Corso di 2° livello per l'organizzazione e la gestione di un ambulatorio degli stili di vita

STILE DI VITA: ATTIVITÀ MOTORIA, ALIMENTAZIONE, INTERVENTI DIETETICO NUTRIZIONALI

Modelli alimentari

Franca Marangoni

Nutrition Foundation of Italy

3° modulo

08 / 09 novembre - 2014

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MILANO 2015
1 MAGGIO • 31 OTTOBRE
NUTRIRE IL PIANETA
ENERGIA PER LA VITA

L'alimentazione per migliori stili di vita

- L'Expo riconosce il ruolo fondamentale giocato dall'alimentazione sulla qualità della vita, intesa non solo come benessere psico-fisico dell'uomo, ma anche come occasione di socializzazione. Sarà anche oggetto di valutazione la stretta interrelazione fra alimentazione e pratica sportiva, in particolare tenendo conto della diffusione di stili di vita sedentari nelle società sviluppate…
- Le linee di sviluppo di questo sottotema saranno articolate su: il ruolo dell'alimentazione in relazione all'armonia della persona e del rapporto con il proprio corpo e con gli altri; le abitudini di consumo alimentare, le innovazioni e le nuove tendenze, come momento di integrazione e di condivisione soprattutto in ambito familiare; la valorizzazione di comportamenti alimentari corretti rispetto alla pratica sportiva…;

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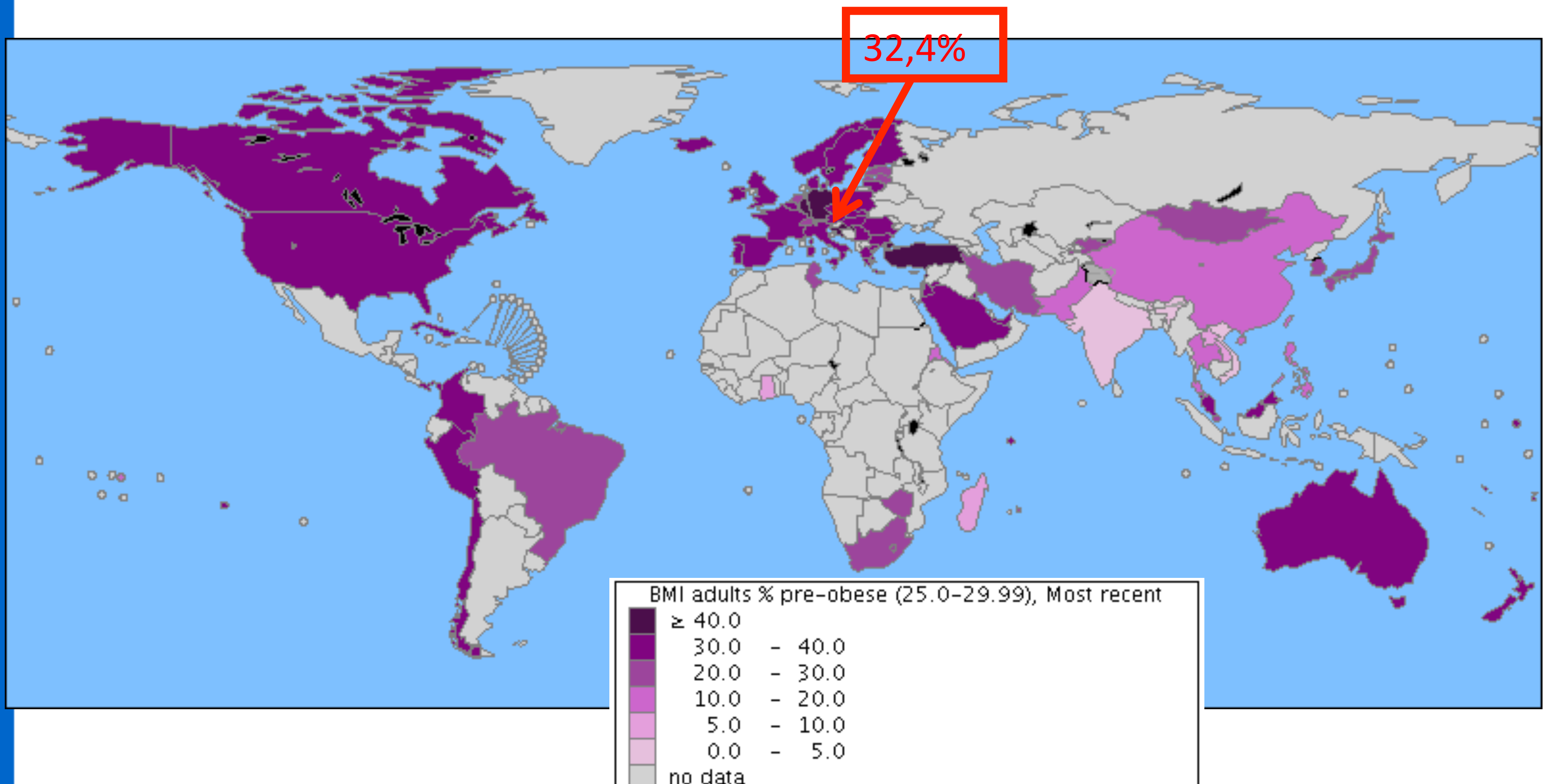
BMI adults % pre-obese (25.0-29.99)



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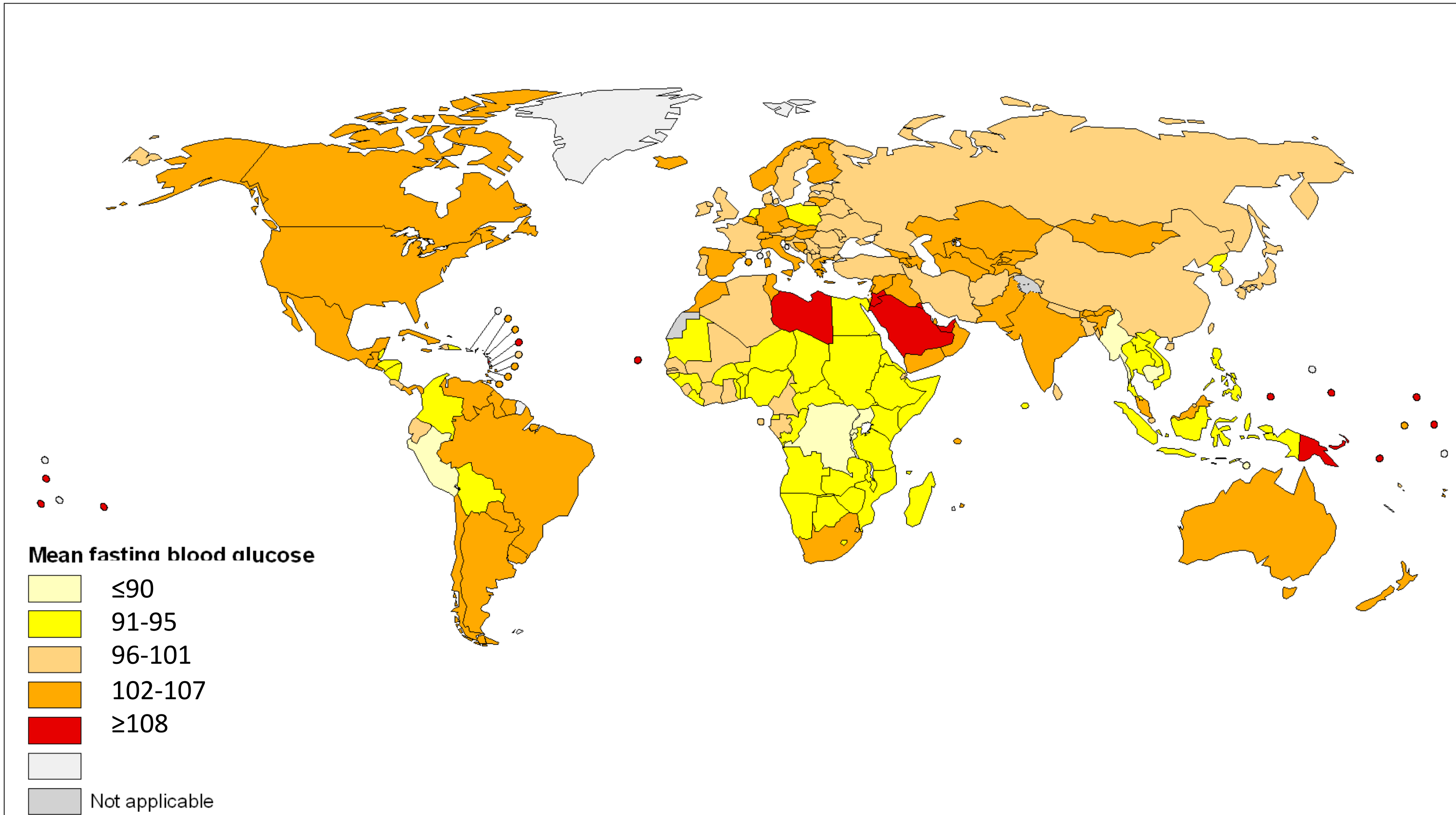
Mean fasting blood glucose (mmmol/L), ages 25+, age standardized
Males, 2008



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

World Health Organization

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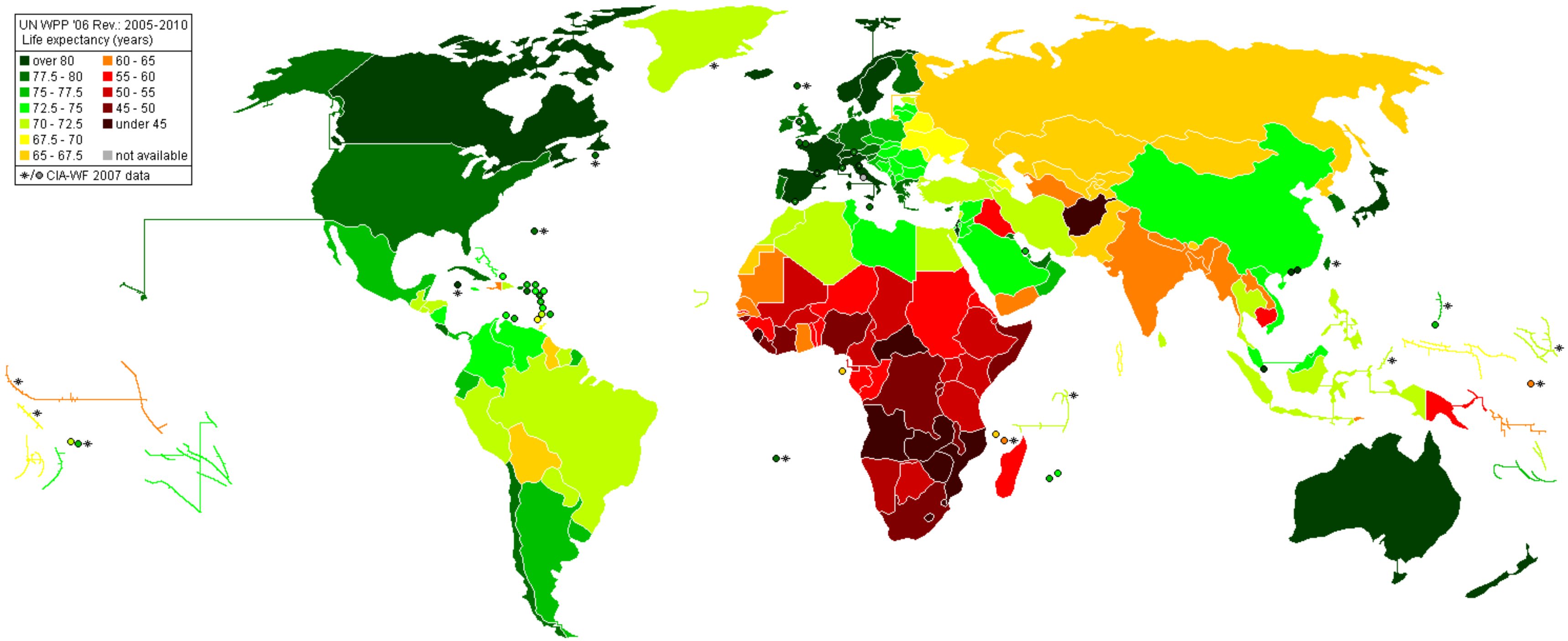
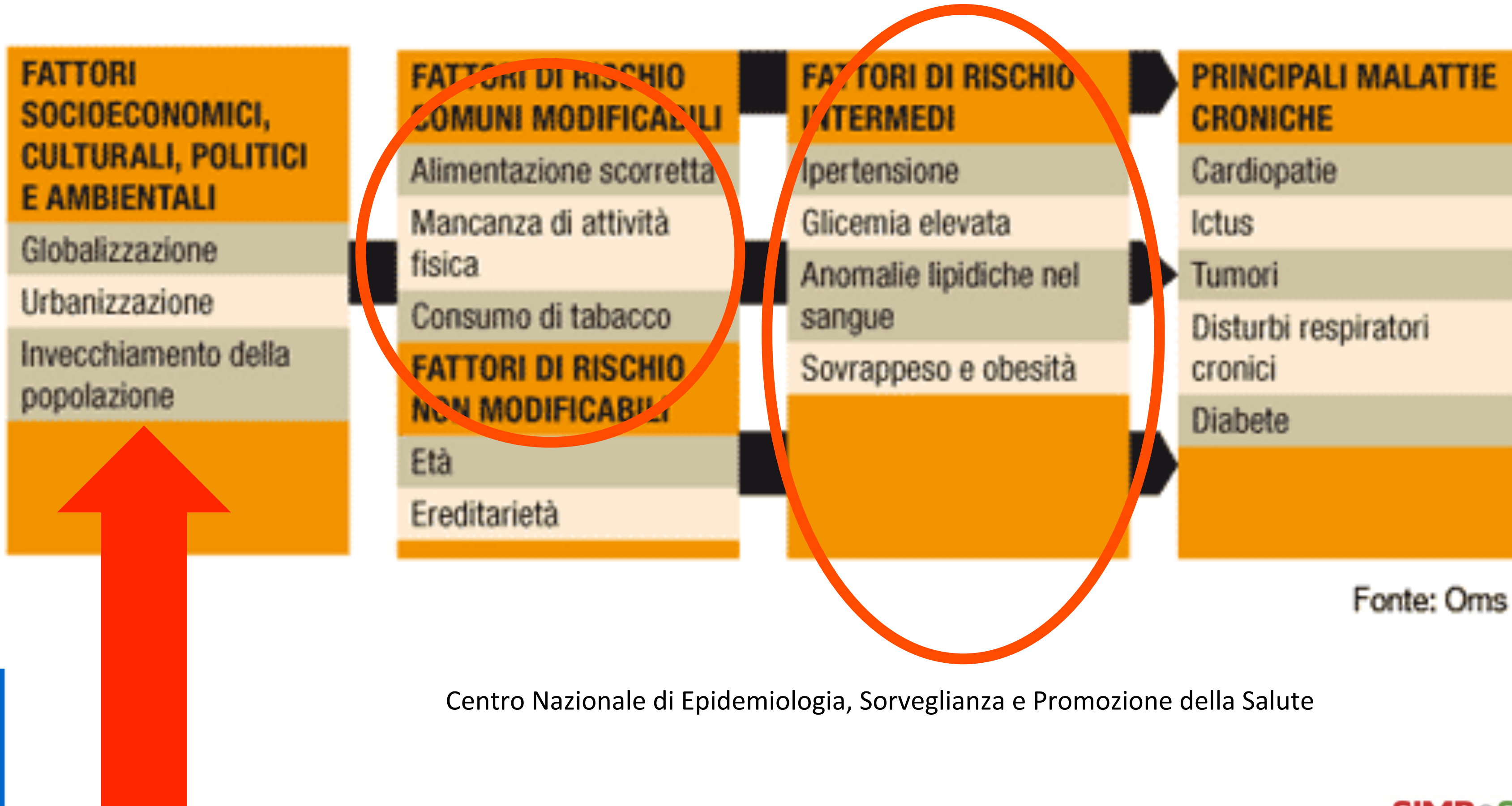
Life expectancy world map



Cause delle malattie croniche



Centro Nazionale di Epidemiologia, Sorveglianza e Promozione della Salute

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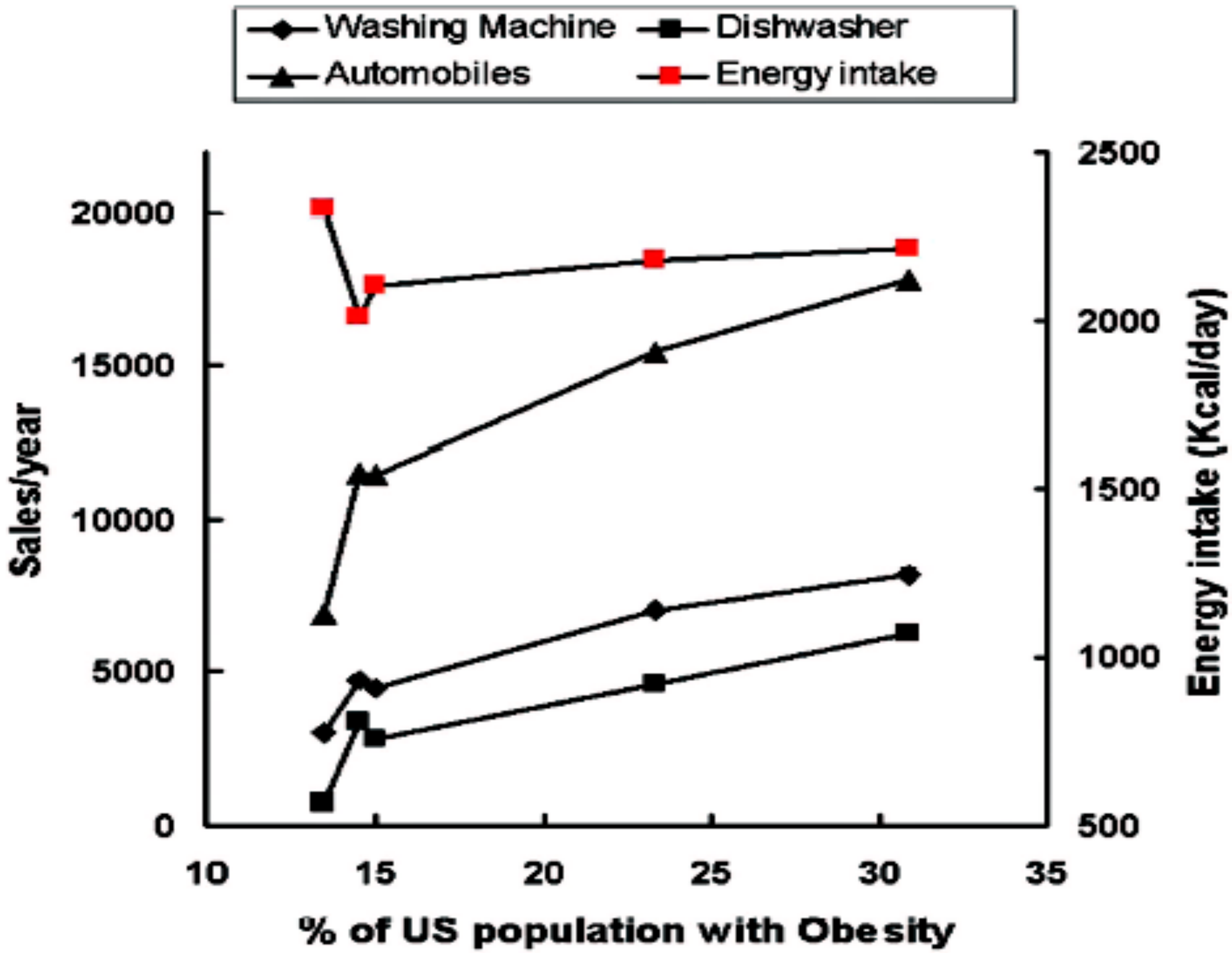
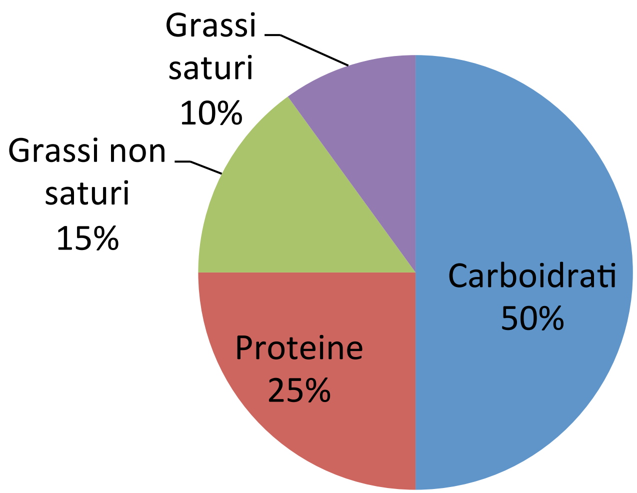
Energy intake from the NHANES data and sales of domestic machines versus obesity rates in the US.



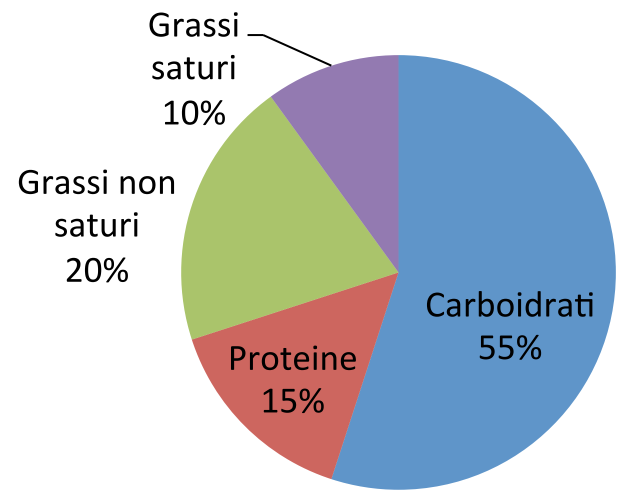
Ripartizione dei nutrienti

- **Proteine** 15 - 20 % dell'apporto energetico totale
- **Lipidi** <30 % del totale
  - ✓ Saturi <10 %
  - ✓ Monoinsaturi 10 %
  - ✓ Polinsaturi 10 %
  - ✓ Colesterolo 100 mg/1000 kcal
- **Carboidrati** 55-60 % del totale
- **Fibre** 20 g / 1000 kcal
- **Sodio** < 6 g/die
- **Acqua** >2 litri/die

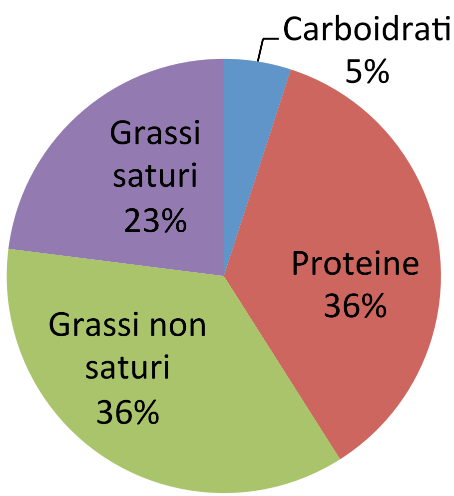
MinSal 2013+LARN 2012



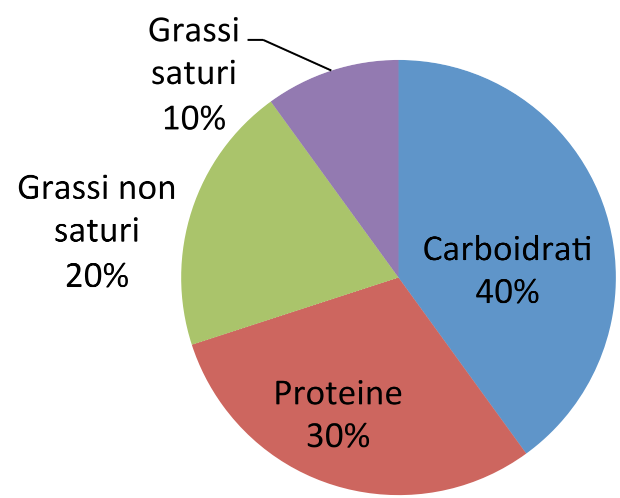
American Heart Association



Atkins



Zona



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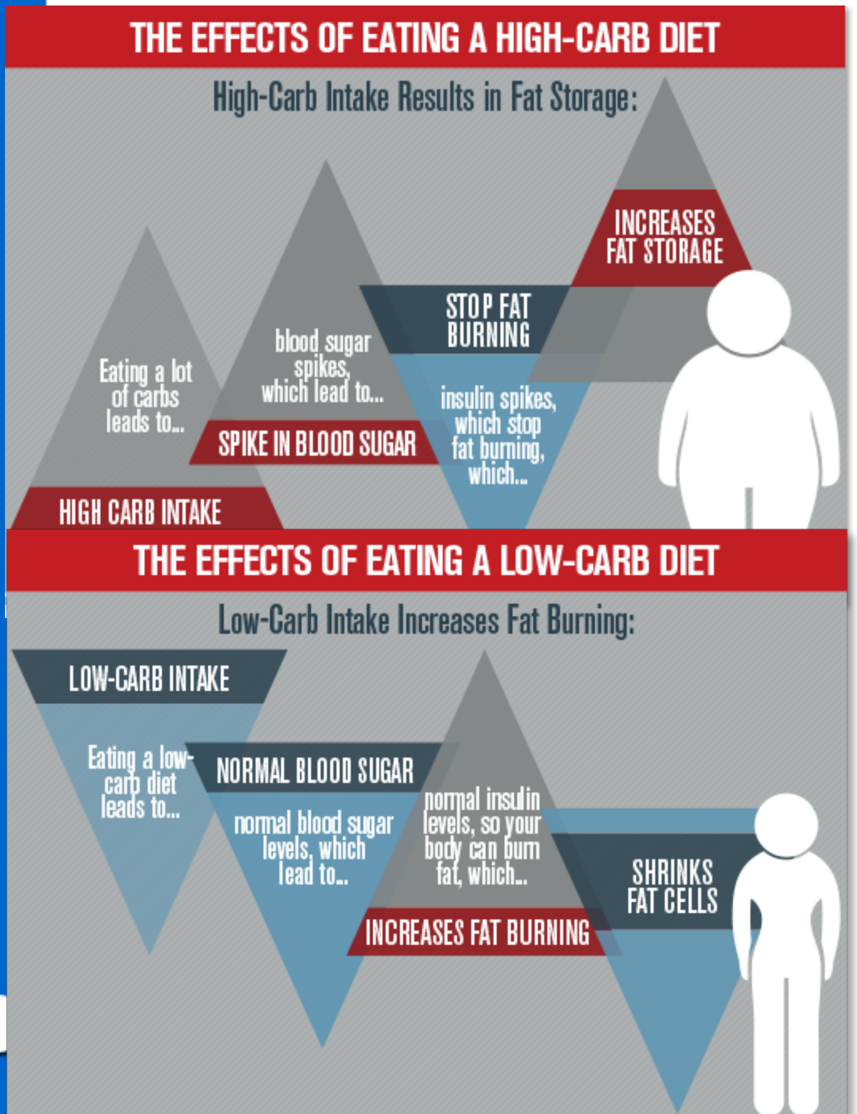
The Atkins diet



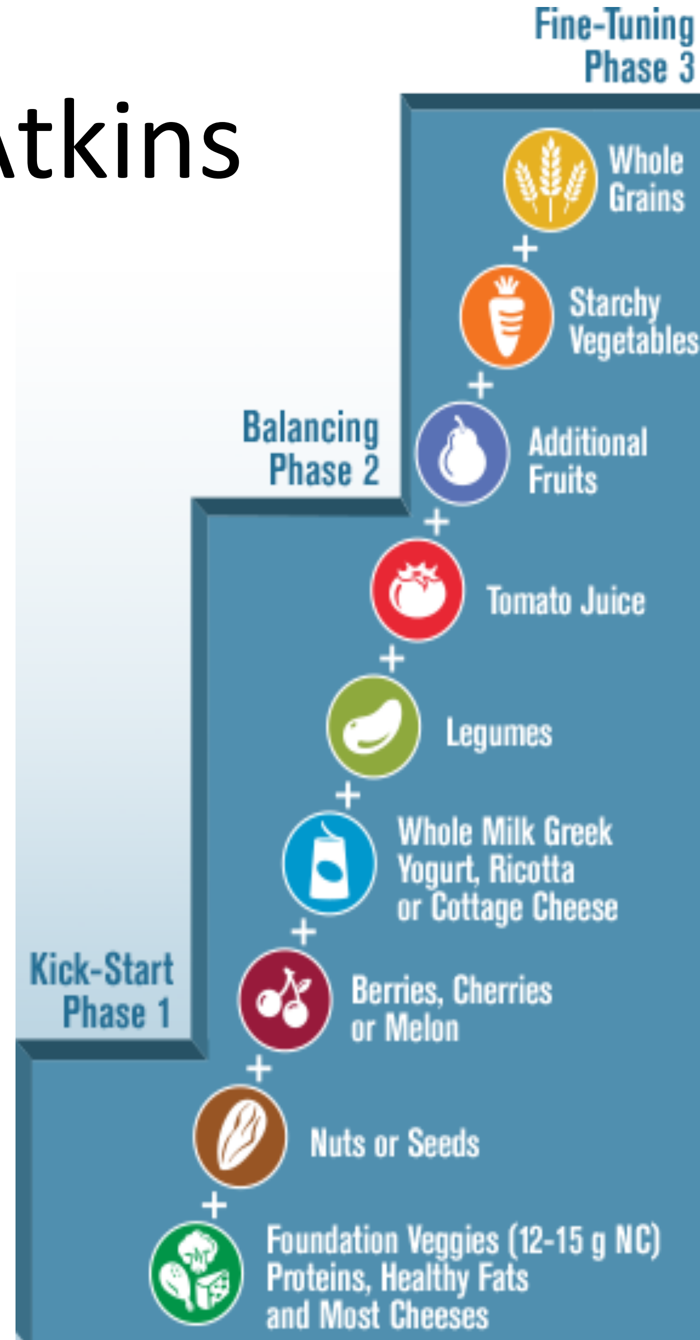
La dieta Atkins

Pro

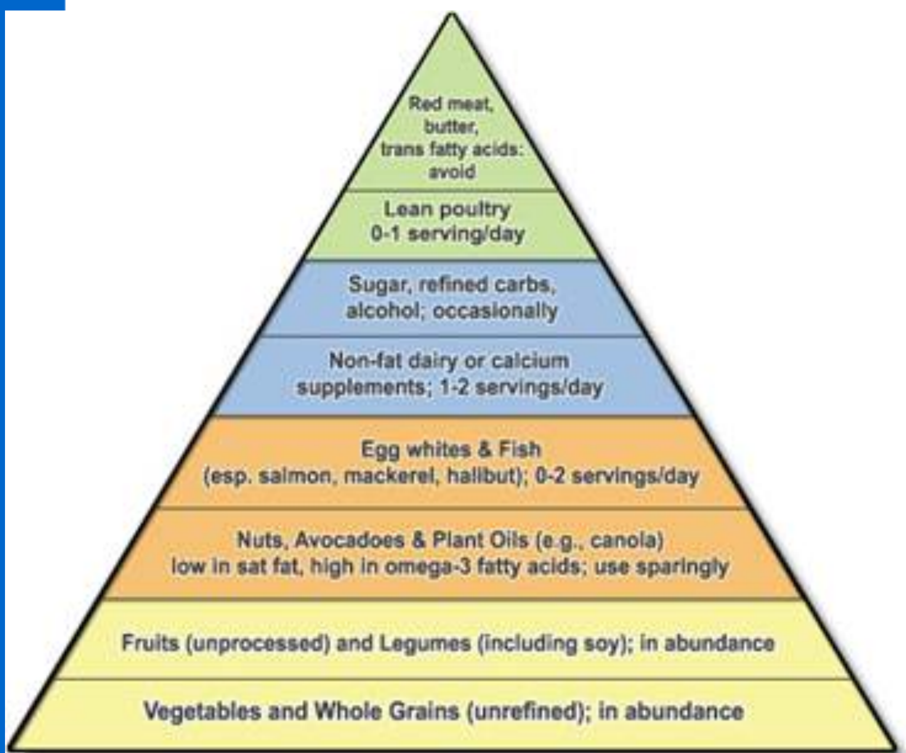
- Saziante
- Organizzata

Contro

- Potenzialmente associata all'aumento del rischio cardiovascolare (grassi e proteine animali)
- Restrittiva
- Difficile da sostenere nel tempo
- Lontana dalle linee guida nutrizionali
- Sconsigliata a pazienti con calcolosi renale, gestanti, mamme che allattano
- Effetti collaterali: cefalea, stipsi, debolezza, …



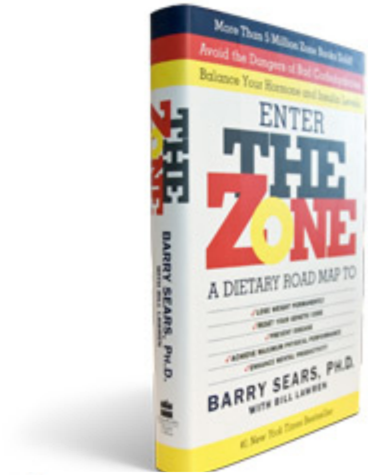
La dieta Ornish

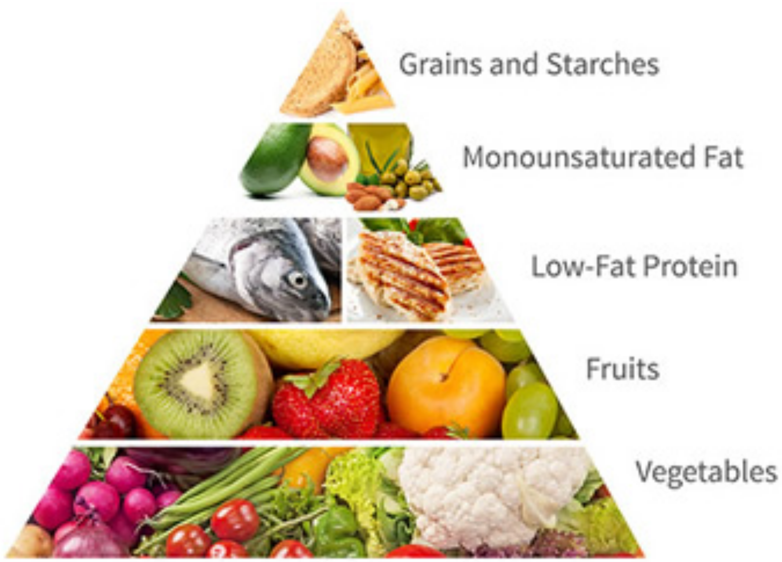


- E' una dieta vegetariana
- E' iperglucidica (70%En da carboidrati, non semplici) e ipolipidica (10% En)
- Non implica restrizione calorica
- Ha un rapporto alimenti:calorie più elevato rispetto ad altre diete
- Viene associata ad attività fisica regolare e alla riduzione dello stress
- E' molto restrittiva
- Non è indicata per alcune condizioni particolari (età pediatrica, gravidanza, allattamento, anziano)

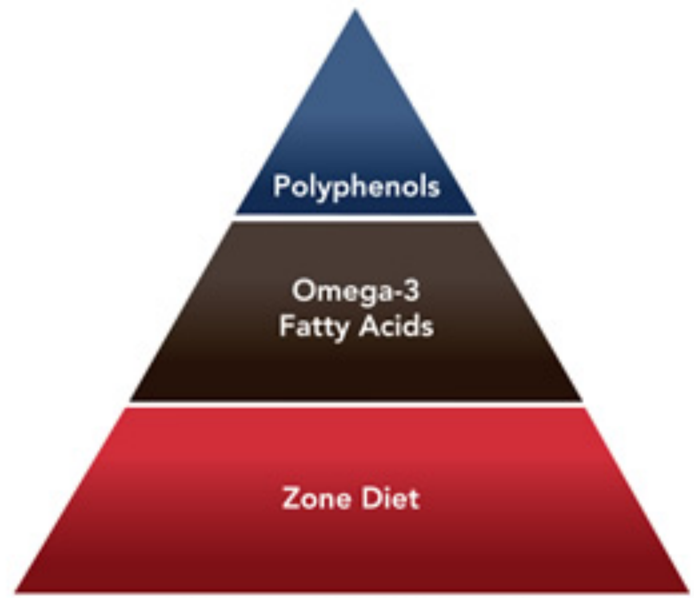
Dr. Sears ZONE Labs®

Leading Anti-Inflammatory Nutrition Since 1995





Zone Food Pyramid



Inflammatory Genes

Weight Watchers

- Successful lifetime member (successful program completer)
- Low-calorie, exchange diet; clients prepare own meals
- "Get Moving" booklet distributed
- Behavioral weight control methods
- Group sessions, weekly meetings

Ahern et al. BMC Public Health 2011, 11:434
http://www.biomedcentral.com/1471-2458/11/434

BMC Public Health

RESEARCH ARTICLE Open Access

Weight Watchers on prescription: An observational study of weight change among adults referred to Weight Watchers by the NHS

Amy L Ahern†, Ashley D Olson†, Louise M Aston† and Susan A Jebb*†

Method:

Data was obtained from the WW NHS Referral Scheme database for 29,326 referral courses started after 2nd April 2007 and ending before 6th October 2009 [90% female; median age 49 years (IQR 38 - 61 years); median BMI 35.1 kg/m2 (IQR 31.8 - 39.5 kg/m2 .

Participants received vouchers (funded by the PCT following referral by a healthcare professional) to attend 12 WW meetings. Body weight was measured at WW meetings and relayed to the central database.

Results:

Median weight change for all referrals was -2.8 kg [IQR -5.9 - -0.7 kg] representing -3.1% initial weight.

33% of all courses resulted in loss of ≥5% initial weight. 54% of courses were completed. Median weight change for those completing a first course was -5.4 kg [IQR -7.8 - -3.1 kg] or -5.6% of initial weight.

57% lost ≥5% initial weight.

Conclusions: A third of all patients who were referred to WW through the WW NHS Referral Scheme and started a 12 session course achieved ≥5% weight loss, which is usually associated with clinical benefits.

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Comparison of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction: A Randomized Trial

Michael L. Dansinger; Joi Augustin Gleason; John L. Griffith; et al.

JAMA. 2005;293(1):43-53 (doi:10.1001/jama.293.1.43)

Objective

To assess adherence rates and the effectiveness of 4 popular diets (Atkins, Zone, Weight Watchers, and Ornish) for weight loss and cardiac risk factor reduction.

Design, Setting, and Participants

A single-center randomized trial at an academicmedical center in Boston, Mass, of overweight or obese (body mass index: mean, 35; range, 27-42) adults aged 22 to 72 years with known hypertension, dyslipidemia, or fasting hyperglycemia. Participants were enrolled starting July 18, 2000, and randomized to 4 popular diet groups until January 24, 2002.

Intervention

A total of 160 participants were randomly assigned to either Atkins (carbohydrate restriction, n=40), Zone (macronutrient balance, n=40), Weight Watchers (calorie restriction, n=40), or Ornish (fat restriction, n=40) diet groups. After 2 months of maximum effort, participants selected their own levels of dietary adherence.

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Variable	Diet Group, Mean Change (SD) Atkins (n = 40)	Zone (n = 40)	Weight Watchers (n = 40)	Ornish (n = 40)
Weight, kg				
2 mo	–4.7 (2.9)†	–4.6 (3.4)†	–4.2 (3.8)†	–5.0 (3.0)†
6 mo	–5.8 (5.3)†	–5.2 (6.4)†	–4.7 (6.1)†	–6.7 (8.0)†
12 mo	–3.9 (6.0)†	–4.9 (6.9)†	–4.6 (5.4)†	–6.6 (9.3)†
BMI				
2 mo	–1.6 (1.0)†	–1.6 (1.2)†	–1.5 (1.3)†	–1.7 (1.0)†
6 mo	–2.0 (1.9)†	–1.7 (2.2)†	–1.7 (2.1)†	–2.4 (2.7)†
12 mo	–1.4 (2.1)†	–1.6 (2.3)†	–1.7 (1.9)†	–2.3 (3.2)†
Waist circumference, cm				
2 mo	–4.3 (2.9)†	–3.6 (3.5)†	–4.2 (4.3)†	–3.7 (3.2)†
6 mo	–5.9 (5.3)†	–4.4 (6.0)†	–4.7 (6.4)†	–4.8 (6.5)†
12 mo	–4.7 (5.4)†	–4.5 (6.0)†	–5.0 (6.0)†	–4.3 (7.2)‡
Total cholesterol, mg/dL				
2 mo	–2.3 (27)	–22.3 (26)†	–17.9 (29)†	–26.2 (30)†
6 mo	–1.6 (24)	–9.6 (23)‡	–10.8 (24)‡	–21.6 (33)†
12 mo	–8.1 (31)	–15.6 (43)	–12.6 (28)‡	–21.5 (26)†
LDL cholesterol, mg/dL				
2 mo	1.6 (20)	–11.7 (29)‡	–14.7 (27)†	–22.7 (27)†
6 mo	–4.9 (18)	–10.3 (26)	–9.4 (27)	–20.0 (28)†
12 mo	–13.5 (32)	–18.1 (41)‡	–14.2 (32)‡	–25.2 (20)†
HDL cholesterol, mg/dL				
2 mo	4.2 (6.7)†	2.2 (8.4)	–0.3 (13.0)	–4.9 (8.2)†
6 mo	7.0 (7.4)†	5.5 (12.7)‡	3.2 (10.3)	–2.8 (9.6)
12 mo	6.4 (8.8)†	5.1 (12.5)‡	5.2 (12.0)‡	–1.1 (9.3)
Total/HDL cholesterol ratio				
2 mo	–0.47 (0.71)†	–0.80 (1.12)†	–0.60 (2.03)	–0.24 (1.19)
6 mo	–0.70 (0.80)†	–0.71 (1.08)†	–0.80 (1.79)‡	–0.48 (1.46)
12 mo	–0.75 (0.81)†	–0.79 (1.21)†	–1.07 (1.98)‡	–0.59 (1.30)
LDL/HDL cholesterol ratio				
2 mo	–0.23 (0.63)‡	–0.40 (0.86)‡	–0.50 (1.70)	–0.29 (0.77)
6 mo	–0.55 (0.66)†	–0.49 (0.85)‡	–0.63 (1.56)‡	–0.41 (0.93)
12 mo	–0.73 (1.01)†	–0.61 (0.94)†	–0.85 (1.65)‡	–0.62 (0.87)†

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Variable	Diet Group, Mean Change (SD)			
	Atkins (n = 40)	Zone (n = 40)	Weight Watchers (n = 40)	Ornish (n = 40)
Triglycerides, mg/dL				
2 mo	–42 (72)†	–66 (112)†	–11 (43)	–1 (90)
6 mo	–19 (53)	–23 (70)	–2 (64)	–4 (99)
12 mo	–2 (117)	4 (183)	–20 (75)	11 (53)
Systolic BP, mm Hg				
2 mo	–5.4 (15)‡	–4.9 (15)	–5.9 (14)‡	–1.8 (10)
6 mo	–6.7 (12)†	–6.1 (17)	–6.4 (16)‡	–1.2 (12)
12 mo	0.3 (17)	2.1 (18)	–4.1 (16)	0.9 (11)
Diastolic BP, mm Hg				
2 mo	–5.5 (9.0)†	–5.8 (8.0)†	–3.7 (8.0)‡	–3.4 (8.1)‡
6 mo	–7.3 (7.4)†	–6.2 (10.8)†	–2.4 (7.9)	–0.5 (8.6)
12 mo	–2.6 (10.3)	–1.8 (11.8)	–2.6 (7.8)	0.4 (6.6)
Glucose, mg/dL				
2 mo	–12.7 (34)‡	–10.8 (31)	–6.6 (26)	–4.2 (27)
6 mo	–14.1 (34)	–12.6 (40)	–5.0 (25)	–9.6 (34)
12 mo	2.5 (42)	–6.4 (22)	–7.1 (23)	–8.2 (43)
Insulin, μIU/mL				
2 mo	–6.5 (15)‡	–8.6 (13)†	–2.2 (7)	–2.3 (15)
6 mo	–4.1 (15)	–3.0 (20)	–3.4 (8)‡	–0.7 (25)
12 mo	–2.3 (9)	–8.5 (17)‡	–4.1 (7)†	–5.9 (8)‡
C-reactive protein, mg/L				
2 mo	–0.42 (1.8)	–0.27 (2.1)	–0.05 (1.3)	–0.84 (3.0)
6 mo	–1.29 (2.6)‡	–0.65 (2.3)	–0.67 (1.7)‡	–1.33 (3.8)
12 mo	–1.33 (2.8)‡	–0.88 (2.6)	–0.88 (1.6)†	–1.76 (3.1)‡

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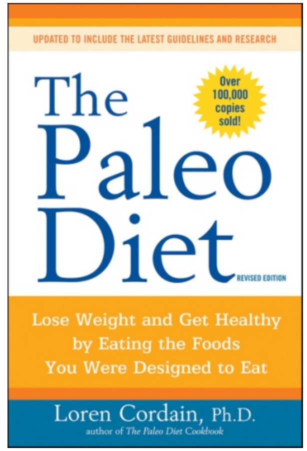
Conclusion

Each popular diet modestly reduced body weight and several cardiac risk factors at 1 year. Overall dietary adherence rates were low, although increased adherence was associated with greater weight loss and cardiac risk factor reductions for each diet group.



- Higher protein intake (15 % En vs 19-35 % found in hunter-gatherer diets).
- Lower carbohydrate intake and lower glycemic index (fresh fruits and vegetables represent the main carbohydrate source and will provide for 35-45 % of your daily calories).
- Higher fiber intake
- Moderate to higher fat intake (MUFA and PUFA)
- Higher potassium and lower sodium intake
- Net dietary alkaline (fruits and veggies) load that balances dietary acid (meats, fish, grains, legumes, cheese, and salt)
- Higher intake of vitamins, minerals, antioxidants, and plant phytochemicals.
- Lower intake of calcium

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La dieta senza glutine

- Unica terapia ad oggi della celiachia, è stata adottata anche da chi vuole perdere peso
- Non vi sono evidenze a supporto di tale effetto
- Pro
  - Limita l'assunzione di carboidrati e incoraggia il consumo di frutta e verdura
- Contro
  - Si associa a possibili carenze (fibra, ferro, folati)
  - E' difficile da seguire nel tempo
  - Prevede l'uso di alimenti equivalenti dal punto di vista energetico a quelli tradizionali ma più costosi
  - La diffusione di questo regime alimentare potrebbe contribuire a mascherare diagnosi di celiachia

La dieta del pompelmo(1000kcal/d)

- Breakfast: Two boiled eggs, two slices of bacon, and ½ grapefruit or 8 ounces of grapefruit juice.
- Lunch: Salad with dressing, any meat in any amount, and ½ grapefruit or 8 ounces of grapefruit juice.
- Dinner: Any kind of meat prepared any way, salad or red and green vegetables, coffee or tea, and ½ grapefruit or 8 ounces of grapefruit juice.
- Bedtime Snack: 8 ounces of skim milk.

Fortemente ipocalorica, ipoglucidica, iperproteica (VLC, low carb, high prot)

Scopo: perdere peso rapidamente (fino a 3-4 kg in 12 giorni) sfruttando gli enzimi 'bruciagrassi' contenuti nel pompelmo

A favore

•Risultati incoraggianti in breve tempo

•Il pompelmo è ricco di vitamina C

Contro

• Non esistono evidenze scientifiche a supporto dell'effetto 'bruciagrassi' del pompelmo

•Perdita di liquidi piuttosto che di massa grassa (rapida ripresa dei chili persi)

•Non è previsto il controllo del peso nel tempo

•Monotonia ed eliminazione di molti alimenti

•Interazioni pompelmo-farmaci (liveli di CYP3A4 ridotti del 47% a 2 ore). Es. Statine e antistaminici.

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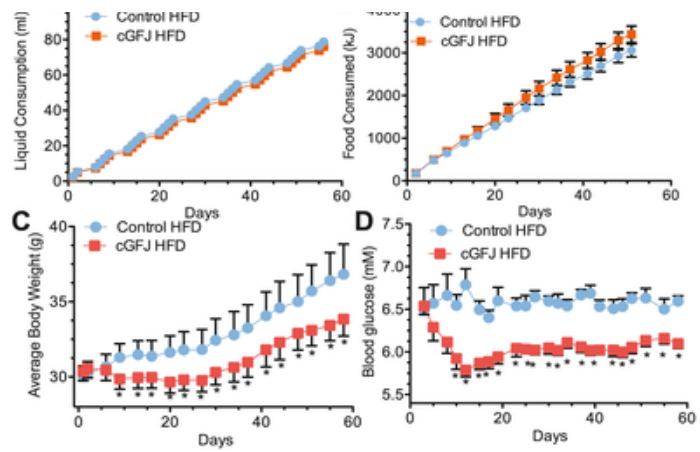
PLOS | ONE

Consumption of Clarified Grapefruit Juice Ameliorates High-Fat Diet Induced Insulin Resistance and Weight Gain in Mice

Rostislav Chudnovskiy, Airlia Thompson, Kevin Tharp, Marc Hellerstein, Joseph L. Napoli*, Andreas Stahl*



Mice were fed a HFD for 6 wk starting at 4 wk old. Animals were then divided randomly into control and GFJ groups (day 0) and HFD feeding was continued an additional 56 d: A) cumulative liquid consumption; B) cumulative food consumption; C) total body weights; D) blood glucose.

Mice fed a high-fat diet and cGFJ experienced a 18.4% decrease in weight, a 13–17% decrease in fasting blood glucose, a three-fold decrease in fasting serum insulin, and a 38% decrease in liver triacylglycerol values, compared to controls.

Chudnovskiy R, Thompson A, Tharp K, Hellerstein M, et al. (2014) Consumption of Clarified Grapefruit Juice Ameliorates High-Fat Diet Induced Insulin Resistance and Weight Gain in Mice. PLoS ONE 9(10): e108408. doi:10.1371/journal.pone.0108408
http://www.plosone.org/article/info:doi/10.1371/journal.pone.0108408

Detox diets

- Detox diets are marketing myth rather than nutritional reality. They sound like a great concept and it would be fabulous if they really delivered all that they promised! Unfortunately, many of the claims made by detox diet promoters are exaggerated, not based on robust science and any benefit short lived.
- While they may encourage some positive habits like eating more fruit and vegetables, it's best to enjoy a healthy, varied diet and active lifestyle rather than following a detox diet.

The blood type diet

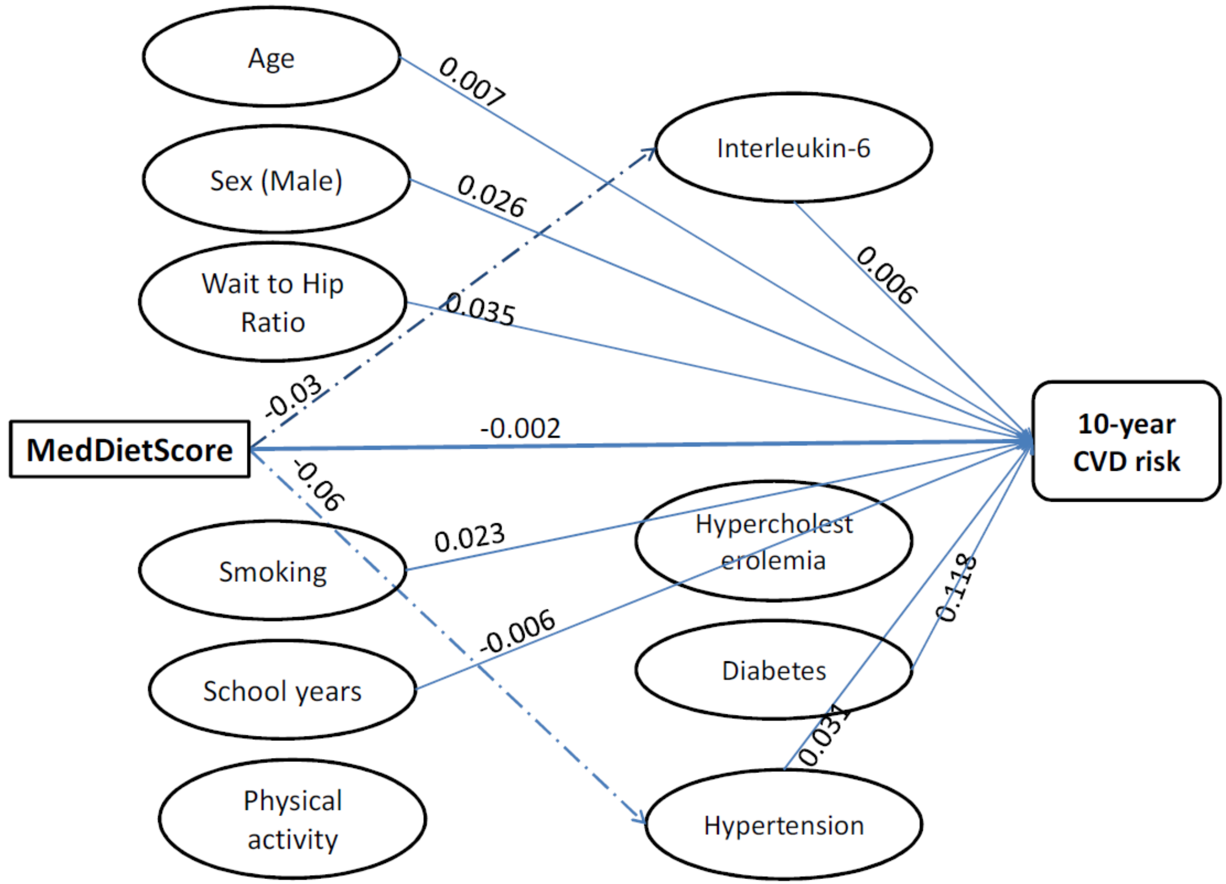
- **Premise**
- The foods you eat react chemically with your blood type. If you follow a diet designed for your blood type, your body will digest food more efficiently. You'll lose weight, have more energy, and help prevent disease.
- **Does It Work?**
- **What You Can Eat**
- **Type O blood:** A high-protein diet heavy on lean meat, poultry, fish, and vegetables, and light on grains, beans, and dairy.
- **Type A blood:** A meat-free diet based on fruits and vegetables, beans and legumes, and whole grains -- ideally, organic and fresh
- **Type B blood:** Avoid corn, wheat, buckwheat, lentils, tomatoes, peanuts, and sesame seeds. Chicken is also problematic. Eating green vegetables, eggs, certain meats, and low-fat dairy is encouraged.
- **Type AB blood:** Foods to focus on include tofu, seafood, dairy, and green vegetables. Avoid caffeine, alcohol, and smoked or cured meats.
- **Cons**
- There haven't been any studies directly comparing weight loss and health in people who were on the diet against those who weren't.
- Only one study has evaluated this kind of diet. It found that people with certain blood types got more of a cholesterol-lowering benefit from eating a low-fat diet.

The ATTICA study

- Mediterranean diet decreased 10-year CVD risk in the entire cohort, as well among smokers, sedentary and obese subjects
- Mediterranean diet decreased CRP and IL-6 levels, but still had a direct effect on CVD risk
- The level of adherence to the Mediterranean diet was modest

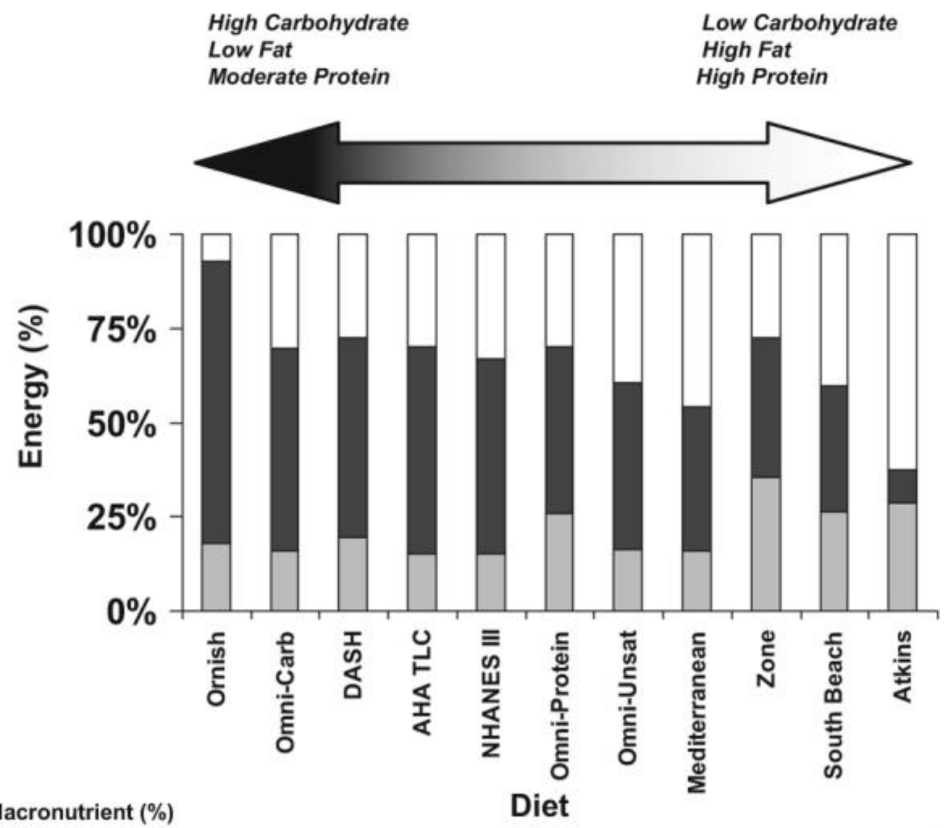
Panagiotakos D et al., the ATTICA Study group, Exploring the path of Mediterranean diet on 10-year incidence of cardiovascular disease: The ATTICA study (2002-2012), Nutrition, Metabolism and Cardiovascular Diseases (2014), doi: 10.1016/ j.numecd.2014.09.006.

The ATTICA study



Panagiotakos D et al., the ATTICA Study group, Exploring the path of Mediterranean diet on 10-year incidence of cardiovascular disease: The ATTICA study (2002-2012), Nutrition, Metabolism and Cardiovascular Diseases (2014), doi: 10.1016/ j.numecd.2014.09.006.

Macronutrient profiles of popular diets, the OmniHeart and Dietary Approaches to Stop Hypertension (DASH) study diets, the American Heart Association Therapeutic Lifestyle (AHA TLC) guidelines, and typical US macronutrient intakes as reported in the third Health and Nutrition Examination Survey (NHANES III).

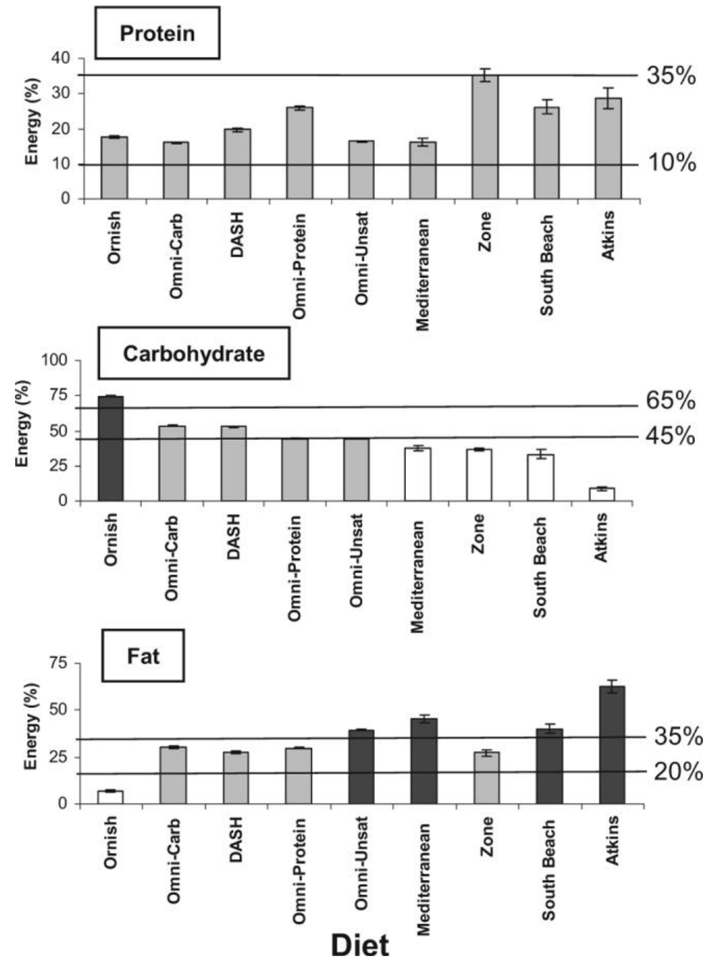


Macronutrient (%)

	Ornish	Omni-Carb	DASH	AHA TLC	NHANES III	Omni-Protein	Omni-Unsat	Mediterranean	Zone	South Beach	Atkins
Protein	18	16	20	15	15	26	16	16	35	26	29
Carbohydrate	75	54	53	55	52	44	44	38	37	33	9
Fat	7	30	28	30	33	30	40	46	27	40	62

de Souza RJ et al., Am J Clin Nutr. 2008 Jul;88(1):1-11.

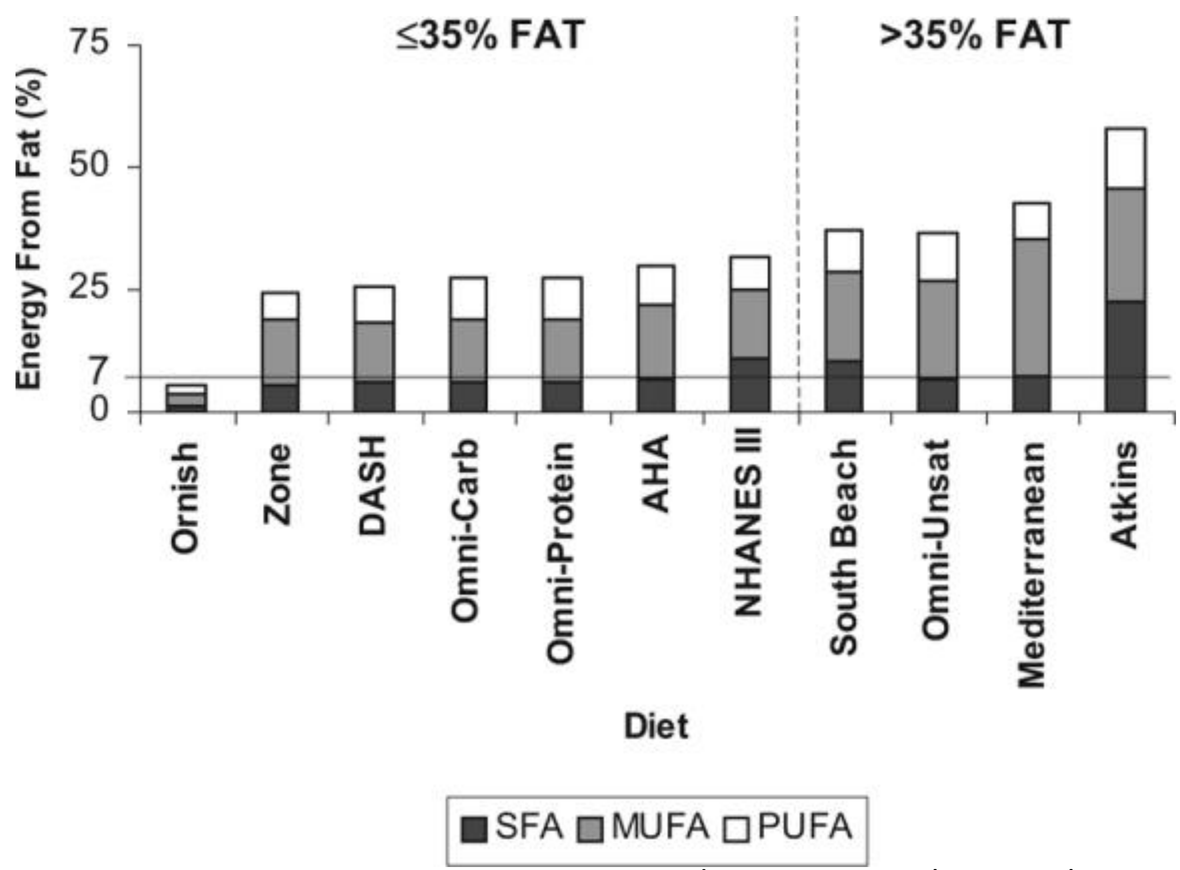
Comparison of the calculated macronutrient profiles (mean ± SEM) of various diet plans with the Institute of Medicine's Acceptable Macronutrient Distribution Ranges (AMDR). Solid horizontal lines represent the upper and lower limits of the AMDR for the macronutrient. ■, exceeds the AMDR; , meets the AMDR; □, failed to reach the minimum AMDR.



SIMPeSV Società Italiana di Medicina di Prevenzione e degli Stili di Vita

de Souza RJ et al., Am J Clin Nutr. 2008 Jul;88(1):1-11.

Typical fatty acid profiles of popular diet sand typical US macronutrient intakes as reported in the third Health and Nutrition Examination Survey (NHANES III) as "reference points." Solid horizontal line represents the 7% upper level of intake for saturated fat proposed by the AHA.



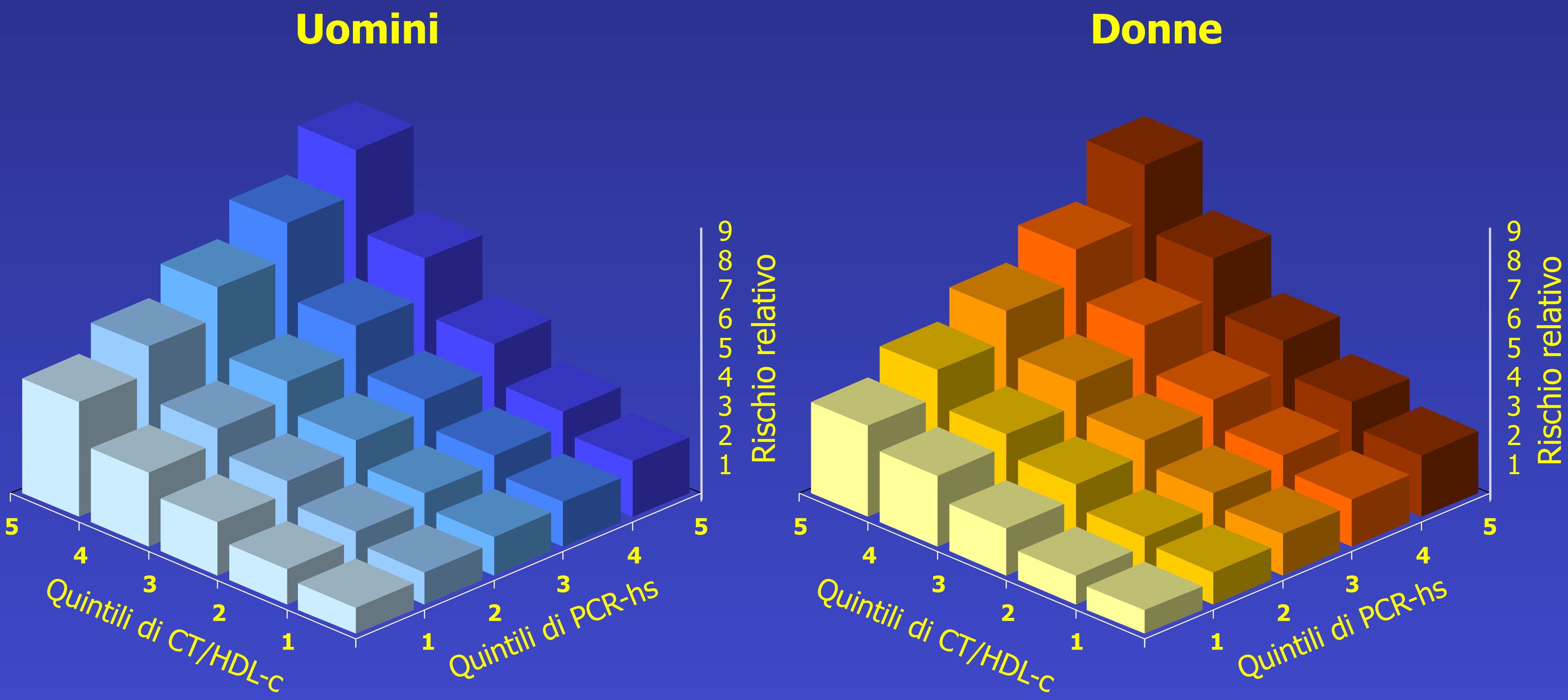
de Souza RJ et al., Am J Clin Nutr. 2008 Jul;88(1):1-11.

Grassi alimentari e infiammazione

- Infiammazione	+ Infiammazione
Acidi grassi omega-3	Acidi grassi insaturi a conformazione *trans*
Acidi grassi omega-6 (?)	Acidi grassi saturi (?)
Acidi grassi monoinsaturi o polifenoli dell'EVOO (?)	

Livelli plasmatici della PCR e profilo lipidico in relazione al rischio coronarico

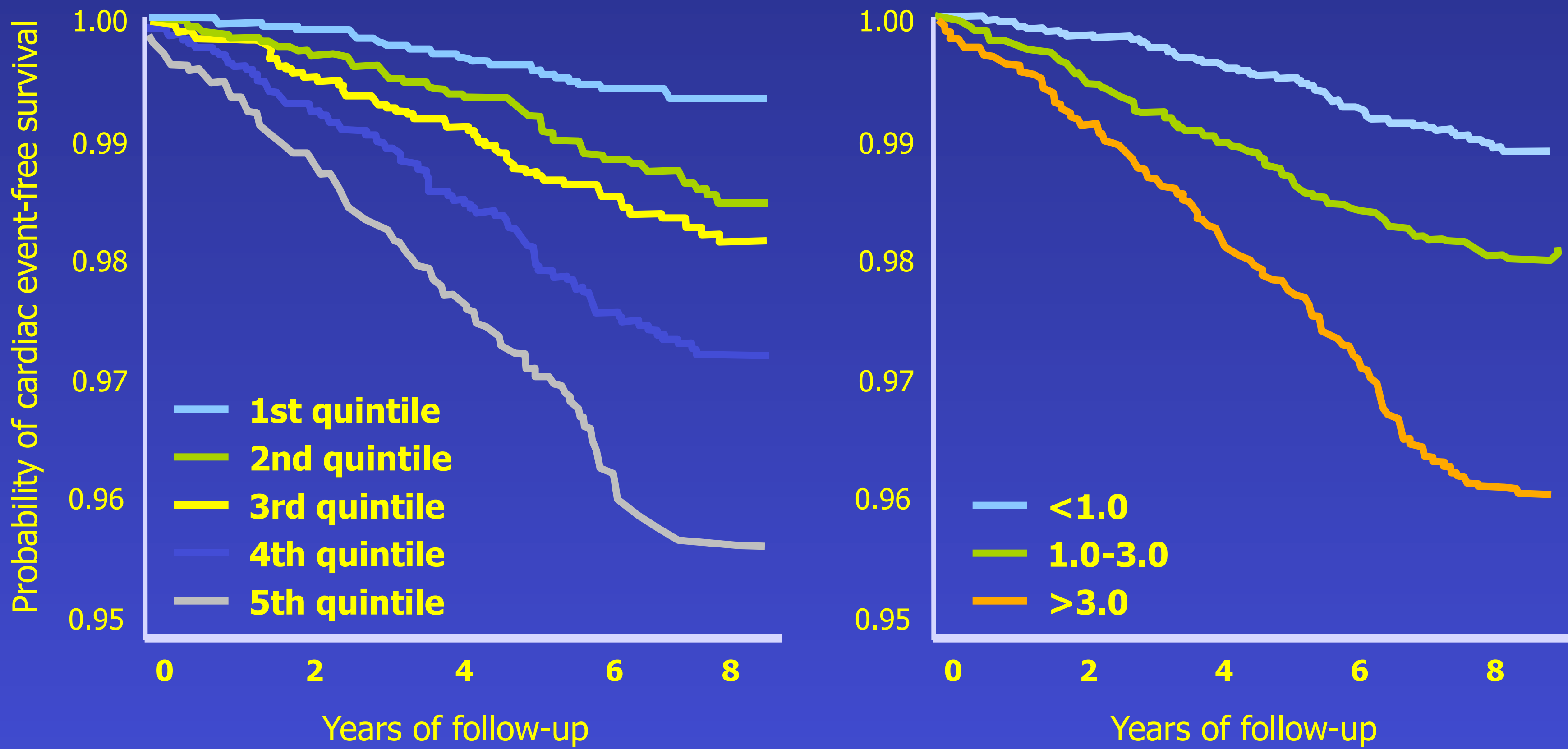
I dati epidemiologici



Circulation 2001

Cardiovascular event-free survival among apparently healthy individuals according to baseline CRP levels

Data are shown using population-based quintiles for CRP (left) **and using 3 simple clinical cut-points for CRP, <1, 1 to 3, and >3 mg/L** (right)



Ridker PM, *Circulation* 2003

Inflammation in young adulthood is associated with myocardial infarction later in life

Campione: circa 433.000 giovani maschi svedesi, di età 18-22 anni, seguiti in media per 35 anni.

individuals who died prematurely of external causes. Even in the youngest group, aged 15 to 19 years, atherosclerotic changes were present in all subjects investigated. The surface area affected by atherosclerosis and the severity of lesions were increased by earlier exposure to traditional CVD risk factors[4,5] and were more pronounced in the older compared with the younger subgroups.[6,7] These observations supports the hypotheses that atherosclerosis is a continuous process beginning early in life.

Besides the fact that most participants in the present study likely had atherosclerotic changes at the time when the ESR was measured, there is also a large body of evidence showing that inflammation is a key feature in early stages of the development of atherosclerosis.[28,29] Erythrocyte sedimentation rate is an indirect

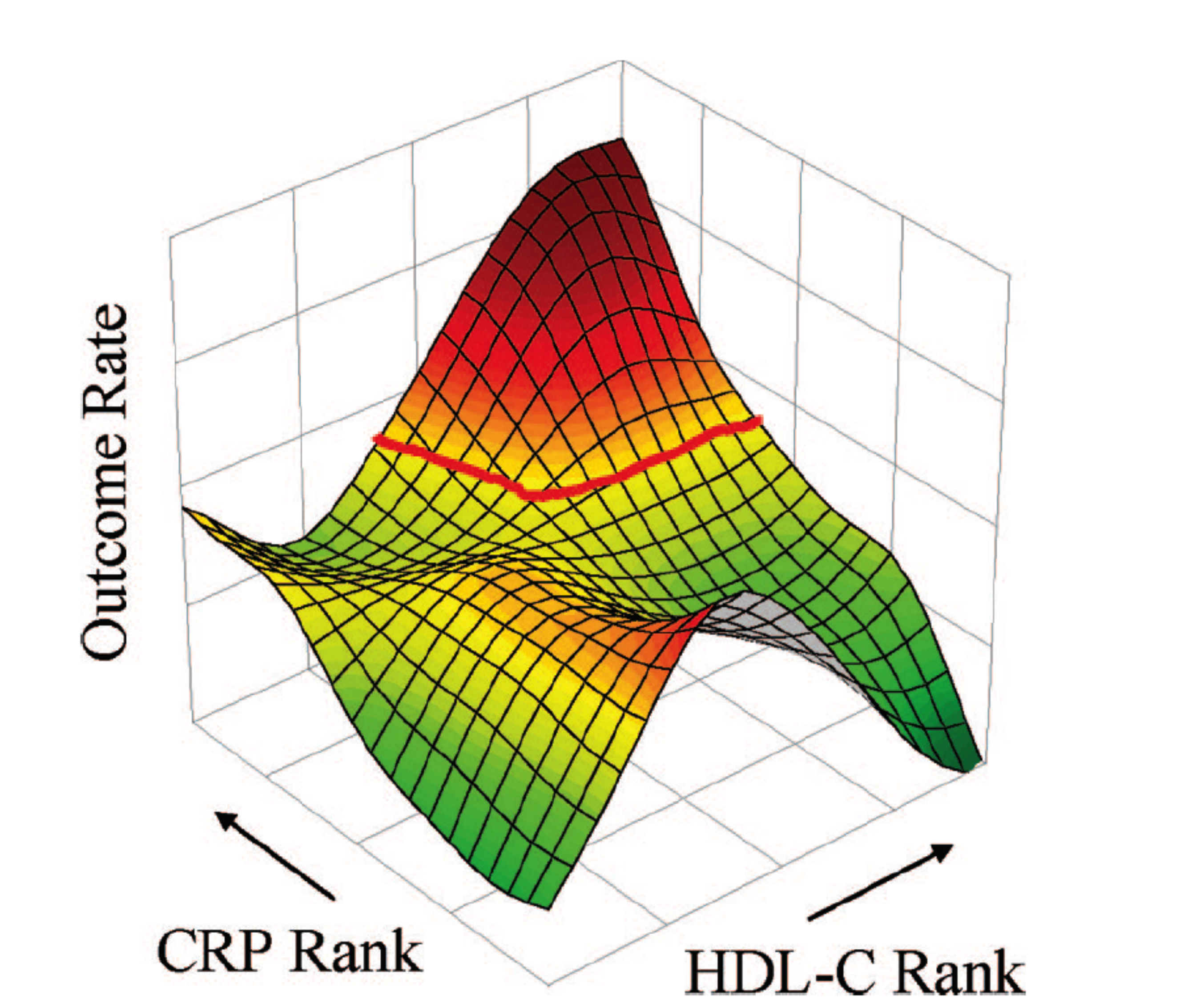
young cohort and did not significantly association between ESR and MI.

Given that almost all MIs are caused by art the most likely explanation for the observ between ESR and MI is through progression rotic changes. Both ESR[19-22] and C-reactiv independently predict cardiac events in mi aged individuals. The results presented previous findings because we are now able ESR already in young adults is associated w MIs later in life.

The results of the present study are of part with respect to preventive efforts aimed cardiovascular morbidity and mortality. M farctions are caused largely by environment can be reduced by lifestyle changes and

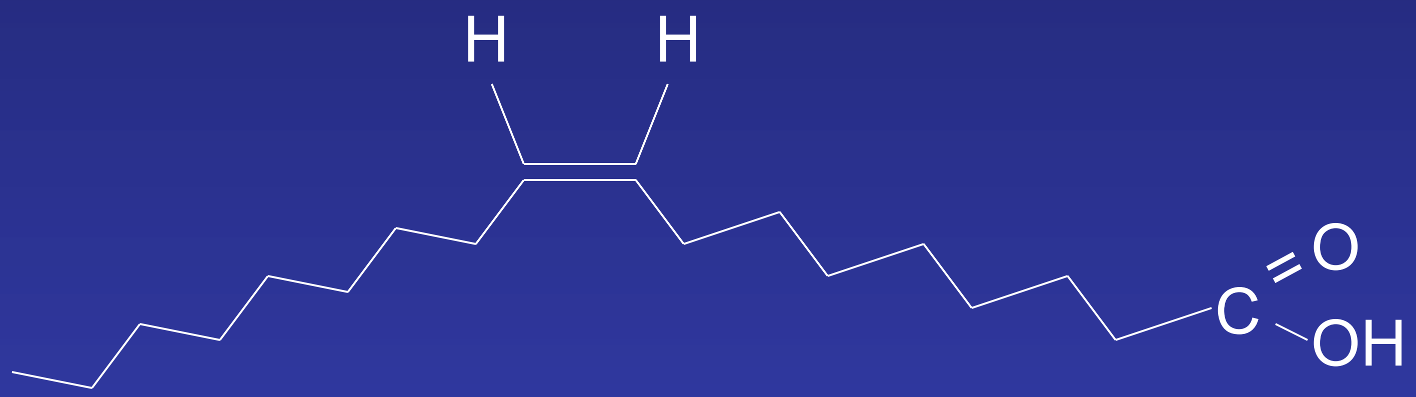
Toss F et al, Am Heart J 2013

HDL and CRP interaction in post-MI patients: a highly complex risk profile

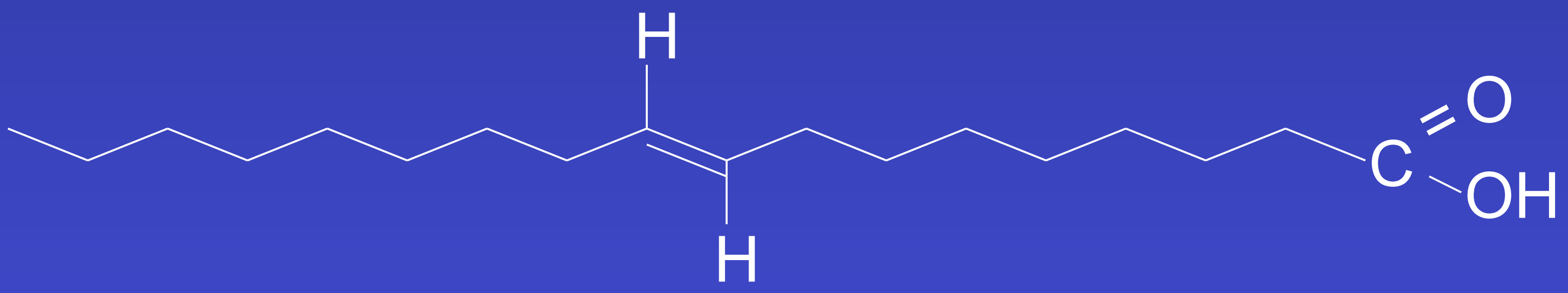


Corsetti JP L et al, ATVB, 2010

Structure of *cis* and *trans* Fatty Acids

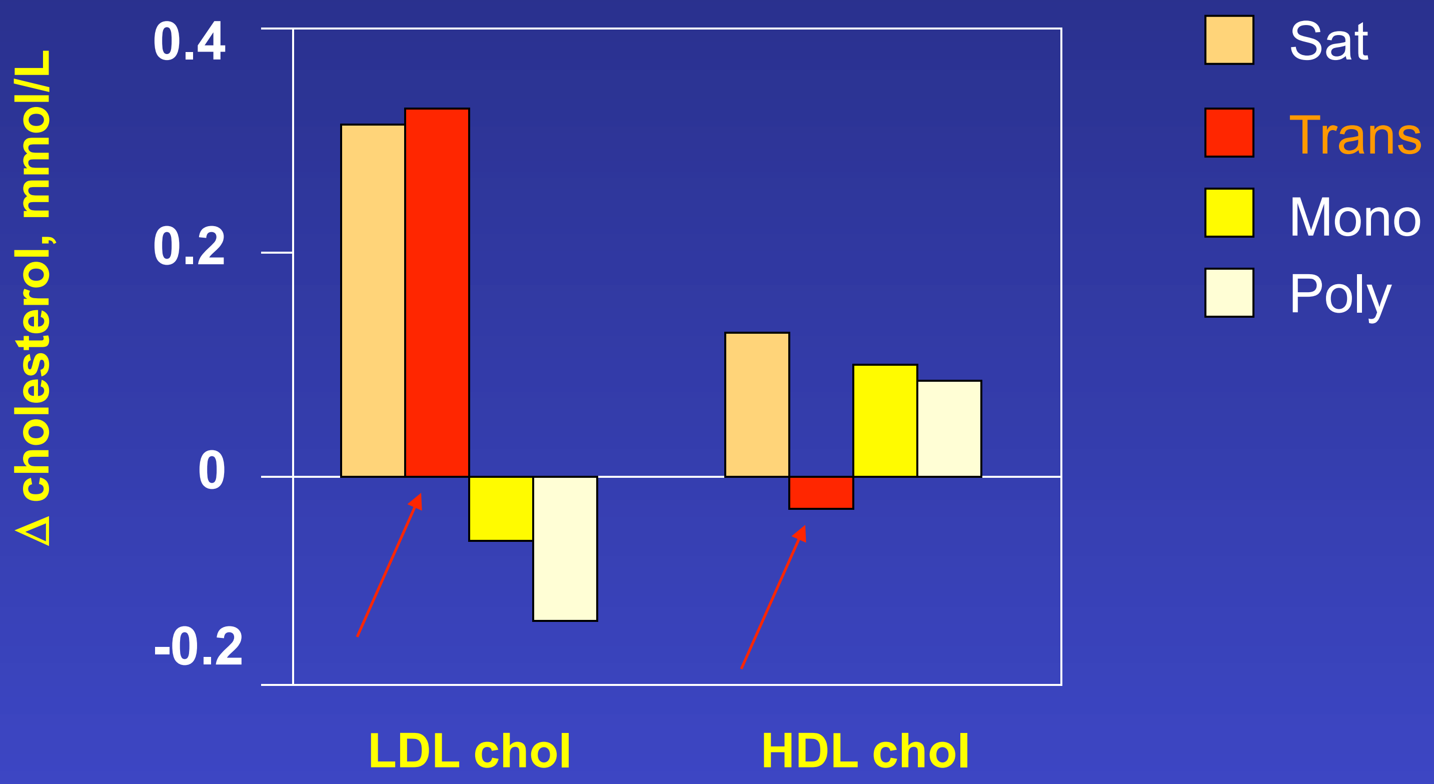


cis double bond: oleic acid



trans double bond: elaidic acid

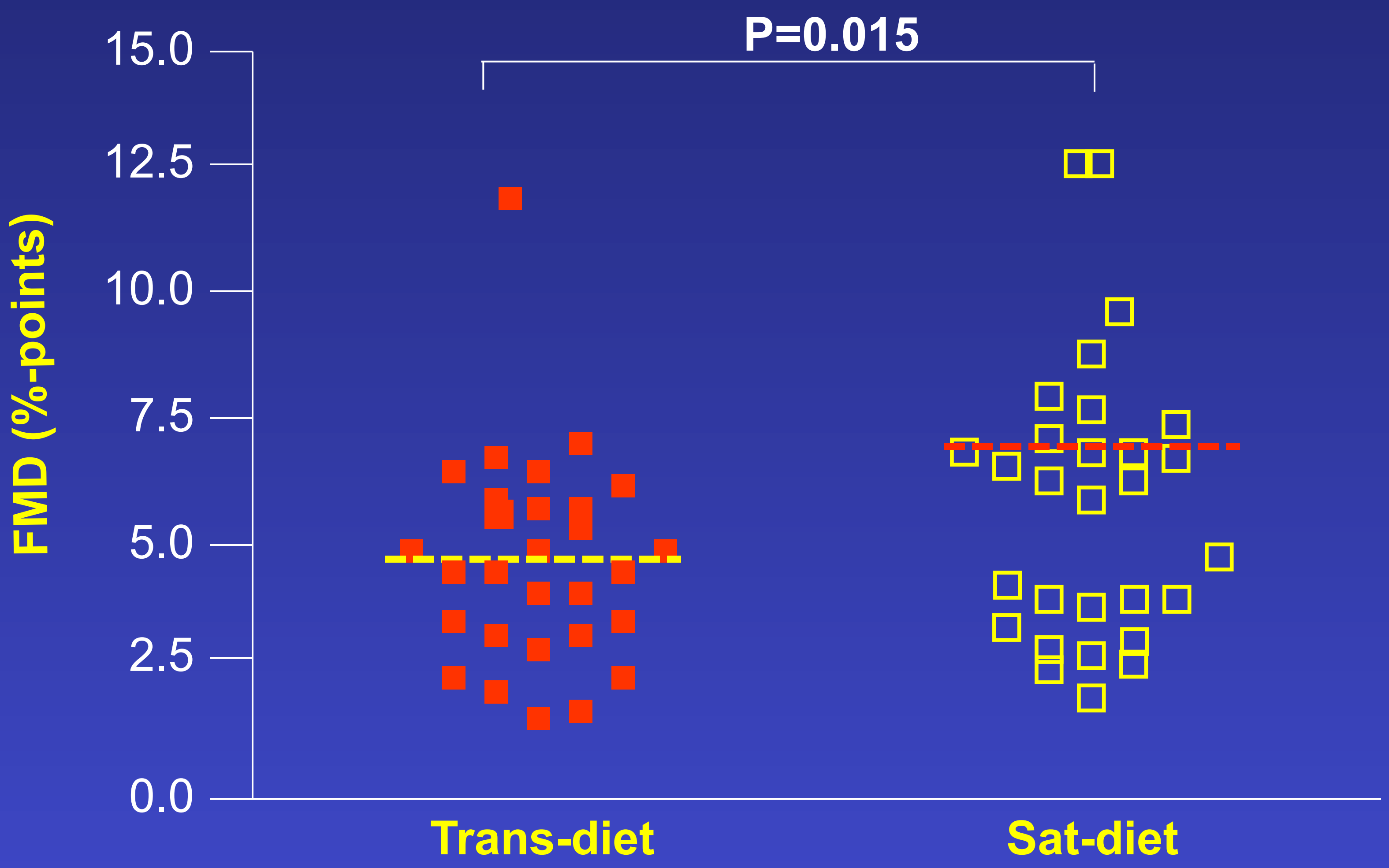
Effects of SAT, *trans* MONO, *cis* MONO, and *cis* POLY Fatty Acids on LDL and HDL Cholesterol



Values obtained by meta-analysis of 32 controlled dietary trials in humans

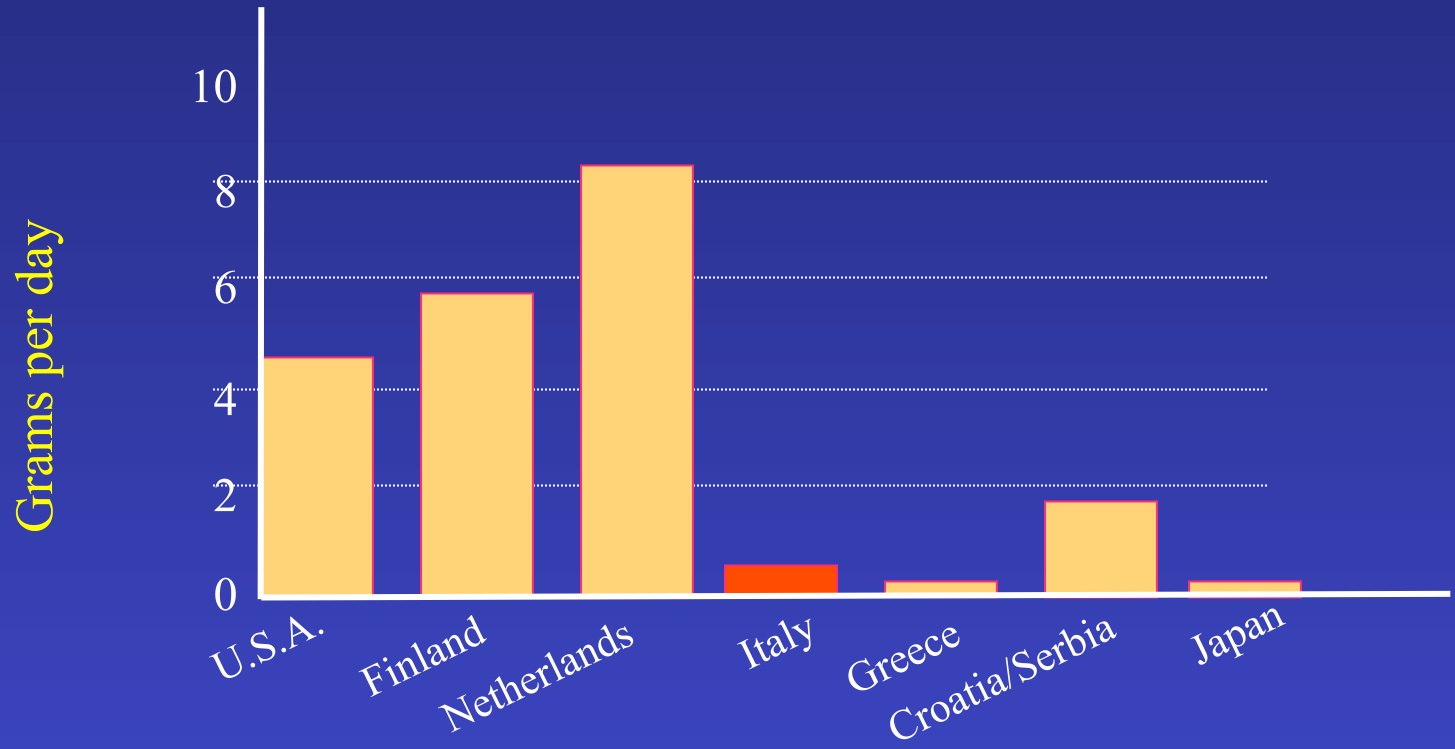
Zock, 1997

Trans Fatty Acids Impair Endothelial Function



FMD of the 29 subjects after the diet rich in TFAs (solid squares) and after the diet *rich* in saturated fatty acids (open squares). The subjects consumed both diets for 21 to 32 days in randomized order

Average Intake of *Trans* Fatty Acids in Various Countries



Intake of *trans* fatty acids with chain lengths of 16 or 18 carbon atoms in seven countries: assessment by chemical analysis in 1987 of diet as reported in 1960 (De Vries et al. 1997).

Zock 1997

GM-CSF, granulocyte-macrophage colony-stimulating factor; hs-CRP, high-sensitivity C-reactive protein; IL-6, interleukin-
peroxisome proliferator–activated receptor-γ; SFA, saturated fatty acids; sICAM-1, soluble intercellular adhesion molecule-1
soluble vascular cellular adhesion molecule-1; TNF-α, tumor necrosis factor α; US, United States.

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fax: +351 222 061 821.

E-mail address: susana.santos@ispup.up.pt (S. Santos).

http://dx.doi.org/10.1016/j.nutres.2013.07.002

Based on this systematic review, a potential positive association of SFA with high-sensitivity C-reactive protein, but not with adipokines, is suggested, which should be confirmed by future research.

Santos S et al, Nutrition Research 33; 687-695, 2013

inflammation, thereby promoting atherosclerosis (14). On the   First published online February 27, 2013; doi: 10.3945/ajcn.112

706   *Am J Clin Nutr* 2013;97:706–17. Printed in USA. © 2013 American Society for

Supplemental Material can be found at:
http://ajcn.nutrition.org/content/suppl/2013/03/10/ajcn.112.052217.DCSupplemental.html

Dairy product consumption *does not exert adverse effects on biomarkers of inflammation in overweight or obese adults*. Several methodologic factors and limitations among existing studies do not allow *differentiation between a beneficial or neutral impact* of dairy products on inflammation.

Labonté ME et al, Am J Clin Nutr, 2013

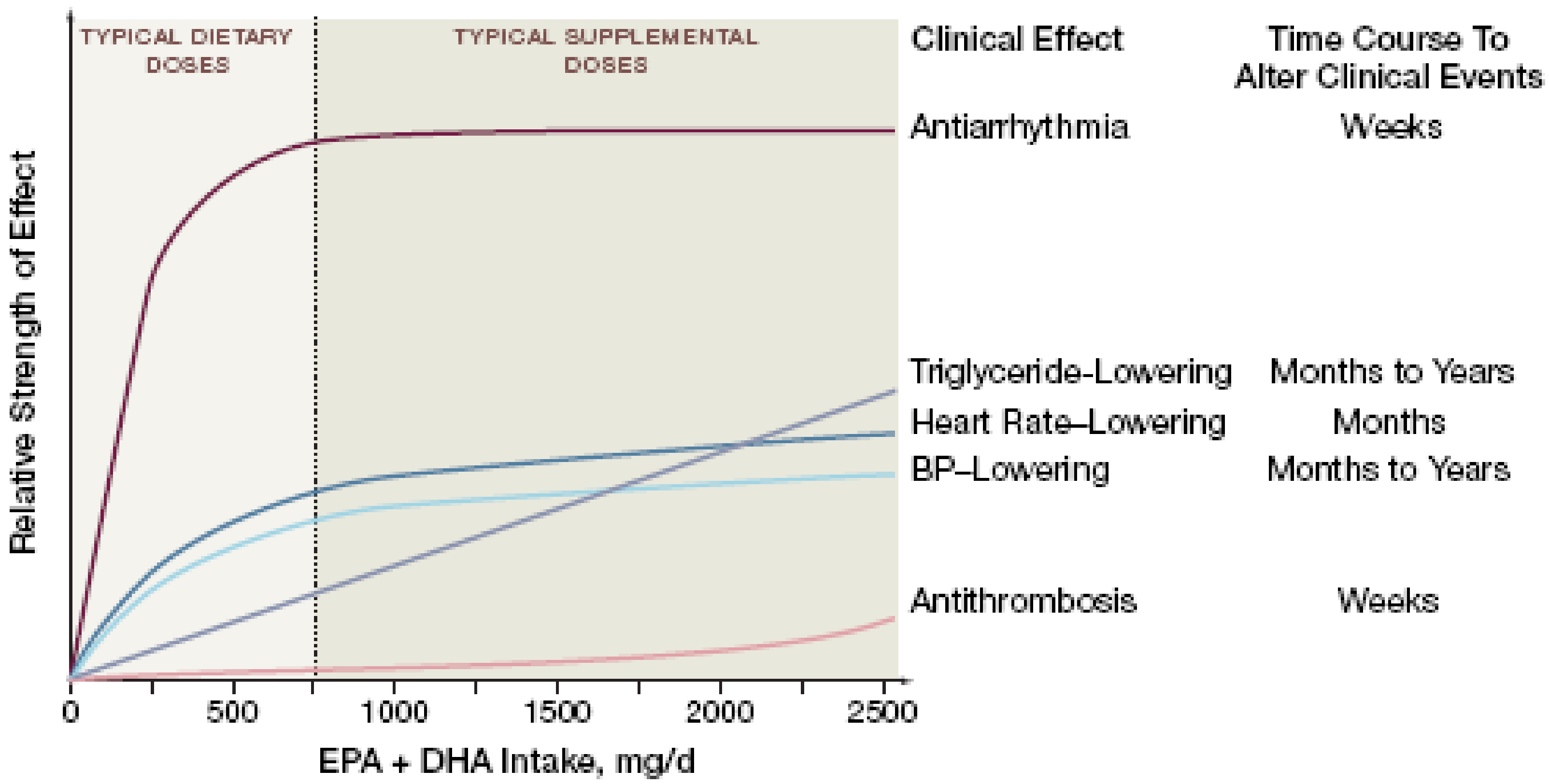
Biomarkers of inflammation and endothelial dysfunction and trans fatty acid intake in the Nurses' Health Study (1986-1990)

Quintile	*n*	*CRP mg/L*	*IL-6 ng/L*	*E-selectin ng/L*
Trans fatty acids (range; g/d)				
Q1 (0.61-1.87)	147	1.1 (0.9, 1.3)	1.8 (1.6, 2.0)	41.8 (39.0, 44.9)
Q2 (1.88-2.26)	145	1.3 (1.1, 1.6)	1.7 (1.5, 2.0)	41.9 (39.0, 45.0)
Q3 (2.27-2.64)	146	1.5 (1.3, 1.8)	1.8 (1.6, 2.0)	41.9 (39.0, 45.0)
Q4 (2.65-3.13)	146	1.7 (1.4, 2.0)	1.9 (1.7, 2.2)	45.1 (42.0, 48.4)
Q5 (3.14-7.58)	146	1.9 (1.6, 2.3)	2.1 (1.8, 2.3)	50.3 (46.8, 54.0)
P for trend*		<0.001	0.02	<0.001

* P for trend of medians in each quintiles

Lopez-Garcia, J Nutr 2005

Schema of Potential Dose Responses and Time Courses for Altering Clinical Events of Physiologic Effects of Fish or Fish Oil Intake



Mozaffarian & Rimm, JAMA 2006

Inflammatory Markers and Daily Fish Consumption in 1,514 men (18 - 87 years)and 1,528 women (18 - 89 years) from the ATTICA study

	Fish Consumption				
	No fish	<150 g/week	150–300 g/week	>300 g/week	p Value
Participants (%)	319 (11%)	1,719 (56%)	745 (24%)	259 (9%)	—
CRP (mg/L)	2.7 ± 1.2	2.0 ± 1.1†	2.0 ± 2.1†	1.8 ± 1.1†	0.004
IL-6 (ng/L)	1.5 ± 0.5	1.3 ± 0.6‡	1.2 ± 1.1†	1.0 ± 0.3†	0.03
TNF-alfa (mg/dL)	5.3 ± 3	5.1 ± 2	4.7 ± 3†	4.2 ± 2†	<0.001
Amyloid A (mg/dL)	6.4 ± 4	5.9 ± 4	5.1 ± 4‡	4.6 ± 3†	0.004
WBC (.000)	6.8 ± 3	6.7 ± 4	6.5 ± 4‡	6.5 ± 3‡	0.04

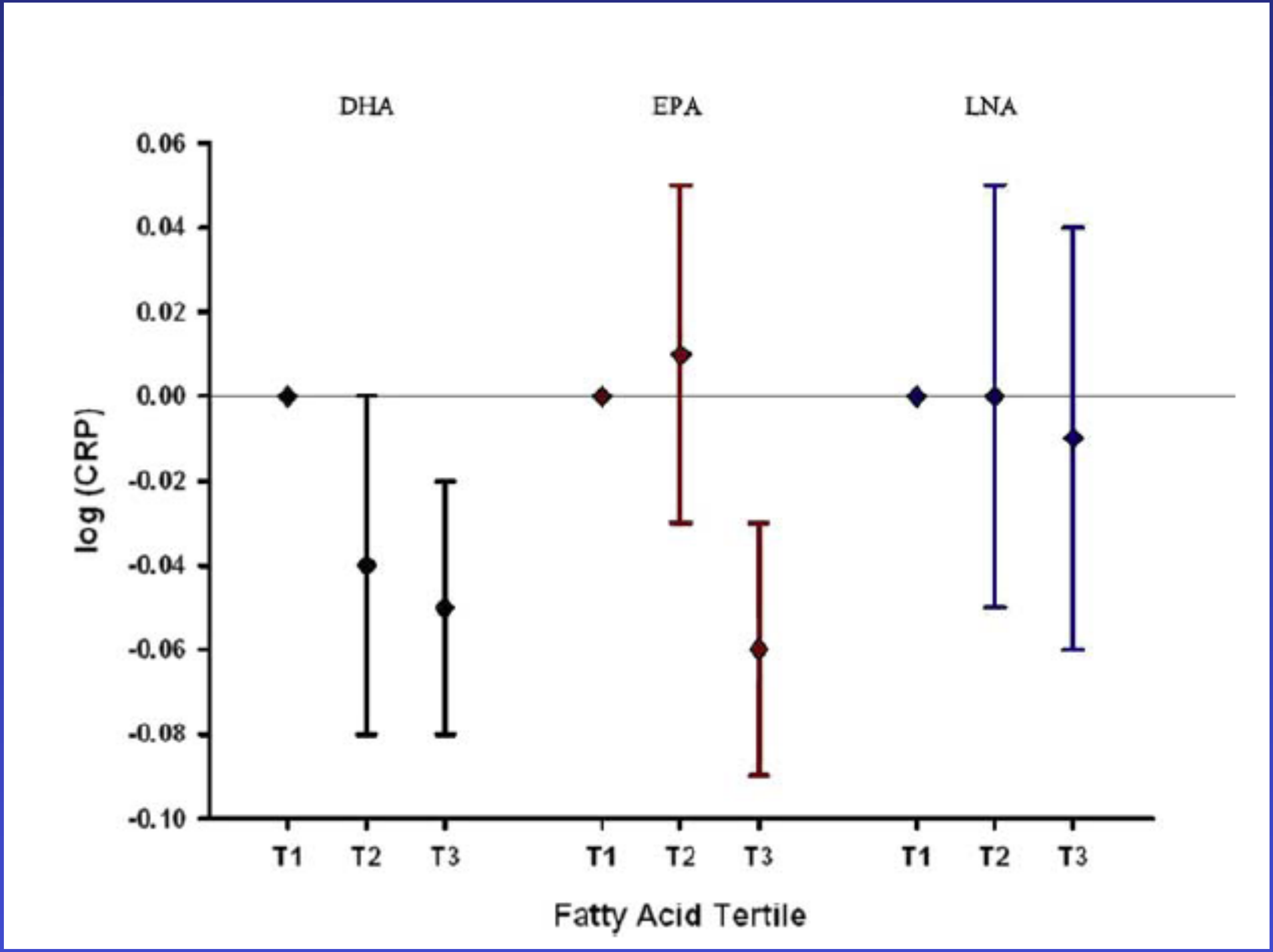
A Zampelas et al; J Am Coll Cardiol 2005; 46:120–4

CRP concentration and plasma omega-3 quartiles in 1,400 finnish men

	r	β	*Serum n-3 fatty acids quartile*[a]				P *for trend*
			1 (n = 348)	*2 (n = 349)*	*3 (n = 349)*	*4 (n = 349)*	
Total n-3 polyunsaturated fatty acids	−0.06						
Model 1		−0.18	1.22 (1.11–1.34)	1.26 (1.14–1.38)	1.21 (1.10–1.33)	1.07 (0.97–1.18)	0.03
Model 2		−0.21	1.23 (1.13–1.35)	1.27 (1.16–1.38)	1.18 (1.08–1.28)	1.08 (0.99–1.17)	0.01
EPA + DPA + DHA	−0.04						
Model 1		−0.09	1.24 (1.13–1.37)	1.18 (1.07–1.30)	1.25 (1.13–1.37)	1.08 (0.98–1.19)	0.07
Model 2		−0.14	1.28 (1.17–1.40)	1.19 (1.09–1.30)	1.21 (1.11–1.32)	1.08 (0.99–1.17)	0.01
EPA	−0.0003						
Model 1		0.02	1.19 (1.08–1.31)	1.24 (1.12–1.36)	1.15 (1.04–1.26)	1.17 (1.06–1.29)	0.60
Model 2		−0.05	1.23 (1.13–1.35)	1.25 (1.14–1.36)	1.13 (1.04–1.24)	1.13 (1.04–1.24)	0.10
DPA	−0.21						
Model 1		−0.96	1.65 (1.50–1.81)	1.18 (1.07–1.29)	1.05 (0.96–1.16)	0.97 (0.88–1.06)	<0.001
Model 2		−0.69	1.51 (1.39–1.65)	1.18 (1.09–1.29)	1.07 (0.98–1.17)	1.03 (0.95–1.13)	<0.001
DHA	−0.05						
Model 1		−0.13	1.17 (1.06–1.29)	1.28 (1.16–1.41)	1.25 (1.14–1.38)	1.06 (0.96–1.16)	0.13
Model 2		−0.16	1.21 (1.12–1.33)	1.24 (1.13–1.35)	1.22 (1.12–1.33)	1.08 (0.99–1.18)	0.05
ALA	−0.10						
Model 1		−0.41	1.42 (1.29–1.56)	1.14 (1.04–1.25)	1.15 (1.04–1.26)	1.07 (0.97–1.17)	<0.001
Model 2		−0.22	1.30 (1.19–1.42)	1.13 (1.03–1.23)	1.18 (1.08–1.29)	1.14 (1.04–1.25)	0.08

Reinders I et al., Eur J Clin Nutr 2012

Terzili di apporto dei vari Omega 3 e PCR: uno studio osservazionale su 9.000 adulti



Naqvi AZ et al, JADA, 2011

Biochemical Pathways of Arachidonic Acid (ω-6) and Eicosapentenoic Acid (ω-3)

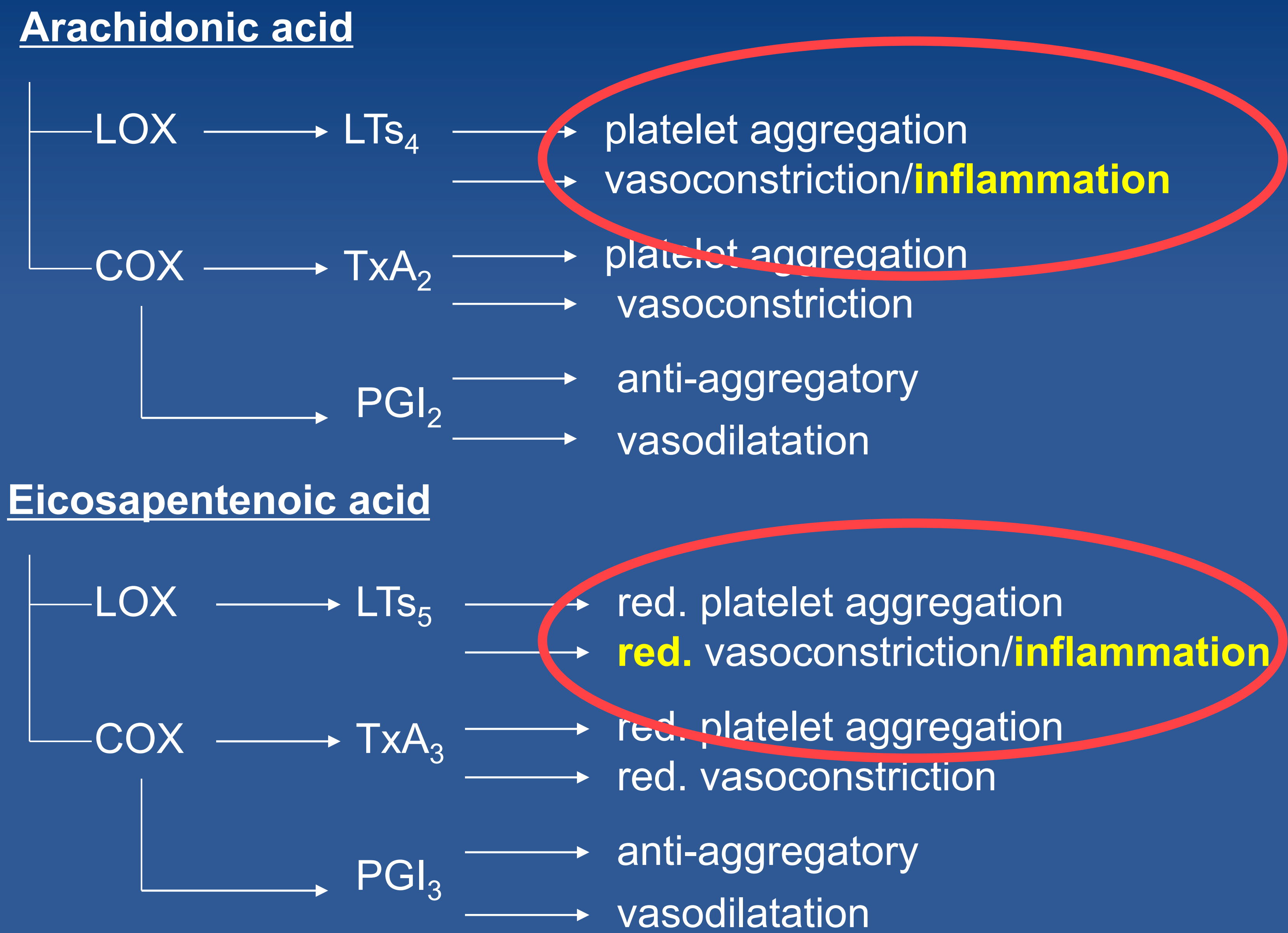
Arachidonic acid

- LOX → LTs_4
  - → platelet aggregation
  - → vasoconstriction/inflammation
- COX → TxA_2
  - → platelet aggregation
  - → vasoconstriction
- COX → PGI_2
  - → anti-aggregatory
  - → vasodilatation

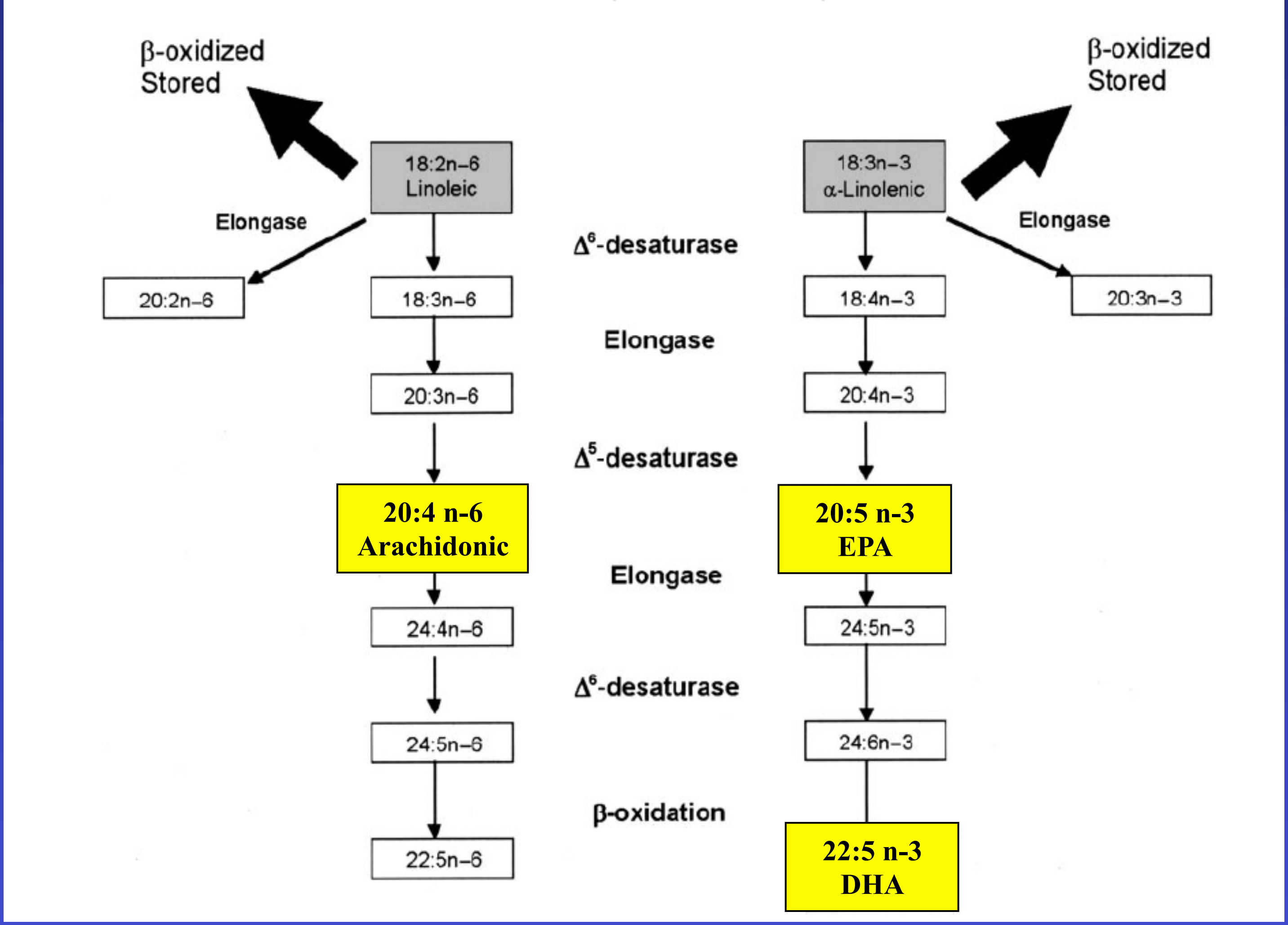
Eicosapentenoic acid

- LOX → LTs_5
  - → red. platelet aggregation
  - → red. vasoconstriction/inflammation
- COX → TxA_3
  - → red. platelet aggregation
  - → red. vasoconstriction
- COX → PGI_3
  - → anti-aggregatory
  - → vasodilatation

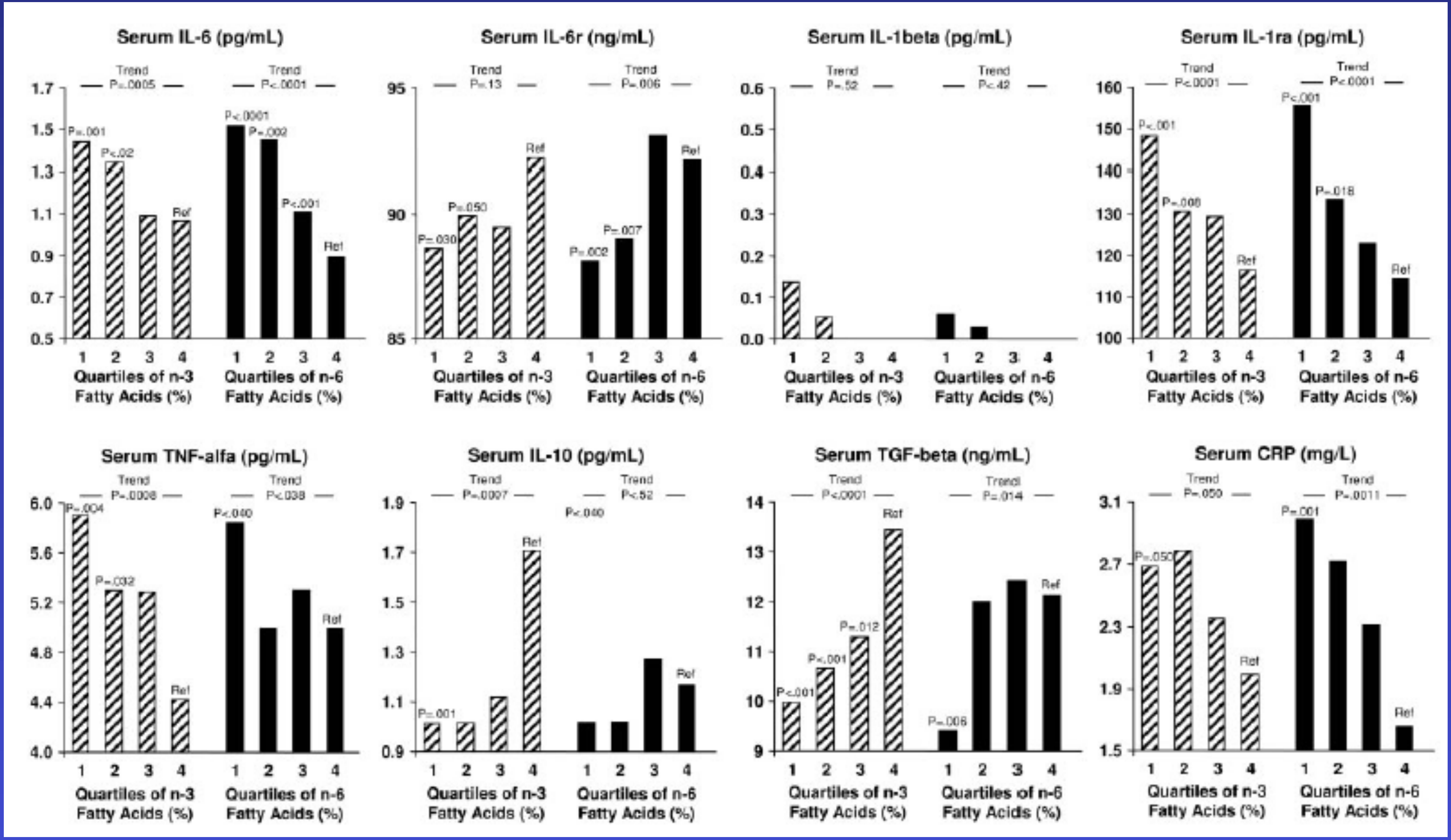
Biochemical Pathways of Arachidonic Acid (ω-6) and Eicosapentenoic Acid (ω-3)



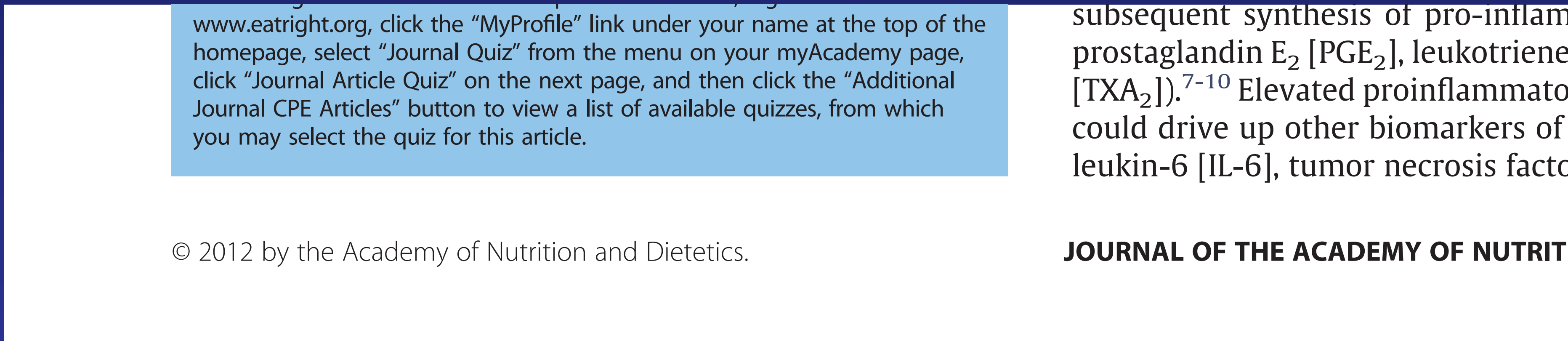
Common metabolic pathways of n-3 and n-6 fatty acids



Plasma Polyunsaturated Fatty Acids and Circulating Inflammatory Markers in 1.123 free living subjects aged 20-98 (InCHIANTI study)



Ferrucci L et al, J Clin Endocrinol Metab 2006



www.eatright.org, click the "MyProfile" link under your name at the top of the homepage, select "Journal Quiz" from the menu on your myAcademy page, click "Journal Article Quiz" on the next page, and then click the "Additional Journal CPE Articles" button to view a list of available quizzes, from which you may select the quiz for this article.

subsequent synthesis of pro-inflamm
prostaglandin E_2 [PGE_2], leukotriene
[TXA_2]).[7-10] Elevated proinflammator
could drive up other biomarkers of i
leukin-6 [IL-6], tumor necrosis factor

1394 pubblicazioni → 15 lavori selezionati

Johnson GH et al, J Acad Nutr Diet, 2012

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1394 pubblicazioni → 15 lavori selezionati

We conclude that virtually no evidence is available from randomized, controlled intervention studies among healthy, noninfant human beings to show that addition of LA to the diet increases the concentration of inflammatory markers.

Johnson GH et al, J Acad Nutr Diet, 2012

Effetto dei monoinsaturi sui markers di infiammazione: una review che mostra pochi dati

Basu A et al., ATVB 2006

Effetto di una dieta ricca di mandorle sui markers di infiammazione e di stress ossidativo in pazienti con diabete di tipo 2.

Total antioxidant capacity and total phenolic
plasma were not altered by the almond diet
Plasma MDA was also not altered by the al

Mandorle: 56 g/die, pari al 20% circa delle calorie

Liu JF et al., Eur J Nutr 2013

Inflammatory markers and total nut and seed consumption, Multi-Ethnic Study of Atherosclerosis.

Inflammatory marker†	Frequency of total nut and seed consumption				*p* for trend
	Never/rare	Less than once/week	1–4 times/week	≥5 times/week	
C-reactive protein (mg/liter)	(*n* = 917)	(*n* = 2,273)	(*n* = 2,183)	(*n* = 666)	
Age-adjusted	2.06	2.00	1.77***	1.69***	<0.001
Model 1‡	1.98	1.97	1.80**	1.72**	0.003
Model 2§	1.97	1.96	1.81*	1.71**	0.003
Model 3¶	1.91	1.94	1.82	1.78	0.06
Interleukin-6 (pg/ml)	(*n* = 898)	(*n* = 2,229)	(*n* = 2,133)	(*n* = 654)	
Age-adjusted	1.30	1.24*	1.19***	1.15***	<0.001
Model 1‡	1.25	1.24	1.21	1.15**	0.004
Model 2§	1.25	1.24	1.21	1.14**	0.003
Model 3¶	1.23	1.24	1.21	1.17	0.05
Fibrinogen (mg/dl)	(*n* = 915)	(*n* = 2,274)	(*n* = 2,182)	(*n* = 669)	
Age-adjusted	348	339***	335***	329***	<0.001
Model 1‡	343	338	338*	331***	0.003
Model 2§	343	338*	338*	331***	0.003
Model 3¶	342	338	338	332**	0.03

Jiang R et al, Am J Epidemiol 2006

Effetti di oli di oliva con differente tenore di polifenoli sui markers di infiammazione e altri parametri in soggetti ipertesi

ADMA (µmol/l)	0.82 ± 0.04	−0.09 ± 0.01	−0.04 ± 0.03	<0.0
Ox-LDL (µg/l)	153.0 ± 51.0	−28.2 ± 28.5	−6.9 ± 22.2	<0.0
CRP (mg/l)	1.6 ± 0.9	−1.9 ± 1.3	−0.6 ± 0.9	<0.0
Blood pressure (mm Hg)				
Systolic	134.14 ± 9.32	−7.91 ± 9.51	−1.65 ± 8.22	<0.0
Diastolic	84.64 ± 8.52	−6.65 ± 6.63	−2.17 ± 7.24	<0.0
IRH measurement (PU)				
HA	1,084 ± 266	+345 ± 386	+36 ± 367	<0.0

Table values are mean ± SD, *n* = 24.
ADMA, asymmetric dimethylarginine; BP, blood pressure; CRP, C-reactive protein; HA, hyperemic area; IRH, ischemia-reactive hyperemia; ox-LDL, oxidized low-densi
PU, perfusion units.
**P* value for the comparison across the intervention groups by ANOVA.

AMERICAN JOURNAL OF HYPERTENSION | VOLUME 25 NUMBER 12 | DECEMBER 2012

Moreno-Luna R A et al, Am J Hypertens 2012

Effetti di oli di oliva con differente tenore di polifenoli sui markers di infiammazione e altri parametri in soggetti ipertesi

ADM	<0.0
Ox-L	<0.0
CRP	<0.0
Bloo	
Sy	<0.0
D	<0.0
IRH	
H	<0.0

Table ... ADM ... L, oxidized low-densi ... PU, p ... *P va

Figure 1 | Changes in (a) systolic and (b) di
to baseline values in young women with hi
hypertension after 2 months on the polyph
the best-fit line, $n = 24$.

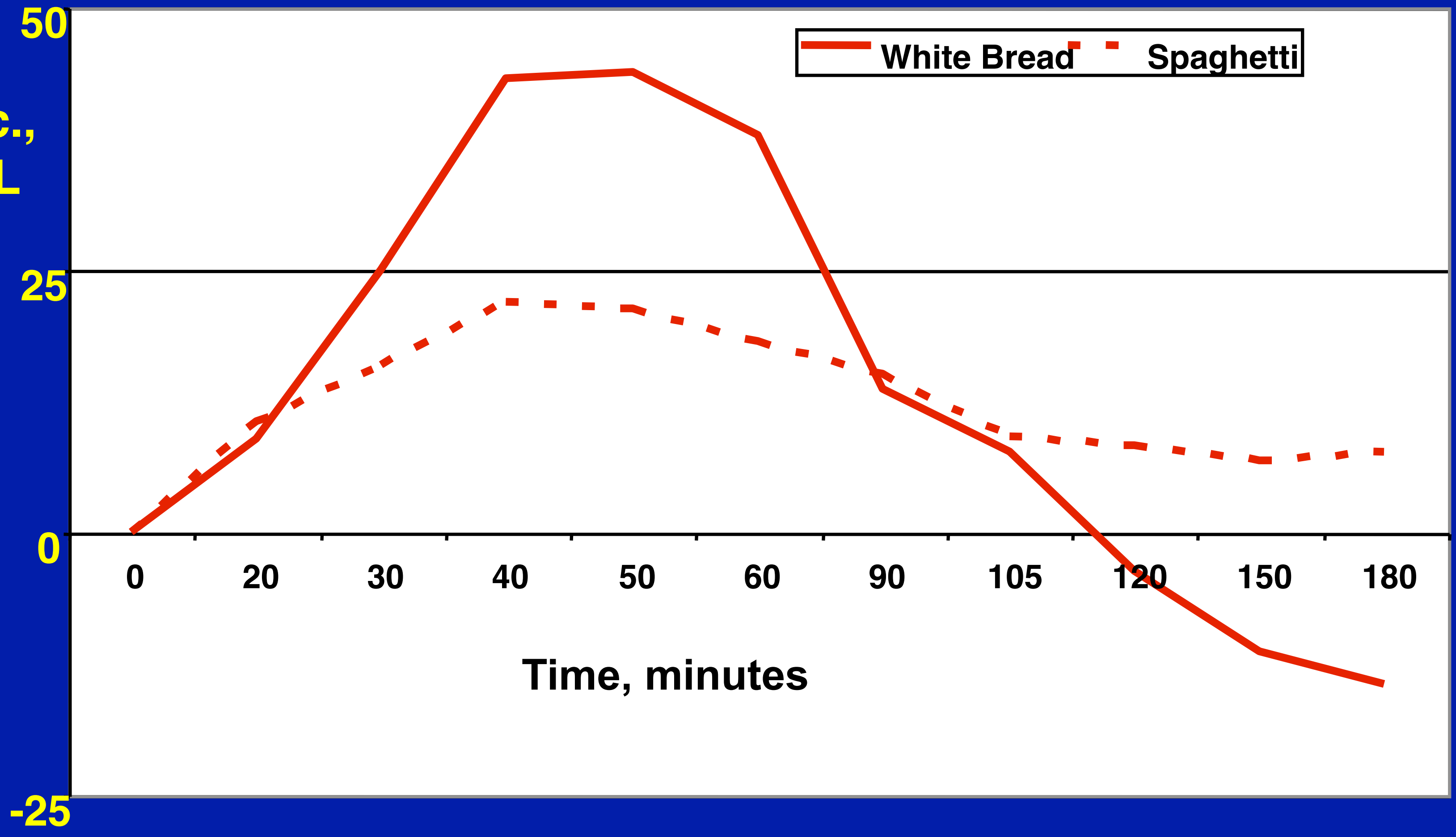
1302

Moreno-Luna R A et al, Am J Hypertens 2012

Nutrizione e fenomeni infiammatori

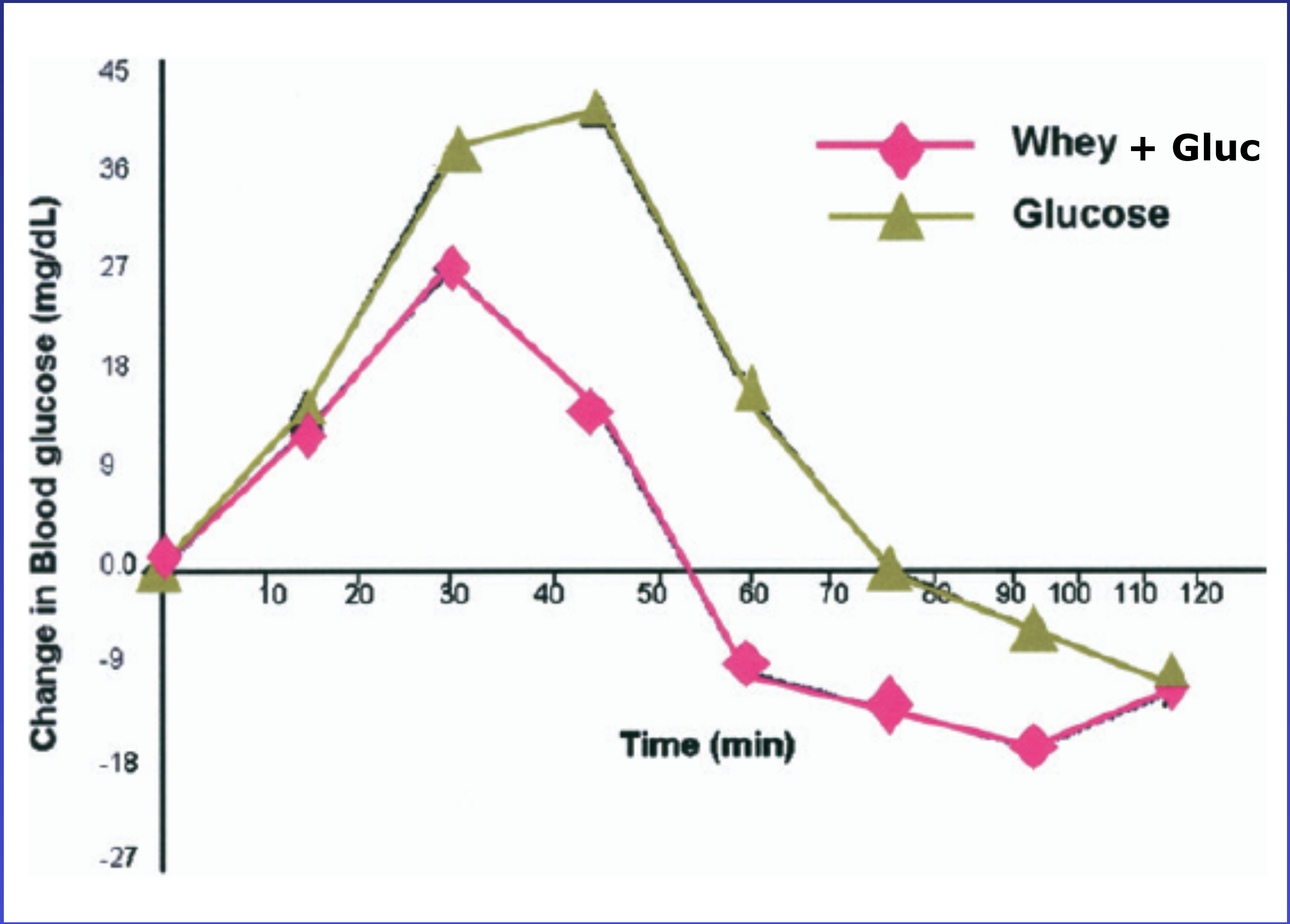
Infiammazione -	Infiammazione +
Diete a basso indice glicemico	Acidi grassi “trans”
Diete ipocolesterole-mizzanti	Diete ad alto indice glicemico
Alcool a dosi moderate	
Acidi grassi omega-3	
Nuts, alcuni polifenoli	

GLYCEMIC RESPONSE AFTER A WHITE BREAD OR A SPAGHETTI MEAL



Ludwig, J Am Med Assoc, 2002

Effects of whey proteins on the glycemic response to a glucose solution

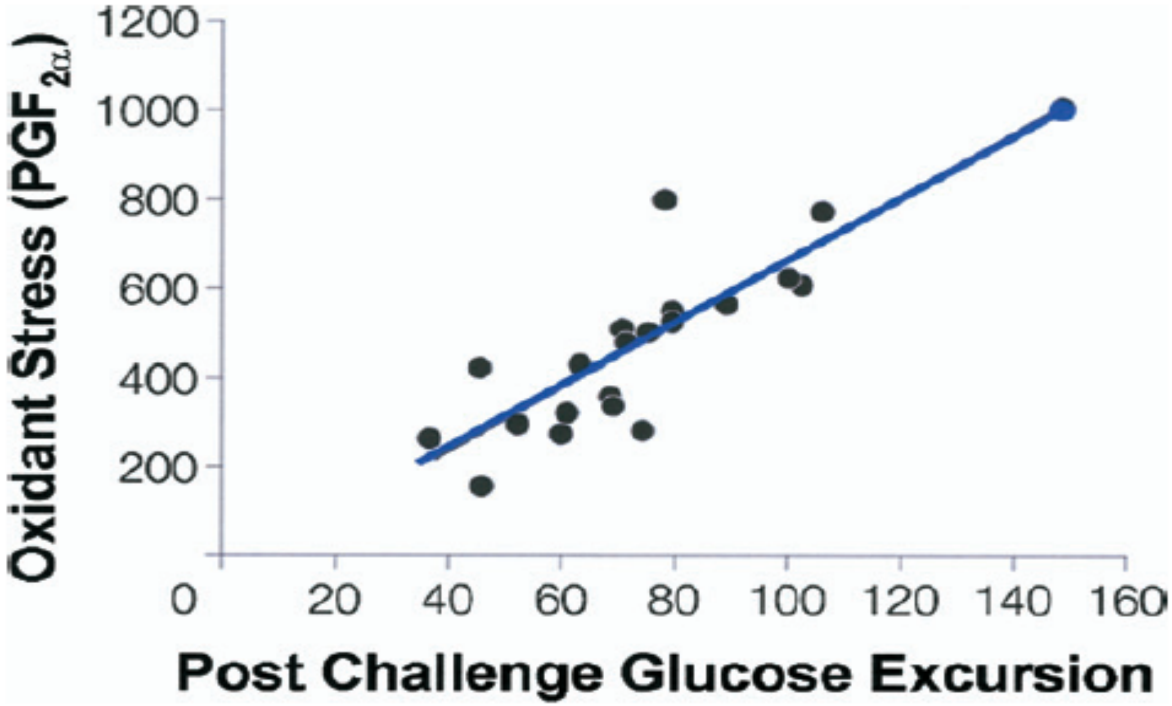


Nillson M et al, Am J Clin Nutr 2007

Indice Glicemico (IG), relativo al Pane Bianco, di alcuni alimenti

Cibo	Indice Glicemico
Pane bianco	100
Pomodori	13
Ciliegie	32
Fagioli	40/60
Mele	52
Spaghetti	52
Maccheroni	68
Pizza	86
Saccarosio	92
Polenta	106
Patate bollite	120
Glucosio	138

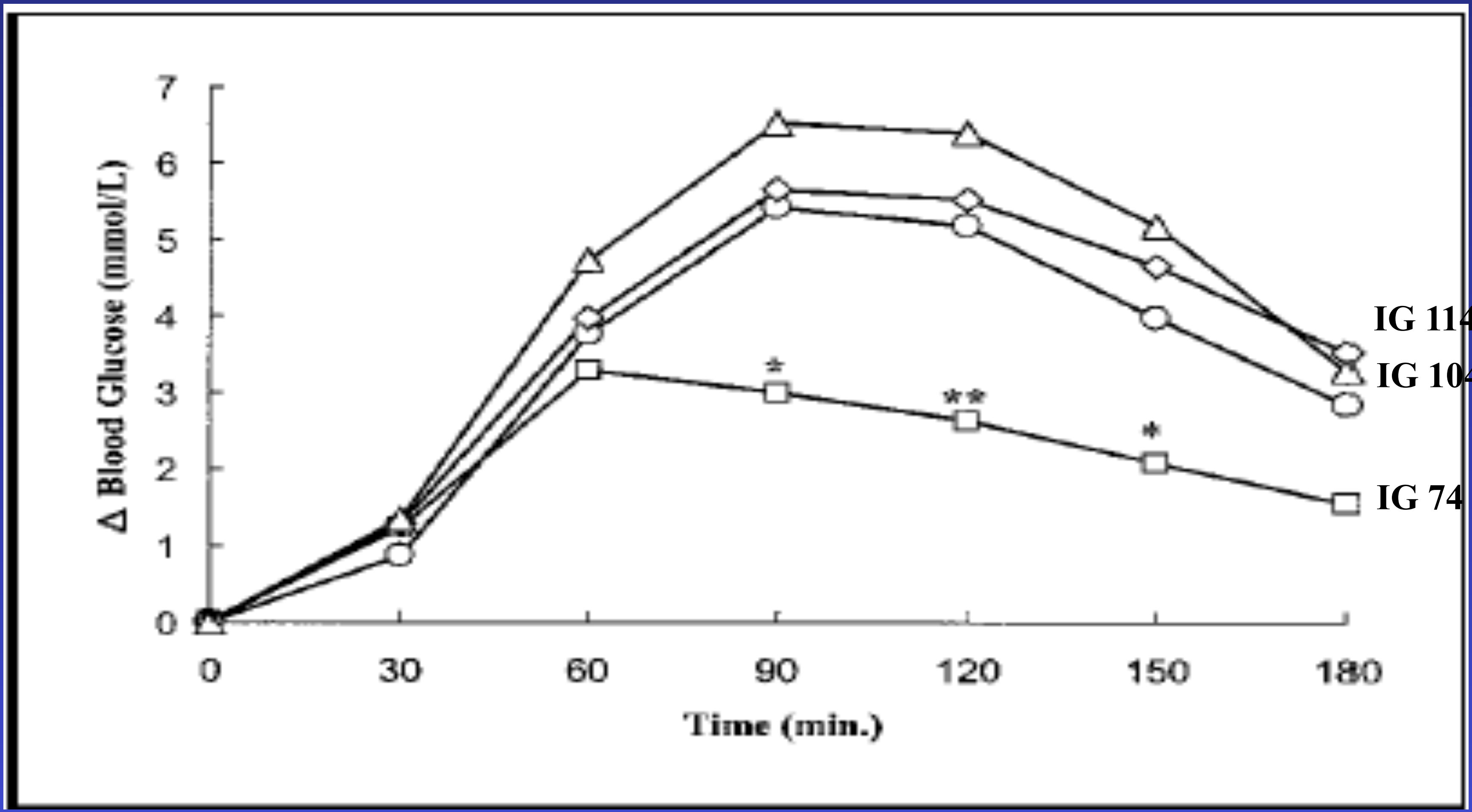
Post-prandial glucose excursions and urinary excretion of 8-iso PGF2 alfa, a measure of oxidant stress.



Glucose Excursion
Directly Related to Oxidant Stress

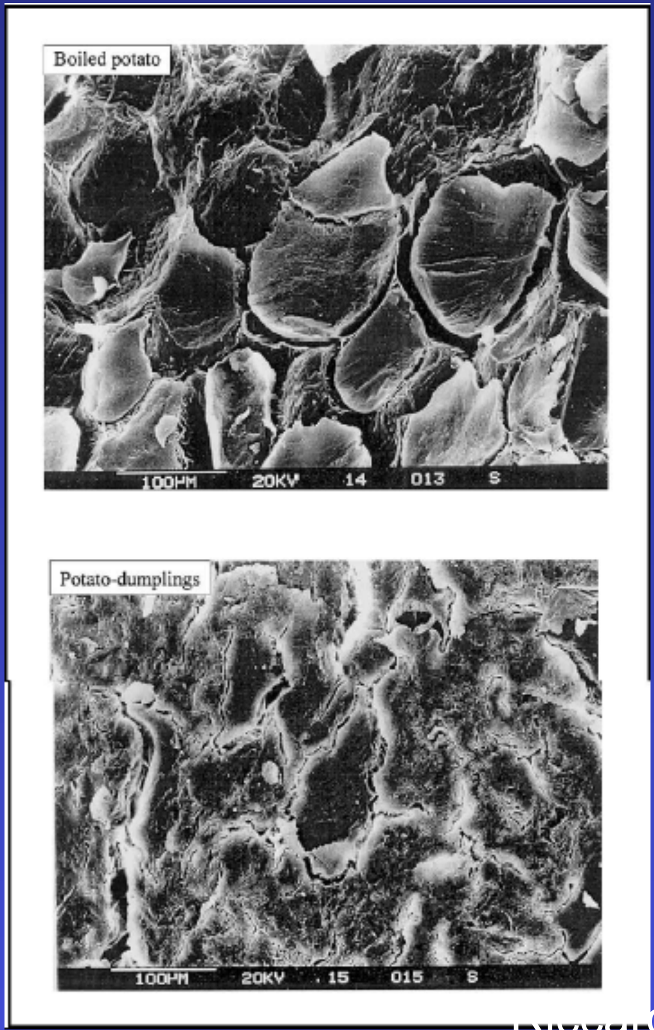
Monnier L et al, JAMA 2006

Il glucosio ematico aumenta rispetto ai livelli basali dopo assunzione di pane bianco ● pane tostato ▲ , pizza ◆ e gnocchi di patate ■ . *p≤ 0.05, ***p*≤0.01 gnocchi vs pane bianco.



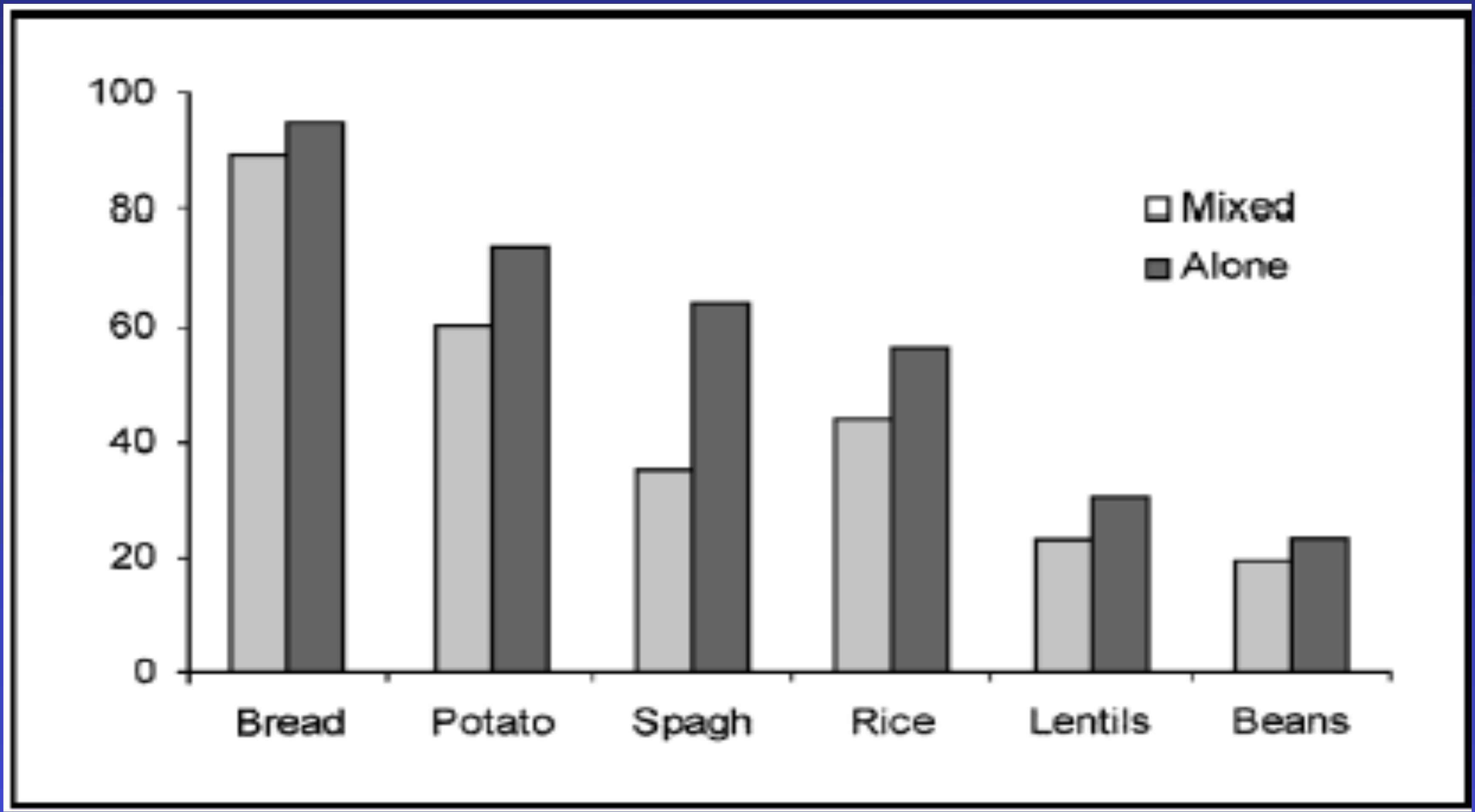
Riccardi, Nutrition Reviews, 2003

L'analisi al microscopio elettronico a scansione dimostra che gli gnocchi hanno una struttura compatta come altri alimenti a base di carboidrati a basso indice glicemico. Al contrario negli alimenti lievitati l'elevata porosità conseguente all'incorporazione di gas che espande durante la cottura, aumenta enormemente la superficie esposta all'attività enzimatica.

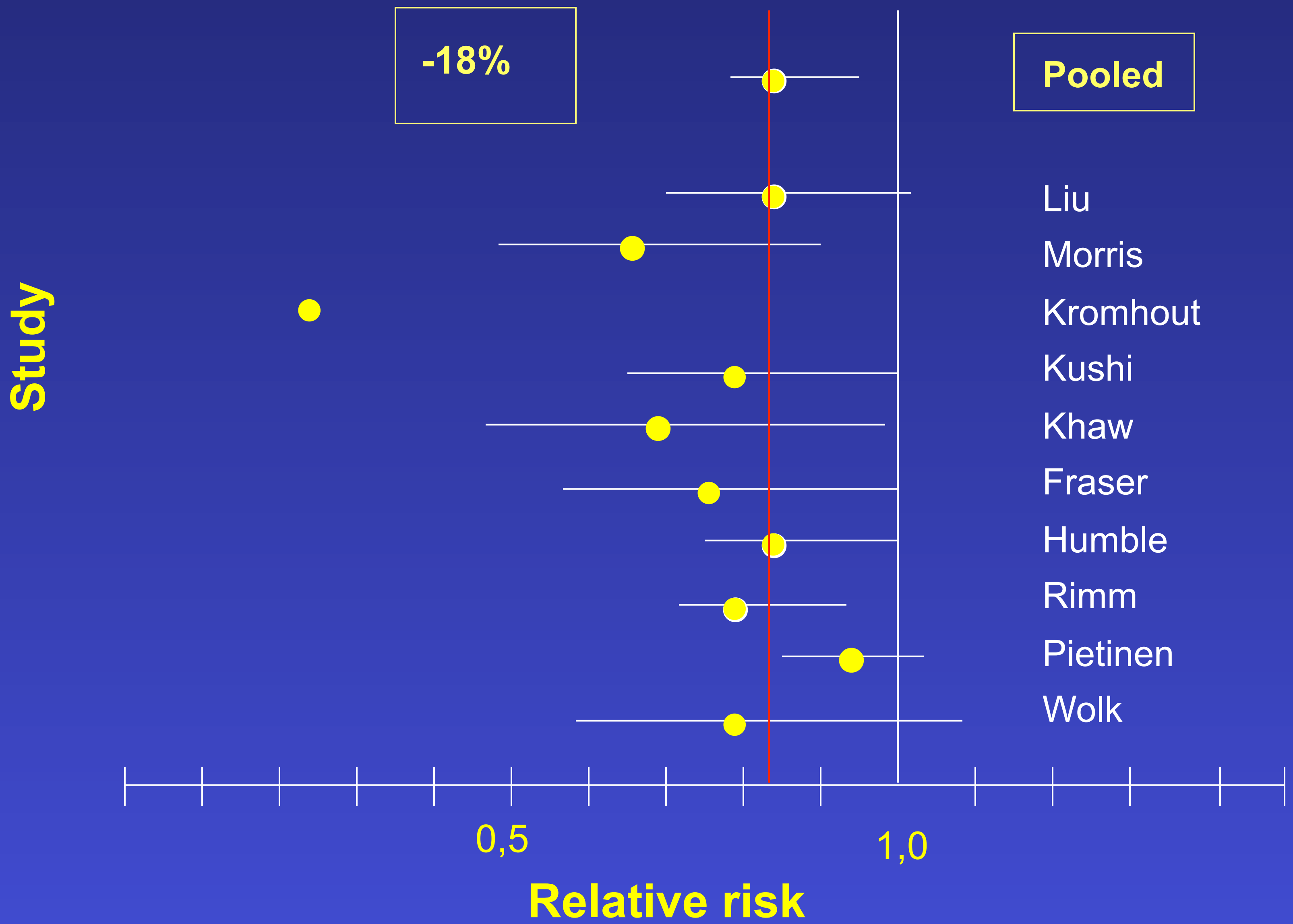


Riccardi, Nutrition Reviews, 2003

Indice glicemico di alcuni alimenti assunti singolarmente o con pasti composti



Dietary Fiber and Cardiovascular Disease: a Metanalisis



Liu, 2002

Fiber intake and PCR in 4.900 USA adults (NAHNES 99-00)

TABLE 3 Odds Ratios (ORs) and 95% Confidence Intervals (CIs) of the Likelihood of Elevated C-Reactive Protein (>3.0 mg/L)

Dietary Fiber Quartile (g/d)	Unadjusted Model		Adjusted Model		Highly Sensitive CRP (mg/L)	
	OR	95% CI	OR	95% CI	Median	95% CI
Q1 <8.4	1.00	1.00	1.00	1.00	2.30	2.10–2.51
Q2 8.4–13.3	0.95	0.78–1.17	0.75	0.53–1.07	2.04	1.74–2.34
Q3 13.3–19.5	0.75	0.60–0.95	0.64	0.43–0.96	1.89	1.46–2.33
Q4 >19.5	0.68	0.55–0.84	0.58	0.38–0.88	1.76*	1.58–1.94

*The median for the highest quartile is significantly lower than the median for the lowest quartile (p <0.05).

Adjusted models include age, race, gender, body mass index, smoking status, alcohol consumption, exercise, medications, and total caloric intake. Estimated United States population median highly sensitive CRP and 95% CI of the medians are shown for each quartile of fiber consumption.

From a fiber intake < 8,4 g/die to an intake > 19,5 g/die, CRP decreases from 2,3 to 1,8 mg/L (- 20%; p<0,05)

King D, Am J Cardiol 2003

Average weight gain (in kg) according to quintiles (Q) of change in intake in the Nurses' Health Study from 1984 to 1996

	Changes in intake by quintile					
	Q1	Q2	Q3	Q4	Q5	*P* for trend
Whole grain						
Median (servings · 1000 $kcal^{-1}$ · d^{-1})	-0.59	-0.09	0.11	0.38	0.90	
Model 1[1]	4.58 ± 0.10[2]	4.23 ± 0.09	4.4 ± 0.09	4.32 ± 0.09	4.07 ± 0.09	< 0.0001
Model 2[3]	4.51 ± 0.10	4.35 ± 0.09	4.60 ± 0.09	4.45 ± 0.09	4.12 ± 0.09	< 0.0001
Refined grain						
Median (servings · 1000 $kcal^{-1}$ · d^{-1})	-0.91	-0.29	0.02	0.32	0.86	
Model 1[1]	3.94 ± 0.09	4.15 ± 0.09	4.34 ± 0.09	4.47 ± 0.09	4.71 ± 0.09	< 0.0001
Model 2[3]	4.25 ± 0.10	4.3 ± 0.09	4.38 ± 0.09	4.44 ± 0.09	4.68 ± 0.09	< 0.0001
Dietary fiber						
Median (g/d)	-3.40	0	2.20	0.21	0.40	
Model 1[1]	5.10 ± 0.09	4.44 ± 0.09	4.24 ± 0.09	4.16 ± 0.09	3.68 ± 0.09	< 0.0001
Model 2[3]	5.16 ± 0.10	4.6 ± 0.09	4.43 ± 0.09	4.26 ± 0.09	3.64 ± 0.09	< 0.0001

Liu, *Am J Clin Nutr* 2003

Total mortality, according to frequency of nut consumption

consumption and total mortality remained largely unchanged when we excluded participants who had ever smoked or who had an extremely high or low BMI; when we excluded participants with diabetes at baseline and suspended updating of dietary variables after a diagnosis of diabetes; when we adjusted for total sodium intake, Mediterranean-diet score, olive-oil intake, and a propensity score that predicted nut intake levels; when we continued to update dietary information after diagnosis of a chronic disease; and when we excluded the first 2 years of follow-up and added a 2-year lag period between nut-intake assessment and each follow-up period (Table S5 in the Supplementary Appendix). Furthermore, the array-approach sensitivity analysis[36] showed

dicted relative risk, ≤0.60) or substantially imbalanced between participants who ate nuts and those who did not (e.g., ≥40% difference in prevalence between those who eat nuts seven or more times per week vs. never) in order to attenuate the inverse association sufficiently so that it that was no longer significant (Tables S6 and S7 in the Supplementary Appendix).

SUBGROUP ANALYSES

In separate analyses of the consumption of peanuts and tree nuts, the associations with total and cause-specific mortality were similar for the two types of nuts (Fig. 1, and Table S8 in the Supplementary Appendix). When consumption of nuts two or more times per week was compared

Bao Y et al, N Engl J Med, Nov 21 2013

Cause specific mortality, according to frequency of nut consumption

Hazard Ratio (95% CI) Hazard Ratio (95% CI) Hazard Ratio (95% CI)

Figure 1. Hazard Ratios for Death from Any Cause and from Specific Causes, According to Frequency of Nut Consumption and Type

Multivariate hazard ratios for death among study participants who consumed nuts two or more times per week versus those w consumed nuts were adjusted for age; race; body-mass index; level of physical activity; status with regard to smoking, whether examination was performed for screening purposes, current multivitamin use, and current aspirin use; status with regard to a fam of diabetes mellitus, myocardial infarction, or cancer; status with regard to a history of diabetes mellitus, hypertension, or hyperch emia; intake of total energy, alcohol, red or processed meat, fruits, and vegetables; and, for women, menopausal status and horm For further details of these variables, see Figure S1 in the Supplementary Appendix. Results were pooled with the use of the ra effects model. P>0.05 for heterogeneity between women and men in all categories of nut consumption. The risk estimates for ot gories of nut consumption are shown in Table S8 in the Supplementary Appendix. Horizontal lines represent 95% confidence i

with no nut consumption, the pooled multivariate-adjusted hazard ratios for death were 0.88 (95% CI, 0.84 to 0.93) for peanuts and 0.83 (95% CI, 0.79 to 0.88) for tree nuts.

In analyses stratified by other pote factors for death, the inverse associ tween nut consumption and total mort sisted in all subgroups (Fig. 2, and Ta

Bao Y et al, N Engl J Med, Nov 21 2013

Energy, fatty acid, phenolic, and sterol composition of an average portion of nuts

Nut (28 g)	Energy	Fat	SFA	MUFA	PUFA	LA	ALA	TPs	PSs	Folate	Vitamin E
	kcal	*g*	*g*	*g*	*g*	*g*	*g*	*mg* GAE	*mg*	*µg* DFE	*mg*
Almonds	162	14.2	1.1	9.0	3.4	3.4	0.0	117	33.6	14	7.4
Cashews	154	13.0	2.6	7.6	2.2	2.2	0.0	76	44.2	7	0.3
Hazelnuts	176	17.0	1.3	12.8	2.2	2.2	0.0	82	26.2	32	4.3
Macadamias	201	21.2	3.4	16.5	0.4	0.4	0.1	45	32.5	3	0.2
Pecans	193	20.2	1.7	11.4	6.0	5.8	0.3	464	28.6	6	0.4
Pistachios	156	12.4	1.5	6.5	3.8	3.7	0.1	565	59.9	14	0.7
Walnuts	183	18.3	1.7	2.5	13.2	10.7	2.5	436	20.2	28	0.2
Peanuts	149	13.8	1.9	6.8	4.4	4.4	0.0	117	61.6	68	2.4

[1] Values presented are for raw nuts. Data are from reference 16. ALA, α-linolenic acid; DFE, dietary folate equivalents; GAE, gallic acid equivalents; LA, linoleic acid; PS, plant sterol; TP, total phenol.

Pribis P et al, Am J Clin Nutr 2014

Cosa si intende per "consumo di dosi moderate di alcool"?

Definizione comunemente utilizzata in Italia:

1-2 drink al giorno per le donne e
2-3 drink al giorno per gli uomini

Un drink è definito come:

- **330 mL di birra**
- **150 mL di vino**
- **40 mL di liquori**

Il contenuto di alcool in ogni drink è di circa:

10-13 g

Consumo di alcool e mortalità cardiovascolare in pazienti con malattia CV: una metanalisi italiana

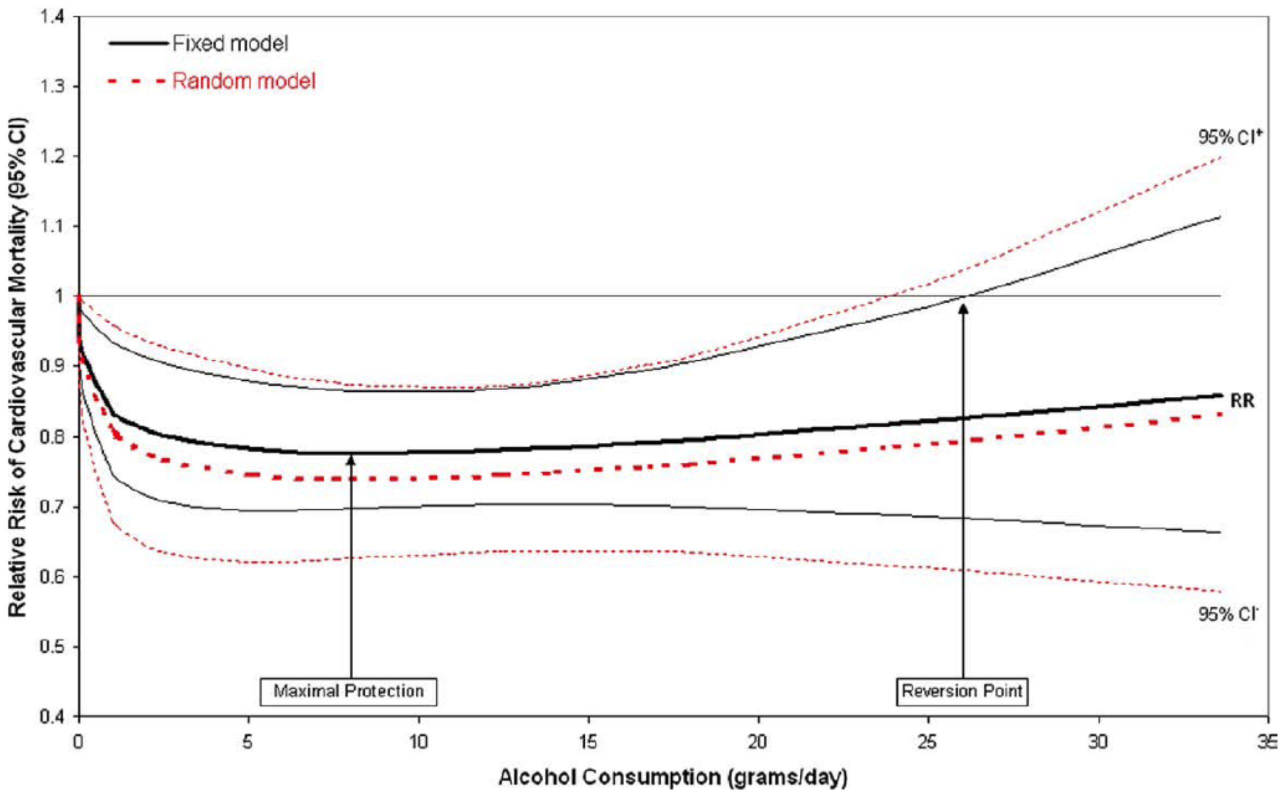


Figure 3 **Alcohol Consumption in Relation to Cardiovascular Mortality in Cardiovascular Disease Patients**

Pooled curves of relative risk of cardiovascular mortality and alcohol intake, extracted from 7 independent relationships using fixed **(solid lines)** and random **(dotted lines)** models. RR = relative risk; 95% CI^- = lower value of confidence interval; 95% CI^+ = upper value of confidence interval.

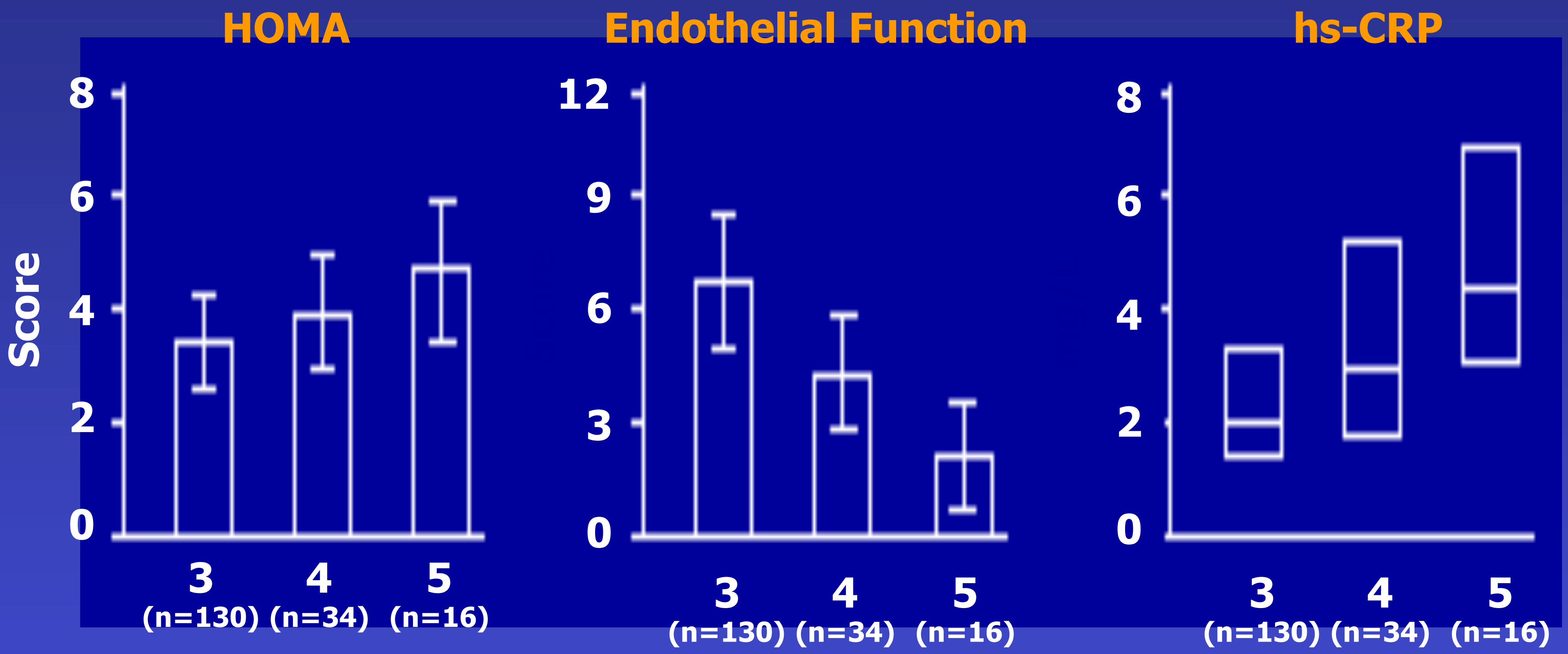
Costanzo S et al, *JACC* 2010

Mediterranean-Style Diet and Metabolic Syndrome

- Subjects: 180 patients (99 males and 81 females) with the metabolic syndrome as defined by the ATPIII.
- Intervention: Mediterranean-style diet with increased amounts of whole grain, fruits, vegetables, nuts and olive oil.
- Main outcome measures: nutrient intake, endothelial function score, lipid and glucose parameters, insulin sensitivity, CRP and interleukins.

Esposito, JAMA 2004

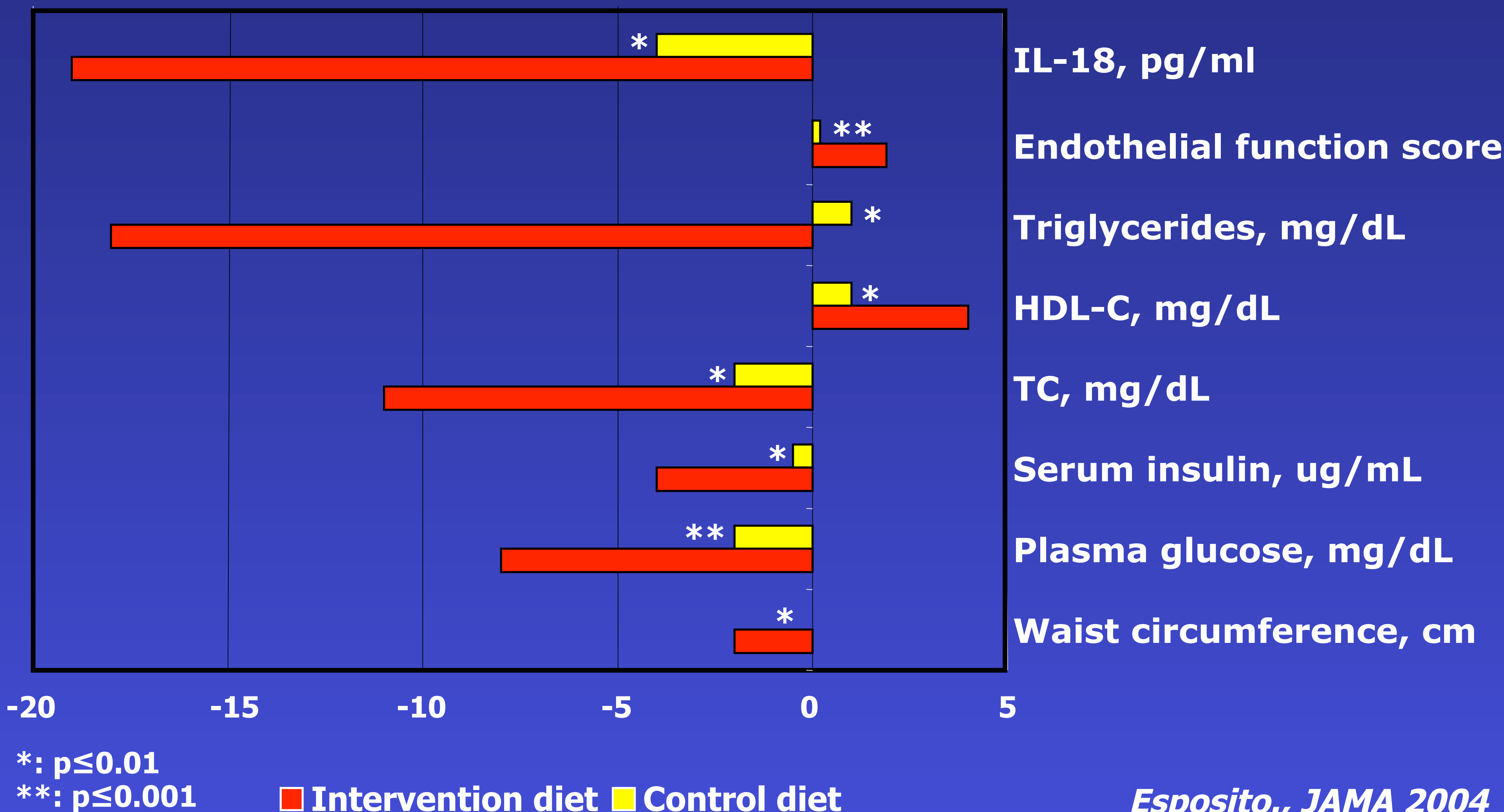
Distribution of HOMA Score, Endothelial Function Score and hs-CRP Levels among the 180 Patients at Baseline, by Presence of 3, 4 and 5 Components of the MS



No. Of Components of the Metabolic Syndrome

Esposito, JAMA 2004

Changes in assessed variables after 2 years of intervention (n=90) and control (n=90) diet, in patients with metabolic syndrome



Esposito., JAMA 2004

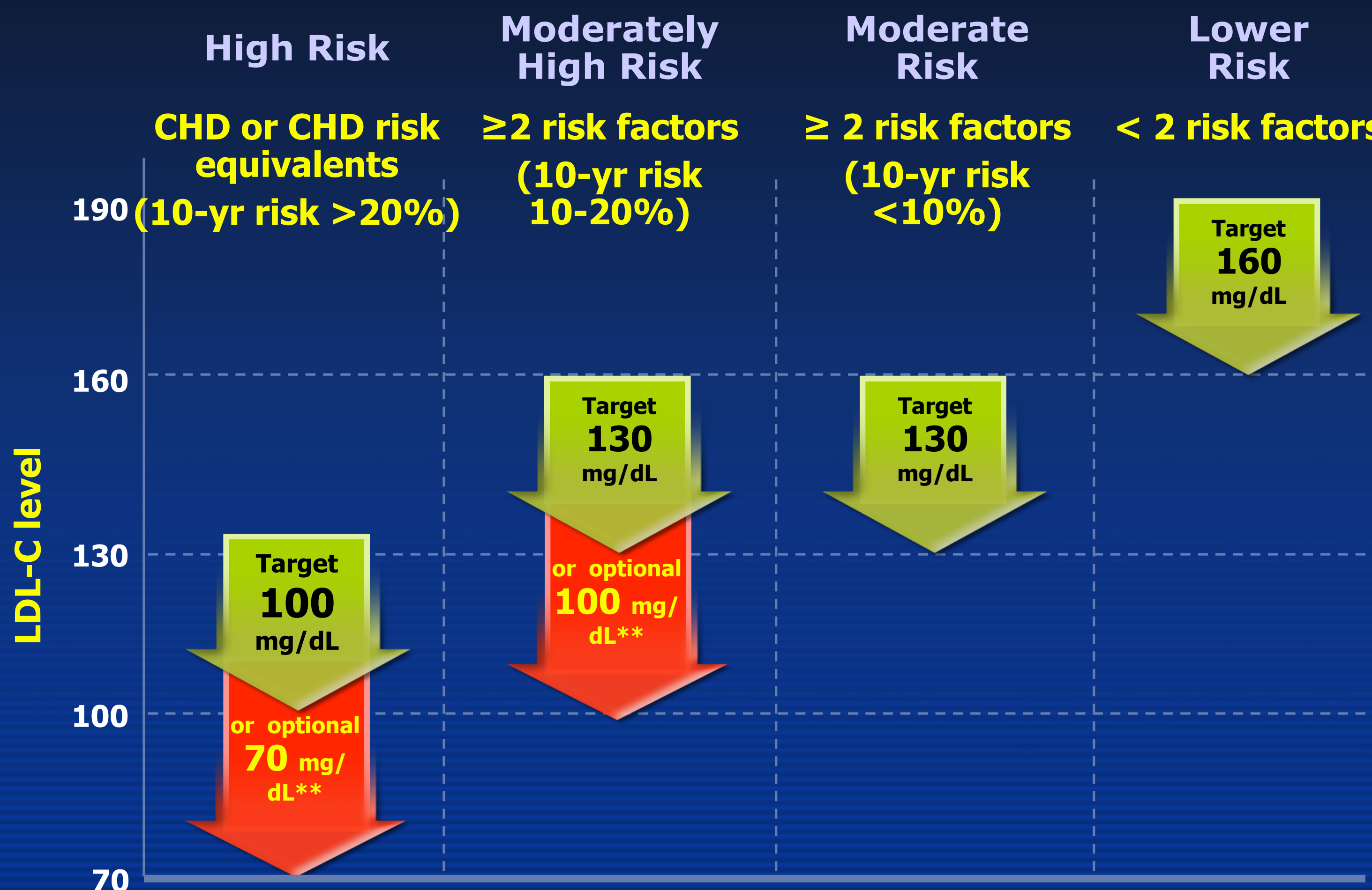
Changes in CRP levels (mg/dL) after 2 years of intervention (n=90) and control (n=90) diet, in patients with metabolic syndrome

	Baseline	2 years
Control diet	**2.9**	**2.8**
Intervention diet	**2.8**	**1.7 *§**

*** $p \leq 0.01$ 2y *vs* baseline**
§ $p \leq 0.01$ intervention *vs* control diet at 2 y

Esposito., JAMA 2004

NCEP ATP III: LDL-C Goals (2004 modifications)



* Therapeutic option in very high-risk patients and in patients with high TG, non-HDL-C <100 mg/dL; ** Therapeutic option;

70 mg/dL = 1.8 mmol/L; 100 mg/dL = 2.6 mmol/L; 130 mg/dL = 3.4 mmol/L; 160 mg/dL = 4.1 mmol/L

Grundy SM et al. *Circulation* 2004; 110:227-239.

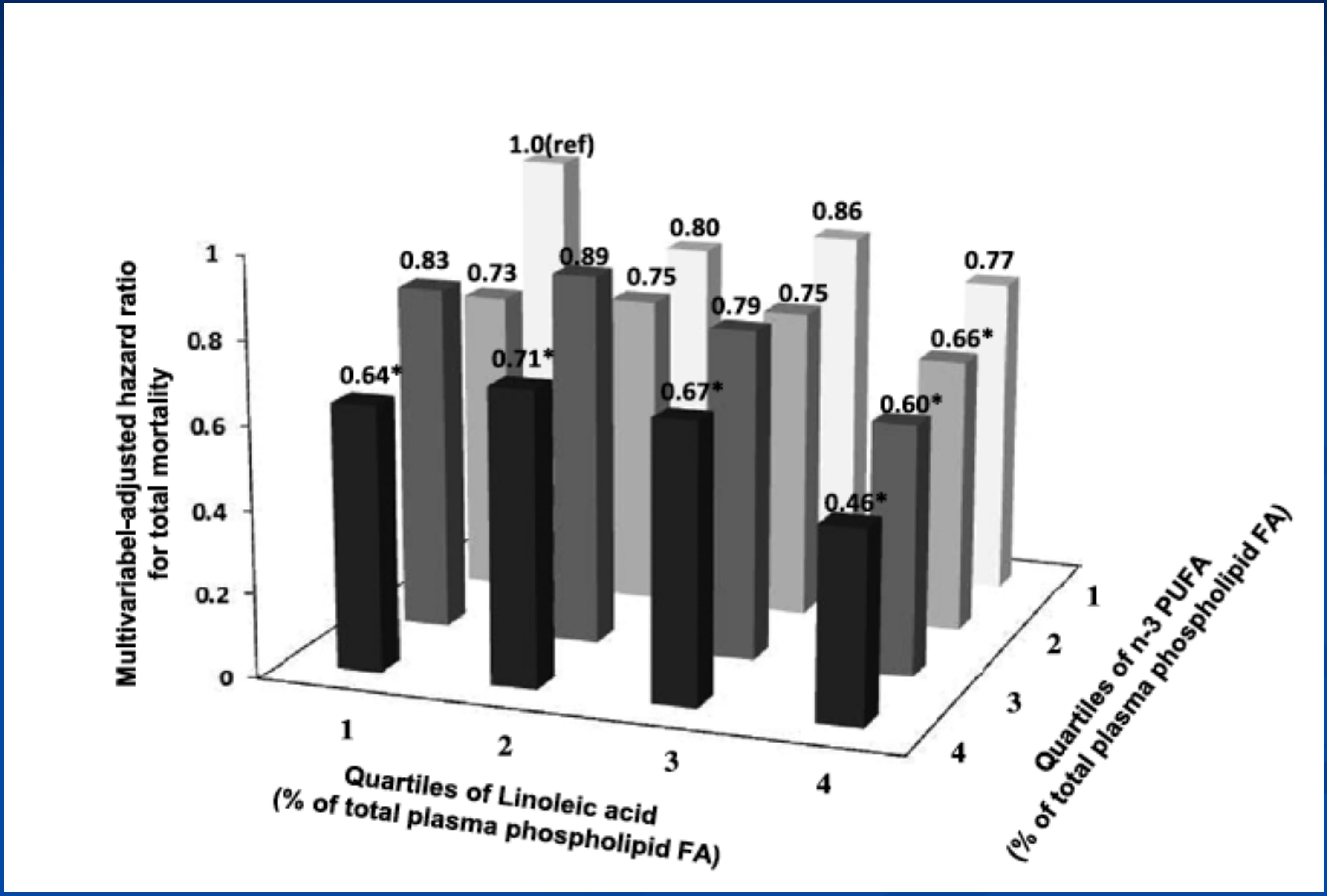
ATP III: Nutritional Components of the TLC (Therapetic Lifestyle Change) Diet

Nutrient	Recommended Intake
Saturated fat*	<7% of total calories
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Total fat	25%–35% of total calories
Carbohydrate	50%–60% of total calories
Fiber	20–30 g/d
Protein	~15% of total calories
Cholesterol	<200 mg/d

*Trans fatty acids also raise LDL-C and should be kept at a low intake.
Note: Regarding total calories, balance energy intake and expenditure to maintain desirable body weight.

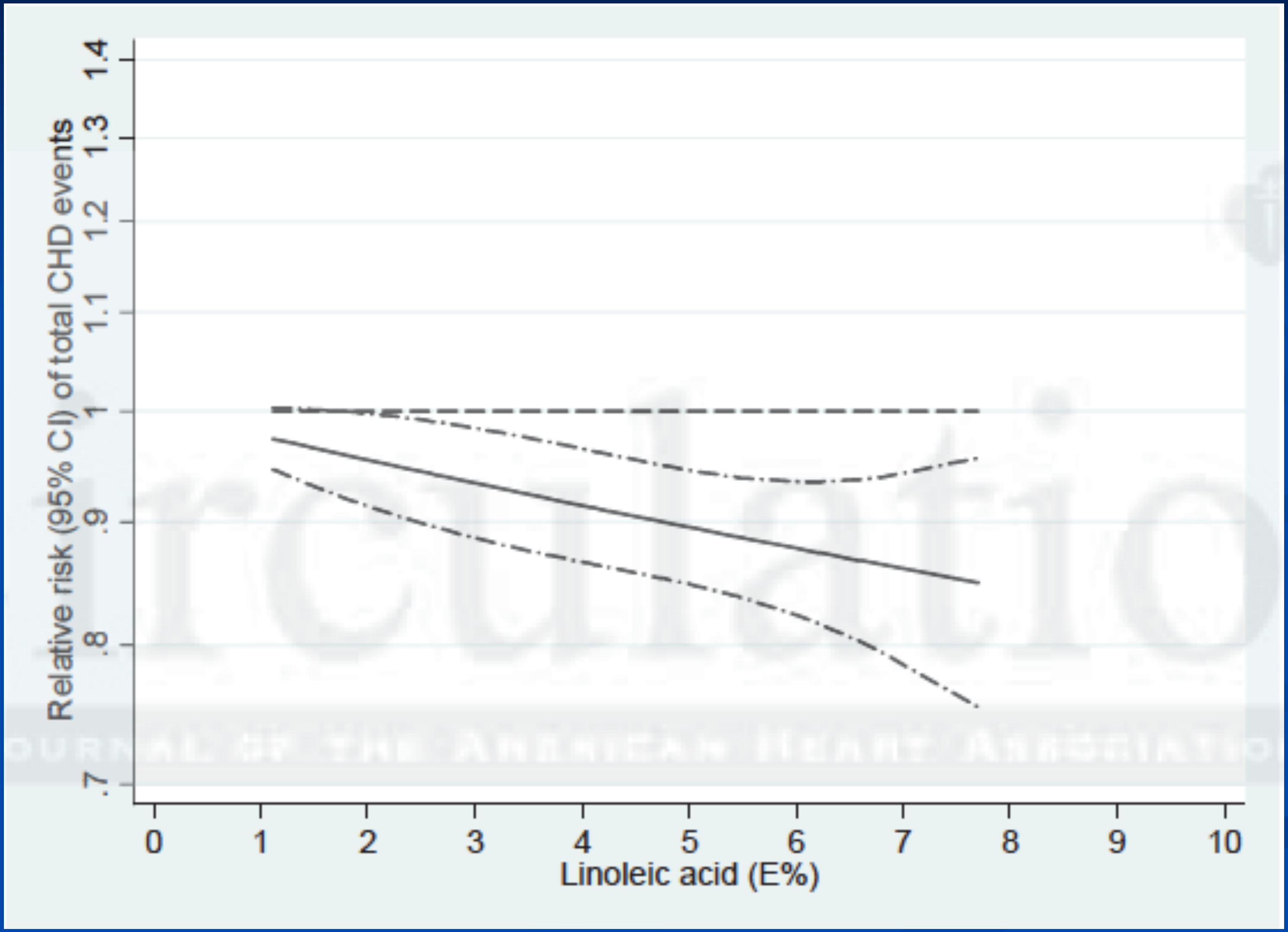
Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

Omega-3, omega-6 and all-cause mortality



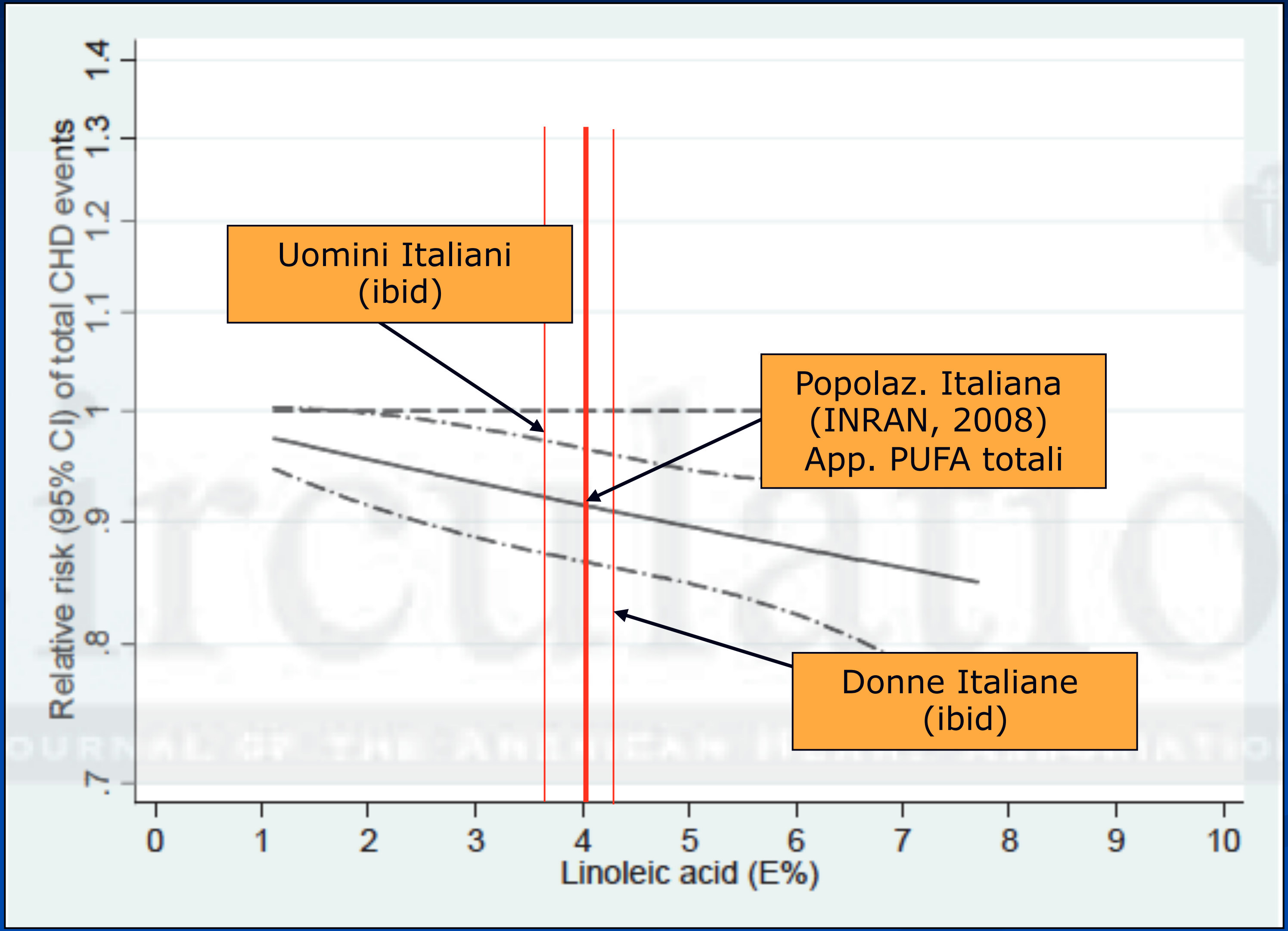
Wu JHY et al, Circulation 2014

Dietary omega-6 and CHD



Farvid MS et al, Circulation 2014

Dietary omega-6 and CHD



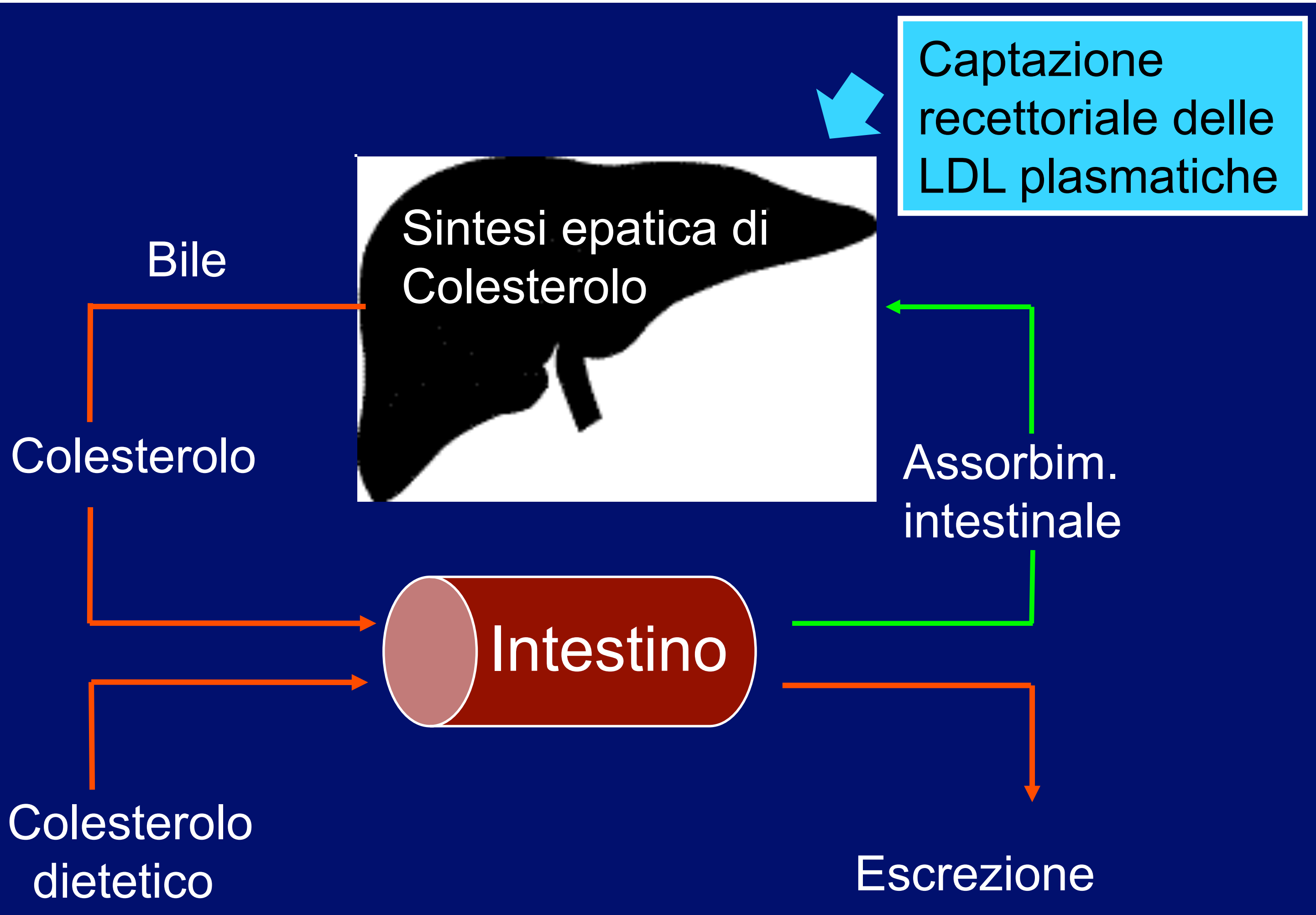
Farvid MS et al, Circulation 2014

Se l’intervento dietetico non è sufficiente:

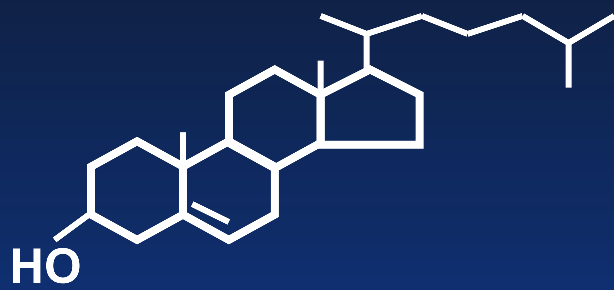
Strategie di potenziamento identificate dall’ATP-III

- Fitosteroli
- Proteine di soia
- Fibra

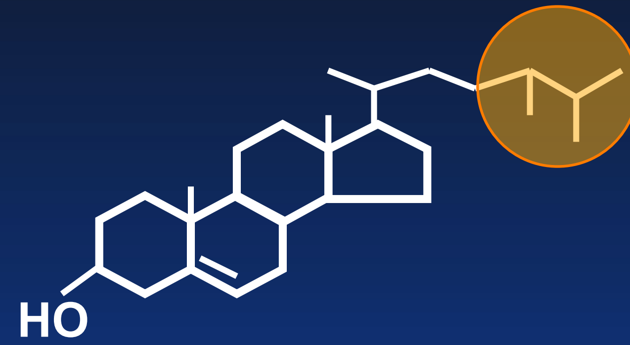
Colesterolo: un complesso sistema a tre vie



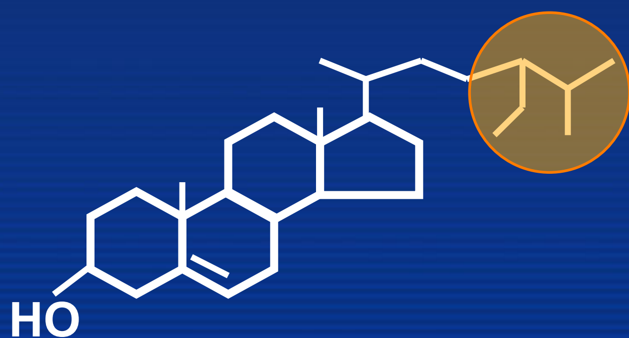
Plant sterols - naturally occurring compounds structurally similar to cholesterol



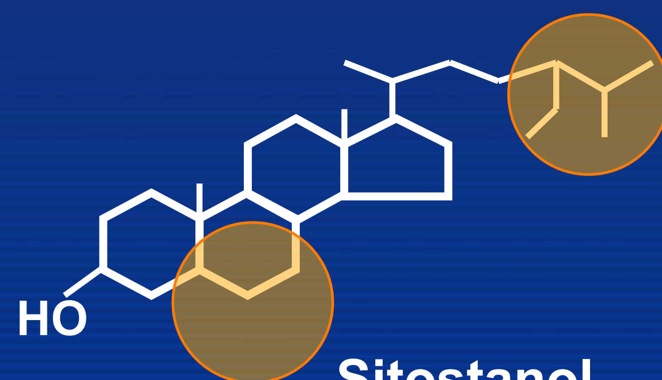
Cholesterol



Campesterol



Sitosterol



Sitostanol

Plant sterol content in foods

Vegetable oils – rich sources of plant sterols

- Corn oil (refined) 715–950 mg/100g
- Rapeseed oil (refined) 250–731 mg/100g
- Soybean oil (refined) 221–328 mg/100g
- Olive oil (extra virgin) 144–150 mg/100g
- Palm oil (refined) 49–61 mg/100g

Fruits, vegetables, cereals & nuts also contain plant sterols

- Apple (one small, 100g): 13 mg
- Orange (one small, 100g): 24 mg
- Broccoli (one cup chopped, 100g): 39 mg
- Carrot (one cup chopped, 100g): 16 mg
- Tomato (one medium, 100g): 4.7 mg
- Wholemeal bread (3 slices, 100g): 86 mg

Sources: Trautwein and Duchateau, Phytosterols: Sources and Metabolism in *Nutrition and Cancer Prevention* 2005; Normen *et al. Eur J Nutr* 1999; Normen *et al. J Food Comp and Analysis* 2002; Weilhrauch *et al. Am Diet Assoc* 1978

Plant sterol intakes in various populations

Data from the Netherlands Cohort Study*

Total plant sterol intake: ♂ 280 mg/day ♀ 240 mg/day

Total plant stanol intake: ♂ 28 mg/day ♀ 23 mg/day

Data from the EPIC Norfolk population**

Total plant sterol intake: ♂ 310 ± 108 mg/day ♀ 303 ± 100 mg/day

Cholesterol intake: ♂ ♀ 260 mg ± 105 mg/day

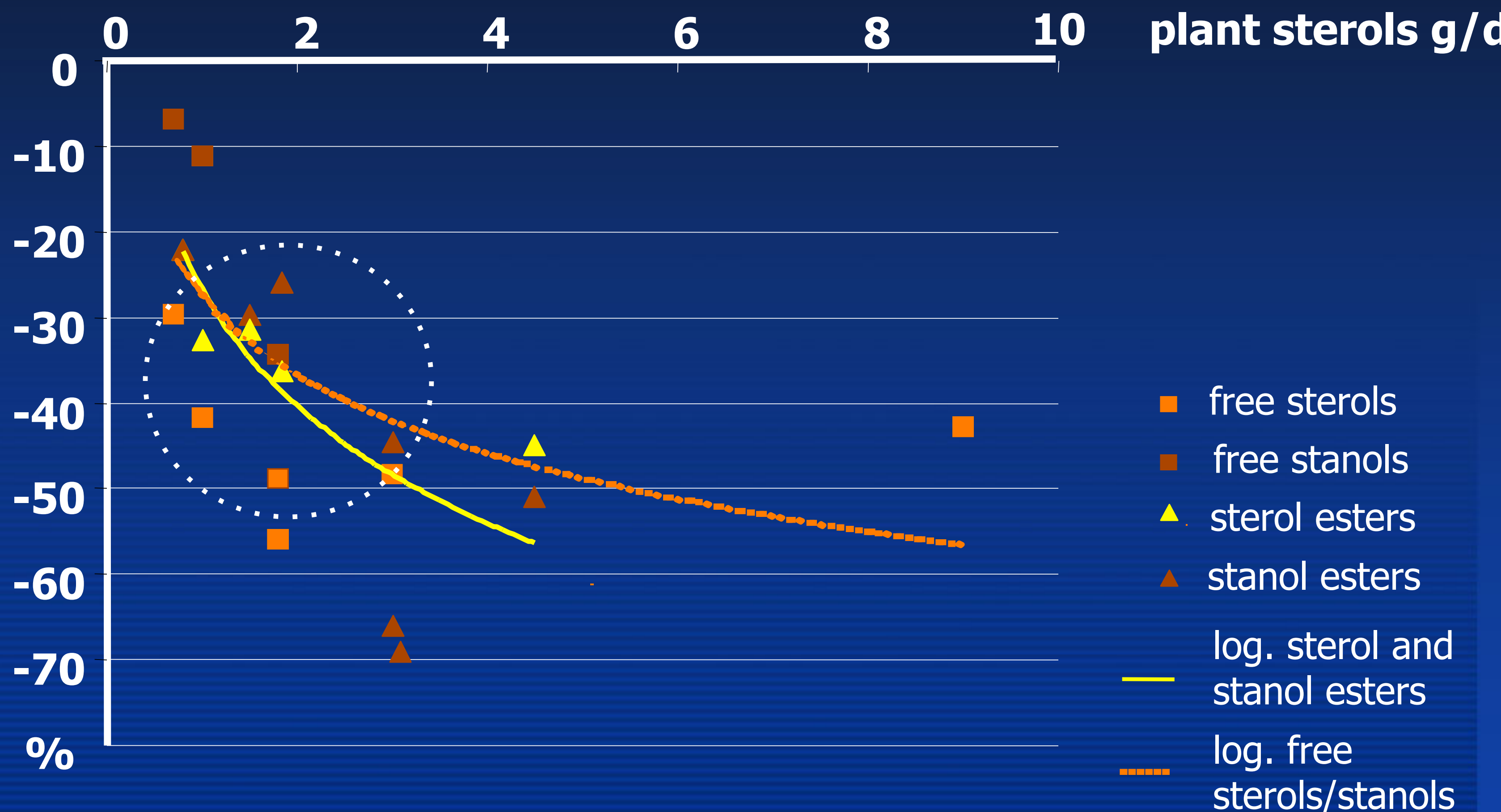
Data from the national FINDIET survey***

Total plant sterol intake: ♂ 305 mg/day ♀ 237 mg/day

Cholesterol intake: ♂ 284 mg/day ♀ 201 mg/day

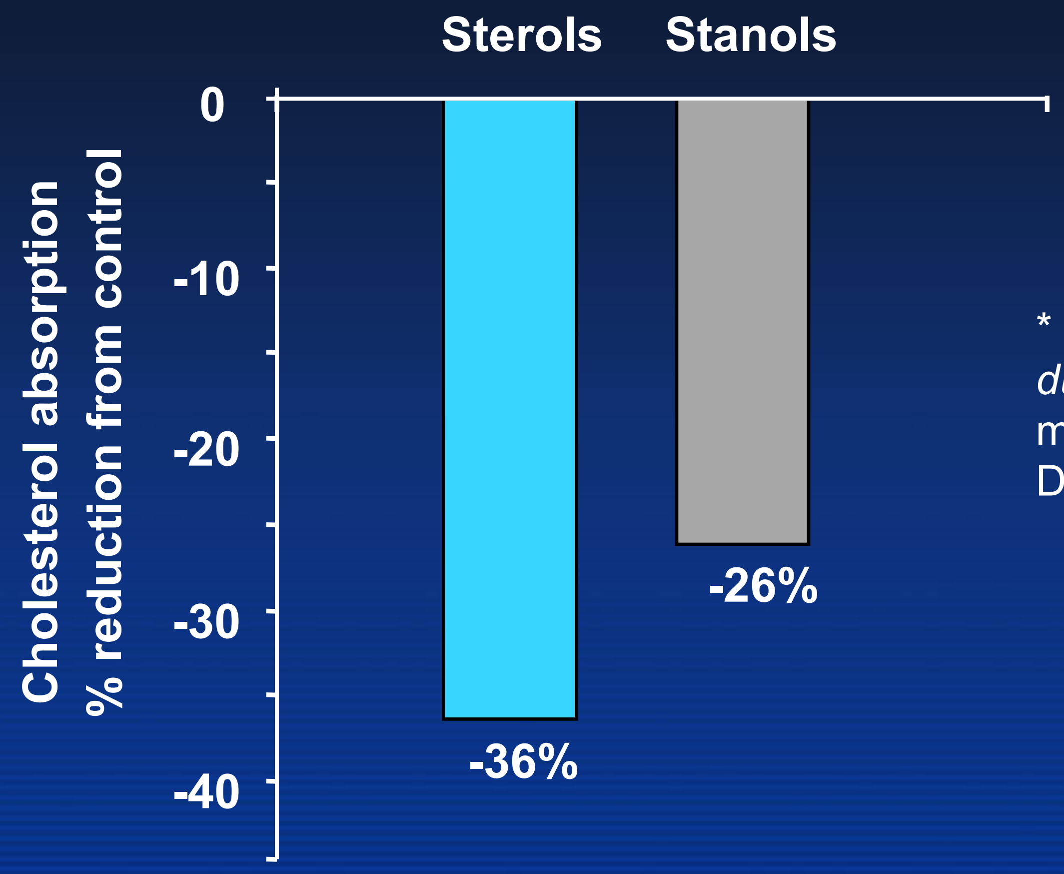
*Normen *et al.*, Am J Clin Nutr, 2001
** Andersson *et al.*, Eur J Clin Nutr, 2004
*** Valsta *et al.*, Br J Nutr, 2004

Reduction of cholesterol absorption by plant sterols: overview of studies



adopted from Normen et al.: "Role of plant sterols in cholesterol lowering" in: Phytosterols as Functional Food Components and Nutraceuticals, 2004

Plant sterol intake leads to reduction in intestinal cholesterol absorption*

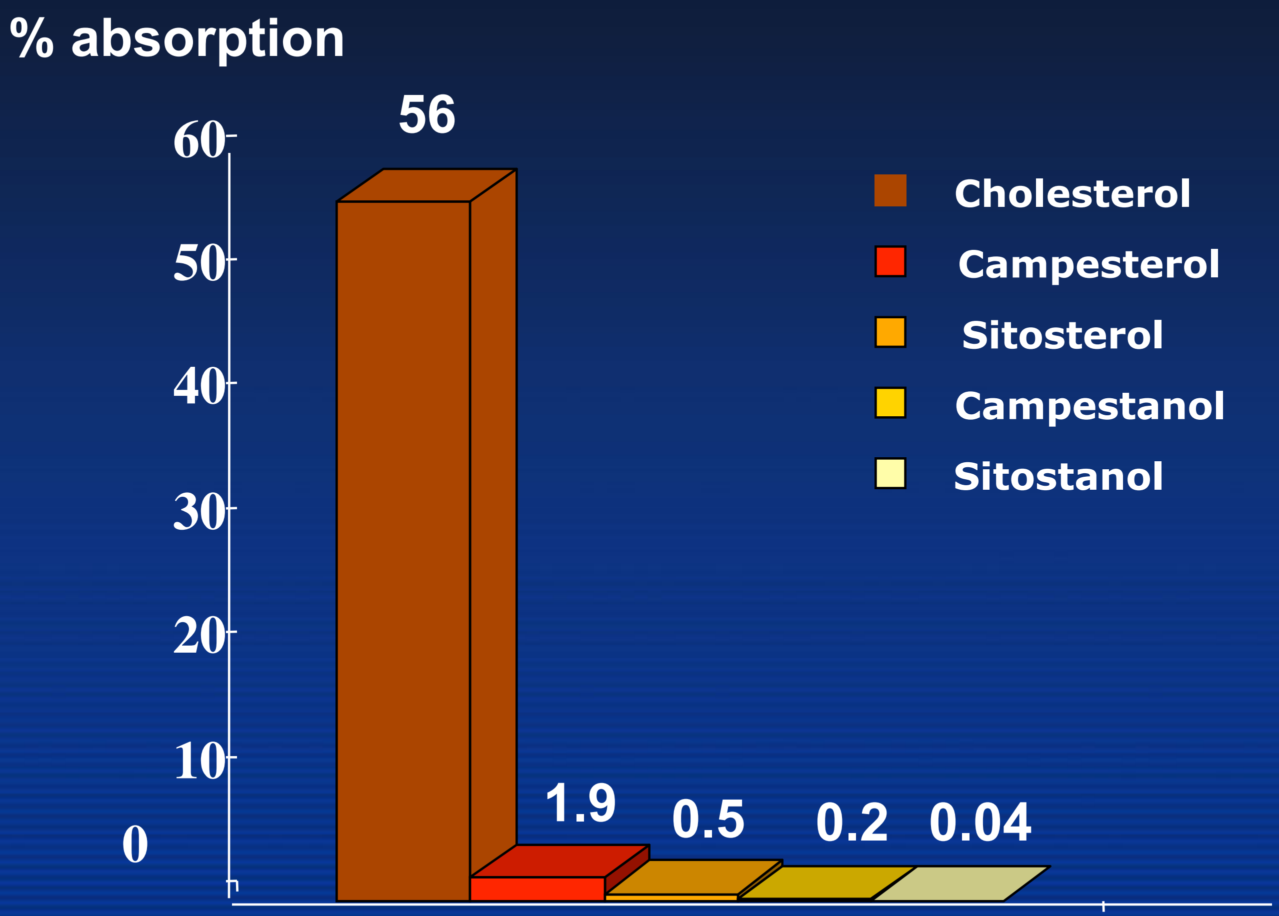


* as measured with the *dual stable isotope ratio* method with ^{13}C- (oral) and D_7 -Cholesterol (iv)

Intake of 23 g/d of spread providing 1.8 g/d of plant sterols or stanols for 3 weeks resulted in a 13.2 % reduction in LDL-cholesterol

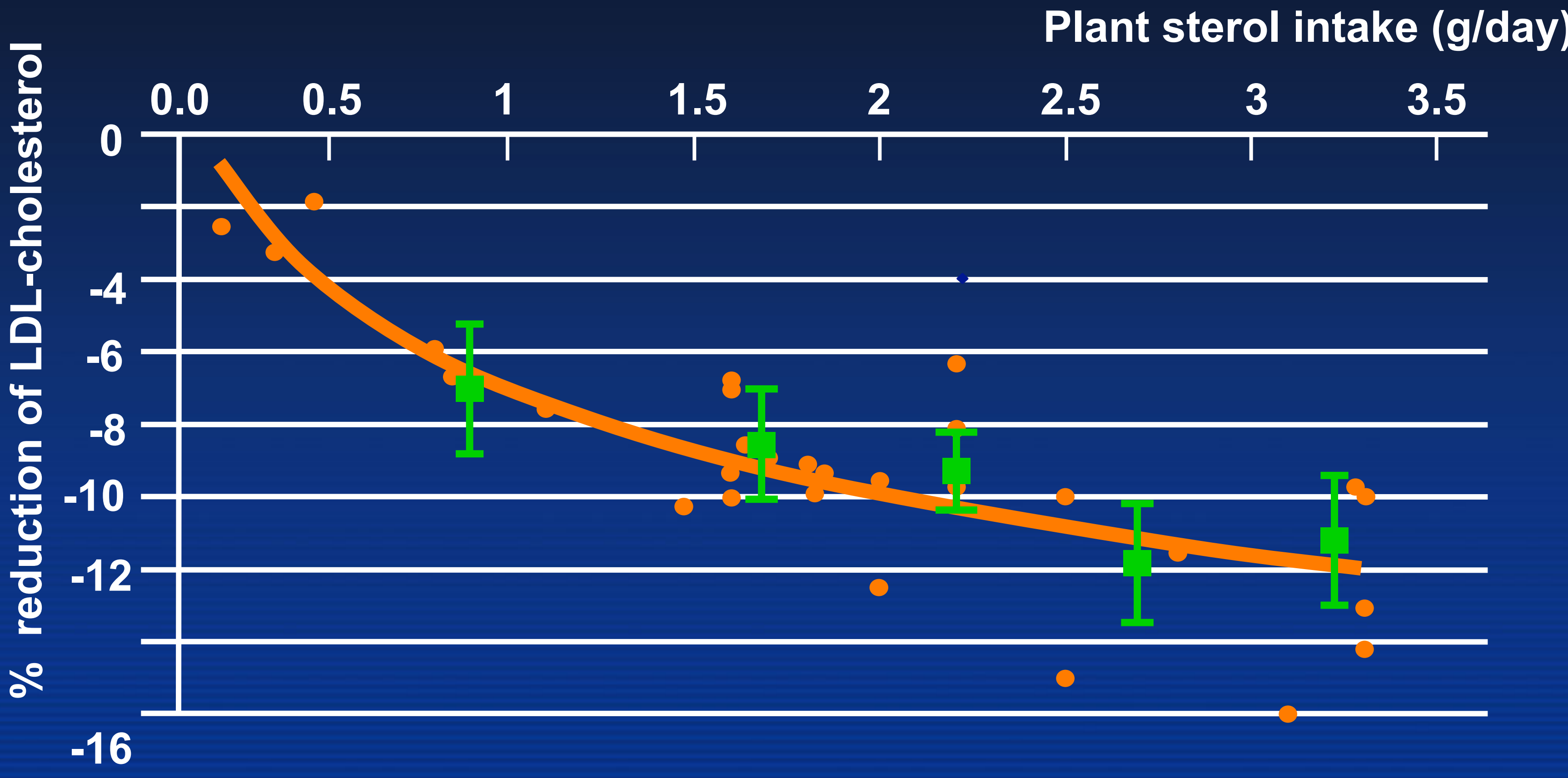
Jones *et al* J Lipid Res, 2000

Intestinal absorption of plant sterols is low compared to cholesterol



adapted from Bosner et al. J Lipid Res, 1999
& Ostlund et al. Am J Physiol Endocrinol Metab, 2002

Cholesterol lowering with plant sterols in fat-based foods: dose-response relationship

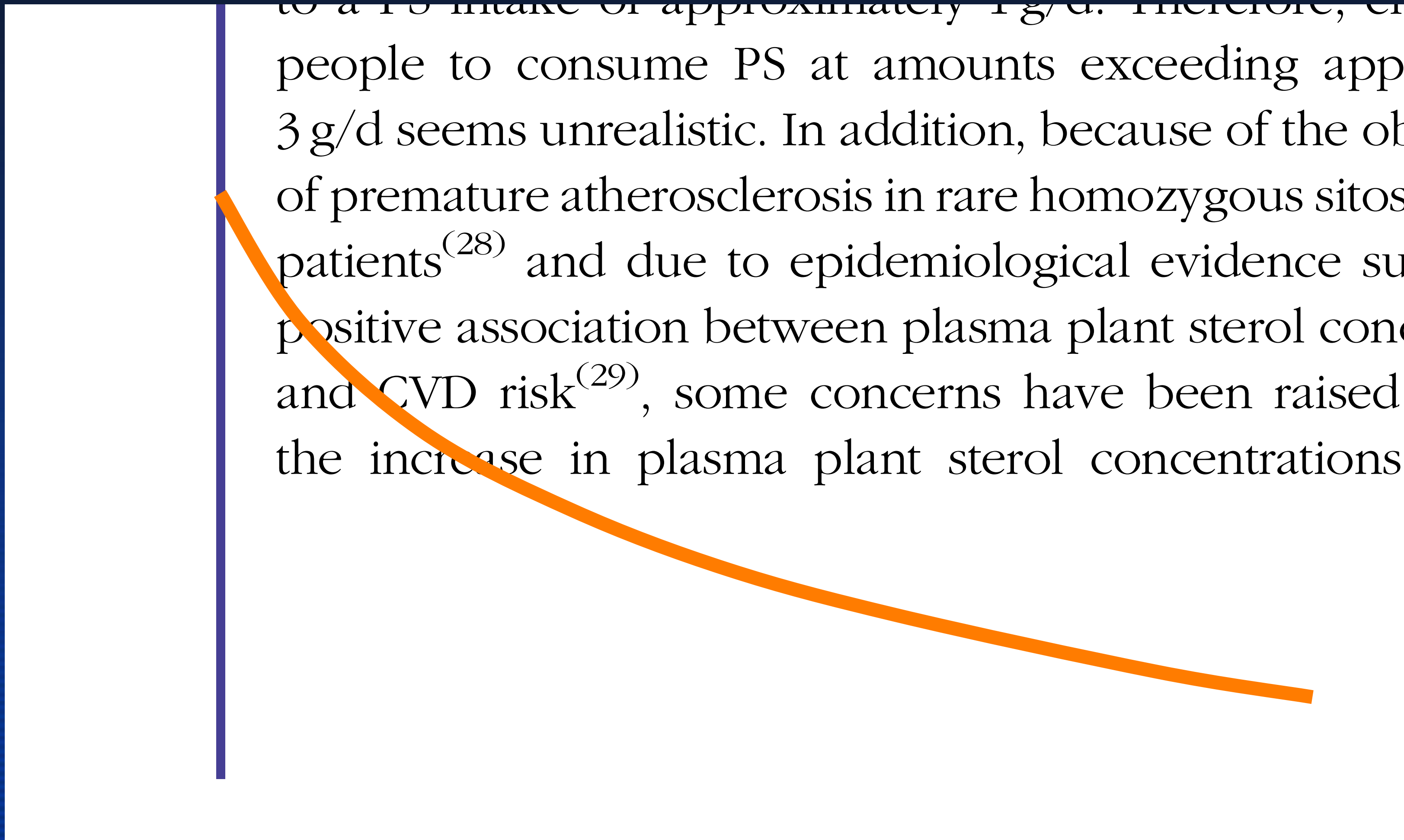


data of ~ 30 placebo-controlled initiated studies with phytosterol-enriched spreads

data (mean plus 95% IC) from meta-analysis of 41 studies with phytosterols or stanols

Katan M et al. Mayo Clin Proc 2003

Cholesterol lowering with plant sterols and stanols: a meta-analysis


people to consume PS at amounts exceeding appr
3 g/d seems unrealistic. In addition, because of the ob
of premature atherosclerosis in rare homozygous sitost
patients[28] and due to epidemiological evidence sug
positive association between plasma plant sterol conc
and CVD risk[29], some concerns have been raised
the increase in plasma plant sterol concentrations

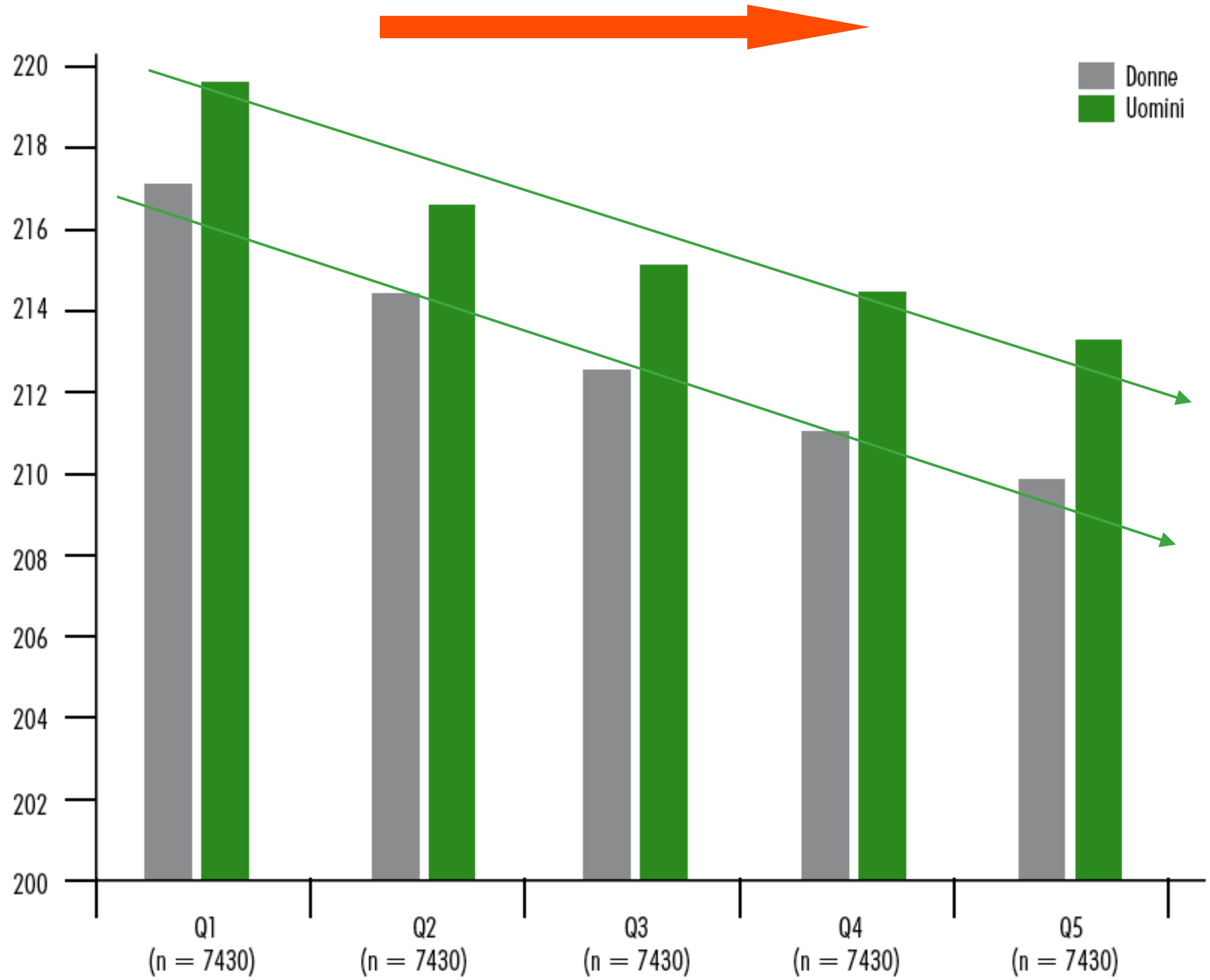
Ras RT et al. Brit J Nutr 2014

Effects of a phytosterol-enriched dairy product on lipids, sterols and 8-isoprostane in hypercholesterolemic patients: A multicenter Italian study

	PS-enriched fermented milk $N = 60$	Control fermented milk $N = 56$
Total cholesterol mg/dl		
Baseline	263.5 ± 2.6	260.0 ± 3.2
3 weeks	226.9 ± 3.3*	242.5 ± 3.5
6 weeks	231.0 ± 3.2*	243.1 ± 4.2
Triglicerydes mg/dl		
Baseline	126.8 ± 6.8	125.4 ± 7.1
3 weeks	117.0 ± 5.5	125.6 ± 7.0
6 weeks	131.6 ± 9.1	128.5 ± 7.6
LDL cholesterol mg/dl		
Baseline	166.2 ± 2.0	163.7 ± 2.1
3 weeks	148.7 ± 3.1*	160.1 ± 2.8
6 weeks	147.4 ± 2.8*	160.5 ± 3.1
HDL cholesterol, mg/dl		
Baseline	51.6 ± 1.9	50.7 ± 1.9
3 weeks	51.9 ± 1.9	52.7 ± 2.1
6 weeks	53.4 ± 2.2	52.7 ± 2.1

Mannarino E, NMCD, 2008

Fitosteroli naturalmente contenuti negli alimenti e colesterolemia: uno studio epidemiologico scandinavo



Colesterolemia totale nei differenti quintili di apporto alimentare di fitosteroli.

Klingberg S et al, Am J Clin Nutr, 2008

Dose effects of dietary phytosterols on cholesterol metabolism: a controlled study

	Phytosterol intake		
	59 mg/d (control)	459 mg/d (moderate)	2059 mg/d (high)
Cholesterol absorption			
Percentage cholesterol absorbed (%)	69.9 ± 2.1	62.8 ± 2.1[2]	52.7 ± 2.1[2,3]
Dietary cholesterol absorbed (mg/d)	139 ± 8	121 ± 8[4]	105 ± 8[2,5]
Biliary cholesterol absorbed (mg/d)	1418 ± 167	1390 ± 167	1244 ± 167
Plasma sterol ratios			
Phytosterols/total cholesterol (μg/mg)	7.4 ± 1.3	14.1 ± 1.3[2]	25.8 ± 1.3[2,3]
Cholestanol/total cholesterol (μg/mg)[6]	1.09 ± 0.08	0.95 ± 0.08[2]	0.85 ± 0.08[2,5]
Lathosterol/total cholesterol (μg/mg)[7]	1.22 ± 0.13	1.51 ± 0.14[2]	1.71 ± 0.14[2,3]
Serum lipid concentrations			
Total cholesterol (mg/dL)	211 ± 6	204 ± 6	198 ± 6[2]
LDL cholesterol (mg/dL)	139 ± 4	132 ± 4	126 ± 4[2]
HDL cholesterol (mg/dL)	50 ± 3	50 ± 3	51 ± 3
Triglycerides (mg/dL)	112 ± 9	112 ± 9	104 ± 9
Non-HDL cholesterol (mg/dL)	161 ± 5	154 ± 5	146 ± 5[2]
LDL cholesterol/HDL cholesterol	2.92 ± 0.16	2.75 ± 0.16[4]	2.58 ± 0.16[2,5]

Racette BS, AJCN, 2010

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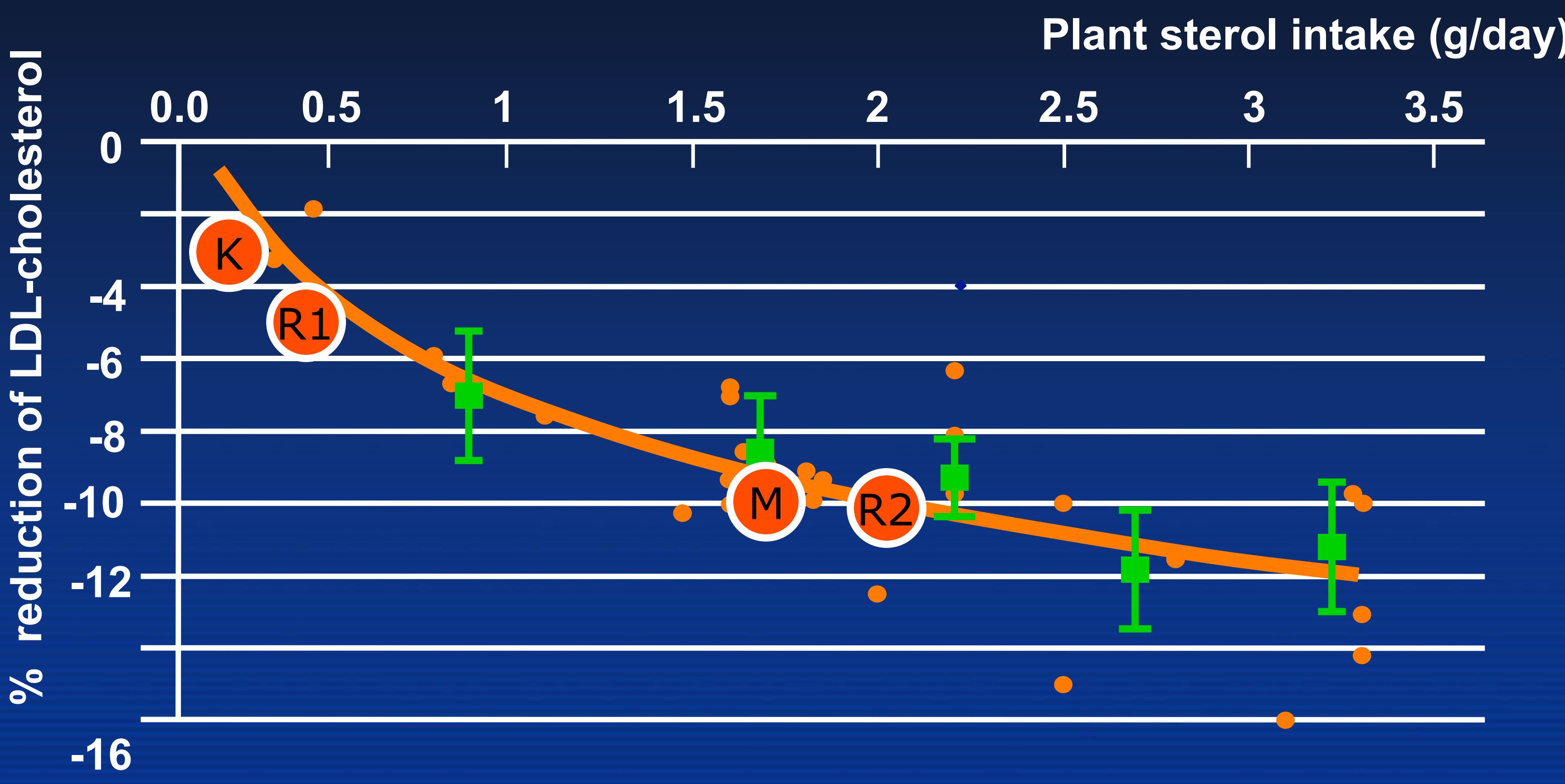
Racette BS, AJCN, 2010

Cholesterol lowering with plant sterols in fat-based foods: dose-response relationship



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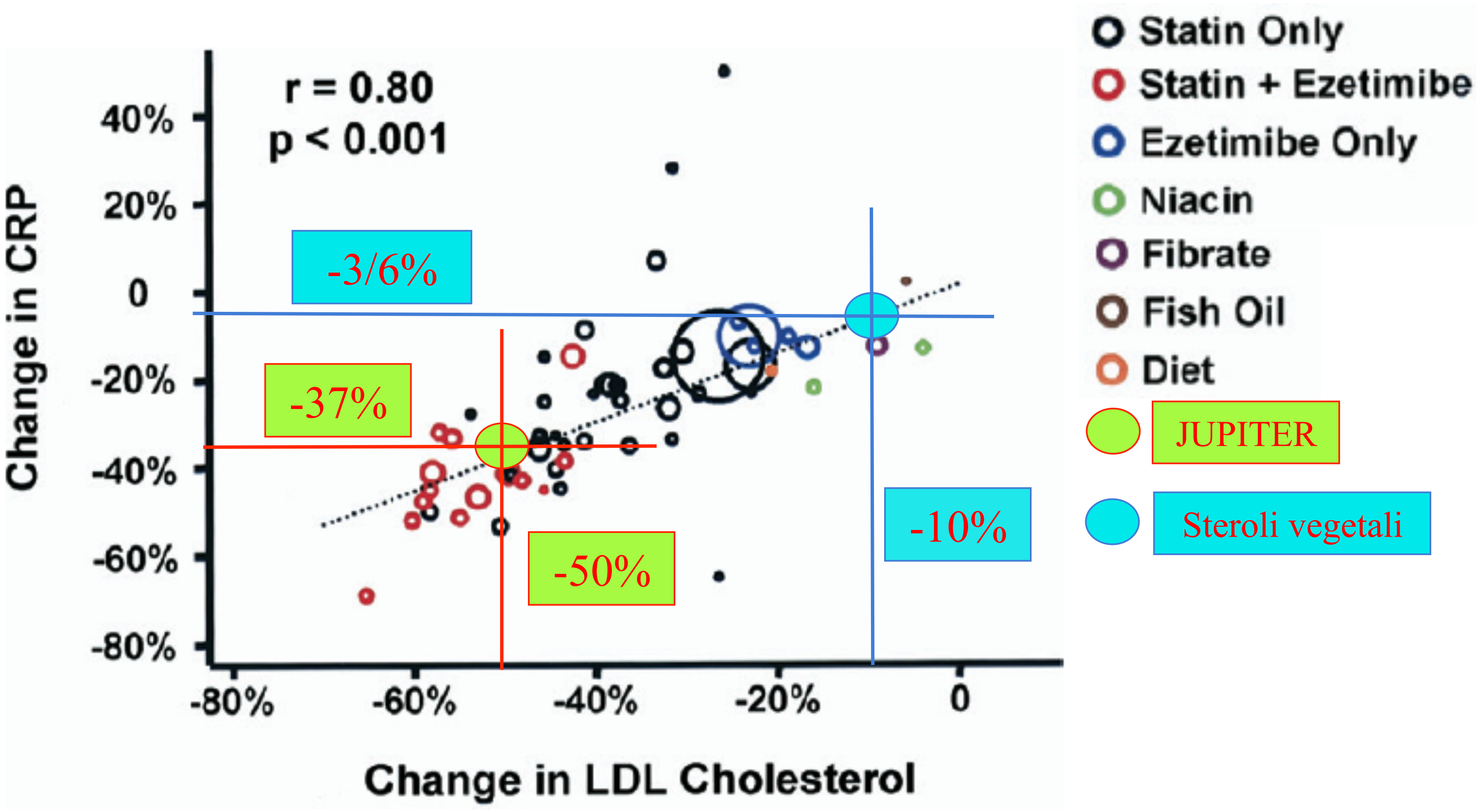
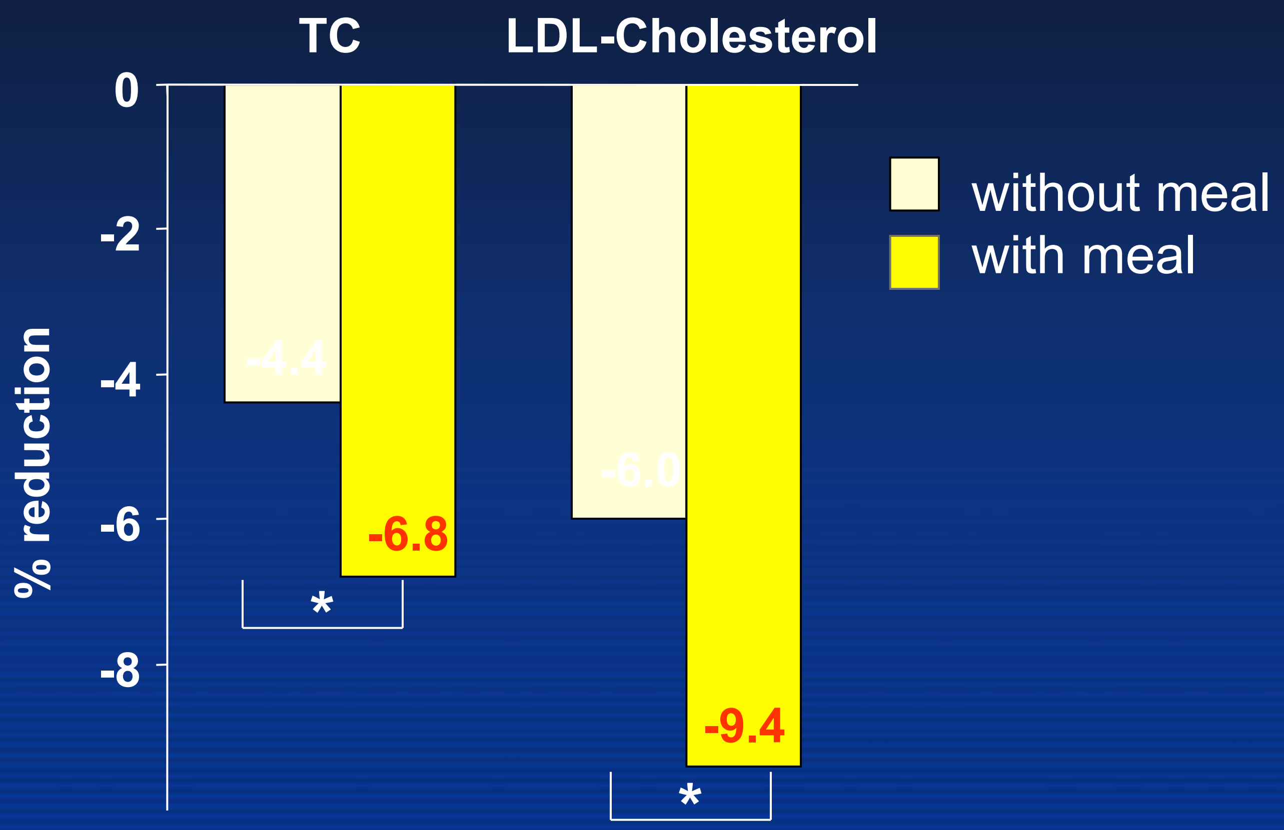
LDL-c and CRP reduction in clinical trials: a meta-analysis.



Kinlay S et al, J Am Coll Cardiol 2007

Impact of intake occasion on cholesterol lowering of single-dose plant sterol intake

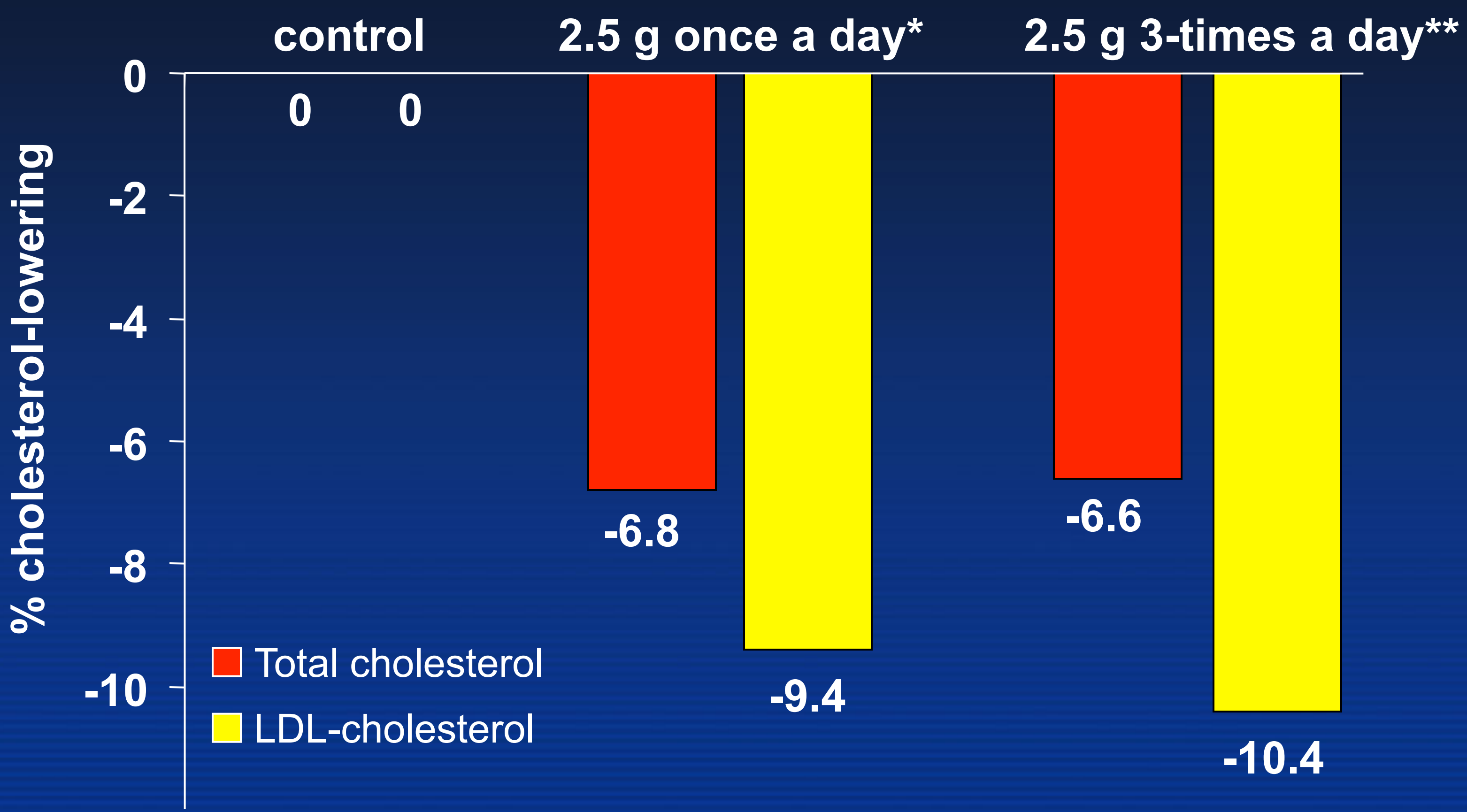
Intake with *vs.* without a meal enhances the cholesterol lowering effect



*statistically significant
#100 g serving size taken once a day delivering 2.8 g plant sterols

Doornbos *et al*., Eur J Clin Nutr, 2006

Plant sterols once vs. three-times per day have similar cholesterol-lowering effect

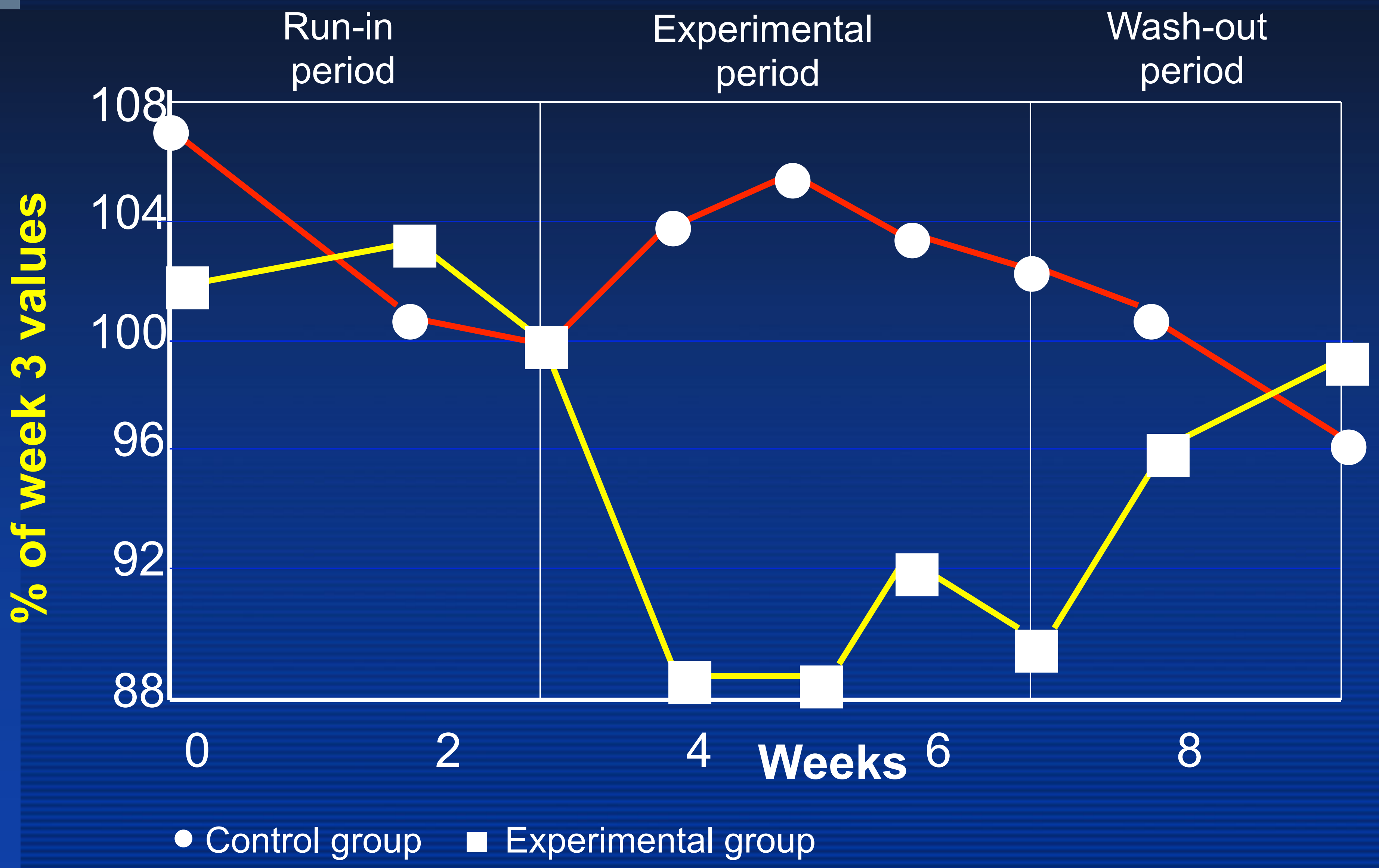


* 2.5 g/d plant stanols once a day with lunch

** 2.5 g/d plant stanols 3-times a day with breakfast (0.42 g), lunch (0.84 g) and dinner (1.25 g)

Plat *et al* Eur J Clin Nutr, 2000

Low Fat Yogurt Enriched in Plant Stanols Effectively Lowers LDL-C



Mensink RP et al, Atherosclerosis, 2002

Cholesterol-lowering effect of plant sterols additive to healthy diet & lipid-lowering medication

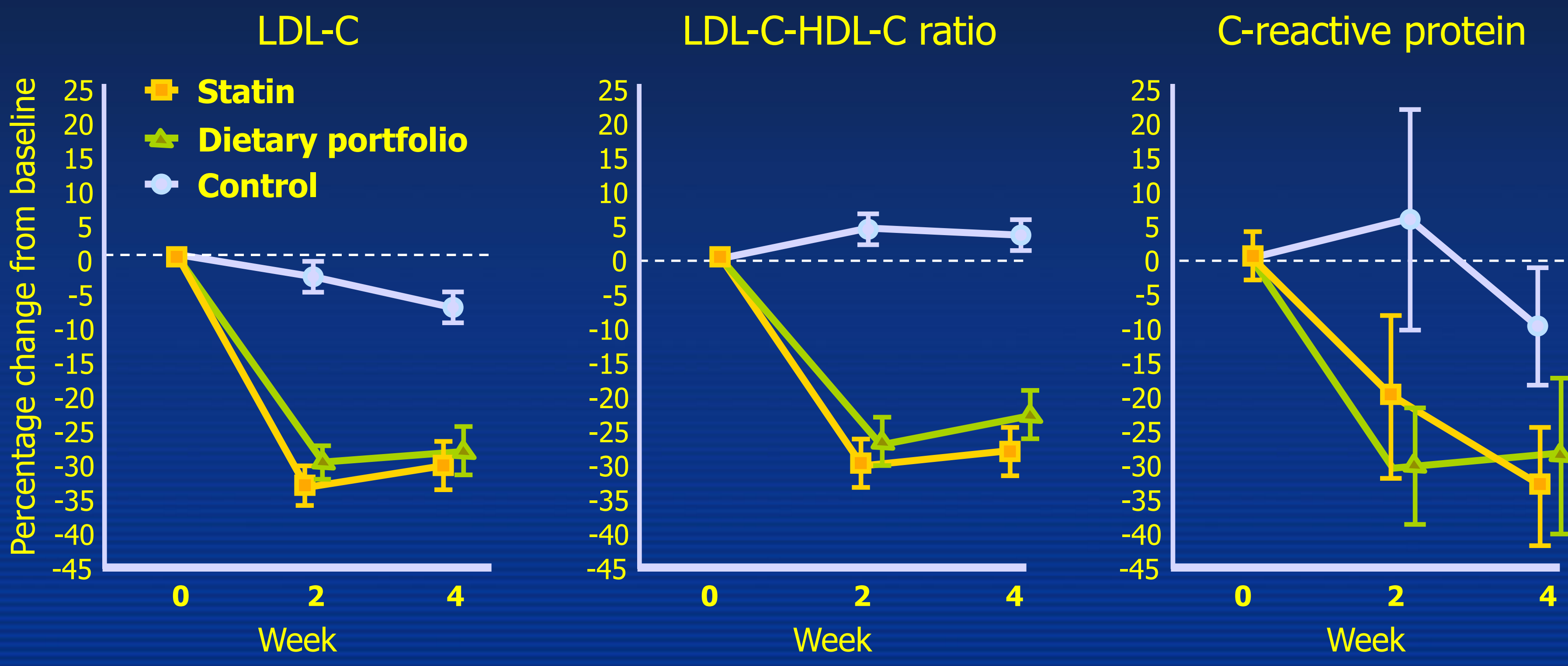
*low in saturated fat and cholesterol

**2-3 g/d of plant sterols in the form of enriched foods

Katan *et al* Mayo Clin Proc, 2003; Edwards & Moore BMC Family Practice, 2003

Effects of a "Dietary Portfolio" of Cholesterol-Lowering Foods vs Lovastatin on Serum Lipid and CRP

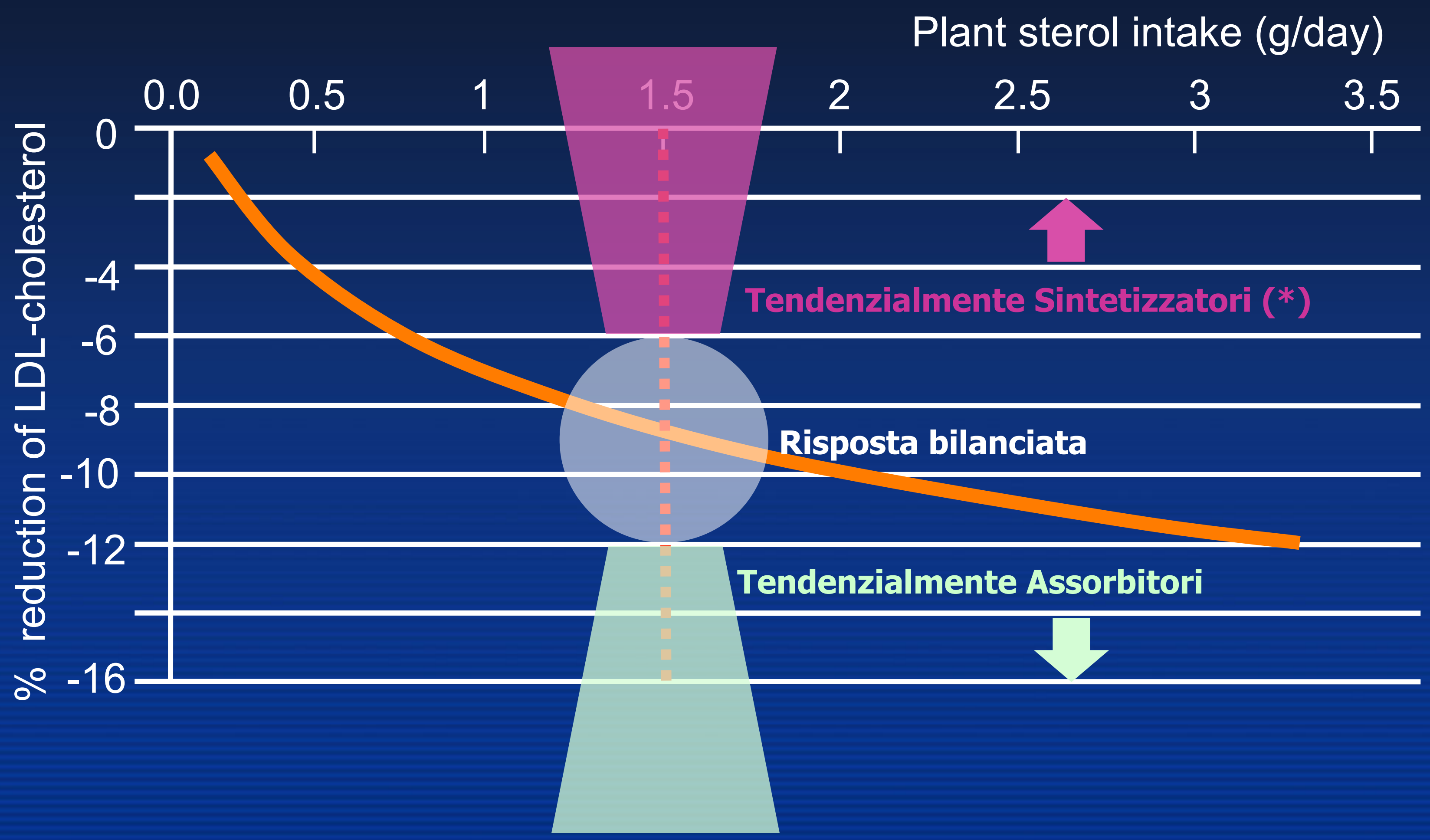
***dietary portfolio = plant sterols, soy protein, viscous dietary fibre, nuts (almonds)**



LDL-C=low-density lipoprotein Cholesterol; HDL-C=high-density lipoprotein cholesterol.
Values are expressed as mean (SE) because, with the number of participants involved, approximately twice the SE represents a significant difference

Jenkins et al., *J Am Med Assoc* 2003

Cholesterol lowering with plant sterols in fat-based foods: dose-response relationship



(*) oppure con bassa aderenza alla terapia

Nutrient, substance, food or food category	Claim	Conditions of use of the claim / Restrictions of use / Reasons for non-authorisation
Plant sterols and plant stanols	Plant sterols/stanols contribute to the maintenance of normal blood cholesterol levels	In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of at least 0.8 g of plant sterols/stanols.
Plant sterols/Plant stanol esters	Plant sterols and plant stanol esters have been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronary heart disease.	Information to the consumer that the beneficial effect is obtained with a daily intake of 1,5-3 g plant sterols/stanols. Reference to the magnitude of the effect may only be made for foods within the following categories: yellow fat spreads, dairy products, mayonnaise and salad dressings. When referring to the magnitude of the effect, the range "7 % to 10 %" for foods that provide a daily intake of 1,5-2,4 g plant sterols/stanols or the range "10 % to 12,5 %" for foods that provide a daily intake of 2,5-3 g plant sterols/stanols and the duration to obtain the effect "in 2 to 3 weeks" must be communicated to the consumer.
Plant sterols: Sterols extracted from plants, free or esterified with food grade fatty acids.	Plant sterols have been shown to lower/ reduce blood cholesterol. High cholesterol is a risk factor in the development of coronary heart disease.	Information to the consumer that the beneficial effect is obtained with a daily intake of 1,5-3 g plant sterols. Reference to the magnitude of the effect may only be made for foods within the following categories: yellow fat spreads, dairy products, mayonnaise and salad dressings. When referring to the magnitude of the effect, the range "7 % to 10 %" for foods that provide a daily intake of 1,5-2,4 g plant sterols or the range "10 % to 12,5 %" for foods that provide a daily intake of 2,5-3 g plant sterols and the duration to obtain the effect "in 2 to 3 weeks" must be communicated to the consumer.

Dietary fibres and cardiovascular health

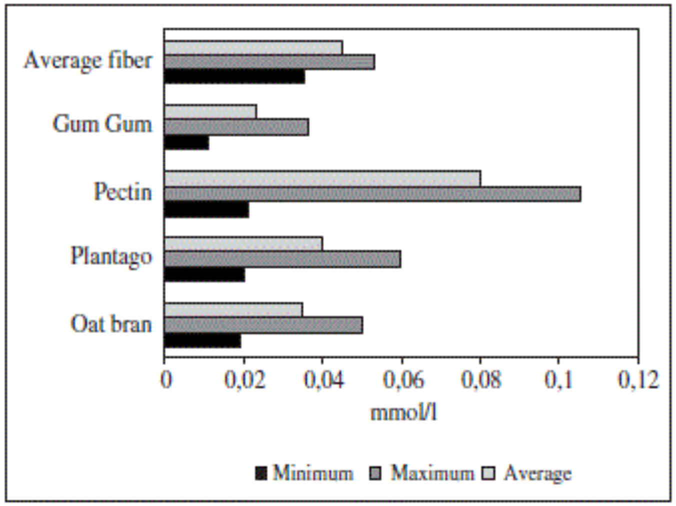
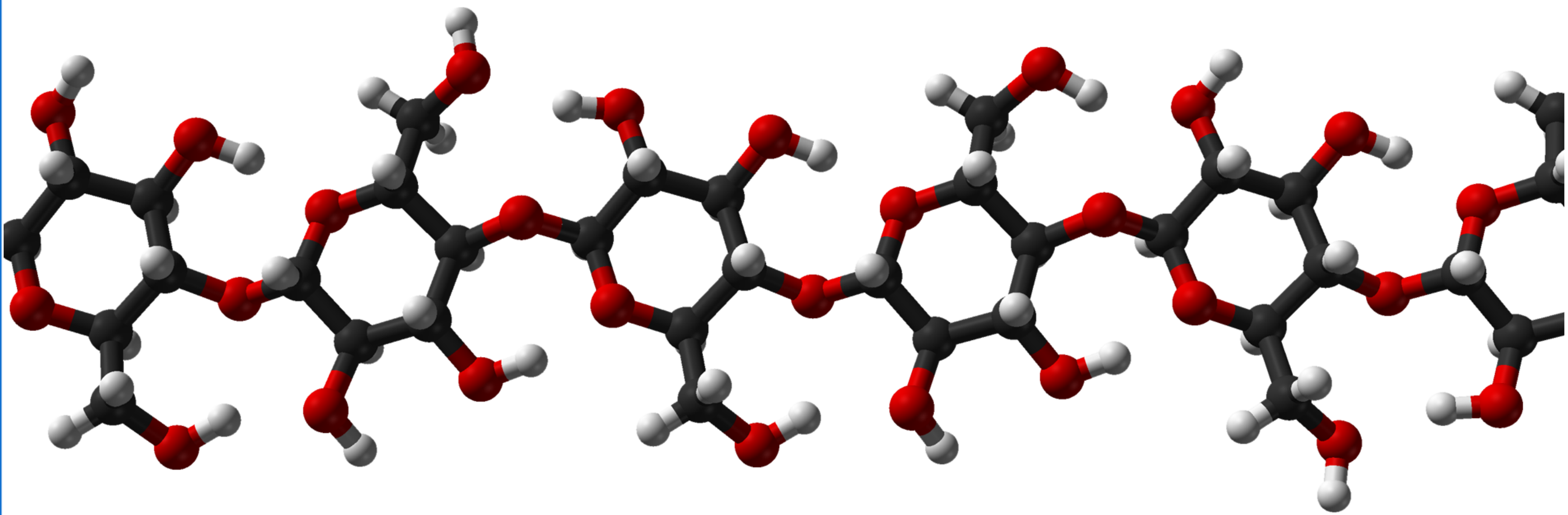


Fig. 5.—Summary of data from meta-analyses in which oat bran, psyllium, pectin, and guar gum were studied[45]. Minimum and maximum correspond to 95% confidence intervals. The figure shows the plasma cholesterol decrease (in mmol/l/g soluble fibre) in 25 studies performed with oat bran in a total of 1600 individuals consuming an average of 5 g/day; in 17 studies performed with psyllium in a total of 757 individuals consuming a mean consumption of 9,1 g; in 7 studies performed with pectin in a total of 277 individual consuming a mean intake of 4,7 g; and in 17 studies performed with Guar gum in a total of 341 individual consuming a mean dose of 17.5 g. Lipid changes were independent of study design, treatment length, and background dietary fat content. Soluble fibre, 2-10 g/d, was associated with small but significant decreases in total cholesterol [-0.045 mmol/l/g soluble fibre(-1) (95% CI: -0.054, -0.035)] and LDL cholesterol [-0.057 mmol/l/g (95% CI: -0.070, -0.044)]. Adapted from Brown et al.[45]

Sanchez-Muniz 2012

Beta-glucano



Suggested mechanisms for cholesterol-lowering impact of β-glucan.

↑ Viscosity in the gastrointestinal tract
↓ Intestinal uptake of dietary cholesterol
↑ Hepatic conversion of cholesterol into bile acids
↓ Reabsorption of bile acids and its return to the liver
↓ Hepatic bile acid concentrations results in:
↓ Hepatic cholesterol pools
↑ Activity of CYP7A1 enzyme, which converts cholesterol into bile acids
↑ Upregulation of the hepatic synthesis of 3-hydroxy-3-methylglutaryl coenzyme A reductase
↑ Upregulation of hepatic LDL-receptors synthesis
↑ Transportation of LDL-cholesterol from the blood into hepatocytes
↑ Plasma LDL cholesterol removal
(–) Cholesterol synthesis independent of bile acid
↑ Production of short-chain fatty acids

Abbreviation and symbols: CYP7A1, cholesterol 7 α-hydroxylase; LDL, low-density lipoprotein; (–), inhibition; ↑, increase; ↓, decrease.

SIMPeSV
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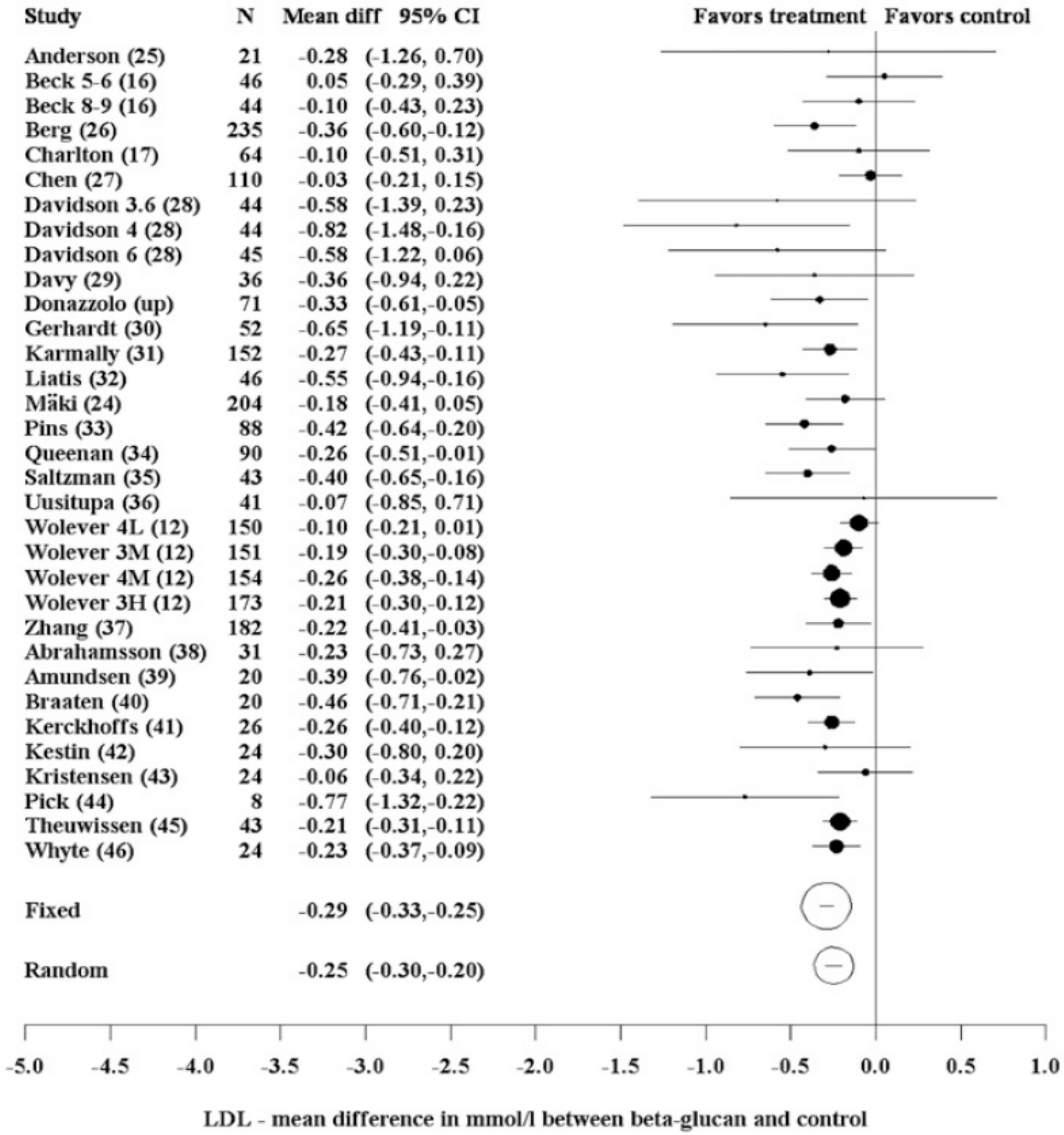
Cholesterol-lowering effects of oat β-glucan: a meta-analysis of randomized controlled trials

Study	N	Mean diff	95% CI
Anderson (25)	21	-0.28	(-1.26, 0.70)
Beck 5-6 (16)	46	0.05	(-0.29, 0.39)
Beck 8-9 (16)	44	-0.10	(-0.43, 0.23)
Berg (26)	235	-0.36	(-0.60,-0.12)
Charlton (17)	64	-0.10	(-0.51, 0.31)
Chen (27)	110	-0.03	(-0.21, 0.15)
Davidson 3.6 (28)	44	-0.58	(-1.39, 0.23)
Davidson 4 (28)	44	-0.82	(-1.48,-0.16)
Davidson 6 (28)	45	-0.58	(-1.22, 0.06)
Davy (29)	36	-0.36	(-0.94, 0.22)
Donazzolo (up)	71	-0.33	(-0.61,-0.05)
Gerhardt (30)	52	-0.65	(-1.19,-0.11)
Karmally (31)	152	-0.27	(-0.43,-0.11)
Liatis (32)	46	-0.55	(-0.94,-0.16)
Mäki (24)	204	-0.18	(-0.41, 0.05)
Pins (33)	88	-0.42	(-0.64,-0.20)
Queenan (34)	90	-0.26	(-0.51,-0.01)
Saltzman (35)	43	-0.40	(-0.65,-0.16)
Uusitupa (36)	41	-0.07	(-0.85, 0.71)
Wolever 4L (12)	150	-0.10	(-0.21, 0.01)
Wolever 3M (12)	151	-0.19	(-0.30,-0.08)
Wolever 4M (12)	154	-0.26	(-0.38,-0.14)
Wolever 3H (12)	173	-0.21	(-0.30,-0.12)
Zhang (37)	182	-0.22	(-0.41,-0.03)
Abrahamsson (38)	31	-0.23	(-0.73, 0.27)
Amundsen (39)	20	-0.39	(-0.76,-0.02)
Braaten (40)	20	-0.46	(-0.71,-0.21)
Kerckhoffs (41)	26	-0.26	(-0.40,-0.12)
Kestin (42)	24	-0.30	(-0.80, 0.20)
Kristensen (43)	24	-0.06	(-0.34, 0.22)
Pick (44)	8	-0.77	(-1.32,-0.22)
Theuwissen (45)	43	-0.21	(-0.31,-0.11)
Whyte (46)	24	-0.23	(-0.37,-0.09)
Fixed		-0.29	(-0.33,-0.25)
Random		-0.25	(-0.30,-0.20)



Whitehead A, Am J Clin Nutr doi: 10.3945/ajcn.114.086108.

Claim	Conditions of use of the claim / Restrictions of use / Reasons for non-authorisation	Health relationship
Beta-glucans contribute to the maintenance of normal blood cholesterol levels	The claim may be used only for food which contains at least 1 g of beta-glucans from oats, oat bran, barley, barley bran, or from mixtures of these sources per quantified portion. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 3 g of beta-glucans from oats, oat bran, barley, barley bran, or from mixtures of these beta-glucans.	maintenance of normal blood cholesterol concentrations
Consumption of beta-glucans from oats or barley as part of a meal contributes to the reduction of the blood glucose rise after that meal	The claim may be used only for food which contains at least 4 g of beta-glucans from oats or barley for each 30 g of available carbohydrates in a quantified portion as part of the meal. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained by consuming the beta-glucans from oats or barley as part of the meal.	reduction of post-prandial glycaemic responses
Barley beta-glucans has been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronery heart disease.	Information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 3 g of barley beta-glucan. The claim can be used for foods which provide at least 1 g of barley beta-glucan per quantified portion.	
Barley beta-glucans has been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronery heart disease	Information shall be given to the consumer that the beneficial effect is obtained with daily intake of 3 g of barley beta-glucan. The claim can be used for foods which provide at least 1 g of barley beta-glucan per quantified portion.	

Nutrient, substance, food or food category	Claim	Conditions of use of the claim / Restrictions of use / Reasons for non-authorisation
Betaine	Betaine contributes to normal homocysteine metabolism	The claim may be used only for food which contains at least 500 mg of betaine per quantified portion. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 1,5 g of betaine. In order to bear the claim information shall be given to the consumer that a daily intake in excess of 4 g may significantly increase blood cholesterol levels.
Chitosan	Chitosan contributes to the maintenance of normal blood cholesterol levels	The claim may be used only for food which provides a daily intake of 3 g of chitosan. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 3 g of chitosan.
Glucomannan (konjac mannan)	Glucomannan contributes to the maintenance of normal blood cholesterol levels	The claim may be used only for food which provides a daily intake of 4 g of glucomannan. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 4 g of glucomannan. Warning of choking to be given for people with swallowing difficulties or when ingesting with inadequate fluid intake - advice on taking with plenty of water to ensure substance reaches stomach.
Guar Gum	Guar gum contributes to the maintenance of normal blood cholesterol levels	The claim may be used only for food which provides a daily intake of 10 g of guar gum. In order to bear the claim, information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 10 g of guar gum. Warning of choking to be given for people with swallowing difficulties or when ingesting with inadequate fluid intake - advice on taking with plenty of water to ensure substance reaches stomach.
Hydroxypropyl methylcellulose (HPMC)	Hydroxypropyl methylcellulose contributes to the maintenance of normal blood cholesterol levels	The claim may be used only for food which provides a daily intake of 5 g of HPMC. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 5 g of HPMC. Warning of choking to be given for people with swallowing difficulties or when ingesting with inadequate fluid intake - advice on taking with plenty of water to ensure substance reaches stomach.
Monascus purpureous (red yeast rice)	Monacolin K from red yeast rice contributes to the maintenance of normal blood cholesterol levels	The claim may be used only for food which provides a daily intake of 10 mg of monacolin K from red yeast rice. In order to bear the claim, information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 10 mg of monacolin K from fermented red yeast rice preparations.