indicated</p>		<p>Comments: <i>Regimen or diet protocol poorly explained; does not explain if all subj consumed TX diets in same order</i></p>

AppendixJ2CornOil AtherogenicityType1&3Table

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