

Supplementary Material

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Supplemental Methods S1. Search strategy

Search terms for meta-analysis of prospective cohort studies:

(dairy OR dairy products OR total dairy OR full fat dairy OR low fat dairy OR milk OR fermented dairy OR cheese OR yogurt) AND (all-cause mortality OR coronary heart disease incidence OR coronary heart disease mortality OR cardiovascular disease incidence OR cardiovascular disease mortality OR coronary artery disease OR acute myocardial infarction)

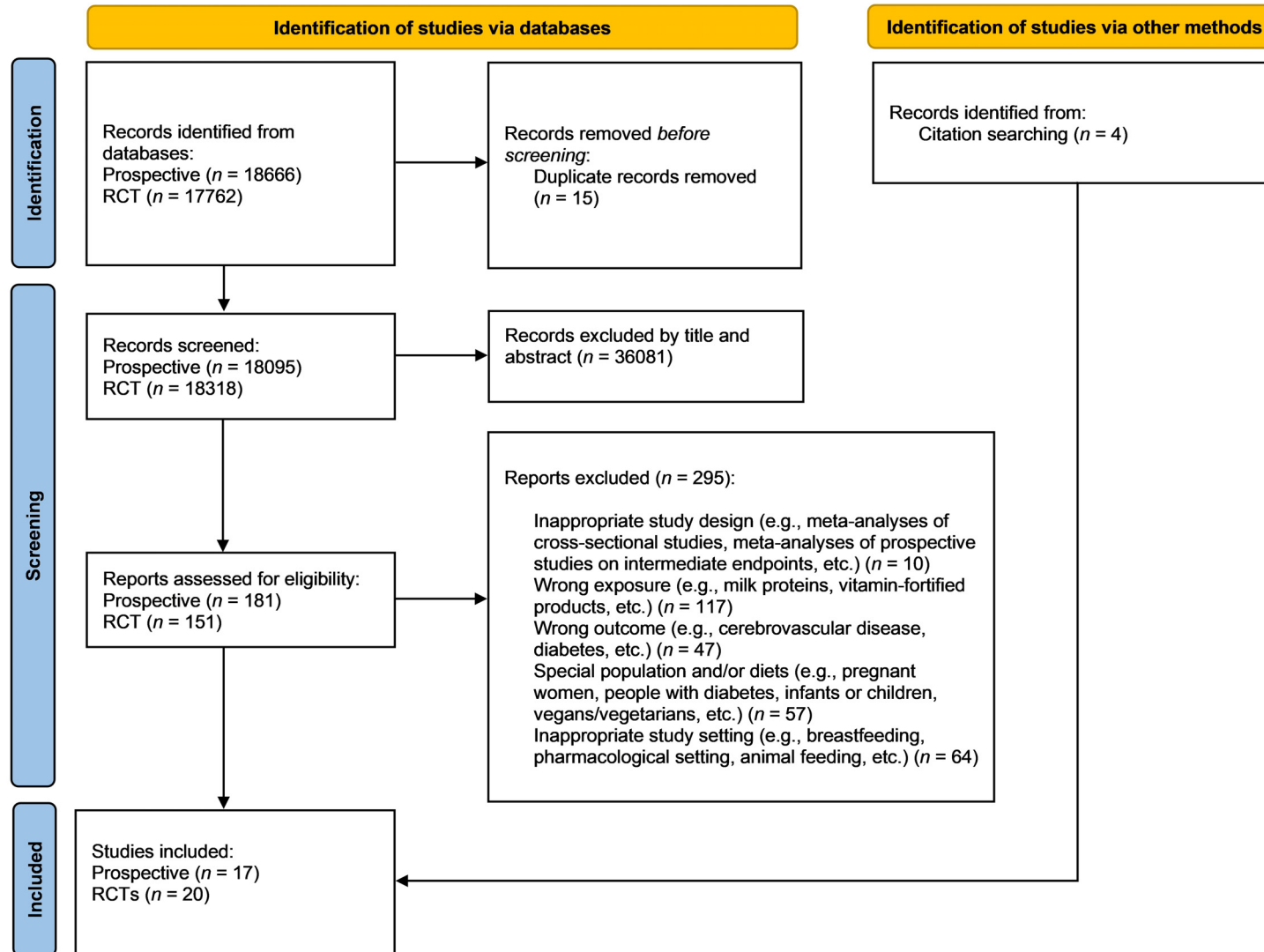
Search terms for meta-analysis of RCT:

(dairy OR dairy products OR total dairy OR full fat dairy OR low fat dairy OR milk OR fermented dairy OR cheese OR yogurt) AND (body weight OR weight gain OR weight reduction OR waist circumference OR blood pressure OR systolic blood pressure OR diastolic blood pressure OR glycemia OR fasting glucose OR plasma glucose OR blood glucose OR glycated hemoglobin OR HbA1c OR HOMA index OR insulin resistance OR insulin sensitivity OR blood lipids OR cholesterol OR total cholesterol OR LDL cholesterol OR HDL cholesterol OR triglycerides OR inflammation OR C reactive protein OR CRP OR interleukin 6 OR IL 6 OR tumor necrosis factor alpha OR TNF alpha OR adiponectin)

Filters applied:

Meta-analysis; Humans; English.

Supplemental Figure S1. PRISMA flow diagram



Supplemental Table S1. Summary of meta-analyses of randomized controlled trials on the effect of dairy products intake on body weight and waist circumference.

DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Body weight		Weighted Mean Difference (95% CI)
				Intervention (duration and dose)	Comparison	
TOTAL DAIRY	Abar-gouei 2012	5	453 Not defined	21-48 wk Increased dairy (3-4 s/d) without energy restriction	Intervention vs. usual diet	0.33 (−0.35; 1.00) kg
	Abar-gouei 2012	9	430 Not defined	8-48 wk Increased dairy (3-5 s/d) with energy restriction	Intervention vs. usual diet	−1.29 (−1.98; −0.60) kg
	Chen 2012	13	1668 with normal weight, overweight, obesity	1-36 mo 1-6.5 s/d of dairy without energy restriction	Intervention vs. usual diet (without energy restriction)	0.39 (−0.36; 1.13) kg
	Chen 2012	16	850 with normal weight, overweight, obesity	2-12 mo 1-6.5 s/d of dairy with energy restriction	Intervention vs. usual diet (with energy restriction)	−0.79 (−1.35; −0.23) kg
	Benatar 2013	18	1629 with normal weight, overweight, obesity, MS (BMI: 25.6±6.2)	10-39 wk (median 26 wk) Increased dairy food without additional interventions	Intervention vs. usual diet	0.60 (0.30; 0.90) kg
	Booth 2015	31	2091 with normal weight, overweight, obesity	3-24 mo (median 7 mo) Calcium intake by 482–2400 mg/d via dairy products (low fat, no fat)	Intervention vs. usual diet or moderate dairy or low-dairy or low-Ca diet	−0.06 (−0.54; 0.43) kg

			dairy or fat content not specified) with and without energy restriction	(with and without energy restriction)	
			3-12 mo		
			Calcium intake by	Intervention vs.	
Booth 2015	19	1246 with normal weight, overweight, obesity	482–2400 mg/d via dairy products (low fat, no fat dairy or fat content not specified) with energy restriction	usual diet or moderate dairy or low-dairy or low-Ca diet (with energy restriction)	–0.32 (–0.93; 0.30) kg
			8-48 wk. Dairy foods (milk, mixed dairy or yogurt) and dairy supplements (average 51 g/d of whey fraction high in leucine or whey protein isolate) with energy restriction	Intervention vs. usual diet (differences in the amount of dairy in the intervention vs. control group: 2- 4 s/d)	
Stonehouse 2016	17	864 with overweight/obesity (1 study MS; 1 study PCOS)			–0.92 (–1.63; –0.20) kg
			1-36 mo	Intervention vs.	
Geng 2018	19	2116 Not defined	0.5-5.24 g/d of dairy supplement without energy restriction	usual diet or dairy-free diet or moderate serving dairy	0.36 (0.01; 0.70) kg
			1-12 mo	Intervention vs.	
Geng 2018	16	930 Not defined	0.5-5.24 g/d of dairy supplement with energy restriction	usual diet or dairy-free diet or moderate serving dairy	–0.64 (–1.05; –0.24) kg
			3-52 wk	Intervention vs.	
Sochoł 2019	23	2362 with overweight, obesity	Dairy supplementation (especially low-fat dairies)	control (i.e. usual diet; low (<2 s/d)	–0.42 (–0.72; –0.12) kg

				with or without an energy deficit or caloric re- striction (dose NA)	or no dairy in- take; placebo capsules; energy deficit diet; soy intake of a com- parable energy intake)	
LOW-FAT DAIRY	Benatar 2013	8	941 with nor- mal weight, overweight, obesity	≥ 1 mo Increased low fat dairy without ad- ditional interven- tions (dose NA)	Intervention vs. usual diet	0.82 (0.35; 1.28) kg
FULL-FAT DAIRY	Benatar 2013	10	688 with nor- mal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional inter- ventions (dose NA)	Intervention vs. usual diet	0.41 (0.04; 0.79) kg
Waist circumference						
DAIRY PRODUCT	Author, year	No. of stud- ies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Dif- ference (95 % CI)
TOTAL DAIRY	Abar- gouei 2012	2	147 Not defined	24 wk Increased dairy (3-5 s/d) without energy restriction	Intervention vs. usual diet	-2.68 (-8.02; 2.66) cm
	Abar- gouei 2012	7	289 Not defined	8-48 wk Increased dairy (3-5 s/d) with en- ergy restriction	Intervention vs. usual diet	-2.43 (-3.42; -1.44) cm
	Benatar 2013	6	440 with nor- mal weight, overweight, obesity, MS	4-16 wk (median 10 wk) Increased dairy without addi- tional interven- tions (dose NA)	Intervention vs. usual diet	-0.07 (-1.24; 1.10) cm

	Geng 2018	5	555 Not defined	1-12 mo 0.5 - 5.24 g/d of dairy supplement without energy restriction	Intervention vs. usual diet or dairy-free diet or moderate serving dairy	-0.24 (-1.36; 0.89) cm
	Geng 2018	10	505 Not defined	2-12 mo 2.37-5.24 g/d of dairy supplement with and without energy restriction	Intervention vs. usual diet or dairy-free diet or moderate serving dairy	-2.18 (-4.30; -0.06) cm
	Sochol 2019	13	1348 with overweight, obesity	4-48 wk Dairy supplementa- tion (especially low-fat dairies) with or without an energy deficit or caloric re- striction (dose NA)	Intervention vs. control (i.e. usual diet; low (<2s/d) or no dairy in- take; placebo capsules; energy deficit diet; soy intake of a com- parable energy intake	-1.09 (-1.68; -0.58) cm
LOW-FAT DAIRY	Benatar 2013	2	134 with nor- mal weight, overweight, obesity	≥ 1 mo Increased low fat dairy without ad- ditional interven- tions (dose NA)	Intervention vs. usual diet	1.18 (-0.61; 2.96) cm
FULL-FAT DAIRY	Benatar 2013	4	306 with nor- mal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional inter- ventions (dose NA)	Intervention vs. usual diet	-0.58 (-1.99; 0.83) cm
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Comp- nys 2020	6	511 with overweight, obesity	Dairy matrix added with probi- otics (duration and dose NA)	Intervention vs. placebo or fer- mented milk	-0.49 (-0.68; -0.29) cm

CI: confidence interval; MS: metabolic syndrome; PCOS: polycystic ovarian syndrome; BMI: body mass index; wk: week(s); mo: month(s); s/d: serving per day; NA: not available.

Table S2. Summary of meta-analyses of randomized controlled trials on the effect of dairy products intake on fasting glucose, glycated hemoglobin and insulin resistance.

DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Fasting glucose		Weighted Mean Difference (95% CI)
				Intervention (duration and dose)	Comparison	
TOTAL DAIRY	Benatar 2013	8	750 with normal weight, overweight, obesity, MS	8-12 wk (median 10 wk) Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	1.32 (0.19; 2.45) mg/dl
	O' Connor 2019	34	2678 with normal weight, overweight, obesity, MS, sarcopenia, hypertension	2-48 wk Elevated dairy intake (3.1 s/d)	Intervention vs. minimal intake (0.5 s/d)	0.07 (0.01; 0.12) mmol/L
LOW-FAT DAIRY	Benatar 2013	4	398 with normal weight, overweight, obesity	≥ 1 mo Increased low fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	0.83 (−0.78; 2.43) mg/dL
	O'Connor 2019	14	862 Not defined	Elevated low fat dairy intake (< 2% fat content) (duration and dose NA)	Intervention vs. minimal intake	0.07 (0.00; 0.14) mmol/L
FULL-FAT DAIRY	Benatar 2013	4	352 with normal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	1.80 (0.21; 3.40) mg/dL
CHEESE	O'Connor 2019	3	231 Not defined	Elevated cheese intake (duration and dose NA)	Intervention vs. minimal intake	−0.04 (−0.23; 0.14) mmol/L

MILK AND/OR YO- GURT	O'Connor 2019	16	1136 Not defined	Elevated milk/yogurt intake (duration and dose NA)	Intervention vs. min- imal intake	-0.08 (0.02; 0.14) mmol/L
	O'Connor 2019	8	535 Not defined	Elevated fermented dairy products intake (yogurt, cheese)	Intervention vs. min- imal intake	0.02 (-0.09; 0.12) mmol/L
	Companys 2020	6	378 with type 2 diabe- tes	Dairy matrix added with probiotics (dura- tion and dose NA)	Intervention vs. pla- cebo or fermented milk	-0.37 (-0.58; -0.17) mmol/L
	Dixon 2020	5	304 with overweight, obesity, pre-type 2 dia- betes, type 2 diabetes, MS, hypertension, CHD, hypercholester- olemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-12.88 (-24.54; -1.22) mg/dl
	Dixon 2020	4	233 with overweight, obesity, pre-type 2 dia- betes, type 2 diabetes, MS, hypertension, CHD, hypercholester- olemia	Milk added with pro- biotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-7.54 (-23.84; 8.76) mg/dL
FERMENTED- DAIRIES OR DAIRIES PLUS PROBI- OTICS						
Glycated hemoglobin						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of sub- jects	Intervention (duration and dose)	Comparison	Weighted Mean Differ- ence (95% CI)
TOTAL DAIRY	O' Connor 2019	4	512 with normal weight, overweight, obesity, MS	4-24 wk Elevated dairy intake (2.7 s/d)	Intervention vs. min- imal intake (0.8 s/d)	-0.09 (-0.16; -0.03) %
	O' Connor 2019	2	274 with MS	≥ 24 wk Elevated dairy intake (dose NA)	Intervention vs. min- imal intake	-0.10 (-0.18; -0.02) %
LOW-FAT DAIRY	O'Connor 2019	2	238 Not defined	< 24 wk Elevated low fat dairy intake (< 2% fat con- tent)	Intervention vs. min- imal intake	-0.08 (-0.20; 0.03) %

(dose NA)						
MILK AND/OR YOGURT	O'Connor 2019	3	438 Not defined	Elevated milk/yogurt intake (duration and dose NA)	Intervention vs. minimal intake	-0.09 (-0.16; -0.03) %
FERMENTED DAIRIES OR DAIRIES PLUS PROBIOTICS	Dixon 2020	5	325 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-0.55 (-1.03; -0.06) %
	Dixon 2020	2	158 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-0.61 (-0.81; 0.58) %
Insulin resistance (HOMA-IR)						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95% CI)
TOTAL DAIRY	Benatar 2013	4	270 with normal weight, overweight, obesity, MS	4-16 wk (median 10 wk) Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	-0.63 (-1.50; 0.24)
	O'Connor 2019	13	840 with normal weight, overweight, obesity, MS, sarcopenia	4-24 wk Elevated dairy intake (2.7 s/d)	Intervention vs. minimal intake (0.3 s/d)	-0.07 (-0.26; 0.12)
	Sochol 2019	12	794 with overweight, obesity	4-48 wk Dairy supplementation (especially low-fat dairies) with or without an energy deficit or caloric restriction (dose NA)	Intervention vs. control (i.e. usual diet; low (<2s/d) or no dairy intake; placebo capsules; energy deficit diet; soy intake of a comparable energy intake)	-1.21 (-1.74; -0.67)

LOW-FAT DAIRY	O'Connor 2019	4	212 Not defined	≥ 12 wk Elevated low fat dairy intake (< 2% fat content) dose NA)	Intervention vs. minimal intake	0.01 (−0.26; 0.28)
CHEESE	O'Connor 2019	2	131 Not defined	Elevated cheese intake (duration and dose NA)	Intervention vs. minimal intake	0.24 (−0.19; 0.66)
MILK AND/OR YOGURT	O'Connor 2019	6	269 Not defined	Elevated milk/yogurt intake (duration and dose NA)	Intervention vs. minimal intake	−0.01 (−0.26; 0.23)
FERMENTED DAIRIES OR DAIRIES PLUS PROBIOTICS	O'Connor 2019	4	188 Not defined	Elevated fermented dairy products intake (yogurt, cheese) (duration and dose NA)	Intervention vs. minimal intake	0.10 (−0.23; 0.43)

CI: confidence interval; CHD: coronary heart disease; MS: metabolic syndrome; HOMA-IR: homeostasis model assessment-insulin resistance; wk: week(s); mo: month(s); s/d: serving per day; NA: not available.

Table S3. Summary of meta-analyses of randomized controlled trials on the effect of dairy products intake on blood pressure.

Systolic blood pressure						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of sub-jects	Intervention (duration and dose)	Comparison	Weighted Mean Differ-ence (95% CI)
TOTAL DAIRY	Benatar 2013	7	711 with normal weight, overweight, obesity, MS	7-26 wk Increased dairy with- out additional inter- ventions (dose NA)	Intervention vs. usual diet	−0.41 (−1.63; 0.81) mmHg
LOW-FAT DAIRY	Benatar 2013	3	342 with normal weight, overweight, obesity, MS	≥ 1 mo Increased low fat dairy without additional in- terventions (dose NA)	Intervention vs. usual diet	−0.85 (−2.55; 0.84) mmHg
FULL-FAT DAIRY	Benatar 2013	4	369 with normal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without addi- tional interventions (dose NA)	Intervention vs. usual diet	0.07 (−1.69; 1.83) mmHg
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Usinger 2012	15	1232 with normal or high normal blood pressure or hyperten- sion	4-21 wk Fermented milk	Intervention vs. pla- cebo	−2.45 (−4.30; −0.60) mmHg
	Dong 2013	6	No. NA mostly with no anti- hypertensive drug use	8 wk (median) 100-450 g/d of probi- otic fermented milk	Intervention vs. pla- cebo product	−2.09 (−4.34; 0.17) mmHg
	Dixon 2020	3	217 with overweight, obesity, pre-type 2 di- abetes, type 2 diabe- tes, MS, hyperten- sion, CHD, hypercho- lesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	−3.56 (−7.43; 0.31) mmHg
	Dixon 2020	4	214 with overweight, obesity, pre-type 2 di- abetes, type 2 diabe-	Milk added with pro- biotics (duration and dose NA)	Intervention vs. no treatment or placebo product	−2.68 (−5.81; 0.44) mmHg

tes, MS, hypertension, CHD, hypercholesterolemia						
Diastolic blood pressure						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95% CI)
TOTAL DAIRY	Benatar 2013	7	711 with normal weight, overweight, obesity, MS	7-26 wk Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	-0.45 (-1.70; 0.80) mmHg
				≥ 1 mo Increased low fat dairy without additional interventions (dose NA)		
				≥ 1 mo Increased whole fat dairy without additional interventions (dose NA)		
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Usinger 2012	15	1232 with normal or high normal blood pressure or hypertension	4-21 wk Fermented milk	Intervention vs. placebo	-0.67 (-1.48; 0.14) mmHg
	Dong 2013	5	No. NA mostly with no antihypertensive drug use	8 wk (median) 100-450 g/d of probiotic fermented milk	Intervention vs. placebo	-1.45 (-4.04; 1.14) mmHg
	Dixon 2020	3	217 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-3.54 (-5.13; -1.96) mmHg
	Dixon 2020	4	214 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS,	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-1.97 (-4.52; 0.58) mmHg

hypertension, CHD, hypercholesterolemia

CI: confidence interval; CHD: coronary heart disease; MS: metabolic syndrome; wk: week(s); mo: month(s); g/d: grams per day; NA: not available.

Table S4. Summary of meta-analyses of randomized controlled trials on the effect of dairy products intake on plasma lipids.

Total cholesterol						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95% CI)
TOTAL DAIRY	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. fish intake	-0.01 (-0.51; 0.50) mmol/L
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. red meat intake	0.02 (-0.46; 0.50) mmol/L
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. SSBs intake	-0.03 (-0.44; 0.39) mmol/L
CHEESE	de Goede 2015	5	119 Not defined	2-6 wk Hard cheese intake (weighted mean difference cheese vs. butter intake: 145 g/d)	Intervention vs. butter	-0.28 (-0.36; -0.19) mmol/L
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Sun 2015	10	NA	4-16 wk probiotic milk or yogurt (dose NA)	Intervention vs. placebo	-0.31 (-0.42; -0.20) mmol/L
	Cho 2015	8	378 with normal or high total cholesterol	4-8 wk of probiotic milk containing live bacteria (dose NA)	Intervention vs. placebo	-6.8 (-11.7; -1.9) mg/dL
	Cho 2015	15	637 with high or normal total cholesterol and/or diabetes and/or pregnancy	3-9 wk of probiotic yogurt/cheese containing live bacteria (dose NA)	Intervention vs. placebo	-8.3 (-12.4; -4.1) mg/dL
	Shimizu 2015	NA	NA	Fermented milk products (duration and dose NA)	Intervention vs. placebo or no treatment	-0.22 (-0.33; -0.11) mmol/L

	Companys 2020	4	248 with hypercholesterolemia	Dairy matrix added with probiotics (duration and dose NA)	Intervention vs. placebo or fermented milk	-0.46 (-0.73; -0.19) mmol/L
	Dixon 2020	5	393 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-9.48 (-16.17; -2.48) mg/dL
	Dixon 2020	9	398 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo product	-8.74 (-14.62; -2.86) mg/dL
	Pourrajab 2020	7	352 with mild to moderate hypercholesterolemia	4-7 wk of 300 g/d of probiotic yogurt	Intervention vs. ordinary yogurt	-8.73 (-15.98; -1.48) mg/dL
	Ziaei 2021	38	2237 with normal weight, overweight, obesity, MS, NASH, pre-type 2 diabetes, type 2 diabetes, hypercholesterolemia (mostly mild or borderline), pre-hypertension	2-24 wk 80 - 600 ml/d of probiotic fermented milk	Intervention vs. conventional yogurt or milk	-8.30 (-11.42; -5.18) mg/dL
LDL-cholesterol						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95% CI)
TOTAL DAIRY	Benatar 2013	9	702 with normal weight, overweight, obesity, MS	4-26 wk (median 12 wk) Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	1.85 (-2.89; 6.60) mg/dL
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. fish intake	-0.01 (-0.45; 0.42) mmol/L

	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. red meat intake	-0.02 (-0.43; 0.39) mmol/L
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. SSBs intake	-0.03 (-0.37; 0.31) mmol/L
LOW-FAT DAIRY	Benatar 2013	3	342 with normal weight, overweight, obesity	≥ 1 mo Increased low fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	-1.42 (-4.74; 1.91) mg/dL
FULL-FAT DAIRY	Benatar 2013	6	360 with normal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	3.30 (-4.30; 10.90) mg/dL
CHEESE	de Goede 2015	5	119 Not defined	2-6 wk Hard cheese intake (weighted mean difference cheese vs. butter intake: 145 g/d)	Intervention vs. butter	-0.22 (-0.29; -0.14) mmol/L
	Sun 2015	11	NA	4-16 wk of probiotic milk or yogurt (dose NA)	Intervention vs. placebo	-0.47 (-0.70; -0.25) mmol/L
	Cho 2015	8	378 with normal or high total cholesterol	4-8 wk of probiotic milk containing live bacteria (dose NA)	Intervention vs. placebo	-9.2 (-13.4; -4.9) mg/dL
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Cho 2015	15	637 with high or normal total cholesterol and/or diabetes and/or pregnancy	3-9 wk of probiotic yogurt/cheese containing live bacteria (dose NA)	Intervention vs. placebo	-7.6 (-11.5; -3.6) mg/dL
	Shimizu 2015	10	397 with normal to moderate hypercholesterolemia	Fermented milk products (duration and dose NA)	Intervention vs. placebo or no treatment	-0.23 (-0.34; -0.13) mmol/L
	Companys 2020	4	248 with hypercholesterolemia	Dairy matrix added with probiotics (duration and dose NA)	Intervention vs. placebo or fermented milk	-0.50 (-0.77; -0.22) mmol/L
	Dixon 2020	4	370 with overweight, obesity, pre-type 2 diabetes, type	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-18.06 (-24.88; -11.24) mg/dL

			2 diabetes, MS, hypertension, CHD, hypercholesterolemia			
			287 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-9.82 (-18.28; -1.36) mg/dL
			352 with mild to moderate hypercholesterolemia	4-7 wk of 300 g/d of probiotic yogurt	Intervention vs. ordinary yogurt	-10.61 (-16.52; -4.69) mg/dL
			1065 with normal weight, overweight, obesity, MS, NASH, pre-type 2 diabetes, type 2 diabetes, hypercholesterolemia (mostly mild or borderline), pre-hypertension	2-24 wk 80 to 600 ml/d of probiotic fermented milk	Intervention vs. conventional yogurt or milk	-7.34 (-10.04; -4.65) mg/dL
HDL-cholesterol						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95 % CI)
				4-26 wk (median 12 wk)		
TOTAL DAIRY	Benatar 2013	8	664 with normal weight, overweight, obesity, MS	Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	-0.19 (-2.10; 1.71) mg/dL
				≥ 1 mo		
LOW-FAT DAIRY	Benatar 2013	3	342 with normal weight, overweight, obesity	Increased low fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	0.73 (-2.50; 3.96) mg/dL

FULL-FAT DAIRY	Benatar 2013	6	360 with normal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	-0.69 (-3.04; 1.67) mg/dL
	de Goede 2015	5	119 Not defined	2-6 wk Hard cheese intake (weighted mean difference cheese vs. butter intake: 145 g/d)	Intervention vs. butter	-0.05 (-0.09; -0.02) mmol/L
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Sun 2015	7	NA	4-16 wk of probiotic milk or yogurt (dose NA)	Intervention vs. placebo	0.02 (-0.01;0.05) mmol/L
	Cho 2015	8	378 with normal or high total cholesterol	4-8 wk of probiotic milk containing live bacteria (dose NA)	Intervention vs. placebo	-2.1 (-4.5; 0.3) mg/ dL
	Cho 2015	15	637 with high or normal total cholesterol and/or diabetes and/or pregnancy	3-9 wk of probiotic yogurt/cheese containing live bacteria (dose NA)	Intervention vs. placebo	0.8 (-0.6; 2.1) mg/ dL
	Company's 2020	4	248 with hypercholesterolemia	Dairy matrix added with probiotics (duration and dose NA)	Intervention vs. placebo or fermented milk	0.26 (0.01; 0.52) mmol/L
	Dixon 2020	4	370 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	0.25 (-1.82; 2.32) mg/ dL
	Dixon 2020	8	363 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	0.86 (-2.07; 3.80) mg/ dL

	Pourrajab 2020	7	352 with mild to moderate hypercholesterolemia	4-7 wk of 300 g/d of probiotic yogurt	Intervention vs. ordinary yogurt	1.56 (−1.58; 4.71) mg/ dL
	Ziaei 2021	38	2267 with normal weight, overweight, obesity, MS, NASH, pre-type 2 diabetes, type 2 diabetes, hypercholesterolemia (mostly mild or borderline), pre-hypertension	2-24 wk 80-600 ml/d of probiotic fermented milk	Intervention vs. conventional yogurt or milk	0.07 (−0.73; 0.87) mg/ dL
Triglycerides						
DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	Intervention (duration and dose)	Comparison	Weighted Mean Difference (95% CI)
TOTAL DAIRY	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. fish intake	0.17 (−0.10; 0.45) mmol/L
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. red meat intake	0.09 (−0.18; 0.36) mmol/L
	Schwingshackl 2018	NA	NA	Dairy intake (duration and dose NA)	Intervention vs. SSBs intake	−0.13 (−0.42; 0.16) mmol/L
CHEESE	de Goede 2015	5	119 Not defined	2-6 wk Hard cheese intake (weighted mean difference cheese vs. butter intake: 145 g/d)	Intervention vs. butter	−0.008 (−0.064; 0.049) mmol/L
FERMENTED DAIRY OR DAIRY PLUS PROBIOTICS	Sun 2015	9	NA	4-16 wk of probiotic milk or yogurt (dose NA)	Intervention vs. placebo	−0.02 (−0.18; 0.33) mmol/L
	Cho 2015	8	378 with normal or high total cholesterol	4-8 wk of probiotic milk containing live bacteria (dose NA)	Intervention vs. placebo	3.8 (−2.0; 0.95) mg/ dL

Cho 2015	15	637 with high or normal total cholesterol and/or diabetes and/or pregnancy	3-9 wk of probiotic yogurt/cheese containing live bacteria (dose NA)	Intervention vs. placebo	-8.1 (-16.9; 0.74) mg/ dL
Company's 2020	3	172 with hypercholesterolemia	Dairy matrix added with probiotics (duration and dose NA)	Intervention vs. placebo or fermented milk	-0.46 (-0.75; -0.14) mmol/L
Dixon 2020	5	393 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Yogurt added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-1.61 (-6.50; 9.71) mg/ dL
Dixon 2020	10	438 with overweight, obesity, pre-type 2 diabetes, type 2 diabetes, MS, hypertension, CHD, hypercholesterolemia	Milk added with probiotics (duration and dose NA)	Intervention vs. no treatment or placebo	-6.99 (-26.34; 12.36) mg/ dL

CI: confidence interval; NASH: nonalcoholic steatohepatitis; CHD: coronary heart disease; MS: metabolic syndrome; wk: week(s); mo: month(s); g: grams; d: day; NA: not available.

Table S5. Summary of meta-analyses of randomized controlled trials on the effect of dairy products intake on markers of subclinical inflammation.

DAIRY PRODUCT	Author, year	No. of studies	No. and type of subjects	C-reactive protein		Weighted Mean Difference (95% CI)
				Intervention (duration and dose)	Comparison	
TOTAL DAIRY	Benatar 2013	6	451 with normal weight, overweight, obesity, MS	7-26 wk (median 19 wk) Increased dairy without additional interventions (dose NA)	Intervention vs. usual diet	-1.07 (-2.54; 0.39) mg/L
	Moosavian 2020	10	641 with normal weight, overweight, obesity, MS	Elevated dairy intake (duration and dose NA)	Intervention vs. low or no dairy intake	-0.24 (-0.35; -0.14) mg/L
LOW-FAT DAIRY	Benatar 2013	3	182 with overweight, obesity	≥ 1 mo Increased low dairy without additional interventions (dose NA)	Intervention vs. usual diet	-0.62 (-1.35; 0.11) mg/L
FULL-FAT DAIRY	Benatar 2013	3	269 with normal weight, overweight, obesity, MS	≥ 1 mo Increased whole fat dairy without additional interventions (dose NA)	Intervention vs. usual diet	-1.81 (-5.47; 1.84) mg/L
MILK AND/OR YOGURT	Moosavian 2020	5	NA	Elevated milk/yogurt intake (duration and dose NA)	Intervention vs. placebo	-0.95 (-1.65; 0.24) mg/L
TNF- α						
TOTAL DAIRY	Moosavian 2020	8	NA	Elevated dairy intake (duration and dose NA)	Intervention vs. low or no dairy intake	-0.66 (-1.23; -0.09) pg/mL
MILK AND/OR YOGURT	Moosavian 2020	3	NA	Elevated milk/yogurt intake (duration and dose NA)	Intervention vs. placebo	-0.37 (-0.56; -0.18) pg/mL
IL-6						
TOTAL DAIRY	Moosavian 2020	7	NA	Elevated dairy intake (duration and dose NA)	Intervention vs. low or no dairy intake	-0.74 (-1.36; -0.12) pg/mL

MILK AND/OR YOGURT	Moosavian 2020	3	NA	Elevated milk/yogurt in- take (duration and dose NA)	Intervention vs. placebo	-0.43 (-2.69; 1.83) pg/mL
Adiponectin						
TOTAL DAIRY	Moosavian 2020	7	NA	Elevated dairy intake (duration and dose NA)	Intervention vs. low or no dairy in- take	2.42 (0.17; 4.66) µg/mL
MILK AND/OR YOGURT	Moosavian 2020	3	NA	Elevated milk/yogurt in- take (duration and dose NA)	Intervention vs. placebo	14.28 (5.81; 22.74) µg/mL

CI: confidence interval; MS: metabolic syndrome; TNF- α : tumor necrosis factor- α ; IL-6: interleuchin-6; wk: week(s); mo: month(s); NA: not available.