

Abraham, 1992

UI: 1619996

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled Diabetics: 13 Non diabetics: 27	Design: Randomized controlled trial ND on blinding	Population: Hyperglycemic (DM and non-DM)	BMI: ND	Inclusion: Adults with established atherosclerotic disease	Cr type: Cr chloride	Placebo	Randomization mode, blinding, allocation concealment and withdrawals not described
Control enrolled Diabetics: 12 Non diabetics: 24			Waist circ: ND				
Age, Total: 63.6 ± SE (42-83) yr	Duration: mean 11.1 ± 0.3 SE (7-16) mo	Quality: B	Waist /hip ratio: ND	Exclusion: ND	Brand name: ND		
% Male, Total: 83	Wash out period for other supplements / medication: ND		Tg: 171 mg/dL		Dose: 250 µg/day		
			HDL: 37 mg/dL				
			BP: ND				
			FBS: 107 mg/dL				
		2h OGTT: ND					
Treatment duration: 11.1± 0.3 SE (7-16) mo	Wash out between cross-over segments: ND	UAER: ND	Others: ND	Compliance: Serum Cr levels	Mean Cr levels in treatment patients is reported elevated while in controls remained constant		
Country: Israel							
Sites: 1							

Abraham, 1992

UI: 1619996

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Glibenclamide	Previous MI Intermittent claudication DM type 2 (13)	Glucose / Glucose Metabolism	Fasting Glucose	
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol LDL HDL Triglycerides	
		Type 2 Diabetes		
Dyslipidemia Drugs: Not specified		Retinopathy		
		Kidney Disease		
Other: ND	Other			

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value**	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose*	mmol/L	Chromium	27	5.77 [104]	5.53, 6.01	5.74	5.52,5.96	-0.03	ND	NS	+0.35	ND	NS
		Control	24	6.11 [110]	5.84, 6.38	5.73	5.51,5.95	-0.38	ND	NS			
Total cholesterol***	mmol/L	Chromium	40	6.21 [240]	5.86, 6.56	6.53	6.02,7.04	+0.32	ND	NS	-0.15	ND	NS
		Control	36	6.34 [245]	5.99, 6.69	6.81	6.36,7.26	+0.47	ND	NS			
Triglycerides***	mmol/L	Chromium	40	1.84 [163]	1.55, 2.13	1.68	1.46,1.9	-0.16	ND	NS	-0.22	ND	<0.02
		Control	36	2.04 [181]	1.80, 2.28	2.10	1.83,2.37	+0.06	ND	NS			
LDL***	mmol/L	Chromium	40	4.32 [167]	4.01, 4.63	4.47	4.06,4.88	+0.15	ND	NS	-0.06	ND	NS
		Control	36	4.47 [173]	4.12, 4.82	4.68	4.27,5.09	+0.21	ND	NS			
HDL***	mmol/L	Chromium	40	0.94 [36]	0.84, 1.04	1.14	1,1.28	+0.20	ND	<0.005	+0.14	ND	NS
		Control	36	0.99 [38]	0.85, 1.13	1.05	0.95,1.15	+0.06	ND	NS			

* Non diabetic group

** mg/dL in brackets

*** Both diabetics and non diabetics included in each comparison group.

Amato, 2000

UI: 10819315

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 9	Design: Randomized controlled trial	Population: Healthy	BMI: 25.9 (24.8-26.9)	Inclusion criteria: Healthy men and women of advanced age	Cr type: Cr picolinate	Placebo	
Control enrolled: 10	Double-blind		Waist circ: ND				
Age, Cr: 69.3±1.4 SE yr	Duration: 8 wk		Waist /hip ratio: ND				
Age, control: 65.7±1.2 SE yr	Wash out period for other supplements / medication: ND		Tg: 116.1 mg/dL (75.9-156.3)				
% Male, Cr: 44			HDL: 42.3 mg/dL (37.8-46.8)				
% Male, control: 50			BP: ND				
Treatment duration: 8 wk			Quality: B		FBS: ND		
Country: USA	Wash out between cross-over segments: NA		2h OGTT: ND	Exclusion criteria: ND	Compliance: Pill counts, serum Cr concentration retrospectively		
Sites:1			UAER: ND			Serum Cr concentration is reported elevated only in the treatment group	
			Others: ND				

Amato, 2000

UI: 10819315

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Insulin sensitivity Glucose effectiveness	Bergman's Minimum model IVGTT 300 mg/kg dextrose, followed 20 minutes later by IV 0.03 U/Kg regular insulin *
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
Other: HRT		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

*Bergman RN, Beard JC, Chen M. The minimal modeling method. Assessment of insulin sensitivity and B-cell function in vivo. Meth Diabetes Res. 1986;2:15-34.

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Insulin sensitivity	min/ μ U mL ($\times 10^{-4}$)	Chromium	9	3	2.4, 3.6	3	2.8, 3.2	0	ND	NS	-0.3	ND	ND
		Control	10	2.7	1.7, 3.8	3	2, 4.2	+0.3	ND	NS			
Glucose effectiveness	min ⁻¹	Chromium	9	0.02	0.02, 0.02	0.02	0.01, 0.02	0	ND	NS	+0.02	ND	ND
		Control	10	0.02	0.01, 0.02	0.004	0.002, 0.006	-0.016	ND	NS			

Anderson, 1983

UI: 6350814

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 76	Design: Randomized cross-over Blinding: ND	Population: Healthy	BMI: ND Waist circ: ND	Inclusion: Healthy adults	Cr type: Cr chloride	Placebo	Lipids are measured by 2 methods: Manganese precipitation (Mn), Cesium chloride ultra centrifugation (Cs).
Age, Total: (21-69) yr	Duration: 6 mo		Waist /hip ratio: ND Tg: 98.2 mg/dL (90.2-106.2)		Brand name: None		
	Wash out period for other supplements / medication: ND		HDL: 41 mg/dL (39.5-42.4) BP: ND		Dose: 200 µg		
% Male, Total: 63			FBS: 83 mg/dL (81-85) 2h OGTT: ND				
Treatment duration: 3 mo	Wash out between cross-over segments: ND	Quality: C	UAER: ND	Exclusion: RDA of vitamins or minerals >3 times, consume brewer's yeast, being on medication, overt illness	Compliance: ND		
Country: US			Others: ND				
Sites: 2							

Anderson, 1983

UI: 6350814

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Fasting Glucose Glucose OGTT (90 min)	1 g/Kg glucose load
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
		Type 2 Diabetes		
Other: ND		Retinopathy		
		Kidney Disease		
		Other		

Reported Results**All Subjects**

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Fasting glucose	mg/dL	Chromium	76	ND	ND	83	81, 85	ND	ND	ND	0	ND	NS
		Control	76	ND	ND	83	81, 85	ND	ND	ND			
Glucose OGTT (90 min)	mg/dL	Chromium	76	ND	ND	91	83, 99	ND	ND	ND	-1	ND	NS
		Control	76	ND	ND	92	84, 100	ND	ND	ND			

Men*

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Fasting glucose	mg/dL	Chromium	48	ND	ND	84	82, 86	ND	ND	ND	+1	ND	NS
		Control	48	ND	ND	83	81, 85	ND	ND	ND			
Glucose OGTT (90 min)	mg/dL	Chromium	48	ND	ND	93	83, 103	ND	ND	ND	0	ND	NS
		Control	48	ND	ND	93	83, 103	ND	ND	ND			

* Men only; only Mn method lipid results are reported in evidence tables

Women*

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Fasting glucose	mg/dL	Chromium	28	ND	ND	82	78, 86	ND	ND	ND	0	ND	NS
		Control	28	ND	ND	82	78, 86	ND	ND	ND			
Glucose OGTT (90 min)	mg/dL	Chromium	28	ND	ND	88	76, 100	ND	ND	ND	-2	ND	NS
		Control	28	ND	ND	90	78, 102	ND	ND	ND			

* Women only; only Mn method lipid results are reported in evidence tables

Anderson, 1991

UI: 1951165

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 17	Design: Randomized cross-over Double blind	Population: 1: Healthy (9 subjects) 2: Hyperglycemic (8 subjects)	BMI: *	Inclusion: Adults	Cr type: Cr chloride	Placebo	All meals provided by research center throughout study. Diets contained chromium in the lowest quartile of normal intake for adults, "well-balanced with respect to nutrients other than chromium. Total daily intake of chromium from diet was usually < 20 µg
Control enrolled: 17 (cross-over)			Waist circ: ND				
Age, Total: 36.8 (22-65) yr	Duration: 14 wk	Waist /hip ratio: ND	Brand name: None				
% Male, Total: 35%	Wash out period for other supplements / medication: 4 wk on low-chromium diet provided by Research Center	Tg: ND		Dose: 200 µg			
		HDL: ND					
		BP: ND					
		FBS: ** 1: ~88 mg/dL 2: ~92					
		2h OGTT: ** 1: ~70 mg/dL 2: ~90 mg/dL					
Treatment duration: 5 wk	Wash out between cross-over segments: None	Quality: B, C for sum OGTT data	UAER: ND	Exclusion: Diabetes, "clinically significant abnormal blood or urine profiles"	Compliance: ND		
Country: US			Others:				
Sites: 1							

* Calculated from mean weights and heights for men and women.

** Estimated from graph. 1 = normoglycemic subjects, 2 = hyperglycemic subjects

Anderson, 1991

UI: 1951165

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None (implied)	None (implied)	Glucose / Glucose Metabolism	Fasting glucose 2 hr OGTT glucose Sum 90 min OGTT glucose Sum 4 hr OGTT glucose	1 g glucose/kg body weight load Sum 0,30,60,90 min Sum 0,30,60,90,120,180,240 min
Hypertension Drugs: ND		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors		
Dyslipidemia Drugs: ND		Type 2 Diabetes		
		Retinopathy		
Other:	Kidney Disease			
	Other			

Anderson, 1991

UI: 1951165

Reported Results

Normoglycemic Subjects

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value*	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose (estimated from graph)	mmol/L	Chromium	9	4.9 [88]	ND	5.0	ND	+0.1	ND	NS	+0.2	ND	NS**
		Control	9			4.8	ND	-0.1	ND	NS			
OGTT glucose (2 hr) (estimated from graph)	mmol/L	Chromium	9	3.9 [70]	ND	3.8	ND	-0.1	ND	NS	+0.2	ND	NS**
		Control	9			3.6	ND	-0.3	ND	NS			
Sum 90 min OGTT glucose	mmol/L	Chromium	9	ND	ND	21.4 [386]	19.8,23.0	ND	ND	ND	ND	ND	NS**
		Control	9	ND	ND	21.2 [382]	20.0,22.4	ND	ND	ND			
Sum 4 hr OGTT glucose	mmol/L	Chromium	9	ND	ND	33.2 [598]	31.6,34.8	ND	ND	ND	ND	ND	NS**
		Control	9	ND	ND	32.7 [589]	31.5,33.9	ND	ND	ND			

* mg/dL in brackets

** Significance value of difference in final values.

Reported Results

Hyperglycemic Subjects

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value*	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose (estimated from graph)	mmol/L	Chromium	8	5.1 [92]	ND	5.4	ND	+0.3	ND	NS	+0.1	ND	NS**
		Control	8			5.3	ND	+0.2	ND	NS			
OGTT glucose (2 hr) (estimated from graph)	mmol/L	Chromium	8	5.0 [90]	ND	4.8	ND	-0.2	ND	NS	-0.2	ND	NS**
		Control	8			5.0	ND	0	ND	NS			
Sum 90 min OGTT glucose	mmol/L	Chromium	8	ND	ND	26.5 [477]	24.1,28.9	ND	ND	ND	ND	ND	<0.01**
		Control	8	ND	ND	30.0 [541]	27.8,32.2	ND	ND	ND			
Sum 4 hr OGTT glucose	mmol/L	Chromium	8	ND	ND	39.4 [710]	37.0,41.8	ND	ND	ND	ND	ND	<0.05**
		Control	8	ND	ND	42.9 [773]	40.9,44.9	ND	ND	ND			

* mg/dL in brackets

** Significance value of difference in final values.

Anderson, 1997

UI: 9356027

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 120 Control enrolled: 60 Age, Cr: 55.2 (total: 35-65) yr Age, control: 55.5±1.2 SD yr % Male, Cr: 56% % Male, control: 66%	Design: Randomized controlled trial Double-blind Duration: 4 mo Wash out period for other supplements / medication: ND	Population: Type 2 DM	BMI: 24.9 Waist circ: ND Waist /hip ratio: ND Tg: ND HDL: ND BP: ND FBS: ~180 mg/dL 2h OGTT: ~279 mg/dL	Inclusion: Type 2 DM <10 yr, otherwise healthy (normal height, weight, and BMI), 35-65 years old, fasting blood glucose of 7.2-15.5 mmol/L, a 2-hr blood glucose of 9.4-16.7 mmol/L, and an HbA _{1c} level of 8.0-12%	Cr type: Cr picolinate Brand name: Nutrition 21, San Diego, CA Dose: 1. 200 µg 2. 1000 µg	Placebo, with measured chromium content of 0.5±0.005 µg per capsule	Data on 25 subjects was not included in the final analyses because of missing values: 10, 7, and 8 subjects in placebo, 200 µg/day and 1000 µg/day Cr groups respectively.
Treatment duration: 4 mo Country: China Sites: 1	Wash out between cross-over segments: N/A	Quality: B (for total cholesterol) C (for other outcomes)	UAER: ND Other:	Exclusion: ND	Compliance: personal communication and pill count "Compliance appeared to be very good"		

Anderson, 1997

UI: 9356027

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: 9 subjects were on insulin, 69 subjects on phenformin, 92 subjects took sulfonylurea drugs (i.e., glibenclamide, glinclazid, glipizide)	None	Glucose / Glucose Metabolism	Fasting glucose Fasting insulin 2-hr OGTT HbA _{1c}	
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol (HDL) (Triglycerides)	
Other: 38 were on traditional Chinese medicines. 22 (out of 155) were on no medication. Several subjects were taking > 1 medication.		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease	Blood urea nitrogen	
	Other			

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Total cholesterol (Estimated from graph)	mmol/L	Cr picolinate 200 µg	53	5.2 [201]	ND	5.2	ND*	0	ND	ND	-0.1	ND	ND*
		Cr picolinate 1000 µg	52	5.1 [197]	ND	4.75	ND**	-0.35	ND	ND	-0.45	ND	ND**
		Control	50	5.3 [205]	ND	5.4	ND	+0.1	ND	ND			
HDL	There were no significant effects of supplemental chromium (data not reported).												
Triglycerides	There were no significant effects of supplemental chromium (data not reported).												
Blood Urea Nitrogen	There were no significant effects of supplemental chromium (data not reported).												

* No significant difference in final total cholesterol levels at 2 or 4 months.

** $P < 0.05$ for difference between final total cholesterol in chromium 1000 µg and placebo cohorts at 4 months; no significant difference at 2 months.

Bahijiri, 2000

UI: 11376359

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 78	Design: Randomized cross-over Double-blind	Population: DM type 2	BMI: 31 (29.1-32.9) Waist circ: ND	Inclusion: Obese adults with type 2 DM	Cr type: Cr chloride Brewer's yeast	Torula yeast	
Age, Total: 36-68 yr	Duration: 32 wk		Waist /hip ratio: ND Tg: 174 (159-195) mg/dL		Brand name: ND		
	Wash out period for other supplements / medication: ND		HDL: 38 (35-42) mg/dL BP: ND	Exclusion: History of pituitary, thyroid, kidney, liver disease, digestive problems, chronic infections, pancreatitis, hemochromatosis, taking mineral or vitamin supplements or chronically ingested yeast	Dose: CrCl ₃ : 200 µg Yeast: 23.2 µg		
% Male, Total: 48			FBS: 193 (177-210) mg/dL 2h OGTT: 256 (237-275) mg/dL				
Treatment duration: 16 wk	Wash out between cross-over segments: 8 wk	Quality: B	UAER: ND		Compliance: Serum, urine Cr concentration		
Country: Saudi Arabia			Others: ND		Excellent compliance is reported		
Sites: 1							

Bahijiri, 2000

UI: 11376359

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Insulin, glibenclamide, metformin, glipizide, gliclazide	DM 2	Glucose / Glucose Metabolism		
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol HDL Triglycerides	
Dyslipidemia Drugs: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
Other: ND	Other			

Reported Results

Outcome	Unit	Cohort	N*	Base		Final		Change			Net Change		
				Value**	95% CI	Value	95% CI	Value	95% CI	P W/in	Value**	95% CI	P Btw
Total cholesterol	mmol/L	Yeast	78 / 74	5.16 [199]	4.86, 5.46	4.82	4.59, 5.05	-0.34	ND	0.07	-0.10	ND	ND
		CrCl ₃	78 / 67			4.99	4.68, 5.30	-0.17	ND	NS	+0.07	ND	ND
		Control	78 / 69			4.92	4.72, 5.12	-0.24	ND	NS			
HDL	mmol/L	Yeast	78 / 74	0.99 [38]	0.93, 1.05	1.22	1.17, 1.27	+0.23	ND	0.005	+0.22	ND	ND
		CrCl ₃	78 / 67			1.19	1.13, 1.25	+0.20	ND	0.007	+0.19	ND	ND
		Control	78 / 69			1.00	0.94, 1.06	+0.01	ND	NS			
Triglycerides	mmol/L	Yeast	78 / 74	1.97 [174]	1.72, 2.22	1.50	1.35, 1.65	-0.47	ND	0.009	-0.45	ND	ND
		CrCl ₃	78 / 67			1.54	1.31, 1.77	-0.43	ND	0.009	-0.40	ND	ND
		Control	78 / 69			1.94	1.79, 2.09	-0.03	ND	NS			

* N is different for baseline (first number) and final results (second number)

** mg/dL in brackets

Boyd, 1998

CAB Accession Number: 981416097

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Enrolled, total: 35	Design: Non randomized cohorts. Double-blinded	Population: Healthy	BMI: ND	Inclusion: Healthy college-aged students taking an exercise class	Cr type: Cr picolinate	Placebo capsule	10 of the original 35 subjects were removed before data analysis because of concerns about compliance. State that half (of 35) enrolled into each arm. No data about how many from each group analyzed Comparison balanced by gender and weight
Age: ND	Duration:13 wk		Waist circ: ND		Brand name: Nutrition 21		
	Wash out period for other supplements / medication: None		Waist /hip ratio: ND		Dose: 1000 µg		
% Male: ND			Tg: Cr: 114 ± 92 mg/dL Control: 148.9±83		Compliance: Pill counts. 10 of 35 excluded from analysis because of concerns about compliance.		
			HDL: Cr: 44.4±12.3 mg/dL Control: 46±11.3				
Treatment duration: 13 wk	Wash out between cross-over segments: N/A	Quality: C	BP: ND	Exclusion: ND			
Country: US			FBS: Cr: 88.4±8.0 mg/dL Control: 93.2±7.1				
Sites:1			2h OGTT: ND				
			UAER: ND				
			Others: Weight: Cr: 69.2±19 Kg Control: 65.7±10.1				

Boyd, 1998

CAB Accession Number: 981416097

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None	Glucose / Glucose Metabolism	Glucose	
Hypertension Drugs: ND		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol HDL LDL Triglycerides	
		Type 2 Diabetes		
Dyslipidemia Drugs: ND		Retinopathy		
		Kidney Disease		
Other:		Other		

Reported Results

Outcome	Unit	Cohort	N*	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw**
Glucose	mg/dL	Chromium	9*	88	83, 94	81	79, 83	-7	ND	NS	+2	ND	NS
		Control	9*	93	89, 98	84	77, 91	-9	ND	NS			

* Study explicitly reports (in Figures 1-3) that data on total cholesterol, insulin, and LDL are from 9 participants. We calculated 95% confidence intervals based on the assumption that glucose values were derived from 9 participants.

** "No significant differences between groups in serum levels of... fasting glucose [at follow-up]."

Cefalu, 1999

CAB Accession Number: 20001410866

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 15	Design: Randomized controlled trial Double-blind Duration: 38 wk Wash out period for other supplements / medication: ND	Population: Healthy (high risk)	BMI: 33.5 (32.8-34.2)	Inclusion criteria: Family history of type 2 DM, obese (>125% ideal body weight)	Cr type: Cr picolinate	Placebo	
Control enrolled: 14			Waist circ: ND				
Age, Cr: 45 ± 3 SD yr			Waist /hip ratio: ND				
Age, control: 49 ± 4 SD yr			Tg: ND				
% Male, Cr: 33			HDL: ND				
% Male, control: 43			BP: ND				
Treatment duration: 32 wk	Wash out between cross-over segments: NA	Quality: C	UAER: ND	Exclusion criteria: chronic disease, medication known to affect glucose metabolism	Compliance: ND		
Country: USA			Others:				
Sites:1			Family history of type 2 DM				

Cefalu, 1999

CAB Accession Number: 20001410866

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Insulin sensitivity index	FSIVGTT ("Bergman") Modified Minimal Model 0.3 g/Kg glucose followed by 0.03 U/kg insulin
			24 hr Glucose profile	Sum of multiple measurements post 75 g OGTT and multiple measurements post-lunch and post-dinner.
			Post-prandial insulin AUC	
			Fasting insulin	
			Cardiovascular Disease	
			Cardiovascular Disease Risk Factors	
Hypertension Drugs: ND	Type 2 Diabetes			
Dyslipidemia Drugs: ND	Retinopathy			
Other: ND	Kidney Disease			
	Other			

Reported Results*

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Insulin sensitivity	min ⁻¹ μU ⁻¹ mL	Chromium	15	2.5	ND	3.9	ND	+1.4	ND	ND	+1.8	ND	P<0.005
		Control	14	3.1	ND	2.7	ND	-0.4	ND	ND			
Glucose sum (24h profile)	mg/dL	Chromium	15	2625	ND	2750	ND	+125	ND	ND	0	ND	NS
		Control	14	2500	ND	2625	ND	+125	ND	ND			

* Estimated from graph; Standard deviation presented graphically

Crawford, 1999

UI: 11225649

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 20 Control enrolled: 20 (cross-over)	Design: Randomized Cross-over, analyzed as parallel randomized controlled trial Double blind	Population: Healthy	BMI: ND Waist circ: ND	Inclusion: African-American women who desired to lose weight, members of a local health club, received dietary consultation to lower caloric intake and exercised a minimum of 3 times a week for 60 minutes	Cr type: Niacin-bound Cr	Placebo	"Results from Group 1 and 2 were different. Accordingly, the data [were] handled separately."
Age: ND	Duration: 2 mo		Waist /hip ratio: ND Tg: 69 mg/dL		Brand name: ChromeMate™ (InterHealth Neutraceutical Inc)		
% Male: 0%	Wash out period for other supplements / medication: None reported		HDL: 69 mg/dL BP: ND FBS: 92 mg/dL 2h OGTT: ND		Dose: 600 µg		
Treatment duration: 2 mo Country: USA Sites: 1	Wash out between cross-over segments: 1 mo	Quality: C	UAER: ND African-American Weight: 186 lb	Exclusion: ND	Compliance: ND		

Crawford, 1999

UI: 11225649

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Fasting glucose	
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
Other:		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose	mg/dL	Chromium	8	102	85, 119	86	76, 96	-16	ND	NS	-15	ND	NS
		Control	10	92	83, 101	91	79, 103	-1	ND	NS			

Evans, 1989

Not in MEDLINE or CAB

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 11 Control enrolled: 11 (cross-over)	Design: Randomized Cross-over Each cross analyzed separately Double blind	Population: Type 2 DM	BMI: ND Waist circ: ND	Inclusion: Adult NIDDM, Hgb A _{1c} >9 mg/dL, stable doses of oral hypoglycemic agents for at least 4 months	Cr type: Cr picolinate (mixed with 5 mg CaPO ₄)	5 mg CaPO ₄	Second study in article (pages 167-169) “The 2-week off period was apparently a not long enough time since there was obviously a residual effect in the subjects when they began ingesting placebo. Therefore, statistical analyses during placebo treatment are based on the 5 subjects who started the study with placebo.”
Age: ND (40-70) yr	Duration: 6 wk	Waist /hip ratio: ND	Brand name: ND				
% Male: 55%	Wash out period for other supplements / medication: N/A	Tg: ND	Dose: 200 µg				
Treatment duration: 6 wk	Wash out between cross-over segments: 2 wk	HDL: ND	Compliance: Capsule count, but ND				
Country: USA Sites: 1		BP: ND					
		Quality: C	UAER: ND	Exclusion: None reported			
			FBS: ~174 mg/dL				
			2h OGTT: ND				
			Hgb A _{1c} : ~10.5%				

Evans, 1989

Not in MEDLINE or CAB

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Yes (constant through study)	None reported	Glucose / Glucose Metabolism		
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol LDL	ND ND
		Type 2 Diabetes		
		Retinopathy		
Dyslipidemia Drugs: ND		Kidney Disease		
Other:		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol	mg/dL	Chromium (Cross 1)	6	218	187, 249	208	179, 237	-10	ND	0.044	~-18	ND	ND
		Chromium (Cross 2)	5	216	187, 245	190	159, 221	-26	ND				
		Control (Cross 1)	5	217	186, 248	213	180, 246	-4	ND	0.5			
		Control (Cross 2)	6	211	178, 244	215	184, 246	+4	ND				
LDL	mg/dL	Chromium (Cross 1)	6	148	124, 172	140	118, 162	-8	ND	0.050	~-15	ND	ND
		Chromium (Cross 2)	5	142	120, 164	134	110, 158	-8	ND				
		Control (Cross 1)	5	136	111, 161	138	105, 171	+2	ND	0.3			
		Control (Cross 2)	6	140	116, 164	152	127, 177	+12	ND				

Ghosh 2002

CAB Accession Number: 20023197921

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments	
Cr enrolled: 50	Design: Randomized Crossover	Population: Type 2 DM	BMI: 22±3.1 SD	Inclusion: Type 2 diabetic patients on diet alone or diet and oral hypoglycemic agents with reasonably stable glycemic control over the previous 3 months as determined by fasting plasma glucose and glycated hemoglobin values.	Cr type: Cr picolinate	Placebo	4 excluded because began insulin treatment. 3 dropped out for personal reasons.	
Control enrolled: 50 (cross-over)	Double-blind		Waist circ: ND		Exclusion: pregnant, allergic to Cr picolinate, on multi-mineral supplementation, chronic diabetic complications, on beta-blocker, thiazide, glucocorticoids, or ACE inhibitors during the study, need initiation of insulin therapy during the study			Brand name: ND
Age, total: 53.5±10.9 SD yr	Duration: 28 wk		Waist /hip ratio: 0.93±0.1					Dose: 400 µg
% Male, total: 66%	Wash out period for other supplements / medication: ND		Tg: 124 mg/dL		Compliance: ND			
Treatment duration: 12 wk	Wash out between cross-over segments: 4 wk		HDL: 54 mg/dL					
Country: India			BP: 133/86					
Sites: 1		Quality: B, C for blood pressure	UAER: ND					
			Other:					

Ghosh 2002

CAB Accession Number: 20023197921

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Some patients were on oral hypoglycemic agents. During the study, anti-hyperglycemic medications and doses were unaltered, except in case of hypoglycemia.	None	Glucose / Glucose Metabolism		
		Cardiovascular Disease		
Hypertension Drugs: None		Cardiovascular Disease Risk Factors	Total cholesterol LDL HDL Triglycerides SBP & DBP	After 12-hr fasting
		Type 2 Diabetes		
		Retinopathy		
Dyslipidemia Drugs: None		Kidney Disease		
Other: ND		Other		

Reported Results

Outcome	Unit	Cohort	N	Base*		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol	mmol/L	Chromium	43	5.2 [201]	4.6, 5.8	4.5	4.1, 4.9	-0.7	ND	ND	-0.4	ND	NS
		Control	43	4.9 [189]	4.4, 5.4	4.6	4.1, 5.1	-0.3	ND	ND			
HDL	mmol/L	Chromium	43	1.3 [50]	1.2, 1.4	1.1	1.0, 1.2	-0.2	ND	ND	0	ND	NS
		Control	43	1.3 [50]	1.2, 1.4	1.1	1.0, 1.2	-0.2	ND	ND			
LDL	mmol/L	Chromium	43	3.3 [127]	2.8, 3.8	2.8	2.4, 3.2	-0.5	ND	ND	-0.4	ND	NS
		Control	43	2.9 [112]	2.5, 3.3	2.8	2.4, 3.2	-0.1	ND	ND			
Triglycerides	mmol/L	Chromium	43	1.5 [133]	1.2, 1.8	1.7	1.4, 2.0	+0.2	ND	ND	-0.1	ND	NS
		Control	43	1.5 [133]	1.2, 1.8	1.8	1.5, 2.1	+0.3	ND	ND			

Both SBP and DBP showed a reduction in both study arms (data not reported)

* Values in brackets are in mg/dL

Gill, 1981

CAB Accession Number: 821434315

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 15	Design: Controlled trial (no data on whether randomized)	Population: Healthy (divided into "low-insulin" and "high insulin" subgroups, see Results table)	BMI: ND	Inclusion: Healthy adults	Cr type: Brewer's Yeast	Torula yeast (in cookie)	Short report in Proceedings
ND on number receiving Cr or receiving control			Waist circ: ND				
Age: ND	Duration: 3 days		Waist /hip ratio: ND		Brand name: None		
	Wash out period for other supplements / medication: ND		Tg: ND		Dose: ND (in "brewer's yeast-based cookie)		
% Male: ND			HDL: ND				
			BP: ND				
			FBS: ND				
			2h OGTT: ND				
Treatment duration: 3 days	Wash out between cross-over segments: N/A	Quality: C	UAER: ND	Exclusion: ND	Compliance: ND		
Country: Australia			Others:				
Sites: 1							

Gill, 1981

CAB Accession Number: 821434315

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	ND	Glucose / Glucose Metabolism	1-60 min OGTT glucose AUC 60-180 min OGTT glucose AUC 1-60 min OGTT insulin AUC 60-180 min OGTT insulin AUC	75 g glucose load
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
Other:		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value***	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
1-60 min OGTT glucose AUC	mmol/L hr	Chromium	10*	5.65 [102]	4.67,6.63	5.96	5.08,6.84	+0.31	ND	NS	+0.08	ND	ND
		Control				5.88	5.14,6.62	+0.23	ND	NS			
		Chromium	5**	5.21 [94]	4.62,5.80	5.77	4.79,6.75	+0.56	ND	NS	+0.40	ND	ND
		Control				5.37	4.49,6.25	+0.16	ND	NS			
60-180 min OGTT glucose AUC	mmol/L hr	Chromium	10*	8.76 [158]	7.68,9.84	9.23	7.88,10.58	+0.47	ND	NS	+0.84	ND	ND
		Control				8.39	7.65,9.13	-0.37	ND	NS			
		Chromium	5**	8.79 [158]	8.26,9.32	9.39	8.04,10.74	+0.60	ND	NS	-0.03	ND	ND
		Control				9.42	7.75,11.09	+0.63	ND	NS			

* Low-insulin subgroup. No data on number receiving chromium or control.

** High-insulin subgroup. No data on number receiving chromium or control.

“The baseline data revealed a group of subjects who, although exhibiting a normal OGTT, had insulin responses significantly greater than the remaining subjects and in the range associated with high risk for ischemic heart disease.”

*** mg/dL hr in brackets.

Grant, 1982

UI: 7164208

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 37	Design: Randomized Cross-over Double-blind	Population: Type 2 DM	BMI: ND	Inclusion: NIDDM, adults (implied)	Cr type: Brewer's yeast	Cellulose placebo	Results of Hb _{A1c} suggested an order-of-treatment effect. 15 subjects received placebo before yeast and 22 subjects received yeast before placebo.
Control enrolled: 37 (cross-over)			Waist circ: ND				
Age: 64 ± 1.6 SEM yr	Duration: 7 wk		Waist /hip ratio: ND		Brand name: ND		Estimations of serum cholesterol, triglycerides and HDL were only completed in a proportion of patients (26, 24, and 13 patients respectively).
% Male: 49%	Wash out period for other supplements / medication: 3 mo constant diet and sulphonylurea dose		Tg: 124 mg/dL HDL: 42 mg/dL BP: ND FBS: 166 mg/dL 2h OGTT: ND		Dose: 1.28 µg chromium (1600 mg yeast)		
Treatment duration: 7 wk	Wash out between cross-over segments: None	Quality: C	UAER: ND	Exclusion: None reported	Compliance: ND		
Country: UK			Others:				
Sites: 1							

Grant, 1982

UI: 7164208

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Sulphonylurea (constant through study)	None reported	Glucose / Glucose Metabolism	OGTT Hgb _{A1c}	50 g glucose load
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol HDL Triglycerides	
		Type 2 Diabetes		
Dyslipidemia Drugs: ND		Retinopathy		
	Kidney Disease			
Other:		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol	mmol/L	Chromium	26	5.7 [220]	5.3, 6.1	5.7	5.3, 6.1	0	ND	NS	-0.1	ND	NS
		Control	26			5.8	5.4, 6.2	+0.1	ND	NS			
HDL	mmol/L	Chromium	13	1.1 [42]	0.9, 1.3	1.5	1.3, 1.7	+0.4	ND	NS	+0.3	ND	<0.05
		Control	13			1.2	1.0, 1.4	+0.1	ND	NS			
Triglycerides	mmol/L	Chromium	24	1.4 [124]	1.0, 1.8	1.5	1.1, 1.9	+0.1	ND	NS	-0.1	ND	NS
		Control	24			1.6	1.2, 2.0	+0.2	ND	NS			

* Baseline values in mg/dL in brackets.

Grant, 1997

UI: 9268955

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 43	Design: Randomized controlled trial Implies double blind with respect to chromium	Population: Healthy	BMI: ND Waist circ: ND	Inclusion criteria: Healthy, sedentary, obese (percentage body fat > 25%) women	Cr type: Cr picolinate Cr nicotinate	Exercise training with placebo	4 arms: 1. Picolinate without exercise 2. Picolinate with exercise 3. Nicotinate with exercise 4. Placebo with exercise No data on how many subjects were randomized to each arm.
Age, total: 24.4 ± 0.70 SD (18-35) yr	Duration: 9 wk	Waist /hip ratio: ND Tg: ND	Brand name: Shaklee, Inc., USA (San Francisco, CA)				
% Male, Total: 0%	Wash out period for other supplements / medication: ND	HDL: ND BP: ND FBS: ~90 mg/dL 2h OGTT: ~108 mg/dL	Dose: 400 µg				
Treatment duration: 9 wk	Wash out between cross-over segments: N/A	Quality: C	UAER: ND		Compliance: tablet counting		
Country: US Sites: 1			Others: Body weight:: 71.3±1.9 kg % body fat: 33%±0.91		"No problem with compliance."		

Grant, 1997

UI: 9268955

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None	Glucose / Glucose Metabolism	Fasting glucose Glucose OGTT (2 hr) Glucose OGTT AUC	100 g dextrose load
		Cardiovascular Disease		
Cardiovascular Disease Risk Factors		Total cholesterol LDL HDL Triglycerides		
Type 2 Diabetes				
Retinopathy				
Hypertension Drugs: ND		Kidney Disease		
Dyslipidemia Drugs: ND		Other		
Other: ND				

Grant, 1997

UI: 9268955

Reported Results

Outcome	Unit	Cohort	N*	Base		Final		Change			Net Change		
				Value***	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose**	mmol/L	CP no exercise	~11	5 [90]	ND	5	ND	0	ND	NS	-0.25	ND	ND
		CP with exercise	~11	5 [90]	ND	5	ND	0	ND	NS	-0.25	ND	ND
		Cr Nic with exercise	~11	5.25 [95]	ND	5	ND	-0.25	ND	NS	-0.5	ND	ND
		Placebo with exercise	~11	5 [90]	ND	5.25	ND	+0.25	ND	NS			
Glucose OGTT (2 hr)**	mmol/L	CP no exercise	~11	6.5 [117]	ND	6.5	ND	0	ND	NS	-0.1	ND	ND
		CP with exercise	~11	5.75 [104]	ND	5.25	ND	-0.5	ND	NS	-0.6	ND	ND
		Cr Nic with exercise	~11	5.9 [106]	ND	5.75	ND	-0.15	ND	NS	-0.35	ND	ND
		Placebo with exercise	~11	5.15 [93]	ND	5.25	ND	+0.10	ND	NS			
Glucose OGTT AUC	mmol/L minute	Reported no significant difference among treatments. No data reported											

* No data on how many subjects randomized to each arm.

** Estimated from graph

*** mg/dL in brackets

Hermann, 1994

CAB Accession Number: 941411083

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 42	Design: Randomized controlled trial	Population: Healthy	BMI: ND	Inclusion: Elderly individuals (>60 y)	Cr type: Cr chloride	Lactose	Sample size for each arm is not given Results for total sample are not reported
Age, Total: 73 (60-87) yr	Duration: 12 wk		Waist circ: ND		Brand name: ND		
% Male, Total: 19	Wash out period for other supplements / medication: ND		Waist /hip ratio: ND		Dose: 150 µg		
			Tg: ND				
			HDL: ND				
			BP: ND				
			FBS: ND				
		2h OGTT: ND					
Treatment duration: 12 wk	Wash out between cross-over segments: NA	Quality: C	UAER: ND	Exclusion: Debilitating or chronic disease	Compliance: ND		
Country: USA			Others: ND				
Sites: 1							

Hermann, 1994

CAB Accession Number: 941411083

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Fasting glucose	
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol HDL LDL Triglycerides	
Other: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results*

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value**	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mmol/L	Chromium	5	5.11 [92]	4.77, 5.45	4.5	4.11, 4.89	-0.61	ND	NS	-0.22	ND	ND
		Control	8	5.11 [92]	4.84, 5.38	4.72	4.42, 5.02	-0.39	ND	NS			

* Only subjects with initial total plasma cholesterol ≥ 6.21mmol/L (240 mg/dL). Authors report that there were no significant effects for the total sample (specific results are not given).

**mg/dL in brackets

Hermann, 1998

CAB Accession Number: 991406374

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 10 Control enrolled: 9 Age, Cr: 68±4 SD yr	Design: Randomized controlled trial Blinding not described Duration: 12 wk	Population: Healthy	BMI: ~25.6 Waist circ: ND Waist /hip ratio: ND Tg: ~169 mg/dL	Inclusion: Independently living elderly (> 50 years old) with elevated plasma total cholesterol, free of any chronic disease, not taking cholesterol-lowering medications, and maintaining a constant body weight.	Cr type: Cr Chloride Brand name: Prepared by Oklahoma State University	Lactose placebo	5 dropouts (2 males, 1 female, and 1 male and 1 female in Cr, placebo, and copper groups respectively). Reasons were not described. At least 1 male had DM by current criteria (FBS > 7.0 mmol/L) 4-wk post-treatment data is also available. A third arm of 8 subjects who took copper supplementation is not included here.
Age, control: ~65.5 yr % Male, Cr: 50% % Male, control: 53%	Wash out period for other supplements / medication: ND		HDL: ~38 mg/dL BP: ND FBS: ~97 mg/dL 2h OGTT: ND		Dose: 240 ± 11 µg		
Treatment duration: 8 wk Country: US Sites: 1	Wash out between cross-over segments: N/A	Quality: B	UAER: ND Others: Advancing age	Exclusion: ND	Compliance: pill counting No compliance levels are reported		

Hermann, 1998

CAB Accession Number: 991406374

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None	Glucose / Glucose Metabolism	Fasting glucose	12-hr fasting
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: None		Cardiovascular Disease Risk Factors		
Other: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose (Total)	mmol/L	Cr Cl ₃	8	5.8 [105]	5.5, 6.1	5.5	5.2, 5.8	-0.3	ND	ND	-0.4	ND	NS
		Placebo	8	5.1 [92]	5.0, 5.2	5.2	5.1, 5.3	+0.1	ND	ND			
Fasting glucose (Male)	mmol/L	Cr Cl ₃	3	7.0 [126]	6.7, 7.3	6.3	5.6, 7.0	-0.7	ND	ND	-0.8	ND	<0.05
		Placebo	5	5.0 [90]	4.8, 5.2	5.1	4.8, 5.4	+0.1	ND	ND			
Fasting glucose (Female)	mmol/L	Cr Cl ₃	5	5.5 [99]	5.2, 5.8	5.3	5.0, 5.6	-0.2	ND	ND	-0.2	ND	NS
		Placebo	3	5.3 [95]	5.1, 5.5	5.3	5.2, 5.4	0	ND	ND			

* mg/dL in brackets.

Joseph, 1999

UI: 10337851

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 17 Control enrolled: 15 Age, Cr: 63±5 SD (54-71) yr Age, control: 60±3 SD (54-65) yr % Male, Cr: 53% % Male, control: 53%	Design: Randomized controlled trial Double-blind Duration: 13 wk Wash out period for other supplements / medication: 3 wk	Population: Healthy & Glucose intolerance	BMI: 26 to 36 Waist circ: 101 cm Waist /hip ratio: 0.94 Tg: ND HDL: ND BP: ND FBS: 101 mg/dL 2h OGTT:~ 108 mg/dL	Inclusion: Non-diabetic (based on updated National Diabetes Data Group (NDDG) criteria) men and women who were not actively involved in any physical training.	Cr type: Cr picolinate Brand name: Nutrition 21, San Diego, CA Dose: 924 µg	Placebo	After the baseline OGTT, 1 man and 2 women who originally enrolled as non-diabetic subjects using old NDDG criteria were then judged to be diabetic by updated NDDG criteria. Their data were excluded from the analyses. Updated NDDG criteria for diabetes: fasting plasma glucose > 7.00 mmol/L, or 2-hr OGTT > 11.10 mmol/L.
Treatment duration: 12 wk Country: US Sites:1	Wash out between cross-over segments: N/A	Quality: B	UAER: ND Others: ND	Exclusion: Any metabolic or cardiac abnormalities. Diabetic by updated NDDG criteria	Compliance: pill counting and weekly interview then confirmed by urinary chromium excretion Compliance levels not reported		

Joseph, 1999

UI: 10337851

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	ND	Glucose / Glucose Metabolism	Fasting glucose 3-hr OGTT Fasting insulin Fasting C-peptide C-peptide AUC	75-g glucose OGTT
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
		Type 2 Diabetes		
		Retinopathy		
Other: ND		Kidney Disease		
		Other Body composition	Height Weight BMI % Body fat Fat mass Fat-free mass Waist circumference Waist /hip ratio	

AUC = incremental area under the curve x 10³

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Fasting glucose	mmol/L	Cr picolinate + RT	17	5.73 [103]	5.5, 5.9	6.01	5.7, 6.3	+0.28	ND	<0.05	-0.05	ND	NS
		Placebo + RT	15	5.45 [98]	5.2, 5.7	5.78	5.5, 6.0	+0.33	ND	<0.05			
Glucose AUC	mmol h /L 180 min	Cr picolinate + RT	17	247 [4450]	199, 295	269	195, 343	+22	ND	NS	+36	ND	NS
		Placebo + RT	15	297 [5350]	239, 355	283	225, 341	-14	ND	NS			

AUC = incremental area under the curve x 10³; RT = resistance training

* Values in brackets are in mg/dL.

Kato, 1998

UI: 9794131

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 11	Design: Prospective single cohort	Population: Insulin Resistant / Glucose Intolerance	BMI: 37.4 (28.6-46.3) kg/m ²	Inclusion criteria: Middle-aged women with upper body obesity. BMI \geq 24 kg/m ² . Waist/hip ratio \geq 0.8	Cr type: Cr Picolinate	None	Data also available at 4 weeks (no significant difference at 0,4, or 8 weeks)
Control enrolled: 0			Waist circ: ND				
Age, Cr: 56.4 (49-64) yr	Duration: 8 wk	Wash out period for other supplements / medication: N/A	Waist /hip ratio: 0.91 (0.80-1.04)	Exclusion criteria: Special diets, exercise program, prescription drugs or nutrient supplement of any kind.	Brand name: Kabco Inc		
% Male, Cr: 0%			Tg: ND		Dose: 400 μ g		
Treatment duration: 8 wk		Quality: C	UAER: ND		Compliance: Urine Cr, but ND		
Country: USA			Others: 2/10 African-Americans				
Sites: 1							

Kato, 1998

UI: 9794131

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: 0	None reported	Glucose / Glucose Metabolism	Fasting glucose	
Hypertension Drugs: 0		Cardiovascular Disease		
Dyslipidemia Drugs: 0		Cardiovascular Disease Risk Factors	Total cholesterol HDL	
Other: 0		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mg/dL	Chromium	10	112	92, 132	108	94, 122	-4	ND	NS	--		
		Control	0										
Total Cholesterol	mg/dL	Chromium	10	247	231, 263	238	220, 256	-9	ND	NS	--		
		Control	0										
HDL	mg/dL	Chromium	10	45	37, 53	46	36, 56	+1	ND	NS	--		
		Control	0										

Lee, 1994

UI: 7882815

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 30 Control enrolled: 30 (cross-over)	Design: Randomized cross-over Double blind	Population: Type 2 DM	BMI: 31.2 kg/m ² Waist circ: ND Waist /hip ratio: ND Tg: 133 mg/dL HDL: ND BP: ND FBS: ND 2h OGTT: ND UAER: ND Others:	Inclusion: NIDDM, adult (implied) Exclusion: Untreated thyroid dysfunction, pregnancy, acute medical or psychiatric illness, serum creatinine > 2.0 mg/dL, liver disease, ethanol or illicit drug use, steroid use, Hgb A _{1c} >10% or FBS >200 mg/dL	Cr type: Cr picolinate Brand name: ND Dose: 200 µg Compliance: Pill count, all ended study periods with < 10 capsules remaining. Compliance was excellent.	Identical placebo	One patient with known coronary disease was withdrawn after being hospitalized for unstable angina. A second patient was removed from the study because of worsening hypertension that occurred while taking placebo.
Age: 56 (32-65) yr % Male: 47%	Duration: 2 mo Wash out period for other supplements / medication: ND	Quality: C					
Treatment duration: 2 mo Country: USA Sites: 2	Wash out between cross-over segments: 2 mo						

Lee, 1994

UI: 7882815

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Both oral and insulin (some change through study)	ND	Glucose / Glucose Metabolism		
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	LDL HDL Triglycerides	Fasting lipid profiles
		Type 2 Diabetes		
Dyslipidemia Drugs: Some (remained constant through study)		Retinopathy		
Other:		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
LDL	mg/dL	Chromium	28	ND	ND	124	ND	ND	ND	ND	0 *	ND	NS
		Control	28	ND	ND	124	ND	ND	ND	ND			
HDL	mg/dL	Chromium	28	ND	ND	43	ND	ND	ND	ND	0 *	ND	NS
		Control	28	ND	ND	43	ND	ND	ND	ND			
Triglycerides	mg/dL	Chromium	28	ND	ND	133	ND	ND	ND	ND	-28 *	ND	<0.05
		Control	28	ND	ND	161	ND	ND	ND	ND			

** Difference between final values at end of 2 months treatment with chromium and with control.

Lefavi, 1993

CAB Accession Number: 941404708

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: Arm 1: 12 Arm 2: 11	Design: Randomized controlled trial Double-blind (3 arms)	Population: Healthy	BMI: ND	Inclusion: Non-diabetics, currently and regularly followed a bodybuilding-type weight training routine for at least 6 mo and possessing a strength level consistent with that training, not taking dietary supplements containing Cr or any medication which might interfere with study results, anabolic steroids or growth hormone not administered in the past 6 mo	Cr type: Cr nicotinate	Placebo	
Control enrolled: 11			Waist circ: ND				
Age, Total: 18-28 yr	Duration: 8 wk	Waist /hip ratio: ND	Tg: 107.7 (93-122.3)		Brand name: Chromate Interhealth Inc.		
% Male, Cr: 100	Wash out period for other supplements / medication: ND	HDL: 45.2 (43.2-47.3)	BP: ND			Dose: 1: 200 µg 2: 800 µg	
		FBS: 100.4 (97.1-103.7)	2h OGTT: 111.4 (100.6-122.1)				
		% Male, control: 100	Quality: B		UAER: ND	Exclusion: ND	
Treatment duration: 8 wk	Wash out between cross-over segments: NA		Others: ND		Good compliance is reported		
Country: USA							
Sites: 3							

Lefavi, 1993

CAB Accession Number: 941404708

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Glu, Insulin	Fasting, OGTT (60')
		Cardiovascular Disease		
Cardiovascular Disease Risk Factors		Total cholesterol, LDL, HDL, Total cholesterol /HDL, Triglycerides	Plasma concentration	
Type 2 Diabetes				
Retinopathy				
Hypertension Drugs: ND		Kidney Disease		
Dyslipidemia Drugs: ND		Other		
Other: ND				

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change*			Net Change**		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mg/dL	Chromium 200 µg	12	102	97, 107	92	86, 98	-10	-16, -4	<0.01	-3	-12, 6	NS
		Chromium 800 µg	11	98	93, 103	92	80, 104	-6	-17, +5	NS	+1	-12, 14	NS
		Control	11	101	94, 109	94	88, 100	-7	-14, 0	NS			
60 minute Glucose (OGTT)	mg/dL	Chromium 200 µg	12	112	92, 132	85	71, 99	-27	-45, -9	<0.01	-17	-42, 8	NS
		Chromium 800 µg	11	115	97, 133	100	83, 117	-15	-33, +3	NS	-5	-30, 20	NS
		Control	11	107	90, 124	97	79, 115	-10	-28, +8	NS			

* Change and CIs were calculated by the formula for mean change for continuous variables assuming a value of $r = 0.5$. For comparisons t-test for paired observations was used ($p < 0.05$ was considered as statistically significant).

** For comparisons t-test for two independent groups was used ($p < 0.05$ was considered as statistically significant).

According to the authors: Fasting Glu in 3 groups decreased from pre-supplementation to with post-supplementation time point [3x2 ANOVA, $F(1,31)=9.19$; $p < 0.005$]. Post-challenge Glu in 3 groups decreased from pre-supplementation to with post-supplementation time point [3x2 ANOVA, $F(1,31)=9.35$; $p < 0.005$]

Main effects for trials were observed when 3x2x2 ANOVA was performed for Glu [$F(1,31)=17.32$, $p < 0.0002$]

Li, 1992

UI: 951402188

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 15 Control enrolled: 15 Age, total: 32 (19-46) yr % Male, Cr: 27% % Male, control: 27%	Design: Randomized controlled trial Blinding not described Duration: 13 wk Wash out period for other supplements / medication: ND	Population: Healthy	BMI: ND Waist circ: ND Waist /hip ratio: ND Tg: 91 mg/dL HDL: ND BP: ND FBS: 63-107 mg/dL 2h OGTT: 76 mg/dL	Inclusion: Adults	Cr type: Brewer's yeast Brand name: Gist Brocades Industrial Enzymes Division, Holland. Dose: 7 µg (10 g yeast)	10 g of Torula yeast (Taiwan Sugar Corp., Taiwan), containing <0.03 µg chromium	
Treatment duration: 13 wk Country: Taiwan Sites: 1	Wash out between cross-over segments: N/A	Quality: B	UAER: ND Others: Body weight: 54.5 kg	Exclusion: DM, persons with intestinal, liver or kidney disease or gout, and those who recently taking nutrient supplements containing chromium.	Compliance: ND		

Li, 1992

UI: 951402188

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	ND	Glucose / Glucose Metabolism	Fasting glucose Fasting insulin Glucose OGTT (2 hr) Insulin OGTT (2 hr)	75 g oral glucose load.
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors	Total Cholesterol Triglycerides	
Other: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other	Body weight	

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose	mg/dL	Brewer's yeast	15	88	83.5, 92.5	100	96.5, 103.5	+11	7.0, 15.0	<.001	-1	ND	ND
		Control	15	87	80.6, 93.4	98	94.0, 102.0	+12	7.0, 17.0	<.001			
Glucose OGTT (2 hr)	mg/dL	Brewer's yeast	15	82	74.6, 89.4	95	87.6, 102.4	+11	7.0, 15.0	<.01	-1	ND	ND
		Control	15	70	58.1, 81.9	86	75.6, 96.4	+12	7.0, 17.0	<.001			

Li, 1994

UI: 7946924

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 11 Control enrolled: 11 Age, Total: 51 (40-76) yr % Male, Cr: 36% % Male, control: 36%	Design: Randomized controlled trial Double blind Duration: 12 wk Wash out period for other supplements / medication: ND	Population: Healthy	BMI: ND Waist circ: ND Waist /hip ratio: ND Tg: 104 mg/dL	Inclusion: Healthy adults	Cr type: Brewer's yeast Brand name: Gist Brocades Industrial Enzymes Division, Holland	Torula yeast (Taiwan Sugar Corp) 10 g/d Cr 0.3 µg	
Treatment duration: 12 wk Country: Taiwan Sites: 1	Wash out between cross-over segments: N/A	Quality: B	UAER: ND Others: Weight 57.5 kg	Exclusion: Taking oral hypoglycemic drugs, history of liver, kidney, gout, intestinal disorders, recent intake of nutrient supplement containing chromium	Dose: 10 g yeast Cr 7µg Compliance: ND		

Li, 1994

UI: 7946924

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	ND	Glucose / Glucose Metabolism	glucose	Fasting, OGTT (2 hr)
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors	Total cholesterol Triglycerides Systolic BP Diastolic BP	
Other: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose	mmol/L	Chromium	11	4.8 [86]	4.4, 5.2	5.1	4.7, 5.5	+0.3	+0.1, +0.5	<0.01	-0.1	ND	NS
		Control	11	4.9 [88]	4.7, 5.1	5.3	4.9, 5.7	+0.4	+0.05, +0.8	<0.05			
Glucose OGTT (2 hr)	mmol/L	Chromium	11	5.4 [97]	4.7, 6.1	5.2	4.5, 5.9	-0.2	-0.6, +0.2	NS	0	ND	NS
		Control	11	5.8 [105]	4.7, 6.9	5.6	4.8, 6.4	-0.2	-1.1, +0.7	NS			

* mg/dL in brackets

Liu, 1978

UI: 665555

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 27 15 without DM Control enrolled: 0	Design: Prospective cohort	Population: Healthy (analyzed subgroup)	BMI: ND Waist circ: ND	Inclusion: Women aged 40-75 year. Healthy or diet-controlled DM	Cr type: Brewer's Yeast	None	12 were hyperglycemic and 15 had normal glucose tolerance Hyperglycemic subjects not included here
Age, Cr: (40-75) yr	Duration: 3 mo	(Also data on hyperglycemic subjects including NIDDM)	Waist /hip ratio: ND Tg: ND		Brand name: Ardamine Yes		
% Male, Cr: 0%	Wash out period for other supplements / medication: ND		HDL: ND BP: ND FBS: All*: 101 mg/dL 1h OGTT: All: 166 mg/dL		Dose: 4 µg Cr; approximately 5 g yeast		
Treatment duration: 3 mo Country: USA Sites: 1	Wash out between cross-over segments: N/A		Quality: C		UAER: ND Others:		

* including subjects with DM

Liu, 1978

UI: 665555

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric*	Method of Measurement
Hypoglycemic Agents: None	12/27 were hyperglycemic, including NIDDM	Glucose / Glucose Metabolism	Fasting glucose 1 hr OGTT glucose Total OGTT glucose Fasting insulin 1 hr OGTT insulin Total OGTT insulin	Preceded with a 3-day, high-carbohydrate diet (approximately 300 g/day) Total = sum of levels at ½, 1, 1½, 2 and 3 hours after 100 g oral glucose load.
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors		
Other:		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

* Outcomes other than Total Glucose were reported only for whole population, including diabetic subjects.

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change			
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI	P
Total Glucose (Non-diabetics)	mg/dL	Chromium	15	660	613,707	624	567,681	-36*	ND	NS	--			
		Control	0											

* 11 (73) "showing improvement".

Martinez, 1985

CAB Accession Number: 851473679

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments	
Total enrolled: 96	Design: Randomized controlled trial Blinding not reported	Population: 1. Healthy (53)	BMI: ND Waist circ: ND	Inclusion: Adult women.	Cr type: Cr chloride	Placebo	10 dropouts due to health-related problems. 33 out of 86 women were in "at risk" of impaired glucose tolerance group, which was defined as 2-hr OGTT > 100 mg/dL. Included diabetics. Subjects analyzed by risk of glucose intolerance based on baseline OGTT and by use of medications that may affect glycemia.	
Age, total: 66.6±6.2 SD (58-92) yr	Duration: 10 wk	2. Glucose intolerance, and type 2 DM, not analyzed (5 out of 33 with type 2 DM)	Waist /hip ratio: ND	Exclusion: IDDM, marked obesity (weight for age > 90%), hyperuricemia	Brand name: ND			
% Male, Total: 0	Wash out period for other supplements / medication: ND		Tg: ND		Dose: 200 µg			
Treatment duration: 10 wk	Wash out between cross-over segments: N/A		Quality: B		UAER: ND			Compliance: Questionnaire revealed that 98% subjects reported using the supplement 95-100% of the time, the rest 75-94% of the time.
Country: Canada					Others: 29% had family history of DM, 23% had hypertension; some patients had advancing age			
Sites: 1								

Background median chromium intake ranged from 51 to 136 ug/day (in Table 5).

The median chromium intake for the total group of at risk non-medicated women (non-Cr medication), whether receiving chromium or placebo, was lower (74 ug/day) than the median for the entire group (91 ug/day).

Furthermore, the at-risk subgroup of non-medicated women who showed a positive response to chromium supplementation, had a significantly lower median chromium intake (56 ug/day, p=0.03), compared to the median (89 ug/d) for the non-medicated low-risk chromium supplemented group.

Martinez, 1985

CAB Accession Number: 851473679

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	Hypertension (23%)	Glucose / Glucose Metabolism	Fasting glucose Fasting insulin Glucose OGTT (2 hr) Insulin OGTT (2 hr)	75 g glucose
Hypertension Drugs: 5 beta-blockers; Some thiazide diuretics		Cardiovascular Disease		
Dyslipidemia Drugs: None		Cardiovascular Disease Risk Factors		
		Type 2 Diabetes		
Other: 30 on medications with "hyperglycemic potential" (thiazides, hormones, analgesics, anti-inflammatory medications.		Retinopathy		
5 on medications with "hypoglycemic potential" (beta-blockers)		Kidney Disease		
19 on medications with no known effect on glycemia (analgesics, antibiotics, antihistamines, cardiac drugs, K salts, psychoactive drugs, laxatives, other gastrointestinal drugs.		Other		

Martinez, 1985

CAB Accession Number: 851473679

Reported Results

Subjects At "Low Risk" of Impaired Glucose Tolerance by OGTT

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
On no medications that potentially could affect glycemia													
Fasting glucose	mg/dL	CrCl ₃	13	89.5	86.0, 90.0	89.2	85.2, 93.2	-0.3	ND	NS	-1.6	ND	ND
		Control	8	87.5	79.7, 95.3	88.8	79.7, 97.9	+1.3	ND	NS			
Glucose OGTT (2 hr)	mg/dL	CrCl ₃	13	82.6	73.5, 91.7	81.9	67.3, 96.5	-0.65	-8.6, 7.3	NS	-19.65	ND	ND
		Control	8	75.6	67.5, 83.7	94.5	74.9, 114.1	+18.9	-4.2, 42.0	NS			
On medications that potentially could affect glycemia													
Fasting glucose	mg/dL	CrCl ₃	15	89.2	85.5, 92.9	91.3	86.6, 96.0	+2.1	ND	NS	+0.8	ND	ND
		Control	17	91.2	88.3, 94.1	92.5	83.3, 107	+1.3	ND	NS			
Glucose OGTT (2 hr)	mg/dL	CrCl ₃	15	81.9	68.3, 95.3	87.0	78.9, 95.1	+5.1	ND	NS	-1.7	ND	ND
		Control	17	85.7	80.8, 90.6	92.5	83.7, 101	+6.8	ND	NS			

Mossop, 1983

UI: 6883494

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 39	Design: Non-Randomized controlled trial (convenience sample and alternate patients were assigned to Cr and control groups) Caregivers blinded	Population: Type 2 DM	BMI: ND Waist circ: ND	Inclusion: Patients attended diabetic clinic for early morning fasting blood draw.	Cr type: Cr chloride	No treatment	39 patients were asked to participate in the trial. At the end of the trial, 13 subjects were excluded from the analyses due to non-compliance, non-attendance, migration and failure to attend in the fasting and unmedicated state.
Age, Total: ND	Duration: 2 to 4 mo	Waist /hip ratio: ND Tg: ND	Brand name: ND				
% Male, Total: ND	Wash out period for other supplements / medication: ND	HDL: 45 mg/dL BP: ND FBS: 259 mg/dL 2h OGTT: ND	Dose: ~600 µg (2 mg CrCl ₃)				
Treatment duration: 2 to 4 mo	Wash out between cross-over segments: N/A	Quality: C	UAER: ND		Compliance: ND		
Country: Africa Sites: 1		Others: ND					

Mossop, 1983

UI: 6883494

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Insulin or oral therapy	ND	Glucose / Glucose Metabolism	Fasting glucose	
Hypertension Drugs: ND		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol HDL	
Dyslipidemia Drugs: ND		Type 2 Diabetes		
		Retinopathy		
Other: ND		Kidney Disease		
	Other			

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value*	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol	mmol/L	Cr chloride	13	ND	ND	ND	ND	-0.21 [-8]	ND	ND	-0.37	ND	NS
		Control	13	ND	ND	ND	ND	+0.16 [+6]	ND	ND			
HDL	mmol/L	Cr chloride	13	1.17 [45]	ND	1.61	ND	+0.44 [+17]	ND	ND	+0.60	ND	ND
		Control	13	1.56 [60]	ND	1.40	ND	-0.16 [-6]	ND	ND			

* Values in brackets are in mg/dL.

Offenbacher, 1980

UI: 7000589

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments		
Cr enrolled: 12 Control enrolled: 12	Design: Randomized controlled trial Single-blind	Population: 1. Healthy (8 subjects)	BMI: ND Waist circ: ND	Inclusion: healthy and diabetic subjects	Cr type: Brewer's yeast	Torula yeast	Also pooled results for diabetics and non diabetics are reported (although randomization had been done separately in these groups) Fewer than 5 Diabetics (results not included in the tables)		
Age, Total: 78 (63-93) yr	Duration: 8 wk	2. Type 2 DM (4 subjects)	Waist /hip ratio: ND Tg: 146 (123-169)		Brand name: ND				
% Male, Cr: 25	Wash out period for other supplements / medication: ND		HDL: ND BP: ND FBS: ND		Dose: 10.8 µg				
% Male, control: 25			2h OGTT: ND						
Treatment duration: 8 wk Country: USA Sites: 1	Wash out between cross-over segments: N/A	Quality: B	UAER: Others:		Exclusion: ketosis-prone insulin dependent DM, marked obesity, hyperuricemia, major intestinal disease, mental incompetence			Compliance: ND	

Offenbacher, 1980

UI: 7000589

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents:	HTN Osteoarthritis Paget's disease Parkinsonism (mild) Pulmonary insufficiency (mild)	Glucose / Glucose Metabolism	Fasting Glucose Fasting Insulin Glucose AUC (2h OGTT) Insulin AUC (2h OGTT)	100 g glucose OGTT, if weight<100 lb (45.4 Kg) or 1.75 g/Kg
		Cardiovascular Disease		
Hypertension Drugs: diuretics (chlorothiazide and KCl, furosemide and KCl)	Arteriosclerotic heart disease	Cardiovascular Disease Risk Factors	Total cholesterol Triglycerides	
Dyslipidemia Drugs:		Type 2 Diabetes		
Other: digoxin, tofranil, valium, alphamethyl dopa		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose	mg/dL	Chromium	8	92	ND	88	ND	-4	ND	<0.05	-4	ND	ND
		Control	8	85	ND	85	ND	0	ND	NS			
Glucose AUC (2h OGTT)**	mg h /dL	Chromium	8	527	464, 590	468	425, 511	-59	ND	<0.05	-74	ND	ND
		Control	8	475	428, 522	490	441, 539	+15	ND	NS			

* Non-diabetics only

** Estimates from graph

Offenbacher 1985

UI: 3898805

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 8 brewer's yeast 8 Cr chloride	Design: 3-arm randomized controlled trial Subjects blinded	Population: Healthy	BMI: ND	Inclusion: Retired, free-living healthy adults	Cr type: Brewer's yeast Cr chloride	Lactose 200 mg	
Control enrolled: 7			Waist circ: ND				
Age, Total:: 73 (63-86) yr	Duration: 10 wk	Waist /hip ratio: ND Tg: 97-125 mg/dl	HDL: ND BP: ND FBS: 94-97 mg/dl 2h OGTT: ND	Exclusion: diabetics taking insulin or oral agents, history of liver, kidney, GI disorder, gout, taking brewer's yeast or chromium	Brand name: Yeast: Natural Brand Cr Cl ₃ : None		
% Male, Total: 17%	Wash out period for other supplements / medication: None	UAER: ND			Dose: Yeast: 5 µg Cr Cl ₃ : 200 µg		
Treatment duration: 10 wk	Wash out between cross-over segments: N/A	Quality: B	Others:	Compliance: monitoring urine biweekly. No compliance results reported.			
Country: US							
Sites: 1							

Offenbacher 1985

UI: 3898805

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	None reported	Glucose / Glucose Metabolism	Fasting glucose OGTT 90 min Insulin:Glucose ratio	75 g glucose load ND, implied only
Hypertension Drugs: ND		Cardiovascular Disease		
Dyslipidemia Drugs: ND		Cardiovascular Disease Risk Factors	Total Cholesterol Triglycerides	
Other:		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Fasting glucose	mg/dL	Brewer's Yeast	8	95	87, 103	95	88, 102	0	ND	NS	+3	ND	ND
		Cr chloride	8	94	86, 102	100	89, 111	+6	ND	NS	+9	ND	ND
		Control	7	97	93, 101	94	90, 98	-3	ND	NS			
Glucose (90 min OGTT)	mg/dL	Brewer's Yeast	8	127	94, 160	129	93, 165	+2	ND	NS	+28	ND	ND
		Cr chloride	8	146	118, 174	152	116, 188	+6	ND	NS	+32	ND	ND
		Control	7	155	114, 196	129	110, 148	-26	ND	NS			
Insulin:Glucose Ratio	"After supplementation, the ratio of insulin to glucose was lower in the brewer's yeast and CrCl ₃ groups, but these differences were not significant."												

Potter, 1985

UI: 3883094

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 6 Control enrolled: NA	Design: Single cohort trial	Population: Glucose intolerance	BMI: 28 kg/m ² Waist circ: ND	Inclusion: Elderly adults	Cr type: Cr chloride	NA	One subject was excluded from the study because of slight paradoxical decrease in urinary chromium following supplementation.
Age, Cr: 66±8.9 SD (range) yr	Duration: 12 wk		Waist /hip ratio: ND		Brand name: ND		
	Wash out period for other supplements / medication: ND		Tg: 112 mg/dL		Dose: 200 ug		
% Male, Cr: 20%			HDL: 51 mg/dL				
			BP: ND				
			FBS: ND				
			2h OGTT: 161 mg/dL				
Treatment duration: 12 wk Country: US Sites: 1	Wash out between cross-over segments: N/A	Quality: C	UAER: ND Others: ND	Exclusion: Taking medications known to interfere with glucose tolerance or glucose tolerances were either normal or diabetic by NDDG criteria.	Compliance: pill counting confirmed by urinary Cr excretion 100% compliance		

Potter, 1985

UI: 3883094

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	ND	Glucose / Glucose Metabolism	Glucose OGTT (1, 2 hr) β cell sensitivity to glucose Tissue sensitivity to insulin Insulin receptor affinity Glucose utilization, insulin receptor affinity, total insulin bound RBC	40 g glucose/m ² surface area Glucose clamp: Plasma IRI response to controlled hyperglycemia* Hyperglycemic clamp technique & OGTT was performed after a 12-hour overnight fast
		Cardiovascular Disease		
Hypertension Drugs: ND		Cardiovascular Disease Risk Factors	Triglycerides Total cholesterol LDL HDL LDL/HDL ratio	
Dyslipidemia Drugs: ND		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
Other: ND	Other			

*IRI = immunoreactive insulin

Potter, 1985

UI: 3883094

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Glucose OGTT (1 hr)	mg/dL	CrCl ₃	5	161	151, 171	ND	ND	-18	-23, -13	<.005	--		
		Control	0										
Glucose OGTT (2 hr)	mg/dL	CrCl ₃	5	161	151, 171	158	135, 181	-3*	-26, +20	NS	--		
		Control	0										
Total cholesterol	mg/dL	CrCl ₃	5	221	217, 225	211	194, 228	-9.0	-20.5, +2.5	NS	--		
		Control	0										
LDL	mg/dL	CrCl ₃	5	147	134, 160	140	127, 153	-7.0	-24.3, +10.3	NS	--		
		Control	0										
HDL	mg/dL	CrCl ₃	5	51	37.6, 64.4	46	36.4, 55.6	-5.0	-10.8, +0.8	NS	--		
		Control	0										
Triglycerides	mg/dL	CrCl ₃	5	112	79.4, 145	126	72.2, 180	+14.0	-47.4, +75.4	NS	--		
		Control	0										
Tissue sensitivity to insulin M/IRI	μU/mL	CrCl ₃	5	5.5	3.9, 7.1	5	3.2, 6.8	-0.6*	-2, 0.8	NS	--		
		Control	0										

* computed from paired analysis

Rabinowitz, 1983

UI: 6352208

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 43	Design: Randomized partial cross-over design Double-blind	Population: 1. Ketosis- prone DM on insulin (21)	BMI: ND Waist circ: ND	Inclusion: Diabetic men	Cr type: 1. Cr chloride 2. Brewer's yeast 3. Brewer's yeast + GTF	Placebo	2 subjects in groups 2 & 3 were on insulin
Age, Total: (21-69) yr	Duration: 16 mo	2. Ketosis- resistant, not obese (7)	Waist /hip ratio: ND Tg: 1. 230 mg/dL 2. 179 3. 269	Exclusion: History of pancreatitis, hemochromatosis, secondary DM to endocrine problems (thyroid or pituitary), life-threatening illness, chronic infection, proteinuria, evidence of GI malabsorption, required diuretics, chronic ingested yeast	Brand name: 1. ND 2. Yeastamin-95 3. Plus Brand		
% Male, Total: 100	Wash out period for other supplements / medication: ND	3. Ketosis- resistant, obese (15)	HDL: ND BP: ND FBS: 1. 194 mg/dL 2. 234 3. 200 2h OGTT: ND		Dose: 1. 150 µg 2. 18 µg 3. 6 µg		
Treatment duration: 4 mo	Wash out between cross-over segments: 2 mo	Quality: C	UAER: ND		Compliance: pill counting, serum Cr levels ND on actual compliance		
Country: US Sites: 4			Others: ND				

Rabinowitz, 1983

UI: 6352208

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Insulin (all group 1, 2 in groups 2 & 3) Oral hypoglycemic agents (11 in groups 2 & 3)		Glucose / Glucose Metabolism	Fasting glucose Glucose AUC (OGTT) Glucose change post-tolbutamide Fasting insulin Fasting C-peptide	Sustacal load (25% of daily calories)
Hypertension Drugs: ND		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol Triglycerides	
Dyslipidemia Drugs: ND		Type 2 Diabetes		
Other: ND		Retinopathy		
	Kidney Disease			
	Other			

Rabinowitz, 1983

UI: 6352208

Reported Results

Outcome	Unit	Cohort	N*	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
1. Ketosis-prone (on insulin)													
Total cholesterol	mg/dL	CrCl ₃	21/15	221	194,248	226	ND	+5	-19,+29	NS	+3	ND	ND
		Yeast	21/13			226	ND	+5	-50,+60	NS	+3	ND	ND
		Yeast+GTF	21/16			221	ND	0	-18,+18	NS	-2	ND	ND
		Control	21/16			223	ND	+2	-14,+18	NS			
Triglycerides	mg/dL	CrCl ₃	21/15	230	50,410	228	ND	-2	-43,+39	NS	+11	ND	ND
		Yeast	21/13			173	ND	-57	-169,+55	NS	-44	ND	ND
		Yeast+GTF	21/16			236	ND	+6	-23,+35	NS	+19	ND	ND
		Control	21/16			217	ND	-13	-64,+38	NS			
2. Ketosis-resistant, Not obese													
Total cholesterol	mg/dL	CrCl ₃	7/4	178	162,194	196	ND	+18	-17,+53	NS	+2	ND	ND
		Yeast	7/5			197	ND	+19	-18,+56	NS	+3	ND	ND
		Yeast+GTF	7/6			168	ND	-10	-35,+15	NS	-26	ND	ND
		Control	7/3			194	ND	+16	-15,+47	NS			
Triglycerides	mg/dL	CrCl ₃	7/4	179	59,299	186	ND	+7	-64,+78	NS	+3	ND	ND
		Yeast	7/5			188	ND	+9	-46,+64	NS	+5	ND	ND
		Yeast+GTF	7/6			135	ND	-45	-104,+14	NS	-49	ND	ND
		Control	7/3			183	ND	+4	-55,+63	NS			
3. Ketosis-resistant, Obese													
Total cholesterol	mg/dL	CrCl ₃	15/9	215	193,237	227	ND	+12	-10,+34	NS	+9	ND	ND
		Yeast	15/10			240	ND	+25	-24,+74	NS	+22	ND	ND
		Yeast+GTF	15/8			225	ND	+10	-4,+24	NS	+7	ND	ND
		Control	15/9			218	ND	+3	-32,+38	NS			
Triglycerides	mg/dL	CrCl ₃	15/9	269	136,402	347	ND	+78	-55,+211	NS	+35	ND	ND
		Yeast	15/10			252	ND	-17	-154,+120	NS	-60	ND	ND
		Yeast+GTF	15/8			354	ND	+85	-187,+357	NS	+42	ND	ND
		Control	15/9			312	ND	+43	-26,+112	NS			

* First number refers to subjects with initial value; second number refers to those with final value.

Riales, 1981

UI: 7032273

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 12 Control enrolled: 11	Design: Randomized control trial Double blind	Population: Healthy (except 1 with NIDDM)	BMI: ND	Inclusion: Rotary Club members, adult men	Cr type: Cr chloride (in water)	Distilled water (5 mL)	Only subset agreed to OGTT (8 Cr, 6 placebo). This subset of OGTT volunteers had higher total cholesterol and triglycerides, lower HDL, and were heavier. 1 person with NIDDM
Age, Cr: 46±9 SD (32-61) yr	Duration: 12 wk		Waist circ: ND		Brand name: None		
Age, control: 49±9 SD (37-60) yr	Wash out period for other supplements / medication:		Waist /hip ratio: ND		Dose: 200 µg Cr 5 days/week		
% Male, Total: 100%			Tg: 179 mg/dL		Compliance: Daily logs and post-study questionnaire.		
Treatment duration: 12 wk	Wash out between cross-over segments:	Quality: C	HDL: 34 mg/dL*	Exclusion: ND	Determined to be "excellent" for 19 (10 Cr, 9 control), fair for 3 (2 Cr, 1 control), and poor for 1 (control).		
Country: US			BP: ND				
Sites: 1			FBS: ~97 mg/dL*				
			90 min OGTT: ~130 mg/dL*				
			UAER: ND				
			Others: Relative weight (% of ideal body weight): 124%*				

* Among 14 subjects who had OGTT. FBS and 90 min OGTT values estimated from graphs.

Riales, 1981

UI: 7032273

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: 1 subject in Cr group Hypertension Drugs: 1 subject in placebo group Dyslipidemia Drugs: None Other: 1 subject in placebo group on aspirin	NIDDM 1 in Cr group HTN 1 in placebo group Arthritis 1 in placebo group	Glucose / Glucose Metabolism	Fasting glucose OGTT 90 min glucose OGTT Glucose sum Insulin:glucose ratio sum Relative insulin	OGTT:75 g glucose load ND: probably sum of 30,60,90 min ND: same 90 min insulin-[(90 min glucose x 0.72)-14.55]*
		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors		
		Type 2 Diabetes		
		Retinopathy		
Kidney Disease				
Other				

* "Relative insulin" calculated as the difference between the actual 90-min insulin and insulin predicted from the corresponding plasma glucose using the regression of 90-min insulin on 90-min glucose for all subjects, except one outlier, at baseline.

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose (estimated from graph)	mg/dL	Chromium	8	100	ND	90	ND	-10	ND	NS	-6	ND	ND
		Control	6	92	ND	88	ND	-4	ND	NS			
OGTT Glucose (90 min) (estimated from graph)	mg/dL	Chromium	8	124	ND	120	ND	-4	ND	NS	+12	ND	ND
		Control	6	136	ND	120	ND	-16	ND	NS			
OGTT Glucose sum	mg/dL	Chromium	8	535	468,602	516	426,606	-17	ND	NS	+12	ND	ND
		Control	6	535	415,656	506	428,584	-29	ND	NS			
OGTT Insulin:Glucose ratio sum		Chromium	8	2.54	1.38,3.70	2.08	1.22,2.94	-18%	ND	NS	-21%	ND	ND
		Control	6	1.94	1.51,2.37	1.99	1.66,2.32	+2.6%	ND	NS			

Trow, 2000

UI: 10683756

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 12	Design: Single cohort study	Population: Type 2 DM	BMI: 22-30 kg/m ²	Inclusion: Free-living adults with DM 2 and a minimum of diagnosis of 3 mo	Cr type: Brewer's yeast	N/A	
Control enrolled: 0			Waist circ: ND		Brand name: ND		
Age, Cr: (45-67) yr	Duration: 12 wk		Waist /hip ratio: ND		Dose: 100 µg		
% Male, Cr: 60	Wash out period for other supplements / medication: ND		Tg: 162 mg/dL				
			HDL: 52 mg/dL				
			BP: ND				
			FBS: 132 mg/dL				
			2h OGTT: ND				
Treatment duration: 8 wk	Wash out between cross-over segments: N/A	Quality: C	UAER: ND	Exclusion: ND	Compliance: ND		
Country: UK			Others: ND				
Sites: 1							

Trow, 2000

UI: 10683756

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Metformin	DM 2	Glucose / Glucose Metabolism	Fasting glucose Glucose OGTT Fasting insulin Insulin OGTT	
		Cardiovascular Disease		
Hypertension Drugs: None reported		Cardiovascular Disease Risk Factors	Total cholesterol HDL LDL Triglycerides	LDL= [total cholesterol] - [triglycerides/2.2] - [HDL]
		Type 2 Diabetes		
Dyslipidemia Drugs: None reported		Retinopathy		
		Kidney Disease		
Other: None reported		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P	W/in	Value	95% CI
Total cholesterol	mmol/L	Chromium Control	12 0	5.49 [212]	4.93, 6.05	5.67	5.09, 6.25	+0.18	ND	NS	--		
Triglycerides	mmol/L	Chromium Control	12 0	1.83 [162]	1.35, 2.31	2.29	1.72, 2.86	+0.46	ND	NS	--		
HDL	mmol/L	Chromium Control	12 0	1.34 [52]	0.87, 1.81	1.48	0.95, 2.01	+0.14	ND	NS	--		
LDL	mmol/L	Chromium Control	12 0	3.11 [120]	2.48, 3.74	3.13	2.33, 3.93	+0.02	ND	NS	--		

* mg/dL in brackets

Urberg, 1987

UI: 3626867

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Total enrolled: 16	Design: Randomized controlled trial Not blinded	Population: Healthy	BMI: ND Waist circ: ND	Inclusion: Elderly individuals in good health	Cr type: Cr chloride Cr chloride + nicotinic acid	Nicotinic acid	Sample size for each arm is not given
Age, Total: >65 yr	Duration: 28 d		Waist /hip ratio: ND Tg: ND		Brand name: ND		
% Male, Cr: ND	Wash out period for other supplements / medication: ND		HDL: ND BP: ND FBS: ND		Dose: 200 µg (for both groups)		
% Male, control: ND			2h OGTT: ND				
Treatment duration: 28 d	Wash out between cross-over segments: NA	Quality: C	UAER: ND	Exclusion: DM, taking supplemental Cr, nicotinic acid or brewer's yeast	Compliance: ND		
Country: USA			Others: ND				
Sites: 1							

Urberg, 1987

UI: 3626867

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Fasting Glucose 2 hr Glucose OGTT AUC 1 hr Insulin OGTT Glycosylated Hgb	50 g glucose load for OGTT
		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors		
		Type 2 Diabetes		
Hypertension Drugs: ND		Retinopathy		
Dyslipidemia Drugs: ND		Kidney Disease		
Other: ND		Other		

Reported Results

Outcome	Unit	Cohort	N*	Base		Final		Change**			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mg/dL	Chromium	ND	95.4	86.8, 103.2	99.0	88.6, 109.4	+4.6 (+3.7%)	ND	NS	+5.6	ND	ND
		Chromium + Nicotinic acid	ND	96.2	87.4, 104.6	89.6	79, 101	-6.6 (-6.8%)	ND	NS***	-5.6	ND	ND
		Control	ND	94.4	82.6, 105.4	93.4	82.8, 103.2	-1.0 (-1.1%)	ND	NS			
2 hr Glucose AUC (OGTT)	mg/dL hr	Chromium	ND	15,589	12390,18788	15,285	11596,18974	-304 (-2.0%)	ND	NS	-648	ND	ND
		Chromium + Nicotinic acid	ND	16,462	14990,17934	14,026	11627,16425	-2436 (-14.8%)	ND	<0.025	-2780	ND	ND
		Control	ND	16,146	11805,20487	16,490	12092,20888	+344 (+2.1%)	ND	NS			

* Total 16 subjects. ND on how many subjects in each group.

** Change reported as percent change.

*** 0.10>P>0.05

Uusitupa, 1983

UI: 6351586

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments		
Cr enrolled: 10 Control enrolled: 10 (cross-over)	Design: Randomized cross-over Double blind	Population: NIDDM	BMI: ND	Inclusion: NIDDM adults	Cr type: Cr chloride	0.02 M HCl (5 mL)			
Age, Total: 58±11 SD (37-65) yr	Duration: 16 wk		Waist circ: ND					Waist /hip ratio: ND	Brand name: None
% Male, Total: 60%	Wash out period for other supplements / medication: 4 wk		Tg: 2.34 mmol/L (207 mg/dL)					HDL: 0.96 mmol/L (37 mg/dL)	Dose: 200 µg
			BP: ND					FBS: 10.3 mmol/L (186 mg/dL)	
			2h OGTT: 15.9 mmol/L (286 mg/dL)						
Treatment duration: 6 wk	Wash out between cross-over segments: No wash out	Quality: A	UAER: ND	Exclusion: ND	Compliance: ND				
Country: Finland			Others:						
Sites: 1									

Uusitupa, 1983

UI: 6351586

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	4 Hypertension 4 Coronary heart disease	Glucose / Glucose Metabolism		
Hypertension Drugs: 7 on diuretics, digoxin or beta-blocker		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol HDL LDL Triglycerides	
Dyslipidemia Drugs: None		Type 2 Diabetes		
Other:		Retinopathy		
		Kidney Disease		
		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol	mmol/L	Chromium	10	6.32 [244]	6.05, 6.59	6.33	6.16, 6.50	+0.01	ND	NS	-0.08	ND	NS**
		Control	10			6.41	6.22, 6.60	+0.09	ND	NS			
HDL	mmol/L	Chromium	10	0.96 [37]	0.93, 1.01	1.02	0.98, 1.06	+0.06	ND	NS	+0.01	ND	NS**
		Control	10			1.01	0.97, 1.05	+0.05	ND	NS			
LDL	mmol/L	Chromium	10	4.17 [161]	4.00, 4.34	4.13	4.00, 4.26	-0.04	ND	NS	-0.25	ND	NS**
		Control	10			4.38	4.22, 4.54	+0.21	ND	NS			
Triglycerides	mmol/L	Chromium	10	2.34 [207]	2.05, 2.63	2.49	2.17, 2.81	+0.15	ND	NS	+0.22	ND	NS**
		Control	10			2.27	1.98, 2.56	-0.07	ND	NS			

* mg/dL in brackets

** Implied

Vinson, 1984

CAB Accession Number: 851467948

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 23 Control enrolled: 0 Age, Cr: 17-63 yr	Design: Prospective single cohort Duration: 6 mo Wash out period for other supplements / medication: ND	Population: 1. Healthy 2. Diabetics	BMI: ND Waist circ: ND Waist /hip ratio: ND TG: ND HDL: ND BP: ND FBS: ND 2h OGTT: ND	Inclusion: ND	Cr type: Brewer's yeast Brand name: Grow Company (Hackensack, NJ) Dose: 218 µg (100 mg yeast)	NA	Not specified whether SE or SD is reported
% Male, Cr: ND							
Treatment duration: 6 mo Country: US Sites: 1	Wash out between cross-over segments: N/A	Quality: C	UAER: ND Others: ND	Exclusion: ND	Compliance: ND		

Vinson, 1984

CAB Accession Number: 851467948

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: Insulin, other not specified	DM	Glucose / Glucose Metabolism	Glycosylated Hgb	Normal range: 5.5-9.0%*
Hypertension Drugs: ND		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol Triglycerides LDL HDL Total cholesterol /HDL	
		Type 2 Diabetes		
Dyslipidemia Drugs: ND		Retinopathy		
Other: ND	Kidney Disease			
	Other			

* per www.mdadvice.com/library/test/medtest204.html

Vinson, 1984

CAB Accession Number: 851467948

Reported Results

Normal Subjects

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Glycosylated Hgb **	%	Chromium	6	7.5	ND	6.6	ND	-0.9	ND	NS	--		
		Control	0										

Hyperglycemic Subjects (Apparently Type 2 DM)

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Total cholesterol **	mg/dL	Chromium	5	224	ND	186	ND	-38	ND	NS	--		
		Control	0										
HDL **	mg/dL	Chromium	5	50	ND	67	ND	+17	ND	<0.01	--		
		Control	0										
LDL *	mg/dL	Chromium	5	151	ND	104	ND	-47	ND	<0.1	--		
		Control	0										
Total cholesterol /HDL*		Chromium	5	4.6	ND	2.8	ND	-39%	ND	<0.01	--		
		Control	0										

Insulin-Dependent Diabetics (Type 2 DM Implied)

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
HDL **	mg/dL	Chromium	7	52	ND	59	ND	+7	ND	NS	--		
		Control	0										
LDL **	mg/dL	Chromium	7	163	ND	172	ND	+9	ND	NS	--		
		Control	0										
Total cholesterol /HDL **		Chromium	7	5.2	ND	4.9	ND	-6%	ND	NS	--		
		Control	0										

Non-Insulin-Dependent Diabetics (on Oral Medication)

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
HDL *	mg/dL	Chromium	5	47	ND	48	ND	+1	ND	NS	--		
		Control	0										
LDL *	mg/dL	Chromium	5	152	ND	148	ND	-4	ND	NS	--		
		Control	0										
Total cholesterol /HDL *		Chromium	5	6.1	ND	6.4	ND	+5%	ND	NS	--		
		Control	0										

* At 4 months

** At 6 months

Volpe, 2001

UI: 11506057

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 22	Design: Randomized controlled trial	Population: Healthy	BMI: 32.9 (31.6-34.1)	Inclusion criteria: Healthy, obese, premenopausal women	Cr type: Cr picolinate	Placebo	
Control enrolled: 22	Double-blind		Waist circ: 97.4 (94.4-100.4)				
Age, Cr: 42.6 ± 6.5 SD yr	Duration: 12 wk		Waist /hip ratio: 0.8 (0.8-0.8)				
			Tg: 112.6 (94.6-130.5)				
Age, control: 42.5 ± 4.2 SD yr	Wash out period for other supplements / medication: ND		HDL: 44.4 (44.1-44.6)				
% Male, Cr: 0			BP: ND				
		FBS: 91.3 (87-95.6)			Brand name: Nutrition 21		
% Male, control: 0		2h OGTT: 87.5 (84-91)					
Treatment duration: 12 wk	Wash out between cross-over segments: NA	Quality: B	UAER: ND	Exclusion criteria: ND	Compliance: patient information		
Country: USA			Others: ND				
Sites:2							
					Dose: 400 µg		
					No subject reported forgetting to take the capsules for > 5 days		

Volpe, 2001

UI: 11506057

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	Obesity	Glucose / Glucose Metabolism	Fasting glucose Fasting insulin Fasting glucagon Fasting C-peptide 2h OGTT glucose 2h OGTT insulin 2h OGTT glucagon 2h OGTT C-peptide	OGTT: after meal with 74 g mixed carbohydrates (300 calories)
		Cardiovascular Disease		
		Cardiovascular Disease Risk Factors	Total cholesterol LDL HDL Triglycerides	
		Type 2 Diabetes		
		Retinopathy		
		Kidney Disease		
Hypertension Drugs: ND				
Dyslipidemia Drugs: ND				
Other: ND		Other		

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mg/dL	Chromium	21	91	86, 97	90	77, 103	-1	ND	NS	-2	ND	NS
		Control	21	91	84, 98	92	88, 95	+1	ND	NS			
Glucose (2h-OGTT)	mg/dL	Chromium	21	88	82, 94	87	80, 93	-1	ND	NS	+1	ND	NS
		Control	21	87	84, 91	86	82, 89	-2	ND	NS			

Wang, 1989

CAB Accession Number: 891416857

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 20 Control enrolled: 10	Design: Non-randomized controlled trial Subjects blinded	Population: Healthy	BMI: ND Waist circ: ND	Inclusion: University faculty and staff who volunteered for a campus-wide glucose and cholesterol screening, with 1-hr postprandial serum total cholesterol > 200 mg/dL.	Cr type: Cr chloride Brewer's yeast	Lactose capsule	How recruited subjects were assigned to the groups was not described.
Age, total: 52±10 SD (31-66) yr	Duration: 12 wk	Waist /hip ratio: ND Tg: 127.3 (47-298) mg/dL	Brand name: CrCl ₃ : Fisher Scientific Co., Fair Lawn, NJ; Yeast: Natural Sales Co., Pittsburgh, PA				
% Male, total: 60%	Wash out period for other supplements / medication: ND	HDL: 47 mg/dL BP: ND FBS: 82 to 110 mg/dL 2h OGTT: ND	Dose: CrCl ₃ = 50 µg Yeast = 15 µg (9 g yeast)				
Treatment duration: 12 wk Country: US Sites: 1	Wash out between cross-over segments: N/A	Quality: C UAER: ND Others: 1-hr postprandial glucose of 75-123 mg/dL	Compliance: supplement compliance check-lists It is reported that subjects closely adhered to instructions				

Wang, 1989

CAB Accession Number: 891416857

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: None	None (apparently healthy)	Glucose / Glucose Metabolism	Fasting glucose Fasting insulin Fasting insulin/glucose ratio	
		Cardiovascular Disease		
Hypertension Drugs: None		Cardiovascular Disease Risk Factors	Total cholesterol HDL LDL Triglycerides	
		Type 2 Diabetes		
Dyslipidemia Drugs: None		Retinopathy		
		Kidney Disease		
Other: None	Other			

Reported Results

Outcome	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting glucose	mg/dL	CrCl ₃	10	94	88, 100	92	88, 96	-2	ND	NS	-4	ND	NS
		Brewers Yeast	10	94	90, 98	90	86, 94	-4	ND	NS	-6	ND	NS
		Control	10	88	84, 92	90	84, 96	+2	ND	NS			
Fasting insulin/glucose ratio		CrCl ₃	10	0.13	0.11, 0.15	0.13	0.11, 0.15	0	ND	NS	-20%	ND	NS
		Brewers Yeast	10	0.16	0.08, 0.24	0.16	0.10, 0.22	0	ND	NS	-20%	ND	NS
		Control	10	0.15	0.13, 0.17	0.18	0.14, 0.22	20%	ND	NS			

Wilson, 1995

UI: 8529496

Design and Baseline Data

Study Characteristics	Study design Follow-up Duration Wash out	Population Quality	Insulin Resistance Criteria (Baseline Mean)	Eligibility Criteria	Chromium Intervention	Control	Comments
Cr enrolled: 15 Control enrolled: 11 Age, Cr: 36.7 ± 1.82 SE yr	Design: Randomized controlled trial Double-blind Duration: 90 d	Population: Healthy Sub-analysis of Insulin Resistance	BMI: 36.2 (35.5-36.0) Waist circ: ND Waist /hip ratio: 0.81 0.81-0.82 Tg: 80 (62-106)	Inclusion: Obese adults in good health	Cr type: Cr nicotinate Brand name: Nutrition 21	Placebo	Sub-analysis of individuals within Cr supplementation group with initial fasting insulin >35 pmol/L is included
Age, control: 35.5 ± 1.89 SE yr % Male, Cr: 50 % Male, control: 54	Wash out period for other supplements / medication: ND		HDL: 58 (50-62) BP: ND FBS: 90 (88-94) 2h OGTT: ND	Exclusion: CKD, chronic liver, pulmonary or cardiac disease, obesity, known history of DM, HTN, or resting BP>90 mmHg, Treatment of HTN or hyperlipidemia, recent weight loss or gain (> 10 pounds), competitive athletes, dancers or gymnasts	Dose: 220 µg		
Treatment duration: 90 d Country: USA Sites: 1	Wash out between cross-over segments: NA	Quality: B (C for sub-analysis)	UAER: ND Others: ND		Compliance: Capsule counting All consumed >95% caps		

Wilson, 1995

UI: 8529496

Concomitant Treatments, Co-morbidities, Major Outcomes Studied

Concomitant Treatments	Co-morbidities	Major Outcomes	Outcome Metric	Method of Measurement
Hypoglycemic Agents: ND	None reported	Glucose / Glucose Metabolism	Fasting Glucose Fasting Insulin	
		Cardiovascular Disease		
Hypertension Drugs: None		Cardiovascular Disease Risk Factors	Total cholesterol LDL HDL Triglycerides Cholesterol /HDL	
		Type 2 Diabetes		
Dyslipidemia Drugs: None		Retinopathy		
	Kidney Disease			
Other: ND		Other		

Wilson, 1995

UI: 8529496

Reported Results

All Subjects

Outcome	Unit	Cohort	N	Base*		Final		Change**			Net Change		
				Value	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mmol/L	Chromium	15	5.0 [90]	4.1, 5.8	ND	ND	-3.5%	ND	ND	-2.1%	ND	NS
		Control	11	5.1 [92]	4.2, 6	ND	ND	-1.4%	ND	ND			

* mg/dL in brackets

** Change corresponds to mean percentage change

Individuals within Cr supplementation group with initial fasting insulin >35 pmol/L

Outcome*	Unit	Cohort	N	Base		Final		Change			Net Change		
				Value*	95% CI	Value	95% CI	Value	95% CI	P W/in	Value	95% CI	P Btw
Fasting Glucose	mmol/L	Chromium	6	4.9 [88]	4.1, 5.8	4.8	4.1, 5.4	-0.1	ND	NS			
		Control	0										
Total cholesterol	mmol/L	Chromium	6	4.9 [189]	3.7, 6.0	5.4	4.2, 6.5	+0.5	ND	NS			
		Control	0										
Triglycerides	mmol/L	Chromium	6	0.8 [71]	0.4, 1.3	1.2	0.3, 2.0	+0.4	ND	NS			
		Control	0										
HDL	mmol/L	Chromium	6	1.5 [58]	0.4, 2.6	1.4	0.2, 2.6	-0.1	ND	NS			
		Control	0										
LDL	mmol/L	Chromium	6	2.9 [112]	1.5, 4.4	3.5	1.5, 4.9	+0.6	ND	NS			
		Control	0										
Cholesterol/HDL		Chromium	6	3.6	2.8, 4.5	4.7	2.8, 6.5	+31%	ND	NS			
		Control	0										

* mg/dL in brackets