

Soy improves cardiovascular and metabolic risk factors

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THE PROBLEM

ATHEROGENIC DYSLIPIDEMIA AND METABOLIC SYNDROME

- **altered circulating lipid profile**
- **increased cardiovascular risk**
- **risk biomarkers (lipids, glucometabolic, etc.)**

associated with other cardiovascular/metabolic features:

- increased visceral adiposity
- insulin resistance / type 2 diabetes mellitus
- arterial hypertension

***Metabolic syndrome (25-45% adult population) >
greater cardiovascular and metabolic morbidity and mortality >***

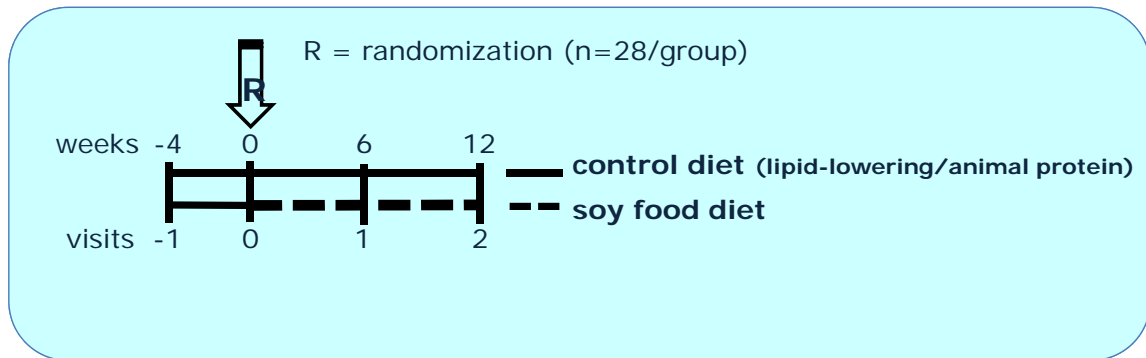
> ??? PLANT FOODS ???

SOY IMPROVES CARDIO-METABOLIC RISK FACTORS

AIM: to assess the cardio-metabolic benefits of a dietary plan containing soy foods (3/4 portions per day) corresponding to 30 g/day soy protein

STUDY DESIGN: randomized, parallel, single-centre

INTERVENTION DURATION: 12 weeks



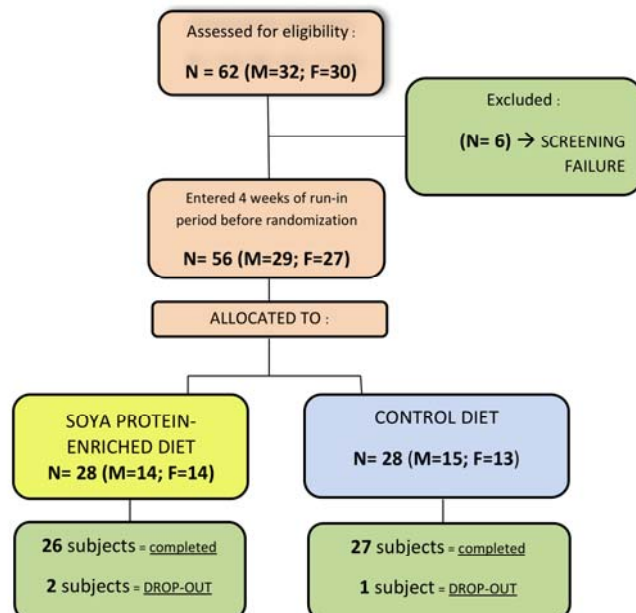
Ruscica et al., Eur J Nutr, 2016

STUDY SUBJECTS

INCLUSION CRITERIA

- males and postmenopausal females (50/50%)
- age: 30 (M)/45 (F) to 75 y
- BMI: 25-32 kg/m²
- LDL-C: 130-190 mg/dL

fulfilling at least 3 of the ATPIII criteria for the metabolic syndrome (2005)



Ruscica et al., Eur J Nutr, 2016

THE STUDY POPULATION

parameter	value	p-value
No. of participants (men/women)	53 (28/25)	-
Age, years	58.9 (55.5, 66.3)	0.89
Weight (kg)	76.0 (69, 81)	0.51
BMI (kg/m ²)	27.8 (25.8, 29.6)	0.31
WC _{TAPE} (cm)	97.0 (93.5, 103.5)	0.26
HC _{TAPE} (cm)	99.0 (94, 102)	0.56
Leptin (ng/mL)	14.2 (6.8, 22.4)	0.31
Adiponectin (µg/mL)	5.9 (4.4, 9.7)	0.68
TC (mg/dL)	254.2 (227.5, 274.6)	0.42
LDL-C (mg/dL)	168.0 (141.8, 186.5)	0.57
HDL-C (mg/dL)	45.6 (38.5, 50.5)	0.52
non-HDL-C (mg/dL)	208.1 (186.1, 231.2)	0.36
Lp(a) (mg/dL)	16.0 (6.0, 25.0)	0.61
TG (mg/dL)	193.0 (143.3, 240.4)	0.37
apoB (mg/dL)	155.0 (141.5, 172)	0.11

- NO DIFFERENCES BETWEEN TREATMENT GROUPS
- 3 or 4 MetS criteria

BMI 27.8 kg/m²

Total cholesterol **254.2** mg/dL
 LDL cholesterol **168** mg/dL
 HDL cholesterol **45.6** mg/dL
 Non HDL cholest. **208.1** mg/dL
 Triglycerides **193** mg/dL

Values are median (interquartile range, Q1 and Q3).

P-values: Wilcoxon-rank sum test and represent differences between median values at baseline between the two arms.

Ruscica et al., Eur J Nutr, 2016

EFFECTS OF SOY NUTRITIONAL INTERVENTION

13/26 (50%) subjects > reduced number of MetS features

	Soy group		Control group		p value
	basal	12 weeks	basal	12 weeks	
WEIGHT (kg)	77.5 (70,81)	75.5 (70,80)	75 (68,81)	76 (66,82)	0.005
BMI (kg/m ²)	28.2 (26.4,29.8)	27.2 (25.8,29.2)	27.3 (25.4,29.4)	27.1 (25.7, 29)	0.05

In the soy group:

- **significant reduction: body weight (-2.6%) and BMI (-3.5%)**
- **no changes:** waist circumference, abdominal adipose tissue and adipokines (leptin, adiponectin), glucose metabolism (FPG, HOMA) and inflammation parameters

Values are median (interquartile range, Q1 and Q3)

P-values: Wilcoxon-rank sum test, differences between median values at baseline between the two arms

Ruscica et al., Eur J Nutr, 2016

EFFECTS OF SOY NUTRITIONAL INTERVENTION

	Soy group		Control group		p value
	Basal	12 weeks	Basal	12 weeks	
Total Chol	256 (232,276)	237 (221,252)	252 (221,272)	250 (234,271)	0.002
LDL-Chol	169.4 (140,189)	154.7 (139,173)	164 (144,182)	171 (148,190)	0.01
HDL-Chol	44 (40,47)	44 (38,49)	47 (38,52)	46 (40,51)	0.26
Non-HDL Chol	213 (186,234)	187 (177,212)	208 (185,219)	199 (189,230)	0.007
ApoB	160 (148,185)	139 (127,153)	155 (127,165)	139 (133,165)	0.019
Triglycerides	207 (162,244)	170 (120,233)	190 (121,237)	146 (124,213)	0.94

In the soy group:

- **reduction: total C (-7.4%), LDL-C (-8.7%), non-HDL-C (-12.2%), ApoB (-14.8%)**
- **no changes: HDL-C**
- triglycerides: reduced in both groups

Values are median (interquartile range, Q1 and Q3)

P-values: Wilcoxon-rank sum test, differences between median values at baseline between the two arms

Ruscica et al., Eur J Nutr, 2016

EFFECTS OF SOY NUTRITIONAL INTERVENTION**Factor analysis**

3 factors explained 52% total variance:

- **Factor 1 (lipid+adipose): most influential (=22% variance)**
- Factor 2 (glucose metabolism)
- Factor 3 (waist-hip circumferences)

Figure see paper: Ruscica et al., Eur J Nutr, 2016

SAFETY AND COMPLIANCE OF SOY NUTRITIONAL INTERVENTION

SAFETY

- *no adverse effects recorded*
- *no changes of liver/kidney/thyroid function during the 3-month intervention*

COMPLIANCE

- *subjects were instructed to use soy foods*
- *soy foods were well accepted*
- *only 2 drop-out cases*

Ruscica et al., Eur J Nutr, 2016

SOY NUTRITIONAL INTERVENTION REDUCED CARDIO-METABOLIC RISK FACTORS

Soy-enriched diet with soy foods corresponding to 30 g/day soy protein:

- 1. reduced the number of Metabolic Syndrome features in 13/26 (50%) subjects**
- 2. reduced body weight and BMI**
- 3. improved the atherogenic lipid profile by reducing:**
 - **total cholesterol**
 - **LDL-cholesterol**
 - **non-HDL-cholesterol**
 - **apolipoprotein B**



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LE JOUR
POUR L'ALIMENTAIRE LA 1993



ORIGINAL CONTRIBUTION

Effect of soy on metabolic syndrome and cardiovascular risk factors: a randomized controlled trial

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Thank you !

