UNIVERSITA' DEGLI STUDI DI ROMA
TorVergata
Università

ASSOCIAZIONE CULTURALE
Giuseppe DOSSETTI
i Valori
TUTELA E SVILUPPO DEI DIRITTI

L'evidenza scientifica della Dieta Mediterranea Italiana nelle prevenzione delle malattie cronico-degenerative

Prof. Antonino De Lorenzo, Dr.ssa Laura Di Renzo, Roma 2009

LA DIETA MEDITERRANEA è FUORI MODA?





Newsweek, January 20th 2003



Science & Technology

health. It doesn't require that you weigh your food or eat according to your blood type or astrological sign. As Willett likes to say, its ultimate message is simple: "Eat, drink and be healthy."

The main difference between the Healthy Eating Pyramid and the government's plan is its focus on individual foods. Willett is quick to break up groups of fats or carbohydrates or proteins to highlight the best and worst sources of those nutrients. That may seem an obvious distinction, but it's a critical departure from the USDA's recommendations. Instead of directing people to the best fats, the most wholesome carbohydrates and the most nutritious sources of protein, the USDA pyramid implies that all fats are dangerous and most carbs are safe. And if the past decade has taught us anything, it's that carbs can be as deadly as fats.

How did the U.S. government get it so wrong? Basically by trying too hard to simplify its message. Scientists have known since the 1960s that the saturated fat in red meat and dairy products can raise cholesterol levels and promote coronary heart disease. Though the USDA had long downplayed those risks to appease the cattle and dairy industries, it had also acknowledged them. When the USDA staff started building the Food Guide Pyramid in the late 1980s, its main objective was to get that message out. Earlier food charts had shown four basic groups—meat, dairy, produce and cereal grains—and encouraged people to eat everything in moderation. The pyramid introduced the notion that some foods (fats) required more moderation than others (carbohydrates).

Scientists were well aware that fats could be healthful and that carbs could cause harm. Studies had shown that unlike butter and lard, the oils found in fish,

The new diet is designed not for short-term weight loss but for lifelong health

who served as an adviser to the surgeon general in the late 1980s. "We never thought of Snackwell's."

It's not just the calories that make refined carbs so troublesome—it's the way they're digested. Unlike whole grains,

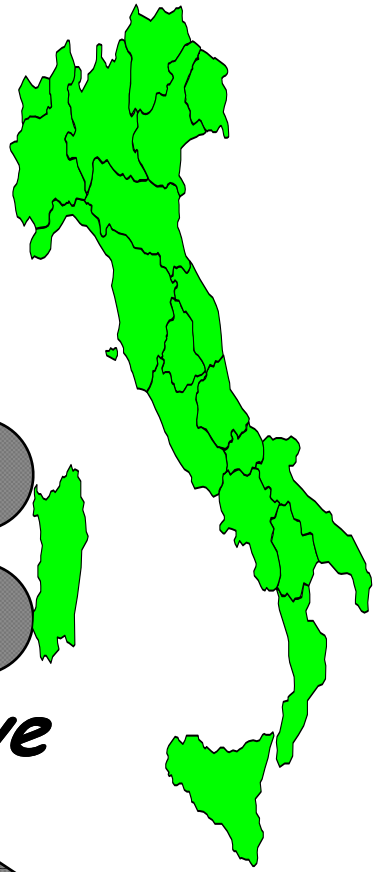
CORRIERE DELLA SERA.it

I nutrizionisti: più proteine nel piatto!!!

"Un ritocco alle nostre abitudini potrebbe aiutarci ad avere meno appetito e meno tendenza ad ingrassare"



…una dieta "che si rispetti"…
…come quella mediterranea….
…deve avere queste proprietà:



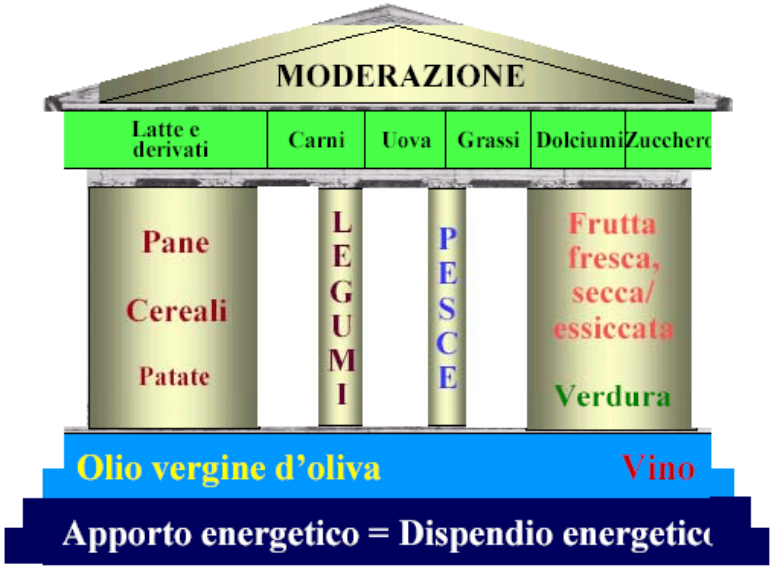
EQUILIBRATA

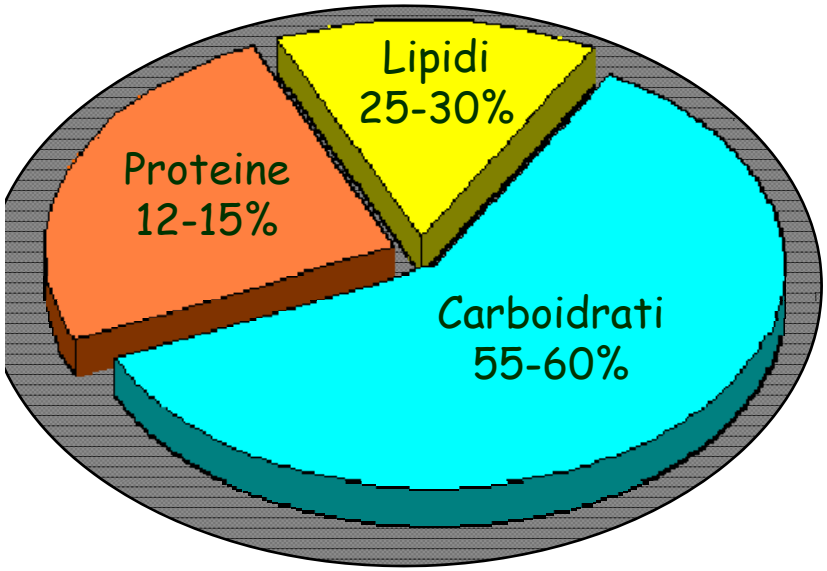
BILANCIATA

ADEGUATA

OTTIMALE

Il fabbisogno energetico giornaliero deve corrispondere a:



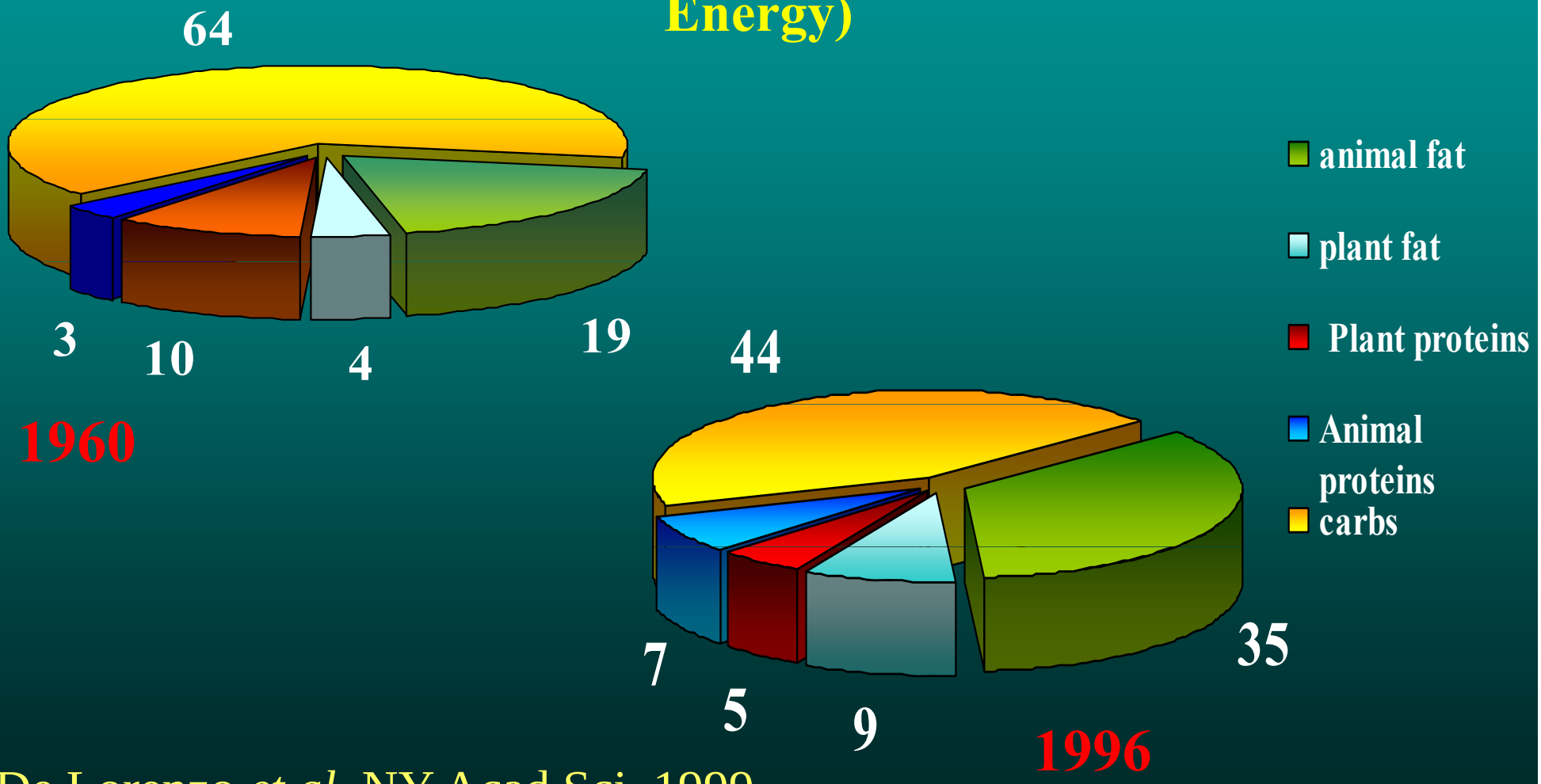


Mortality Rate

	Mediterranean Europe (Dalmazia, Crevalcore, Montegiorgio, Creta, Corfu)		Non Mediterranean Europe (Finlandia, Slavonia, Velika)
Risk	3.506	15 years	2.701
All Causes of Death	1.612		2.078
CHD	284		655
Risk	3.598	25 years	2.884
All Causes of Death	4.299		5.550
CHD	978		1.947

Human Nutrition Unit - University of Rome Tor Vergata

1960-1996: Daily Intake of Nutrients in Nicotera (% of Total Energy)



De Lorenzo *et al*, NY Acad Sci, 1999

Adherence to the Mediterranean food pattern predicts the prevalence of hypertension, hypercholesterolemia, diabetes and obesity, among healthy adults; the accuracy of the MedDietScore

Demosthenes B. Panagiotakos [a,*], Christos Pitsavos [b], Fotini Arvaniti [c], Christodoulos Stefanadis [b]

Predicting 10-year CHD risk (%) in men and women from the ATTICA study (2001–02, in Athens metropolitan area), by group of the Mediterranean Diet Score

Age	Mediterranean diet score									
	0–5	6–10	11–15	16–20	21–25	26–30	31–35	36–40	41–45	>45
Men										
<30	4%	3%	3%	3%	3%	3%	2%	2%	1%	0%
30–35	5%	5%	4%	4%	4%	3%	3%	3%	2%	1%
36–40	6%	5%	5%	5%	5%	5%	4%	3%	3%	2%
41–50	7%	7%	6%	6%	6%	5%	5%	4%	4%	3%
51–55	8%	8%	7%	7%	7%	6%	6%	5%	5%	4%
56–60	10%	9%	8%	7%	7%	7%	7%	6%	6%	5%
61–65	12%	12%	9%	9%	8%	7%	7%	6%	6%	6%
66–70	14%	14%	11%	10%	9%	9%	9%	8%	7%	7%
71–75	17%	16%	12%	11%	11%	10%	9%	9%	8%	8%
>75	19%	16%	14%	13%	12%	11%	11%	10%	9%	9%
Women										
<30	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%
30–35	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%
36–40	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%
41–50	3%	3%	2%	2%	2%	2%	2%	1%	1%	1%
51–55	4%	4%	3%	3%	3%	3%	2%	2%	2%	2%
56–60	5%	5%	4%	4%	3%	3%	3%	2%	2%	2%
61–65	6%	6%	5%	5%	4%	4%	4%	4%	3%	2%
66–70	7%	7%	6%	6%	5%	5%	5%	5%	4%	5%
71–75	8%	8%	7%	7%	7%	6%	6%	6%	5%	4%
>75	9%	8%	7%	7%	7%	6%	6%	6%	5%	4%

The probabilities were estimated using the Framingham equations that incorporated age, blood cholesterol, HDL cholesterol, blood pressure, cigarette smoking and diabetes mellitus, and classified by the dietary score categories. The 10-year risk estimates (%) are presented smoothed, using linear interpolation of the logit of the Framingham probabilities, and rounded.

Indice di Adeguatezza Mediterraneo (IAM):

$$IAM = \frac{\%\ \text{energia da CARBOIDRATI (gr. 1)+PROTETTIVI (gr. 2)}}{\%\ \text{energia da DERIVATI ANIMALI (gr. 3)+DOLCI (gr. 4)}}$$

Carboidrati (gruppo1): ***pane, cereali, legumi, patate***

Protettivi (gruppo 2): ***vegetali, frutta, pesce, vino rosso, olio d'oliva***

(Gruppi di alimenti appartenenti alla dieta mediterranea)

Derivati animali (gruppo 3): ***latte, formaggio, carne, uova, grassi animali e margarina***

Dolci (gruppo 4): ***bevande dolci, biscotti/torte, zucchero***

(Gruppi di alimenti non appartenenti alla dieta mediterranea)

Alberti et all. Eur J Clin Nutr 1999



Indici nutrizionali di un pasto tipico americano.
Valore di 100g:

kcal	499
Proteine (g)	23.7
Lipidi (g)	15.5
Carboidrati (g)	78.7
INQ proteine	1.5
INQ carboidrati	1.0
INQ lipidi	1.0
CSI	7.6



Indici nutrizionali di un pasto tipico mediterraneo.
Valore di 100g:

kcal	532
Proteine (g)	7.24
Lipidi (g)	2.92
Carboidrati (g)	38.28
INQ proteine	1.21
INQ carboidrati	1.2
INQ lipidi	0.47
CSI	0.49

Mediterranean Diet

- A study conducted in Greece showed that with greater adherence to the Mediterranean diet was a greater reduction in total mortality, including both CVD, and cancer.
- Trichopoulous, NEJM, 348: 2599, 2003.

- Adherence to a Mediterranean diet is associated with reduced all cause mortality.
- Kokkinos P et. Al. J Clin Hypertens. 7(3): 165-72, 2005.

Adherence to Mediterranean diet and health status: me analysis

Sofi F. et al. British Medical Journal 16 sept 2008

Reducing heart attack in people with heart disease

Intervention	Risk reduction
Mediterranean diet	72%
Fish oil	35%
Quit smoking advice	32%
Statins	25%
Antihypertensives	21%
Aspirin	18%

Source: de Lorgirel et al, The final report of the Lyon Diet Heart Study: Circulation.

Cost-effectiveness of prevention for heart disease

Treatment	**Cost per life year gained (£ sterling)**
Aspirin	50
Thiazide (antihypertensive)	66
Mediterranean Diet	***290***
ACE Inhibitor (antihypertensive)	5634
Simvastatin (cholesterol lowering)	8240



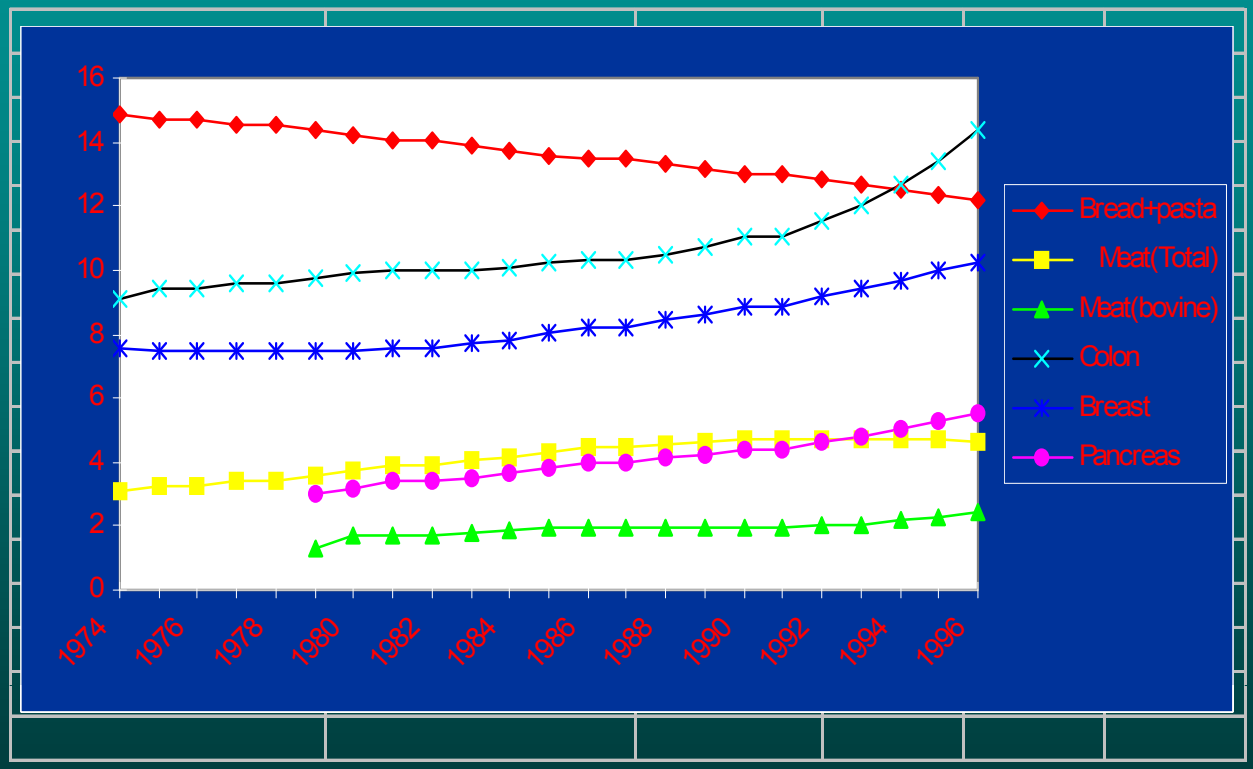
Source: Ebrahim S, Davey-Smith G, McCabe C, Payne N, Pickin M, Sheldon TA et al. What role for statins? A review and Economic model. Health Technol Assess 1999;3:No (19)

Prevenzione del cancro e dieta mediterranea

Neutralizzazione
di radicali liberi

DIETA MEDITERRANEA

Prevenzione
della formazione di
radicali liberi



De Lorenzo et al. Ann. New York Academy Sci, 1999.

European Journal of Clinical Nutrition (2007), 1–6
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0954-3007/07 $30.00
www.nature.com/ejcn

ORIGINAL ARTICLE

Effect of a moderately hypoenergetic Mediterranean diet and exercise program on body cell mass and cardiovascular risk factors in obese women

A Andreoli[1], S Lauro[2], N Di Daniele[3], R Sorge[4], M Celi[3] and SL Volpe[5]

Table 1 Breakdown of the components of the moderately hypoenergetic Mediterranean diet

	Breakfast	*Snack*	*Lunch*	*Snack*	*Dinner*
kcal	197.3±26.5	83.7±7.5	656.7±24.9	99.7±28.4	466.0±15.5
MJ	0.83±0.11	0.35±0.03	2.75±0.1	0.42±0.12	1.95±0.06
Total carbohydrate (g)	32.4±4.2	17.8±0.3	88.4±11.1	25.4±7.7	51.7±0.4
Total protein (g)	7.9±0.7	2.2±0.3	36.1±1.4	0.92±0.1	28.3±2.3
Total fat (g)	4.7±1.1	0.87±0.57	20.3±7.3	0.24±0.25	18.3±1.2
Saturated fat (g)	1.7±0.6	0.08±0.003	4.6±2.3	0.04±0.02	3.1±0.2
Polyunsaturated fat (g)	0.8±0.4	0.6±0.2	2.3±0.7	0.5±0.1	2.9±0.3
Monounsaturated (g)	0.9±0.07	0.05±0.01	9±0.5	0.05±0.01	7±0.1
Total cholesterol (mg)	12.4±6.6	—	33.3±27.7	—	28.3±5.8
Total fiber (g)	1.4±0.8	3.7±1.1	11.7±1.2	5.3±3.5	10.7±3.1

Values represent mean±s.d.

Use of quality control indexes in Moderately Mediterranean Diets for treatment of obesity

Table 2: Plasma chemistry and metabolic parameters before and after MHD

	bseline	2-mounths MHD	statistial significance
Albumin (g/100 ml)	4.15 ± 0.14	4.02 ± 0.39	NS
Fasting glucose (mmol/L)	5.05± 0.45	4.98 ± 0.43	NS
Fasting insulin (mU/ml)	11.48 ± 6.77	8.07 ± 4.17	p<0.01
AUC glucose	29.50± 6.24	28.07 ± 5.29	NS
AUC insulin	263.2 ± 118.7	208.7 ± 82.6	p<0.005
Fibrinogen (mg/100 ml)	359 ± 78	324± 87	p<0.0001
Total cholesterol	5.40 ± 1.04	4.97 ± 0.92	p<0.05
HDL cholesterol (mmol/L)	1.30 ± 0.30	1.33 ± 0.33	NS
LDL cholesterol (mmol/L)	3.36 ± 1.07	2.90 ± 0.74	p<0.005
Triglycerides (mmol/L)	1.70 ± 1.00	1.46 ± 0.66	NS
Uric acid (mmol/L)	0.30 ± 0.06	0.28 ± 0.05	p<0.01

Values are expressed as mean ± SD
Statistical analysis was performed using un-paired *student's t-test.*

A. De Lorenzo et all; Diab Nutr Met 2001

A. De Lorenzo et all; Diab Nutr Met 2001; Diabetes Care 2001 and Chest 2001

Mediterranean diet and risk for Alzheimer's disease

Scarmeas N. *et al Annals of Neurology 2006*

La Dieta Mediterranea caratterizzata da alto consumo di:

- **vegetali**
- **Legumi**
- **Frutta**
- **Cereali**
- **Alto consumo acidi grassi insaturi (olio di oliva)**
- **Basso consumo acidi grassi saturi, carne**
- **Moderato consumo di pesce, prodotti caseari, vino**

Riduce il rischio di malattie cardiovascolari e tumori
Migliora la performance cognitiva e riduce il rischio di Alzhaimer (AD)

Adherence to the Mediterranean Diet Is Inversely Associated With Circulating Interleukin-6 Among Middle-Aged Men

A Twin Study

Jun Dai, MD, MSc; Andrew H. Miller, MD; J. Douglas Bremner, MD; Jack Goldberg, PhD; Linda Jones, BS; Lucy Shallenberger, MPH; Rocky Buckham, BS; Nancy V. Murrah, RN, BSN; Emir Veledar, PhD; Peter W. Wilson, MD; Viola Vaccarino, MD, PhD

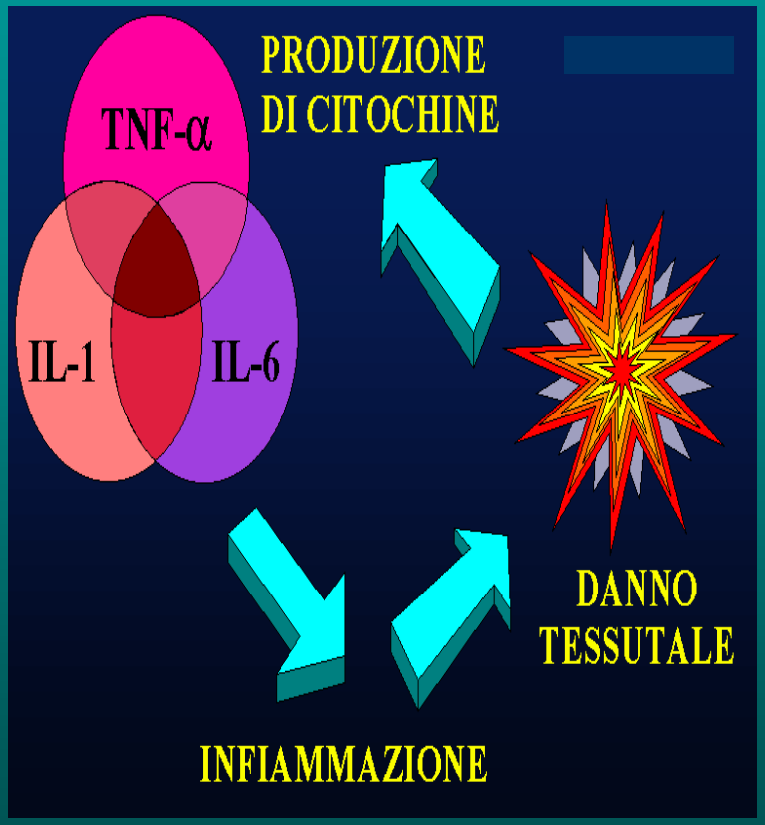


Table 1. Age, Lifestyle, and Clinical and Biochemical Characteristics of Subjects According to the MDS

	MDS				
Variable	0–3 (n=104)	4 (n=70)	5 (n=81)	6–9 (n=90)	P*
Age, y	53.8±0.3	54.3±0.3	54.5±0.3	54.8±0.3	0.02
Education, y	13.8±0.2	14.1±0.2	14.7±0.2	14.5±0.2	0.003
Body mass index, kg/m^2	29.6±0.5	29.5±0.6	29.5±0.5	28.5±0.5	0.13
Waist-to-hip ratio	0.94±0.01	0.95±0.01	0.95±0.01	0.94±0.01	0.75
Physical activity, unit	7.15±0.16	7.34±0.19	7.69±0.18	7.49±0.17	0.07
Smoking status, n (%)					0.001
Former	29 (27.9)	24 (34.3)	33 (40.7)	44 (48.9)	
Current	41 (39.4)	34 (48.6)	13 (16.0)	9 (10.0)	
Never	34 (32.7)	12 (17.1)	35 (43.2)	37 (41.1)	
Married, n (%)	77 (74.0)	54 (77.1)	66 (81.5)	77 (85.6)	0.07
Employed, n (%)	78 (75.0)	58 (82.9)	64 (79.0)	74 (82.2)	0.28
Depressive symptoms, BDI score	3.04±0.62	4.44±0.74	4.15±0.70	3.98±0.57	0.02
Plasma glucose, mg/dL	98.2±1.8	102.7±2.1	100.0±2.0	103.3±1.9	0.052
Systolic blood pressure, mm Hg	130.3±1.6	129.5±1.8	128.5±1.7	129.3±1.6	0.61
Diastolic blood pressure, mm Hg	80.8±1.1	80.6±1.2	79.8±1.2	82.3±1.1	0.37
Blood lipids, mg/dL					
Total triglycerides	176.6±10.0	192.9±11.6	179.2±11.6	182.5±10.5	0.75
Total cholesterol	185.3±3.7	193.2±4.4	186.0±4.2	189.1±4.0	0.57
HDL cholesterol	38.9±0.9	38.4±1.0	39.7±1.0	37.7±1.0	0.41
LDL cholesterol	124.0±3.3	125.9±3.9	120.8±3.7	125.0±3.5	0.96
Previous coronary heart disease, n (%)	13 (12.5)	2 (2.9)	12 (14.8)	6 (6.7)	0.31
Diabetes mellitus, n (%)	8 (7.7)	8 (11.6)	11 (13.6)	10 (11.1)	0.35
Hypertension, n (%)	36 (34.6)	21 (30.0)	24 (29.7)	26 (28.9)	0.40
Use of fish oil supplements, n (%)	2 (1.9)	2 (2.9)	5 (6.2)	10 (11.1)	0.01
Use of statins, n (%)	26 (25.0)	11 (15.7)	27 (33.3)	22 (24.4)	0.79
Use of aspirin, n (%)	29 (27.9)	12 (17.1)	25 (30.9)	21 (23.3)	0.67
Plasma inflammatory biomarkers					
IL-6, pg/mL†	2.1 (1.8–2.3)	1.9 (1.6–2.2)	1.8 (1.6–2.1)	1.5 (1.3–1.7)	<0.0001
hsCRP, mg/L†	1.4 (1.1–1.7)	1.3 (1.0–1.7)	1.1 (0.9–1.4)	1.0 (0.8–1.3)	0.02

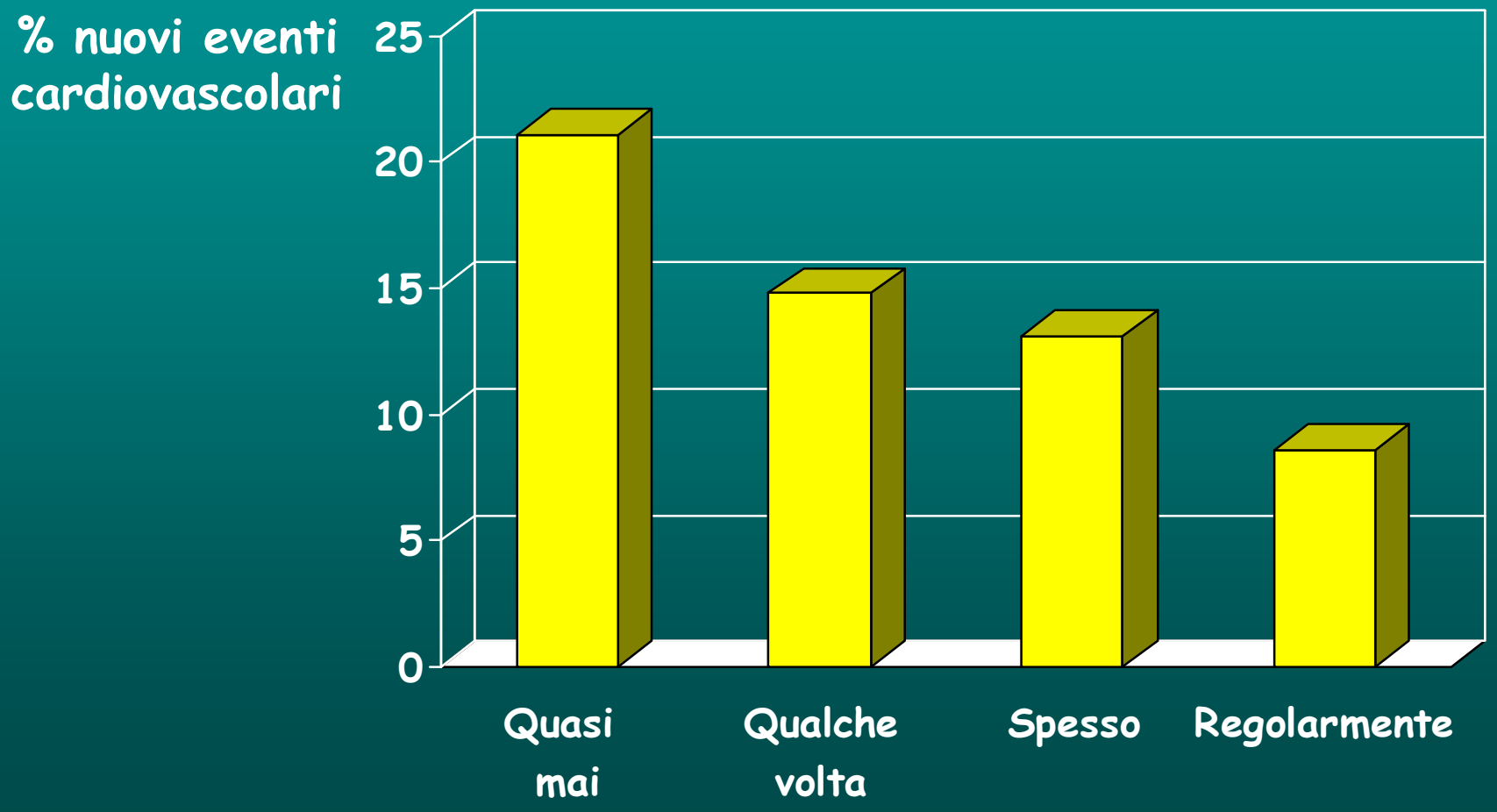
BDI indicates Beck Depression Inventory; HDL, high-density lipoprotein; and LDL, low-density lipoprotein. Results are expressed as mean±SEM when appropriate. Variables (%) are dichotomous except smoking status.

*Test for trend across diet groups. All probability values are corrected for pair clustering. Mixed models were used for continuous variables, generalized estimating equation logistic models for dichotomous variables, and repeated proportional odds model with generalized estimating equation for the 3-level ordinal smoking variable.

†Geometric means (95% CIs).


Stile di vita ed abitudini alimentari
Qualità e tipicità e...

GISSI-P: CONSUMO DI OLIO D'OLIVA



CHEMICAL COMPOSITION

- **Triglycerides**
  - 98 - 99%
- **Fatty Acids**
  - **Monounsaturated**
  - **Polyunsaturated**
  - **Saturated**
  - Oleic 65 - 80%
  - α-Linolenic and Linoleic <13%
  - Palmitic 7 - 15%
- **β-carotene (provitamin A) tocopherols (vitamin E)**
- **Phenols**
- **Squalene (0,2-0-7 %)**
- **Aroma components**



Expert Opin Investig Drugs 2000 Aug;9(8):1841-8

SQUALENE: POTENTIAL CHEMOPREVENTIVE AGENT.
Smith TJ. (University of South Carolina, USA)

quantità assunta: **30 mg/giorno in USA**

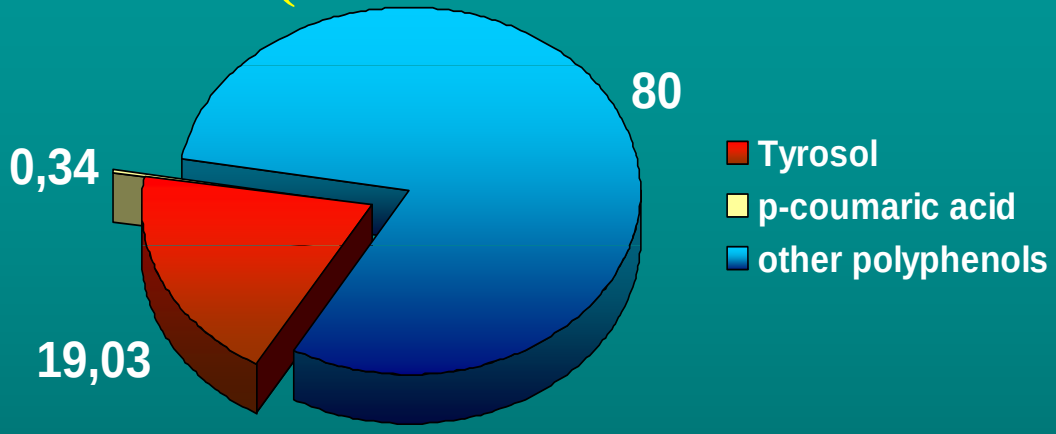
200-400 mg/giorno nei paesi Mediterranei
(olio oliva)

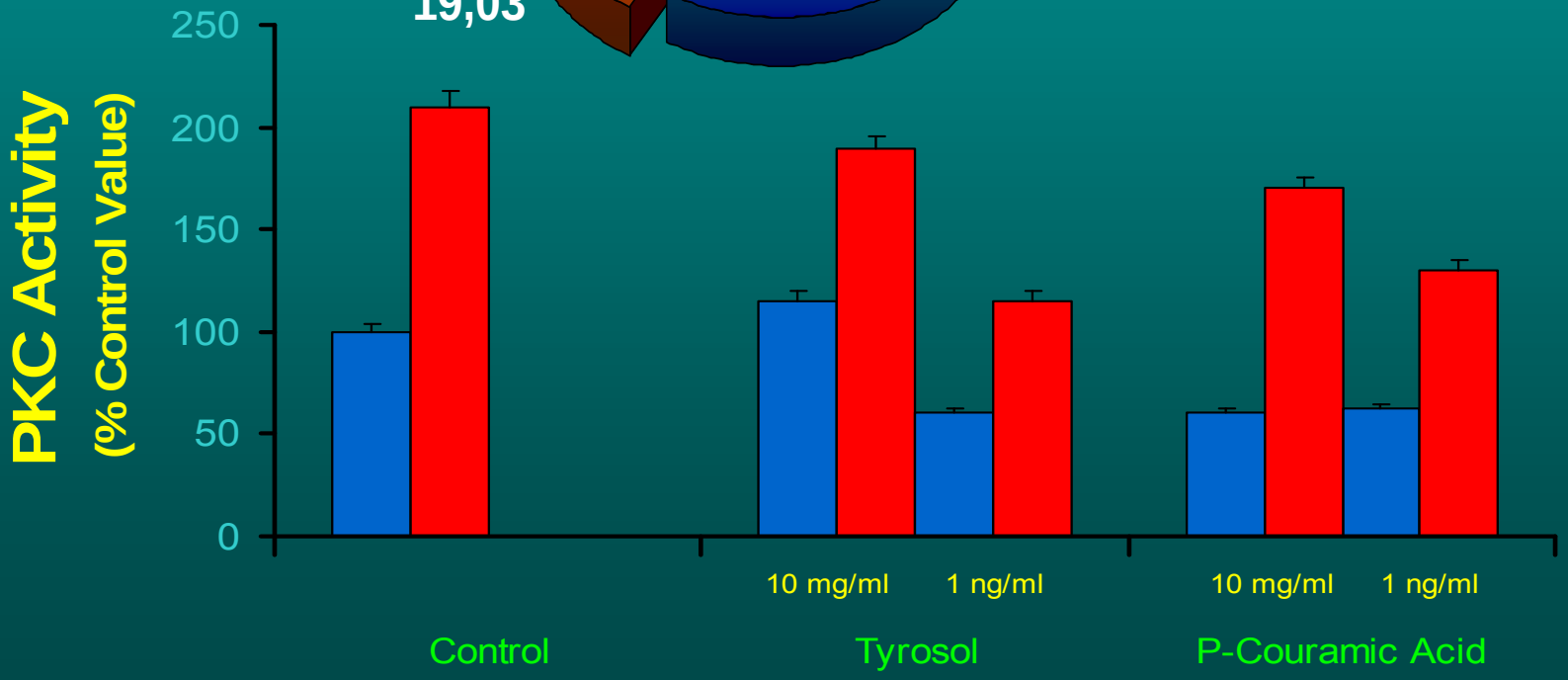
Studi sperimentali dimostrano che lo squalene inibisce effettivamente l'insorgenza dei tumori del colon, polmone e pelle

Meccanismo coinvolto: **inibizione della fernesilazione di Ras, modulazione della attivazione carcinogenesi**
attività antiossidante

Unità Nutrition Umana - Università di Roma Tor Vergata

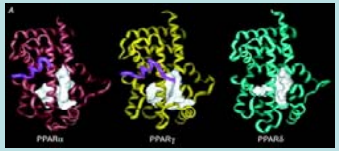
Tyrosol and p-cumaric Acid Content in Olive Oil (% of Total Phenolic Fraction)





De Lorenzo et al. Biochem. Cell Molecular Biol., 1999

Why are PUFAs healthy?



+

PPRE

Fatty acid oxidation genes

−

SREBP1
SP1/NF-Y

Lipogenic genes

β-Oxidation



VLDL-TG

FA synthesis
Triglyceride synthesis



- Lipid and glucose metabolism
- Cell cycle control
- Inflammation

J Pharmacol Sci **97**, 184 – 189 (2005)

Journal of Pharmacological Sciences
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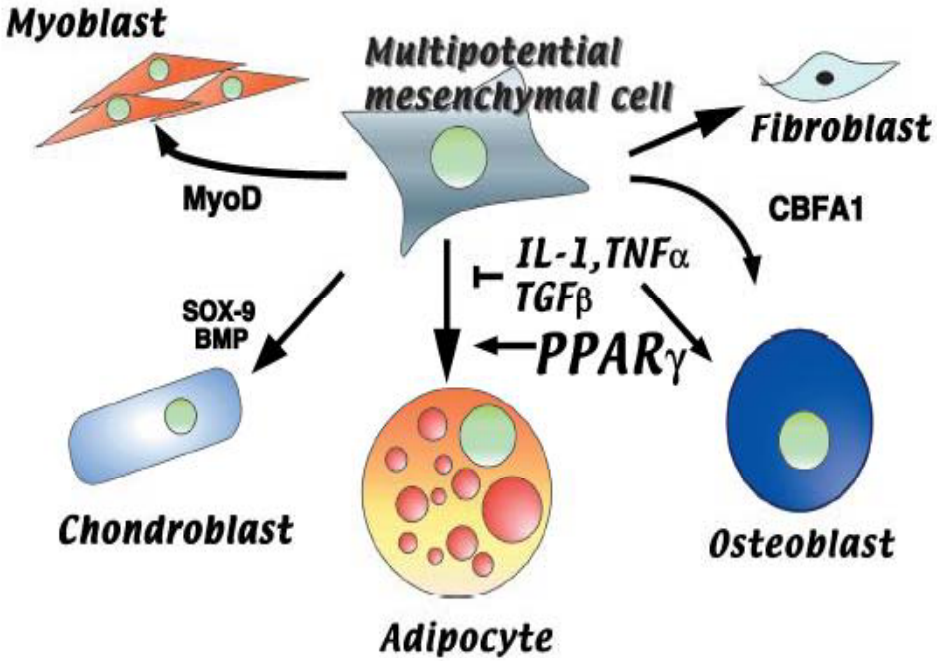
Forum Minireview

Nuclear Receptors as Targets for Drug Development: Crosstalk Between Peroxisome Proliferator-Activated Receptor γ and Cytokines in Bone Marrow-Derived Mesenchymal Stem Cells

Ichiro Takada[1,*], Miyuki Suzawa[1], and Shigeaki Kato[1]



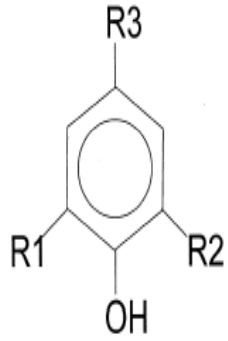
Our results indicate that suppression of PPARγ function by IL-1 or TNF-α leads to increased sensitivity of mesenchymal stem cells to other cytodifferentiation factors and to development of cell types other than adipocytes, such as osteoblasts and osteoclasts (27).

Differential anti-inflammatory effects of phenolic compounds from extra virgin olive oil identified in human whole blood cultures

Elizabeth A. Miles, Ph.D.*, Pinelope Zoubouli, B.Sc., Philip C. Calder, Ph.D., D.Phil.

Institute of Human Nutrition, School of Medicine, University of Southampton, Southampton, United Kingdom

Manuscript received February 24, 2004; accepted June 7, 2004.



	R1	R2	R3
Vanilic acid	H	OCH_3	COOH
Homovanillic acid	H	OCH_3	CH_2CH_2OH
p-Coumaric acid	H	H	CH=CHCOOH
Syringic acid	CH_3O	OCH_3	COOH
Caffeic acid	H	OH	CH=CHCOOH
Tyrosol	H	H	CH_2CH_2OH

Fig. 1. Chemical structures of some of the phenolic compounds studied.

Oleuropein glycoside and caffeic acid decreased the concentration of interleukin-1. Kaempferol decreased the concentration of prostaglandin. No effects were seen on concentrations of interleukin-6 or tumor necrosis factor- and there were no effects of the other phenolic compounds.

Some, but not all, phenolic compounds derived from extra virgin olive oil decrease inflammatory mediator production by human whole blood cultures. This may contribute to theantiatherogenic properties ascribed to extra virgin olive oil.

Ibuprofen- like activity in extra-virgin olive oil

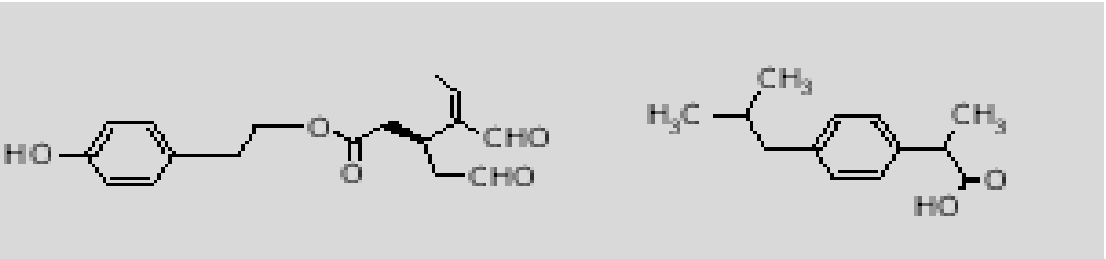


Figure 1 | Structures of (−)oleocanthal (left) and the anti-inflammatory drug ibuprofen (right). How they underpin the similar throat-irritating and pharmacological properties of the two compounds is unclear as yet.

-Newly pressed extra-virgin olive oil contains oleocanthal, a compound whose pungency induces a strong stinging sensation in the throat as FANS

- 50g of extra-virgin olive oil contain 200 µg/ml of oleocanthal

- this dose is corresponding to 10% of ibuprofen dosage recommended for adult pain relief

Beuchamp et al. Nature vol 437 1 Settembre 2005

Adherence to the Mediterranean diet is associated with total antioxidant capacity in healthy adults: the ATTICA study[1–3]

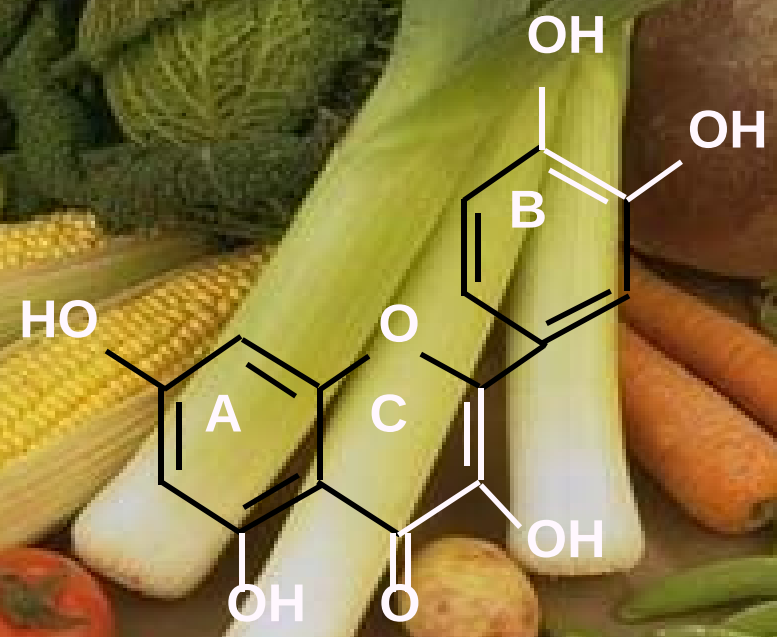
Christos Pitsavos, Demosthenes B Panagiotakos, Natalia Tzima, Christina Chrysohoou, Manolis Economou, Antonis Zampelas, and Christodoulos Stefanadis

TABLE 2
Frequency consumption of several food groups, according to Mediterranean diet score[1]

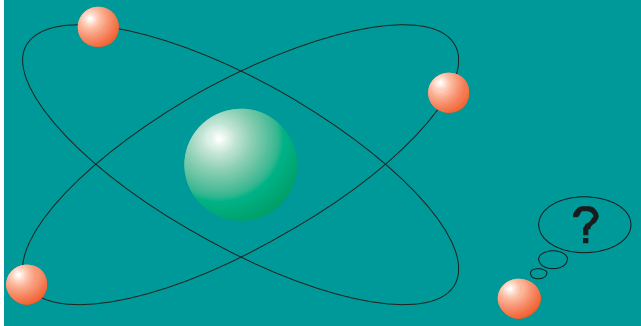
	Tertile of diet score						
	Men (n = 1514)			Women (n = 1528)			
Food groups	1st (0–20) (n = 504)	2nd (21–35) (n = 505)	3rd (36–55) (n = 505)	1st (0–20) (n = 509)	2nd (21–35) (n = 509)	3rd (36–55) (n = 510)	P[2]
Red meat and red meat products (servings/wk)	3.0 ± 1.1[3]	1.6 ± 1.9[4]	1.1 ± 1.8[4]	2.5 ± 1.1	1.7 ± 1.2[4]	0.9 ± 1.1[4]	0.02
Poultry (servings/wk)	1.7 ± 1.1	1.4 ± 0.6	0.8 ± 0.9	1.3 ± 0.5	1.3 ± 0.7	1.0 ± 0.4	0.44
Sweets (servings/wk)	1.0 ± 1.4	1.1 ± 1.3	1.2 ± 1.2	1.1 ± 1.9	1.2 ± 1.6	1.3 ± 1.9	0.33
Fish (servings/wk)	1.0 ± 1.1	1.3 ± 2.1	1.6 ± 2.2	1.0 ± 1.3	1.3 ± 2.0	1.9 ± 1.4	0.87
Dairy products, low-fat (servings/wk)	4.1 ± 2.2	5.9 ± 2.2	6.2 ± 2.4[5]	5.0 ± 1.3	6.2 ± 1.1[4]	6.9 ± 2.1[5]	0.001
Fruit (servings/wk)	5.0 ± 3.1	5.3 ± 2.9	7.1 ± 2.2[5]	5.0 ± 3.2	5.7 ± 2.1[4]	7.0 ± 2.1[5]	0.03
Vegetables (servings/wk)	1.4 ± 1.4	1.9 ± 1.2[4]	2.4 ± 1.5[5]	1.2 ± 1.1	2.3 ± 1.2[4]	3.1 ± 1.2[4]	0.01
Legumes (servings/wk)	1.3 ± 1.1	1.8 ± 1.2[4]	2.1 ± 1.1[4]	0.9 ± 1.5	1.3 ± 1.4	1.7 ± 0.7[4]	0.03
Potatoes (servings/wk)	1.7 ± 1.4	1.9 ± 1.6[4]	2.1 ± 1.3[4]	1.9 ± 1.5	2.7 ± 1.4[4]	2.9 ± 1.1[4]	0.03
Nonrefined cereals (servings/wk)	1.2 ± 1.5	1.8 ± 1.3	2.4 ± 1.4	1.2 ± 1.4	1.7 ± 1.5	2.2 ± 1.2	0.12
Alcoholic beverages (mL/d)	160 ± 44	115 ± 35[4]	95 ± 25[5]	85 ± 30	80 ± 25[4]	75 ± 45[5]	0.001
Daily use of olive oil (%)	77	86	91	79	88	95	0.001

[1] No significant interactions were observed between tertile of diet score and sex.
[2] Derived from ANOVA. Reflect the association between food consumption and tertiles of diet score, after adjustment for sex.
[3] $\bar{x}$ ± SD (all such values).
[4,5] [illegible]

Phenolic Compounds



Role of antioxidants in carcinogenesis



Reactive O2
+
O2-Derived
Free Radicals

Antioxidant
Scavengers &
Enzyme Systems

Lipid peroxidation
in cell membranes

Oxidized bases
in DNA

Normal cell

Cell repair
Exposure of DNA
Cell Death
Lipid Peroxides

Compensatory
Cellular
Hypoproliferation

Mutations

DNA Repair

Normal Cell

Cell Death
No Repair

Less regulation of cell
growth & differentiation

Cell Hyperproliferation

Exposure of DNA

Further Mutations

Phytochemicals, Phytonutrients







Hydroxycinnamates (e.g ferulic acid, caffeic acid)

Polyphenols

Isoflavones (genistein, daidzein)



Flavonoids

Flavonols (e.g. quercetin)



Flavanones, flavon



Flavanols

Anthocyanins





Catechins

Pro(antho)cyanidins





UNITA' ORAC

Figura 5 *Area sotto la curva di decadimento della beta-ficoeritrina (B-PE)*

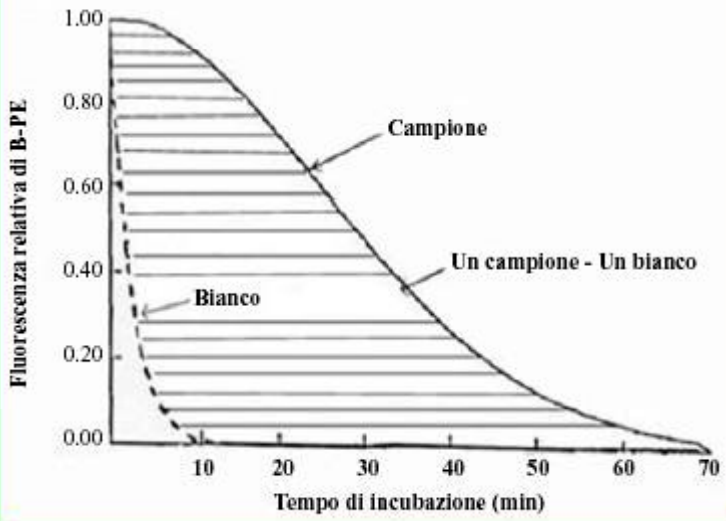
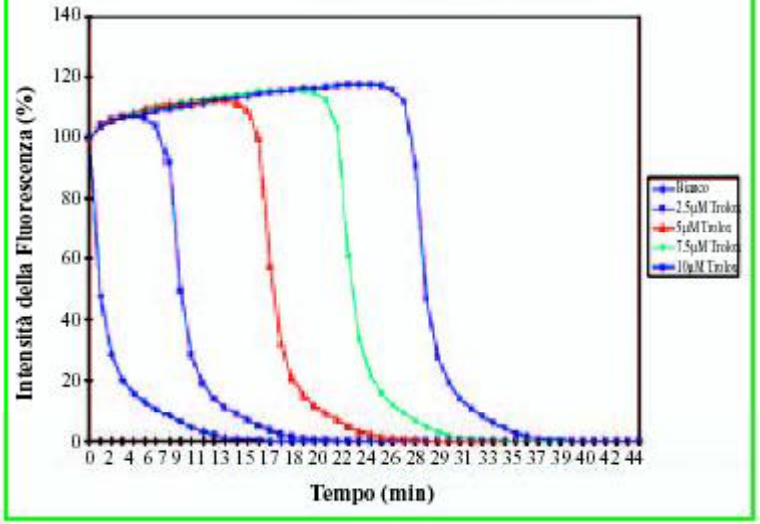


Figura 6 *Curve di calibrazione dello* standard *Trolox*



1 unità ORAC = 1 µM di equivalenti Trolox®

È stato stimato che ogni persona dovrebbe introdurre una quantità di vegetali pari a 5000 unità ORAC al giorno per godere pienamente dei benefici degli antiossidanti contenuti.

Allium cepa



Allium sativum



Salvia officinalis



Rosmarinus officinalis



Tabella 8 *Valori di fenoli totali, flavonoidi, flavanoli e ORAC nelle erbe aromatiche analizzate*

		FENOLI TOTALI*		FLAVONOIDI*		FLAVANOLI*		ORAC*	
ERBE AROMATICHE	**NOME BOTANICO**	mg/100g ± DS		mg/100g ± DS		mg/100g ± DS		µmolTE/100g ± DS	
Erba cipollina	*Allium schoenoprasum*	74·9	8·9	35·3	3·1	1·10	0·10	2094·2	196
Aneto	*Anethum graveolens*	215·2	22·0	93·2	9·6	0·73	0·06	4392·1	403
Salvia	*Salvia officinalis*	798·0	81·0	749·5	71·0	1·61	0·17	32 004·1	3095
Santoreggia	*Santureja hortensis*	201·2	20·0	67·5	62·0	1·13	0·12	9645·2	871
Timo	*Thymus vulgaris*	1537·0	140·0	1165·3	100·0	0·22	0·02	27 425·5	2501
Issopo	*Hyssopus officinalis*	214·5	21·0	176·0	17·0	2·65	0·31	6050·2	600
Melissa	*Melissa officinalis*	434·0	40·0	289·0	26·0	1·91	0·21	5996·5	500
Maggiorana	*Origanum majorana*	854·2	83·0	812·6	82·0	2·71	0·26	27 297·4	2611
Origano	*Origanum vulgare*	435·1	41·0	361·0	31·0	1·14	0·12	13 970·2	1090
Prezzemolo	*Petroselium hortensis*	67·9	6·1	52·2	4·2	0·90	0·06	1301·8	131
Menta	*Mentha piperita*	611·2	60·0	592·5	49·0	4·33	0·39	13 978·1	1100
Rucola	*Eruca sativa*	136·4	12·0	46·0	6·2	1·42	0·13	2373·3	230
Rosmarino	*Rosmarinus officinalis*	1377·3	130·0	1321·2	131·0	2·41	0·21	290·32	2842
Basilico	*Ocymum basilicum*	234·0	28·0	230·0	20·0	0·93	0·09	4805·2	450
Dragoncello	*Artemisia dracunculus*	570·0	59·0	537·0	48·0	0·11	0·02	15 542·2	1206

* I valori sono riferiti a mg/100 g di vegetale fresco e sono le medie di deviazioni *standard* di 4 differenti determinazioni DS Deviazione *Standard*

Scientific Evidence: Hot Nature Food

Thermo-Effect

Zingerone (*Suekaw 1984*) and
Capsaicinoids (*kawada et al 1988*)
promote adrenal medulla Catecholamine Secretion.

The capsaicin receptor- involves in the heat-activated ion channel in the pain pathway (*Caterina et al 1997*).

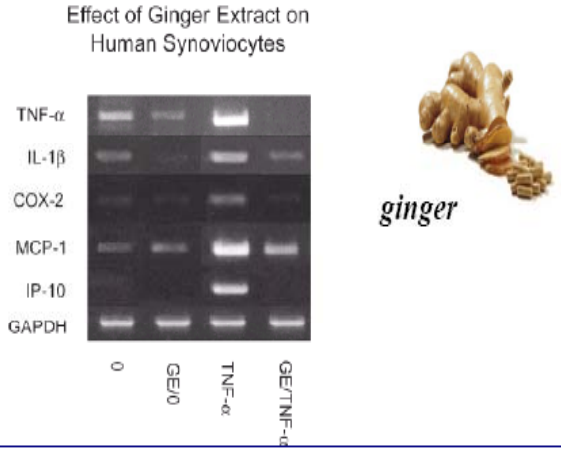


Capsaicinoids

zingerone

Inhibition of cytokine and chemokine induction by ginger extract (GE) in human synoviocytes.

(Reinhard Grzanna et al., J Med Food 8 (2) 2005, 125–132)



TNF- (1 ng/mL) for 1 hour, increased levels of TNF- and IL-1 mRNA (lane 3). Ginger (GE) pretreatment reduced TNF, IL1, COX 2, MCP 1, IP 10 (lane 4)

Tabella 9 *Valori di fenoli totali, flavonoidi totali e ORAC nelle spezie analizzate*

		FENOLI TOTALI*		TOTALE FLAVONOIDI*		ORAC*	
SPEZIE	**NOME BOTANICO**	mg/100g	± DS	mg/100g	± DS	µmolTE/100g	± DS
Cumino	*Cuminum cyminum*	750·0	69	740·1	76·0	76 800·2	7500
Cardamomo	*Elettaria cardamomum*	148·3	15	19·3	2·3	2764·0	254
Coriandolo	*Coriandrum sativum*	134·2	14	94·6	9·2	5141·3	531
Zenzero fresco	*Zingiber officinalis*	200·5	19	117·5	12·0	14 840·2	1060

* I valori sono riferiti a mg/100 g di spezia e sono le medie di deviazioni *standard* di 4 differenti determinazioni DS Deviazione *Standard*

Walnut: Brain Food (organ-specific)



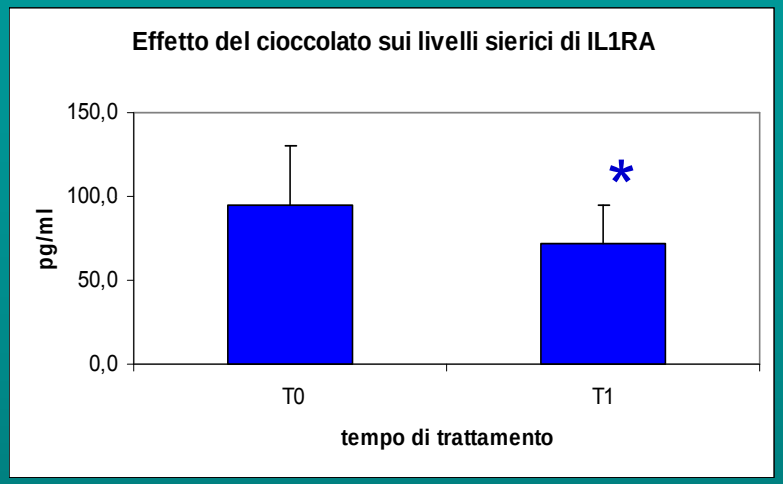
Rich in Omega-3 PUFAS

Walnut extract inhibit the fibrillization of amyloid beta-protein, and also defibrillizes its preformed fibrils.

(Chauhan N et al., Curr Alzheimer Res 2004 1:183-8)

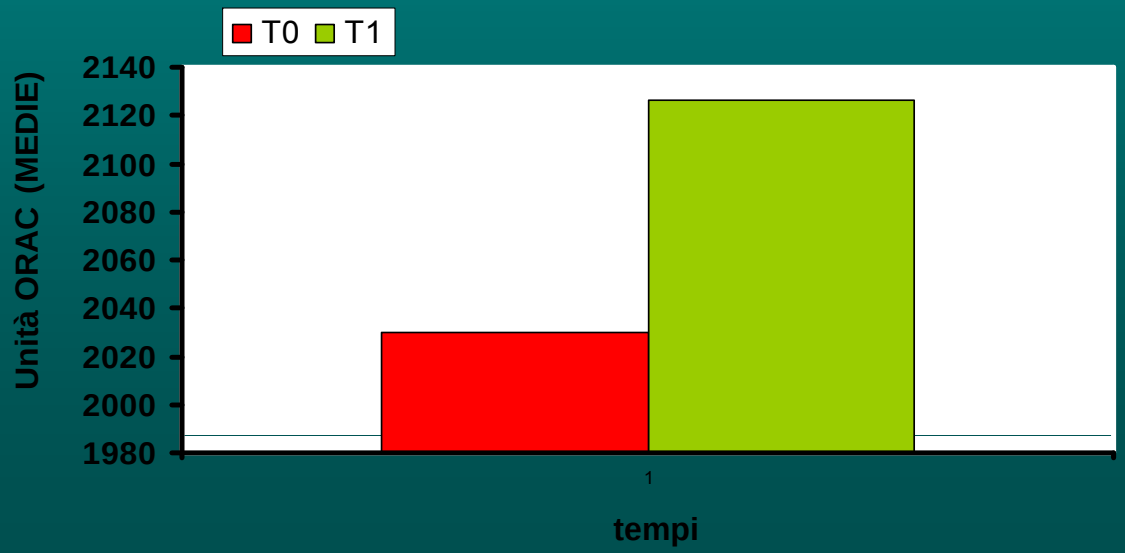
- **NOCI – NOCCIOLE - MANDORLE:**
  - **È una recente novità (National Center for Health Statistics, 2002 – JAMA 287, 2002 – JAMA 290, 2003)**
  - **Donne che consumano 5 oncie (una oz = 30 gr) a settimana di noci, presentano -35% di IMA non fatale**
  - **Uomini che consumano noci (no quantities) due volte a settimana presentano *una riduzione del 47% di morte cardiaca improvvisa*, *e del 30% per la mortalità per malattia coronarica***







Unità ORAC campioni ematici



BIO CHE BLUFF

L'ESPRESSO 31 AGOSTO 2007

"Uno studio accusa cibi biologici: sono pieni di grassi e additivi, zuccheri e sali. Spesso non sono migliori di quelli industriali.

Eppure sono molto cari".



CIBI BIO

l'Italia impazza per i piatti naturali

La Repubblica 10 settembre 2008
di Caterina Pasolini

Le nuove frontiere della nutrizione: i risultati della ricerca

Responsabile Prof. Antonino De Lorenzo

Coordinatore Dott.ssa *Laura Di Renzo*
Università di Roma Tor Vergata

UNIVERSITA' DEGLI STUDI DI ROMA
TorVergata
Università

European Review for Medical and Pharmacological Sciences 2007; 11: 185-192

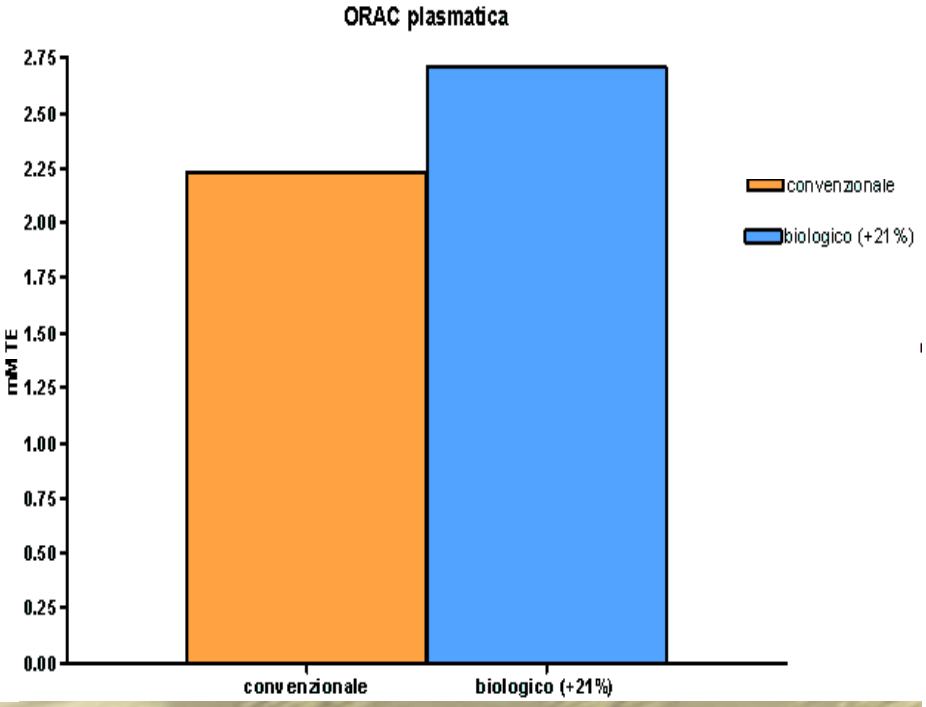
Is antioxidant plasma status in humans a consequence of the antioxidant food content influence?

L. DI RENZO[1,2], D. DI PIERRO[3], M. BIGIONI[1], V. SODI[1], F. GALVANO[4], R. CIANCI[1,5], L. LA FAUCI[4], A. DE LORENZO[1]

[1]Department of Neuroscience, Division of Human Nutrition, University of Tor Vergata, Rome (Italy)
[2]I.N.Di.M., National Istitute for Mediterranean Diet and Nutrigenomic, Reggio Calabria (Italy)

Table I. Antioxidant capacity in conventional and organic produts.

	Conventional		Organic		
	Median	Range	Median	Range	_%
Garlic	2572,5	70	3816,5	52	48**
Orange	900	50	1606	56	79**
Banana	205,9	16	339	38,6	65**
Carrot	116,4	27,2	166,8	58,4	43**
Beans	50,4	21,2	207,6	31,2	312**
Strawberry	846,7	37,2	921,2	41,6	9**
Lettuce	756,3	99,8	608,5	80,8	-20**
Limon	1505	54	1603	48	7**
Apple	454	81,9	610,5	47	34**
Potato	298,8	4,4	423,6	50,8	42**
Tomato Souce	205,2	19,8	213,8	58,8	4
Pear	246,4	132,2	185,3	58,4	-25**
Peas	88,2	41,8	164,8	65	87**
Tomato	280,8	72,6	475,2	98,4	69**
Celery	265,7	119,8	414,9	40,4	56**
Wine	3132	280,2	4725	164	51**
Courgettes	774	148,8	894	60,6	15**
Milk	195,8	78,4	216,6	38,6	11*



Meno sostanze tossiche?

Chi mangia sano gode di buona salute, prevenendo tutte le malattie legate sia a cattive abitudini alimentari che all'uso di alimenti non salubri. Il cibo, insieme all'acqua e all'aria è una delle variabili che influenzano in modo determinante il delicato equilibrio del nostro organismo.

Twenty-four-hour urinary excretion of ten pesticide metabolites in healthy adults in two different areas of Italy (Florence and Ragusa)

Calogero Saieva[a], Cristina Aprea[b], Rosario Tumino[c], Giovanna Masala[a], Simonetta Salvini[a], Graziella Frasca[c], Maria Concetta Giurdanella[c], Ines Zanna[a], Adriano Decarli[d], Gianfranco Sciarra[b], Domenico Palli[a,*]

Table 3

Mean adjusted[a] levels of daily urinary excretion of pesticide metabolites in sixty-nine 24-h urine samples by EPIC center (EPIC Florence and Ragusa)

Pesticide metabolite	Florence (nmol/day)	Ragusa (nmol/day)	*P*-value
TCP	31.5	16.7	**0.01**
Alkylphosphates[b]	459.9	204.5	**0.007**
-Diethylphosphates[c]	105.3	50.1	**0.009**
-Dimethylphosphates[d]	354.6	154.3	**0.01**
ETU	11.5	4.2	**0.03**
3PBA	5.8	7.1	0.61

[a] From a covariance analysis including terms for age, sex, BMI, smoking history and center.

[b] Alkylphosphates: sum of six alkylphosphates measured: DMP, DMTP, DMDTP, DEP, DETP, DEDTP.

[c] Diethylphosphates: sum of three diethylphosphates measured: DEP, DETP, DEDTP.

[d] Dimethylphosphates: sum of three dimethylphosphates measured: DMP, DMTP, DMDTP.

Science of the Total Environment 332 (2004) 71–80

Dietary Intake and Its Contribution to Longitudinal Organophosphorus Pesticide Exposure in Urban/Suburban Children

Chensheng Lu,[1] Dana B. Barr,[2] Melanie A. Pearson,[1] and Lance A. Waller[3]

Table 1. Descriptive statistics of DVWA concentrations (μg/L) of OP pesticide metabolites measured in CPES-WA children from summer 2003 to spring 2004.

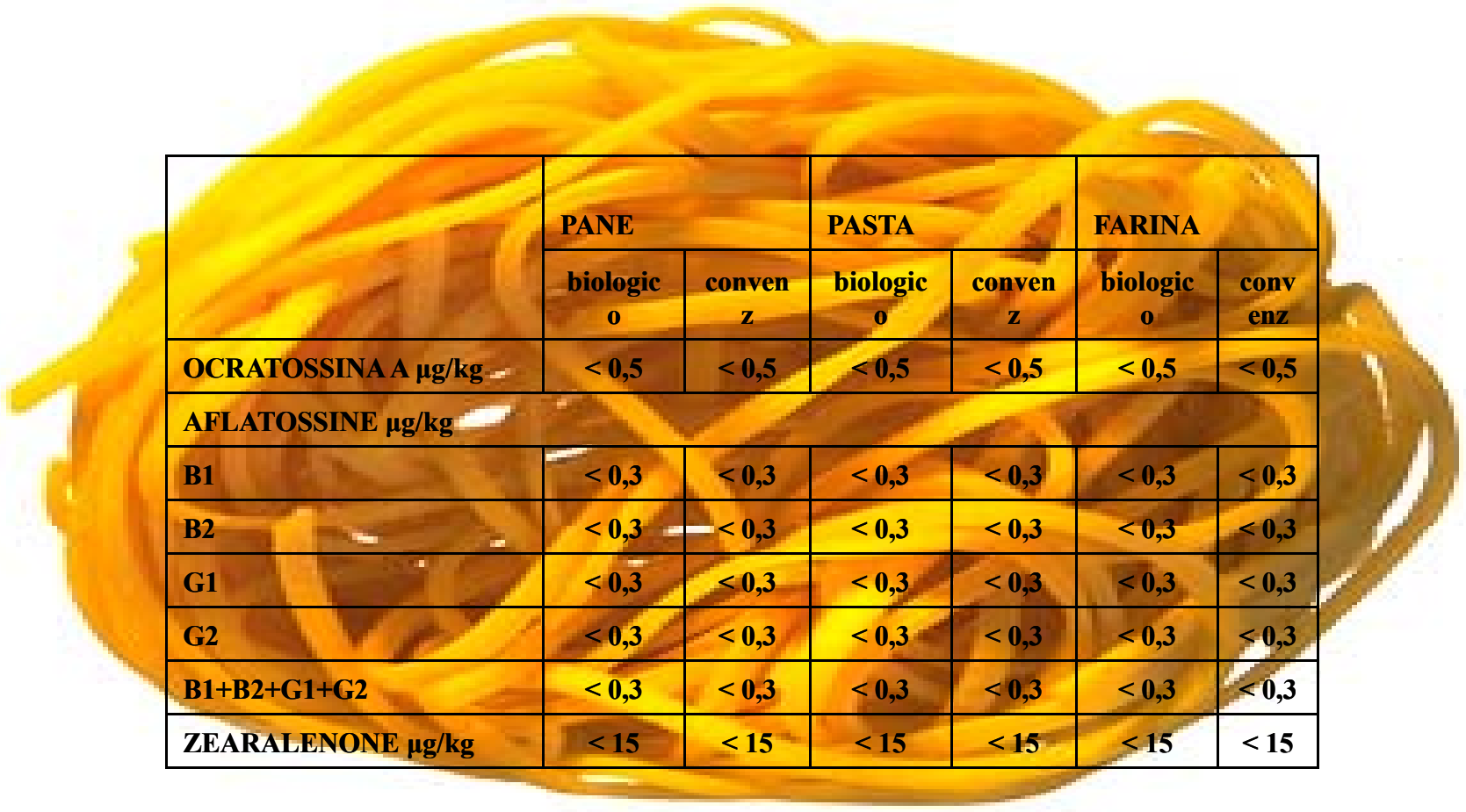
	MDA	TCPy	IMPY	CMHC	DEAMPY
Mean (μg/L)	4.6	5.1	0.2	0.01	0.3
SD	17.1	5.0	1.2	0.02	1.3
No. of DVWA measurements[a]	702	701	677	702	675
Range (μg/L)	(0, 263)	(0, 32)	(0, 15)	(0, 0.5)	(0, 18)
LOD (μg/L)	0.3	0.2	0.7	0.2	0.2
Frequency of detection (%)	66	91	9	13	25
Percentile					
5th	0	0	0	0	0
10th	0	0.2	0	0	0
25th	0	1.5	0	0	0
50th	1.6	3.7	0	0	0
75th	3.6	7.5	0	0	0.01
90th	8.9	11.3	0	0.02	0.5
95th	17.1	14.7	0.5	0.07	0.9

[a]These numbers do not include the measurements from the days (5 days) when subjects consumed organic diets.

	MELE		VERDURA	
	biologico	convenz	biologico	convenz
FITOFARMACI GC-MS (A) mg/Kg				
ACLONIFEN	< 0,01	< 0,01	< 0,01	< 0,01
ACRINATRINA	< 0,01	< 0,01	< 0,01	< 0,01
BOSCALID	< 0,01	**0,044§**	< 0,01	< 0,01
BROMACIL	< 0,01	< 0,01	< 0,01	< 0,01
CLORPIRIFOS-ETILE	**< 0,01**	**0,02§**	**< 0,01**	**0,264§§**
CLORPIRIFOS-METILE	< 0,01	< 0,01	< 0,01	< 0,01
FITOFARMACI GC-MS (B) mg/Kg				
ETOPROFOS	< 0,01	< 0,01	< 0,01	< 0,01
ETOSSAZOLO	< 0,01	< 0,01	< 0,01	< 0,01
ATRIDIAZOLO	< 0,01	< 0,01	< 0,01	< 0,01
FAMOFOS (FAMFUR)	< 0,01	< 0,01	< 0,01	< 0,01
FAMOXADONE	< 0,01	< 0,01	< 0,01	< 0,01
FENAMIFOS	< 0,01	< 0,01	< 0,01	< 0,01
FITOFARMACI GC-MS (C) mg/Kg				
PICOXISTROBIN	< 0,01	< 0,01	< 0,01	< 0,01
PIPERONIL BUTOSSIDO	< 0,01	< 0,01	< 0,01	< 0,01
PIRAZOFOS	< 0,01	< 0,01	< 0,01	< 0,01
PIRIDABEN	< 0,01	< 0,01	< 0,01	< 0,01
PIRIDAFENTION	< 0,01	< 0,01	< 0,01	< 0,01

	PASTA	
	biologico	**convenz**
INSETT. FOSFORATI (G. "1") mg/Kg		
ACEFATE	< 0,01	< 0,01
AZINFOS ETILE	< 0,01	< 0,01
INSETT. CLORURATI (G. "2") mg/Kg		
ALDRIN	< 0,01	< 0,01
ALDFA-ENDOSULFAN	< 0,01	< 0,01
INSETT. PIRETROIDI (G. "3") mg/Kg		
BIFENTRIN	< 0,01	< 0,01
CIFLUTRIN (SOMMA ISOMERI)	< 0,01	< 0,01
ACAR., ERB. e FUNG. (G. "4") mg/Kg		
ACLONIFEN	< 0,01	< 0,01
BENFLURALIN	< 0,01	< 0,01
ACARICIDI e FUNGICIDI (G. "5") mg/Kg		
BENALAXYL	< 0,01	< 0,01
BITERTANOLO	< 0,01	< 0,01

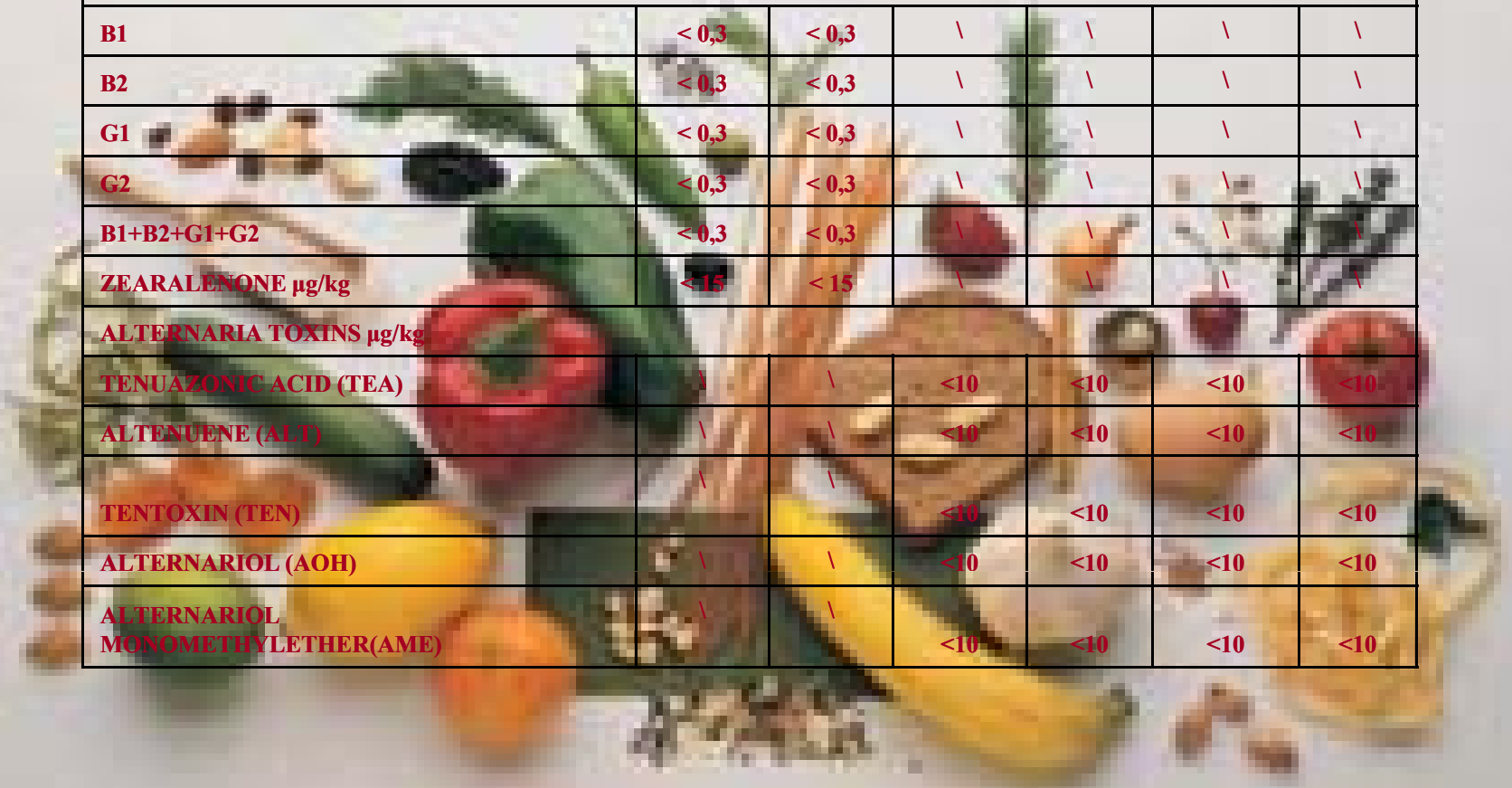
Livello di micotossine nei cereali (pane, pasta e farina) biologici e convenzionali misurato tramite metodica HPLC.



	PANE		PASTA		FARINA	
	biologico	convenz	biologico	convenz	biologico	convenz
OCRATOSSINA A µg/kg	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5
AFLATOSSINE µg/kg						
B1	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3
B2	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3
G1	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3
G2	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3
B1+B2+G1+G2	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3
ZEARALENONE µg/kg	< 15	< 15	< 15	< 15	< 15	< 15

Livello di micotossine in frutta (mele), verdura (bieta) e legumi (fagiolini) biologici e convenzionali misurato tramite metodica HPLC.

	LEGUMI		MELE		VERDURA	
	biologico	convenz	biologico	convenz	biologico	convenz
OCRATOSSINA A µg/kg	< 0,5	< 0,5	\	\	\	\
AFLATOSSINE µg/kg						
B1	< 0,3	< 0,3	\	\	\	\
B2	< 0,3	< 0,3	\	\	\	\
G1	< 0,3	< 0,3	\	\	\	\
G2	< 0,3	< 0,3	\	\	\	\
B1+B2+G1+G2	< 0,3	< 0,3	\	\	\	\
ZEARALENONE µg/kg	< 15	< 15	\	\	\	\
ALTERNARIA TOXINS µg/kg						
TENUAZONIC ACID (TEA)	\	\	<10	<10	<10	<10
ALTENUENE (ALT)	\	\	<10	<10	<10	<10
TENTOXIN (TEN)	\	\	<10	<10	<10	<10
ALTERNARIOL (AOH)	\	\	<10	<10	<10	<10
ALTERNARIOL MONOMETHYLETHER(AME)	\	\	<10	<10	<10	<10



	ConvRL	BioRL	ConvRC	BioRC
IL1α	12,27+8,67	17,34+4,97	15,81+6,4	18,23+5,97
IL1b	4,93±2,55	7,48±3,94	7,12±2,83	7,6±3,43
IL2	11,62±4,09	10,81±1,39	12,38±4,24	11,81±1,29
IL6	4,23±3,11	5,95±2,86	4,81±1,92	5,55±2,66
IL8	1,57±0,86	1,11±0,61	1,45±0,85	1,13±0,51
IL10	2,57±1,63	2,26±0,84	4,02±2,5	2,36±0,85
IL12	18,43±2,07	19,09±9,38	17,18±8,55	20,07±9,28
IL15	7,54±2,92	4,12±0,79	6,16±3,13	3,82±0,77
TNF-α	12,2±2,2	21,69±14,61	20,17±6,78	21,89±14,91
INF-γ	16,5±1,15	19,19±6,94	20,98±10,29	18,19±7,94
GSH	0,43±0,09	0,56±0,1	0,44±0,07	0,66±0,15
LOOH	71,5±17,87	38,61±7,88	66,66±33,47	36,65±6,88
NO2/NO3	63,09±36,76	91,94±47,46	66,43±29,16	92,94±48.46
ANPC %	52,8±14,17	47,47±7,64	51,97±12,45	46,47±7,74

OMOCISTEINA: UN INDICATORE DELLO STATO DI SALUTE?

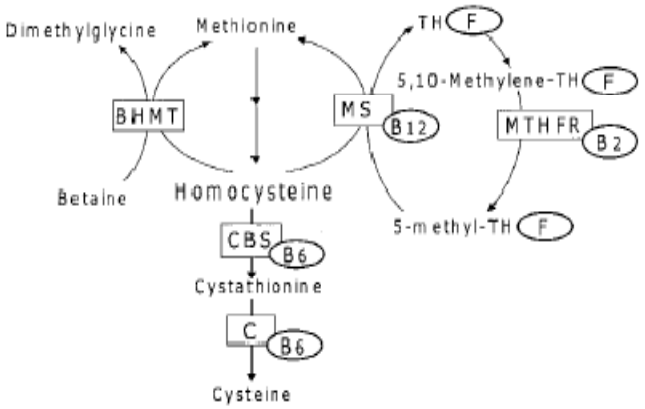


FIG 1. Simplified intracellular homocysteine metabolism. BHMT, betaine-homocysteine methyltransferase; C, γ-cystathionase; MS, methionine synthase; TH, tetrahydro; F, folate; B2, vitamin B_2; B6, vitamin B_6; B12, vitamin B_{12}.

BIA's Values at T0 and at T1

	T0		*T1*			
	Median	*Range*	*Median*	*Range*	*% difference*	*Spearman's Correlation*
Fat (%)	29,1	18,7	23,4	23,2		0,983*
Fat (Kg)	24,3	33,1	19,9	36,9		0,983*
Lean (%)	70,9	18,7	76,6	23,2		0,983*
Lean (Kg)	59,4	20,9	65,1	22,3		0,996*
TBW (%)	51,9	13,7	56,1	17		1*
ECW (%)	41,5	14,2	44,9	12,2		0,867*
ICW (%)	58,5	14,2	44,9	12,2		0,867*
Res (Ohm)	464	204	412	200	-11,2%**	
Rea (Ohm)	56	27	48	27	-14,3%**	
Na/K	0,9	0,4	1,05	0,3	+16,6%**	

* P<0.01

** P<0.05 Wilcoxon's Non Parametric Test

– Ematic's values at T0 and at T1

	T0		*T1*		
	Median	*Range*	*Median*	*Range*	*Difference*
Homocysteine (uM/L)	17,3	29,9	12,15	19,7	-5,15*
Phosphorus (mg/dl)	4,7	0,4	3	5,02	-1,7*
Sodium (mEq/L)	141,00	3,00	140,00	4,00	-1 NS
Potassium (mEq/L)	4,3	0,4	4,3	1,3	0 NS
Calcium (mg/dl)	9,7	0,5	9,5	1,3	-0,2 NS
Glucose (mg/dl)	88	79	86	72	-2 NS
Triglycerides (mg/dl)	83	126	113	92	30 NS
Total cholesterol (mg/dl)	155	110	178	115	23 NS
HDL cholesterol (mg/dl)	41	18	38	22	-3 NS

P<0.05 Wilcoxon Signed Ranks Test

UN’ ONCIA DI PREVENZIONE VALE UNA LIBBRA DI CURA!

(BENJAMIN FRANKLIN, 1735)



grazie