



Che cos'è la nutraceutica

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I nutraceutici: definizione

- Sostanze di origine naturale (per lo più vegetale) con azione farmacologica nota sull'organismo umano.
- Possono essere:
 - Contenute naturalmente in un alimento «naturale»
 - Contenute in un alimento arricchito («funzionale»)
 - Isolate e purificate in formulazioni farmaceutiche (unica forma realmente standardizzabile e valida per tutti i nutraceutici)

I nutraceutici: legislazione

- In Italia sono regolamentati sotto la legge degli integratori alimentari ([Regolamento UE 119 del 2014](#) ; [Circolare 19 Ottobre 2012](#) ; [Decreto Legge 13 Settembre 2012](#)), quindi possono avere funzione di preservazione della salute, ma non terapeutico, e devono essere per definizione sicuri.
- Gli Health Claim sono regolamentati dall'EFSA (ma esistono claim accettati anche dal Ministero, che regola anche massimi dosaggi impiegabili)
- Gli health claim devono essere testati sul soggetto «sano» !!!
- La qualità dei prodotti è garantita solo dal produttore.

Nutraceutica e farmacologia

- La nutraceutica risponde ai principi base della farmacologia:
 - Farmacocinetica: B, C_{max}, T_{max}, ...
 - Farmacodinamica: minima dose efficace, recettore/enzima, potenza, durata d'azione, ...
 - Evidence-based medicine
- E' fortemente influenzata dalla tecnica farmaceutica applicata

Ruolo dei nutraceutici in terapia medica

- **Prevenzione primaria**
- **Rallentamento del danno prima dell'introduzione del farmaco o di trattamenti (semi)invasivi**
- **Potenziamento della terapia impostata**
- **Rallentamento del danno per allungare i tempi pre-recidiva**
- **Gestione di pazienti in cui i trattamenti standard sono controindicati per comorbidità**

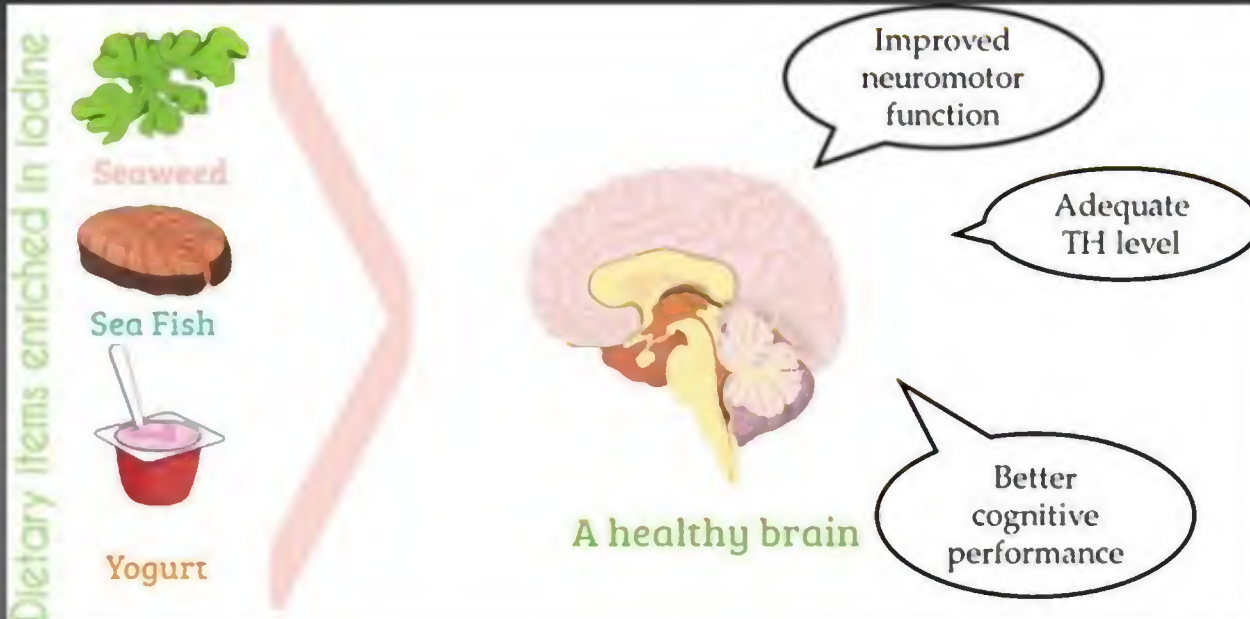
Vantaggi dell'approccio nutraceutico

- Usualmente buon profilo di safety
- Rarissime controindicazioni (pregressa intolleranza)
- Rarissime interazioni con terapia farmacologica
- Gradito dal paziente
- Multi-target
- Potenzialmente efficaci (se molecole, forme farmaceutiche, durata del trattamento e dosaggi corretti)

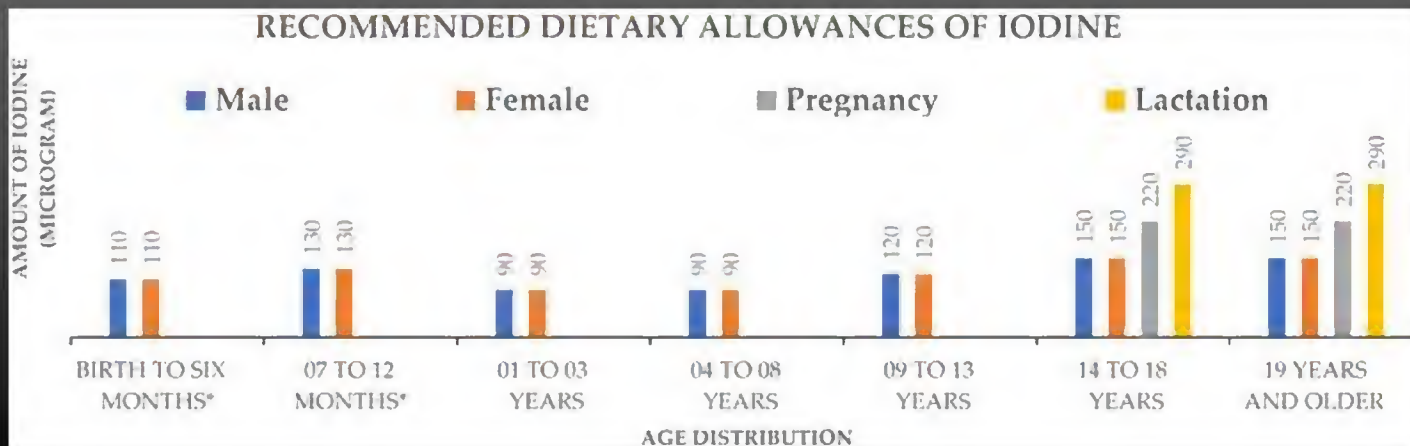
Limiti dell'applicazione pediatrica

- **Mancanza di studi di farmacocinetica**
- **Rari/Rarissimi studi clinici condotti su bambino, spesso sottodimensionati**
- **Estrapolazione dati dall'adulto o uso tradizionale**

Un esempio: lo iodio



[Food Sci Nutr. 2018; 6\(6\): 1341-51.](#)



Food Item	Amount	Approximate (mcg) per Serving	Percent of Daily Value
 Banana	Medium one	3	2
 Canned Corn	Half cup	14	9
 Plain Yogurt low fat	One cup	75	50
 Iodized Salt	One and half gram	71	47
 Boiled Macaroni	One cup	27	18
 Raisin Bran Cereal	One cup	11	7
 Seaweed	One gram	16 to 2984	11 to 1989
 Shrimp	Three ounces	35	23
 Reduced Fat Milk	One cup	56	37
 Egg	One piece	24	16
 Fruit Cocktail	Half cup	42	28
 Canned Tuna Fish	Three ounces	17	11
 Chocolate Ice-cream	Half cup	30	20
 Cheddar Cheese	One ounce	12	8
 Fish Sticks	Three ounces	54	36
 Baked Cod	Three ounces	99	66

[Food Sci
Nutr. 2018;
6\(6\): 1341–
51.](#)

The Role of Nutritional Supplements in the Treatment of ADHD: What the Evidence Says

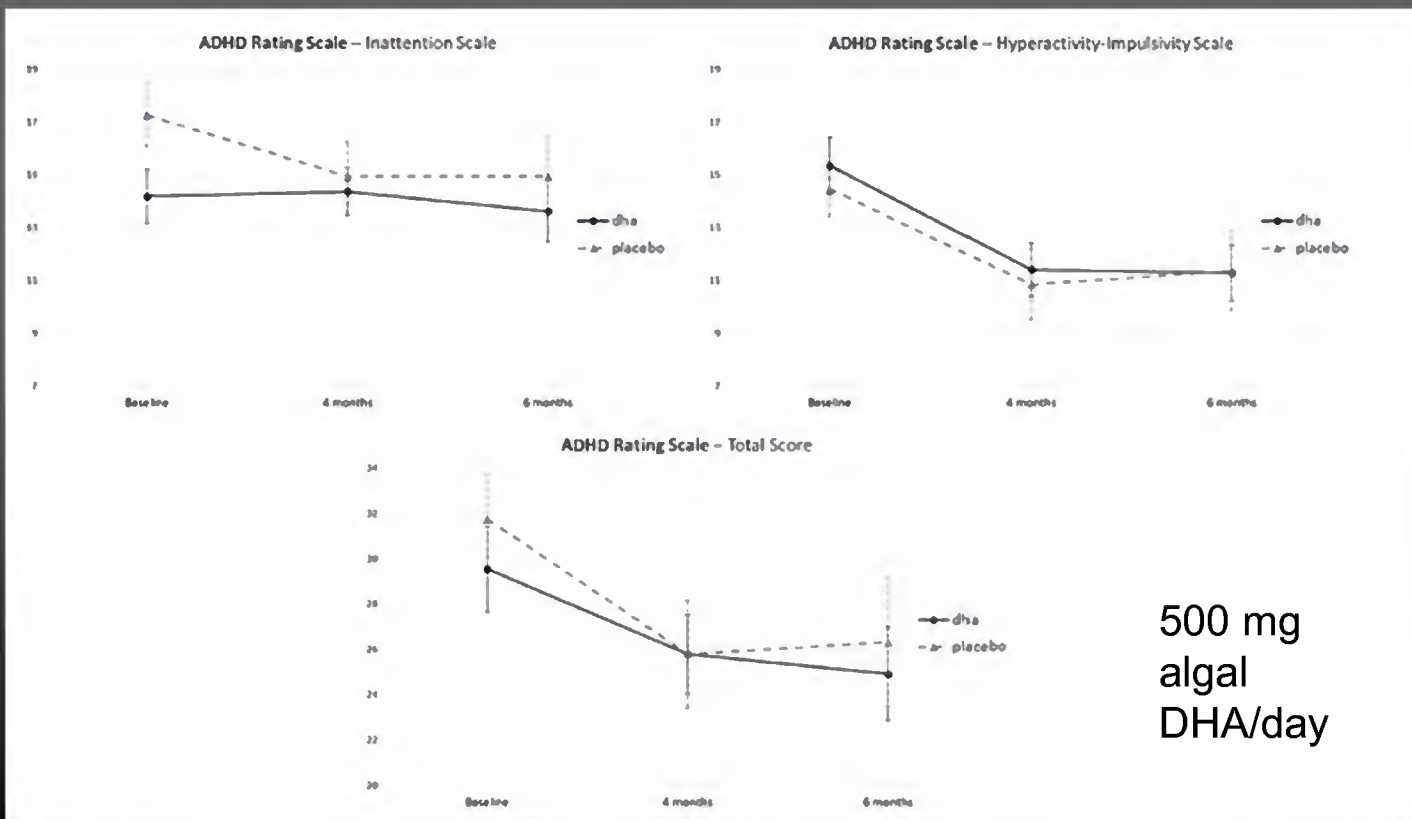
Candidate dietary supplements:

- PUFAs -> All ?
 - Zn
 - Fe
 - Mg
- } Deficient or at deficiency risk subjects



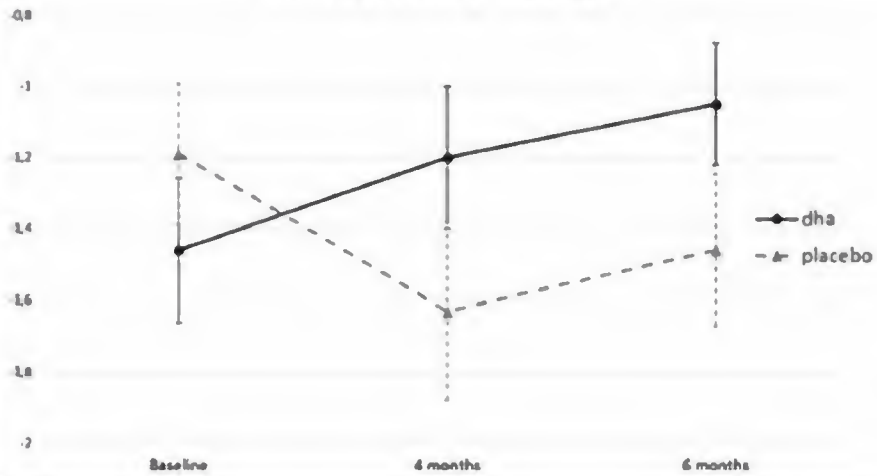
Behavioral and cognitive effects of docosahexaenoic acid in drug-naïve children with attention-deficit/hyperactivity disorder: a randomized, placebo-controlled clinical trial

Alessandro Crippa¹ · Alessandra Tesei¹ · Federica Sangiorgio¹ · Antonio Salandi¹ · Sara Trabattoni¹ · Silvia Grazioli^{1,2} · Carlo Agostoni³ · Massimo Molteni¹ · Maria Nobile¹

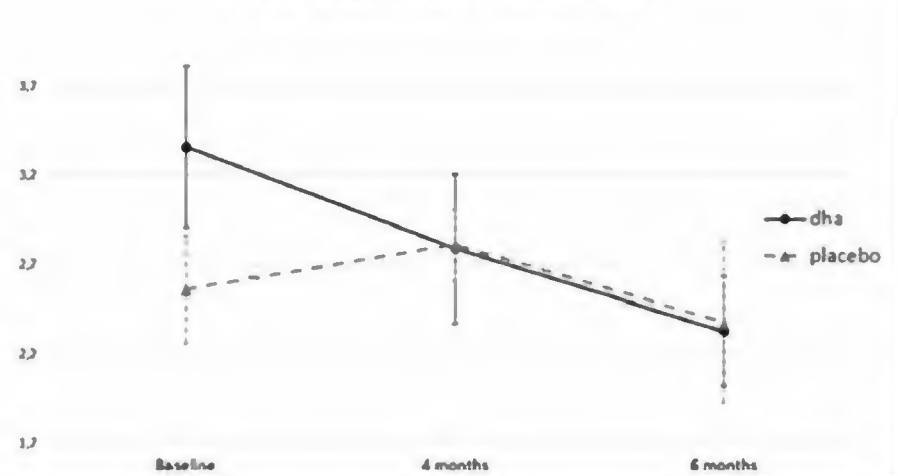


500 mg
algal
DHA/day

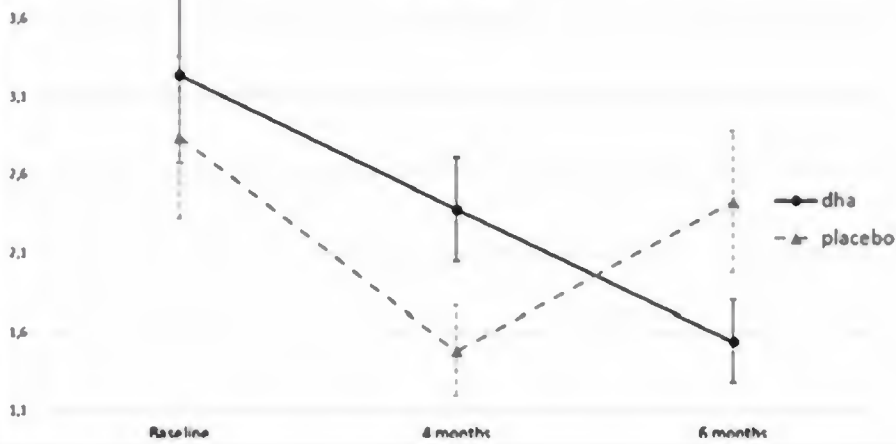
CHQ Psychosocial Summary



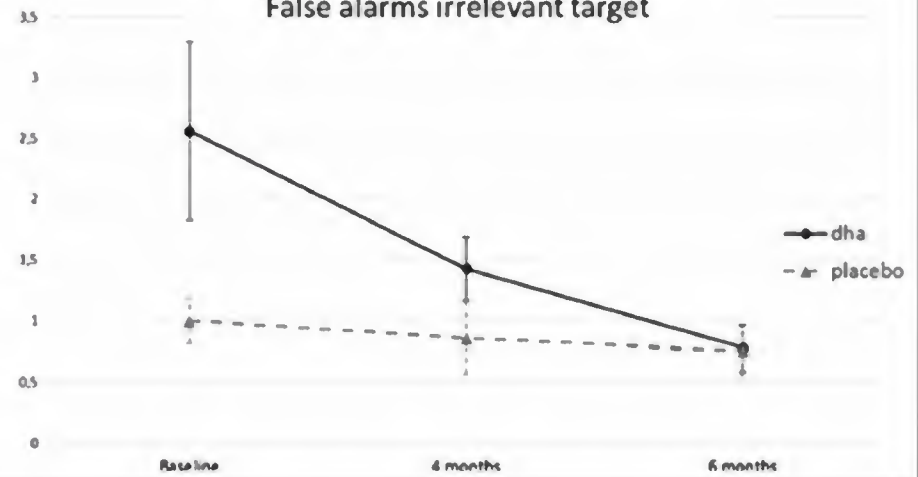
SDQ Emotional Problem Scale

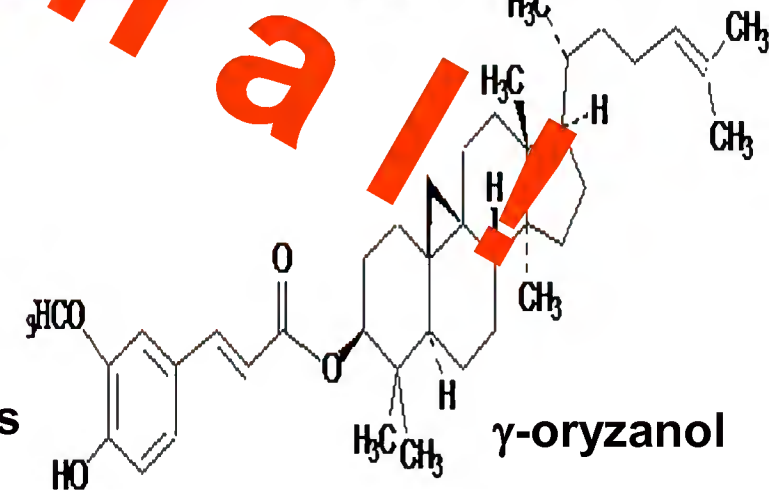
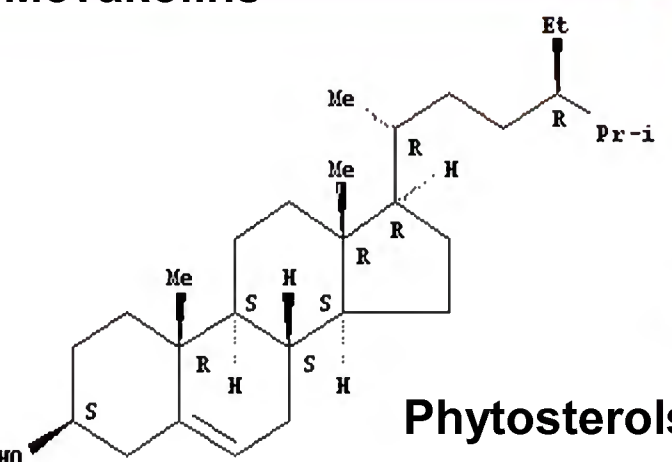
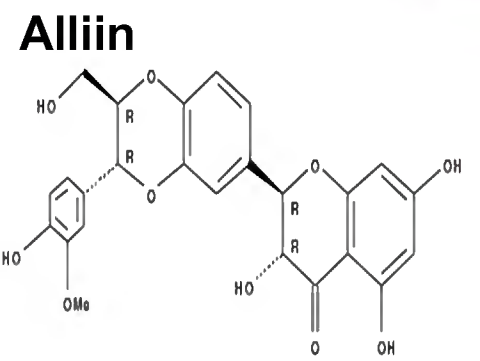
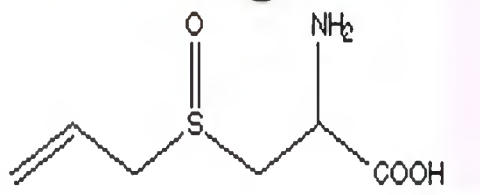
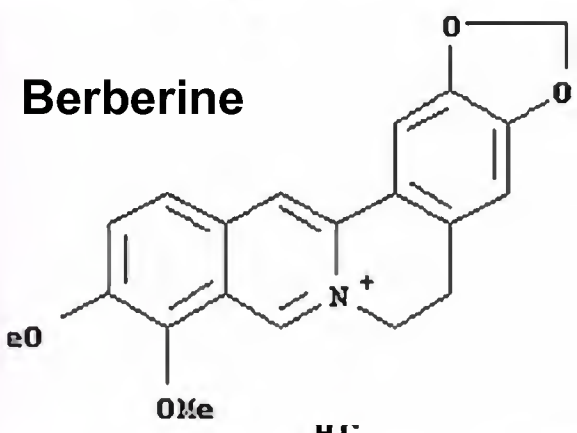
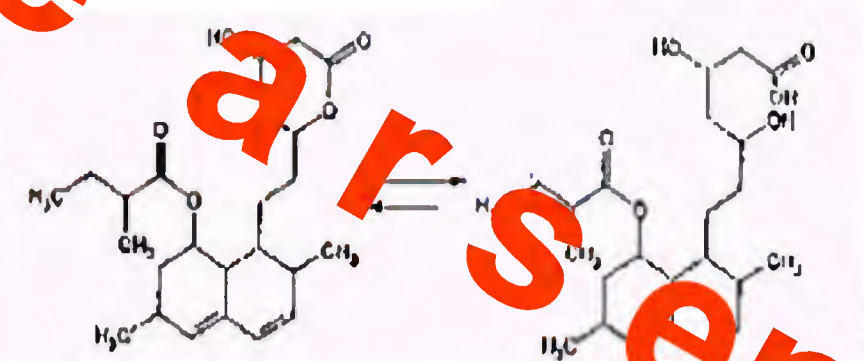
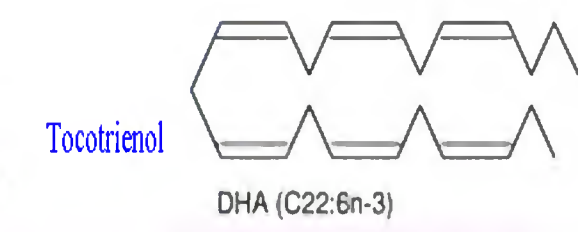
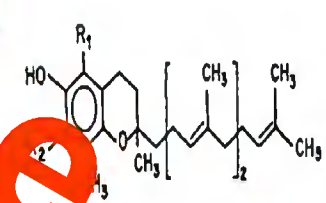
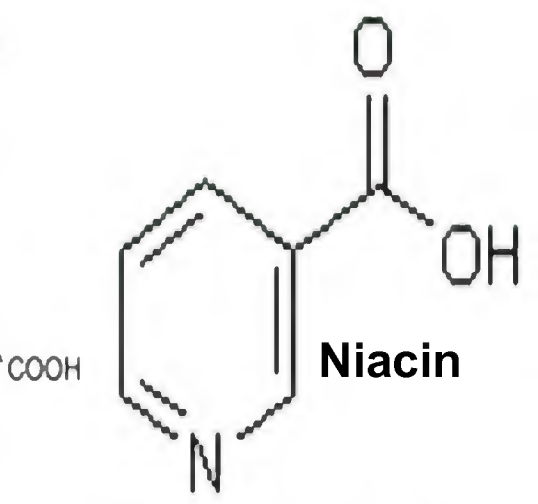
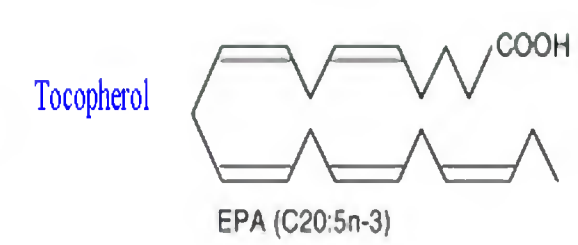
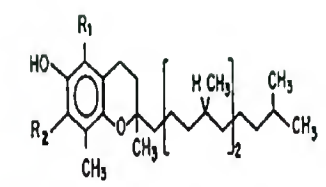
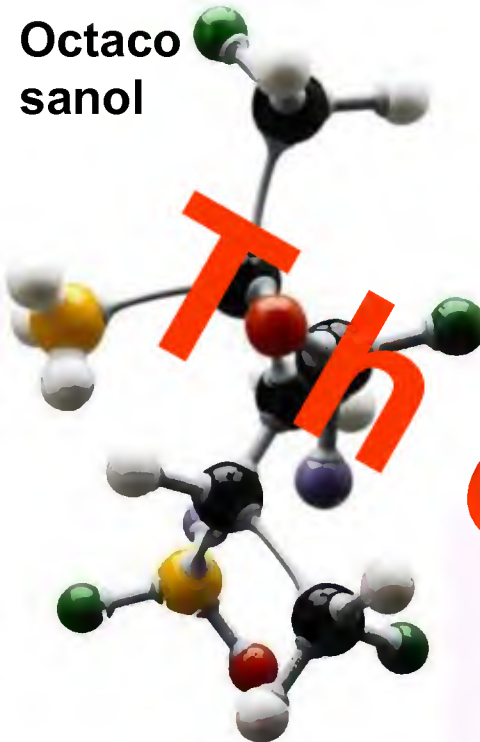


ANT — Focused Attention 4 Letters Misses



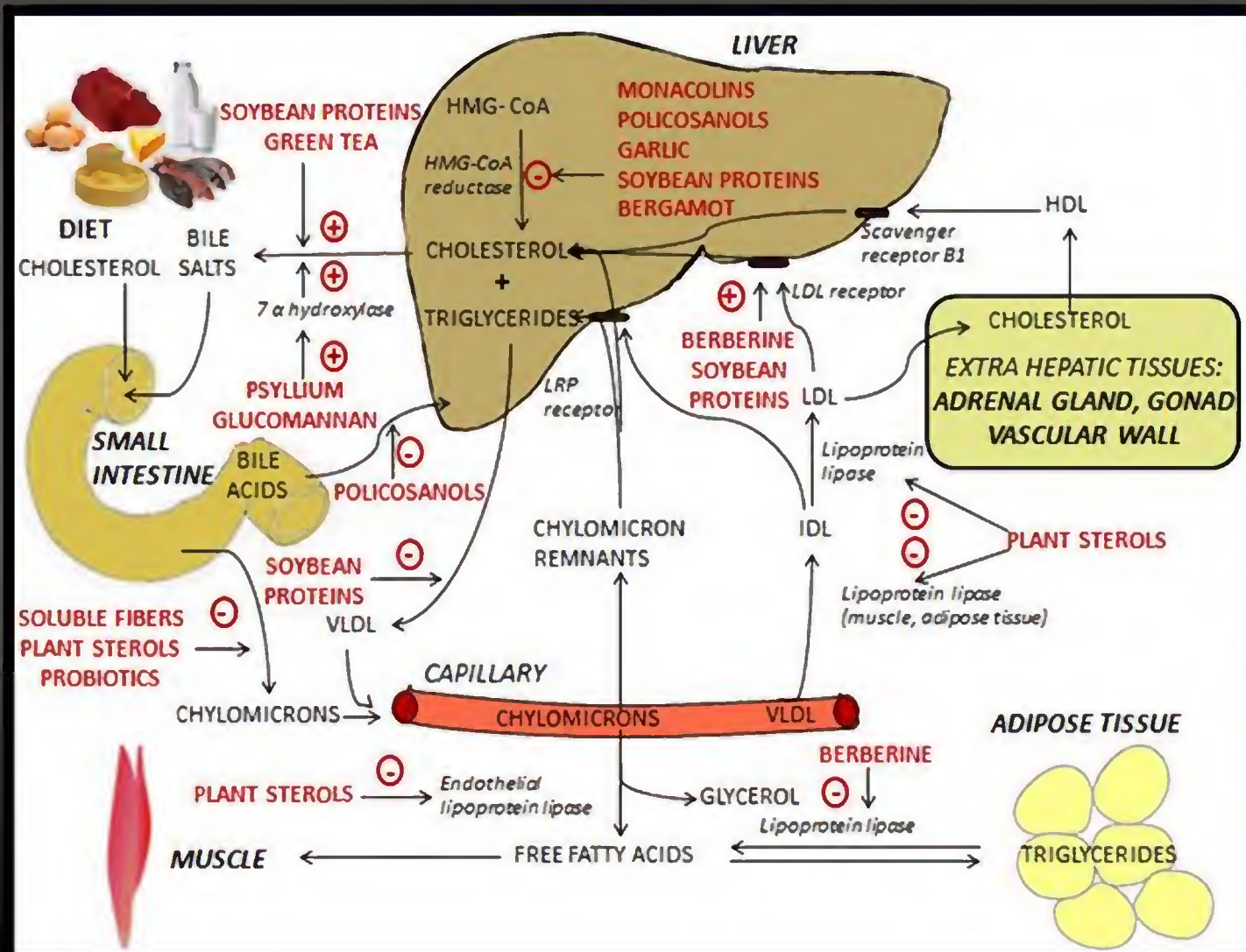
ANT — Focused Attention 4 Letters False alarms irrelevant target





The Arsenal!

Nutraceutici con azione ipolipemizzante: meccanismi d'azione

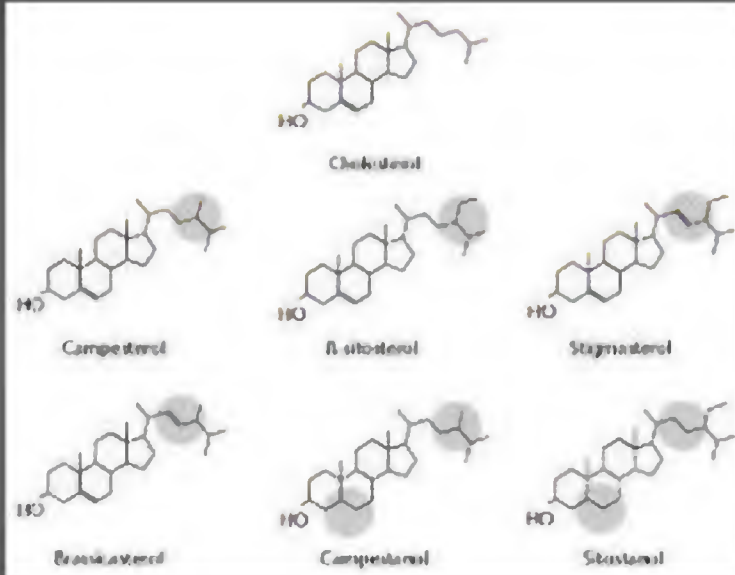


Cicero AFG, Colletti A. In: Combined therapy in dyslipidemia. Springer-Verlag. 2015

Evidenza/Efficacia

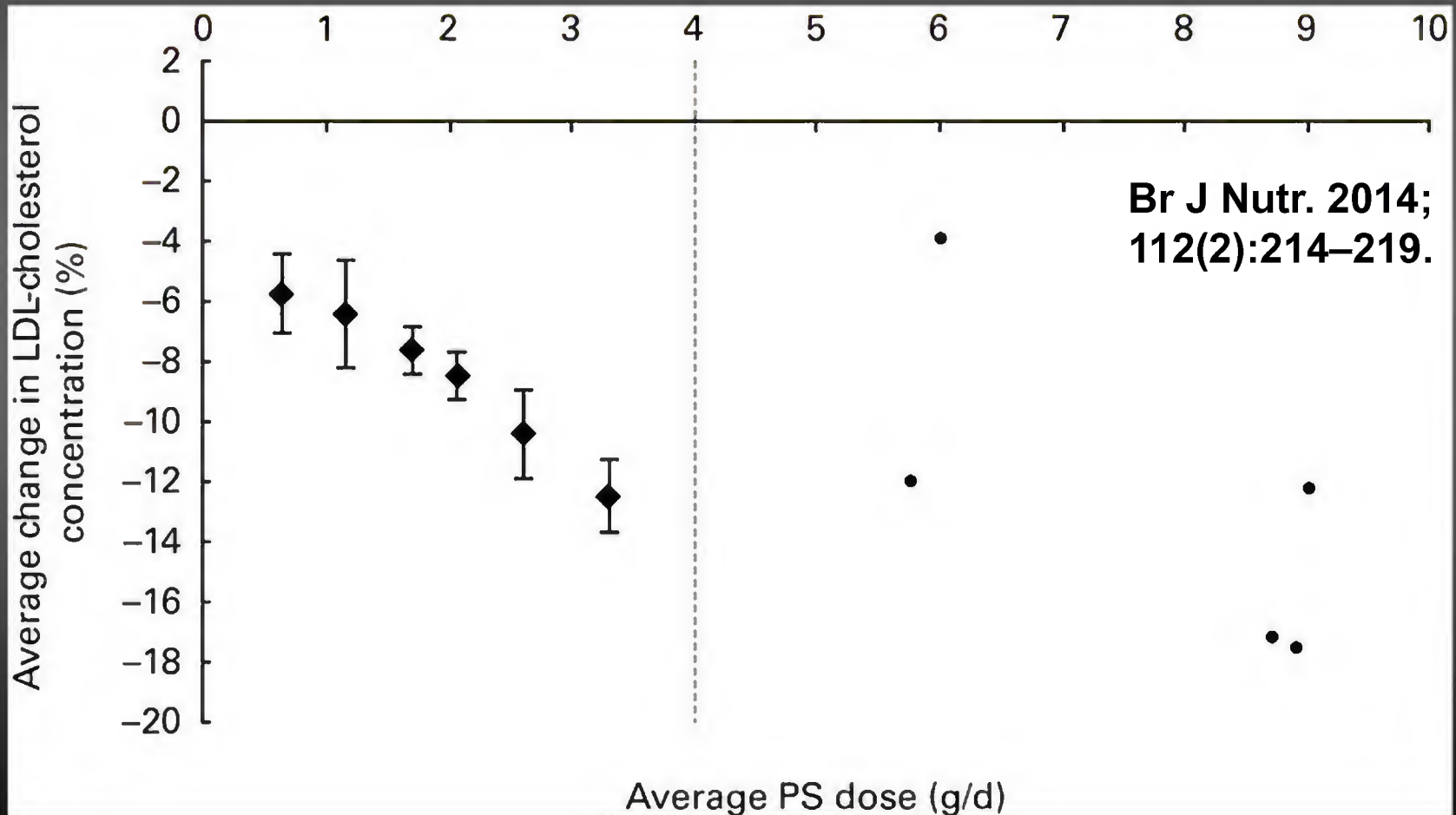
	Clinical evidence	Clinical efficacy
Red Yeast Rice	+++	+++
Berberine	++	++
Soluble Fibers	+++	+
Phytosterols	+++	+
Garlic	++	+
Policosanols	++	+/-
Vegetal proteins	++	+
Tocotrienols	+	+
Probiotics	+	+

Fitosteroli



Cicero AF et al. *Food Funct.* 2017;8(6):2076-88.

Average effects on LDL-C concentration for different dose ranges of phytosterols



Vantaggi dei fitosteroli

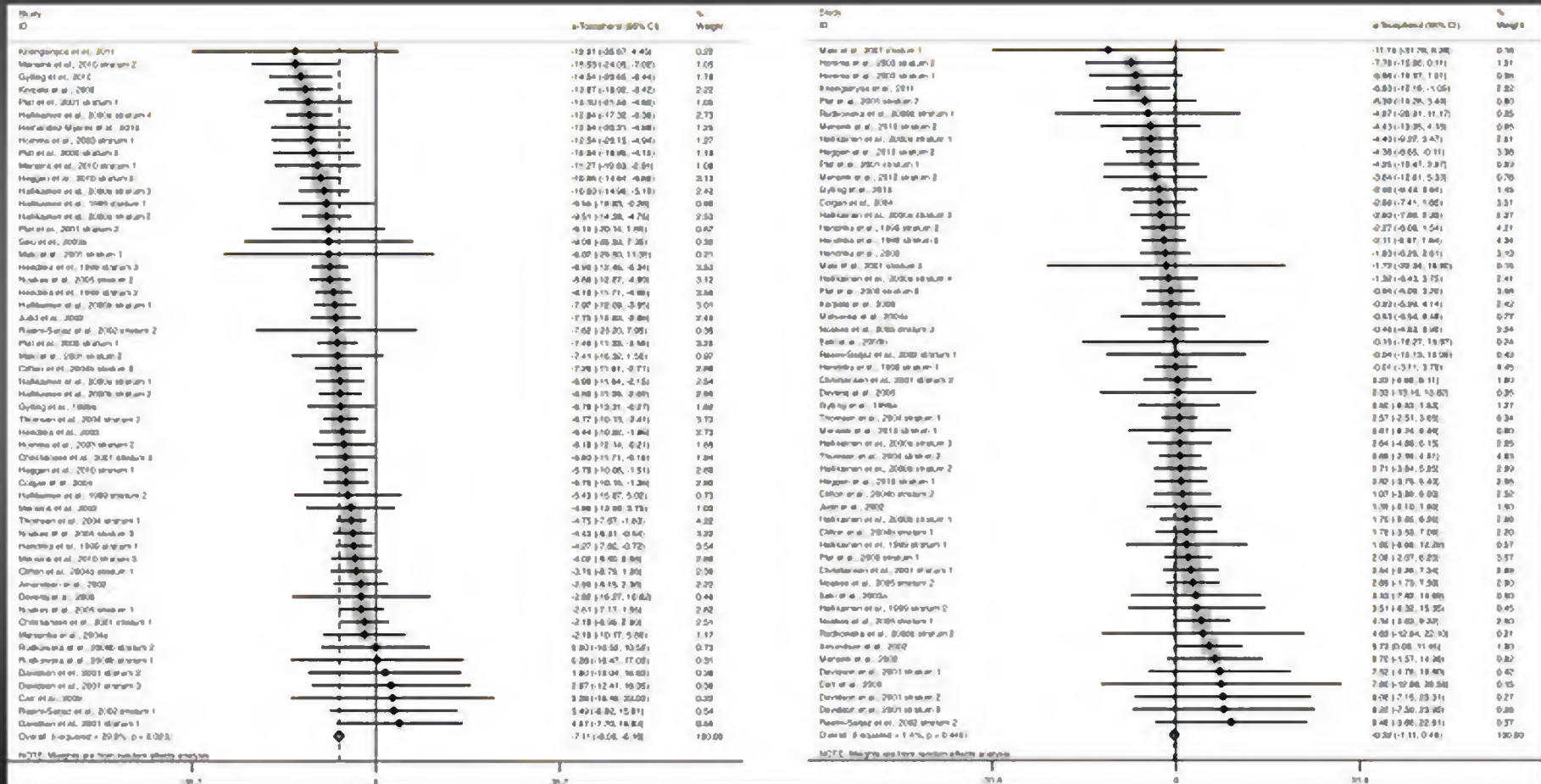
- **Virtualmente privi di effetti collaterali**
- **Virtualmente privi di interazioni farmacologiche**
- **Non assorbiti (= utilizzabili anche in gravidanza ed età pediatrica)**

-

Dubbi: - Beta-sitosterolemia

- Assorbimento carotenoidi (?)

Relative change in non-standardized (left) and TC-standardized (right) plasma α -tocopherol concentrations



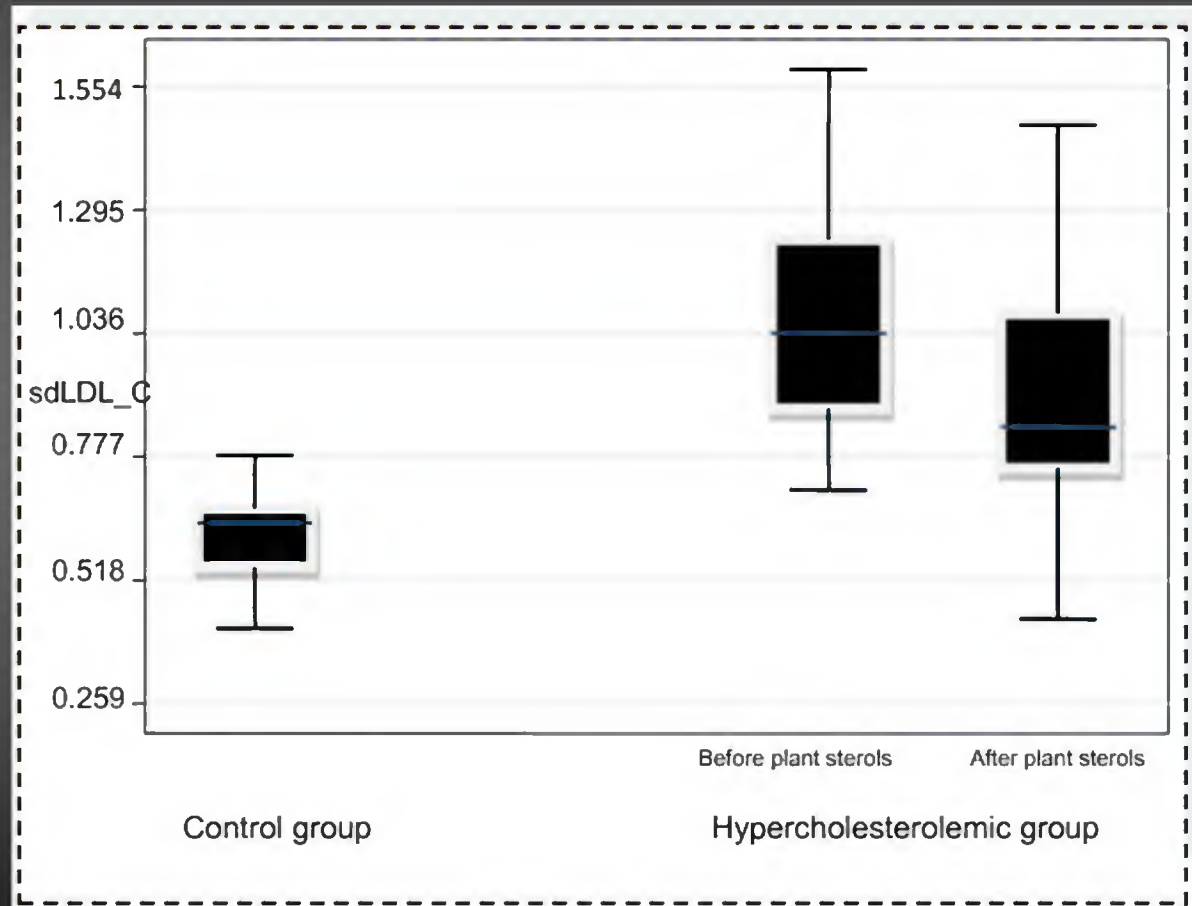
ORIGINAL ARTICLE

Primary hyperlipidemias in children: effect of plant sterol supplementation on plasma lipids and markers of cholesterol synthesis and absorption

O. Guardamagna · F. Abello · V. Baracco ·
G. Federici · P. Bertucci · A. Mozzi ·
L. Mannucci · A. Gnasso · C. Cortese

	FH (<i>n</i> = 29)		FCH (<i>n</i> = 11)		UH (<i>n</i> = 12)	
	Before	After	Before	After	Before	After
Gender (M/F)	16/13		5/6		6/6	
T-C (mmol/l)	7.55 ± 1.09	6.90 ± 1.06*	5.90 ± 0.65	5.20 ± 0.75*	6.15 ± 0.83	5.35 ± 0.93*
LDL-C (mmol/l)	5.61 ± 1.06	5.04 ± 1.06*	3.96 ± 0.57	3.34 ± 0.70*	4.11 ± 0.93	3.36 ± 0.70*
Trig. (mmol/l)	0.89 (0.46–1.98)	0.77 (0.40–2.29)	1.23 (0.90–3.29)	1.16 (0.63–2.15)	0.99 (0.56–1.82)	0.81 (0.41–3.15)
HDL-C (mmol/l)	1.50 ± 0.36	1.50 ± 0.36	1.32 ± 0.28	1.40 ± 0.31	1.55 ± 0.23	1.50 ± 0.23
Lathosterol ratio	67.2 (24.9–148.2)	63.0 (34.8–301.4)	72.5 (36.0–156.1)	68.6 (33.1–145.5)	79.4 (24.5–116.3)	64.2 (30.6–113.0)
Campesterol ratio	244.6 (73.6–441.7)	221.2 (93.1–482.4)	199.6 (87.1–425.8)	261.4 (89.2–326.8)	255.0 (232.5–526.6)	212.8 (158.8–514.5)
Sitosterol ratio	99.3 (44.8–312.1)	115 (49.3–431.3)	101.0 (63.1–236.7)	135.0 (82.5–216.9)	99.0 (68.9–204.2)	128.3 (78.8–260.4)

Plant sterols-enriched diet decreases sdLDL-C levels in children with hypercholesterolemia



Effect of a plant sterol, fish oil and B vitamin combination on cardiovascular risk factors in hypercholesterolemic children and adolescents: a pilot study

Iveta Garaiova^{1†}, Jana Muchová^{2†}, Zuzana Nagyová³, Csilla Mišlanová⁴, Stanislav Oravec⁵, Andrej Dukát⁵, Duolao Wang⁶, Sue F Plummer¹ and Zdeňka Ďuračková^{2*}

Parameter	Baseline mean (SD)	Change at week 8	95% CI	P-value	Change at week 16	95% CI	P-value
Total-C (mg/dl) ^a	205.56 (44.10)	-5.96	-15.19 to 3.27	0.2005	-15.92	-25.15 to -6.69	0.0011
LDL-C (mg/dl) ^a	124.52 (38.20)	-2.96	-9.84 to 3.92	0.3912	-10.52	-17.40 to -3.64	0.0035
HDL-C (mg/dl) ^a	52.04 (10.83)	-1.96	-5.48 to 1.56	0.2683	0.32	-3.20 to 3.84	0.8557
Atherogenic Index	4.08 (1.08)	0.02	-0.25 to 0.28	0.8940	-0.36	-0.62 to -0.09	0.0095
TAG (mmol/l)	1.42 (0.66)	0.22	-0.17 to 0.61	0.2586	-0.24	-0.63 to 0.15	0.2191
Apolipoprotein A1 (g/l)	1.50 (0.25)	0.05	-0.04 to 0.14	0.3073	0.02	-0.07 to 0.11	0.7086
hsCRP (mg/l)	1.86 (2.03)	-0.11	-1.05 to -0.83	0.8159	0.86	0.08 to 1.81	0.0729
Homocysteine (μmol/l)	8.51 (3.14)	-2.88	-3.61 to -2.14	<0.0001	-3.25	-3.98 to -2.51	<0.0001
Methionine (μmol/l)	28.55 (4.32)	-5.13	-7.14 to -3.13	<0.0001	-8.58	-10.59 to -6.57	<0.0001
Cysteine (μmol/l)	173.87 (33.25)	44.00	25.98 to 62.03	<0.0001	36.37	18.34 to 54.39	0.0002
<i>Lipoprotein Subfractions (mg/dl)^a</i>							
VLDL	28.84 (6.34)	-1.08	-3.86 to 1.70	0.4378	-5.48	-8.26 to -2.70	0.0002
IDL-1	28.48 (10.02)	-1.88	-4.40 to 0.64	0.1399	-5.20	-7.72 to -2.68	0.0001
IDL-2	11.12 (4.21)	-0.12	-1.25 to 1.01	0.8322	-2.08	-3.21 to -0.95	0.0006
IDL-3	16.40 (7.71)	3.04	0.31 to 5.77	0.0297	-1.08	-3.81 to 1.65	0.4299
LDL-1	47.60 (14.78)	0.48	-3.88 to 4.76	0.8226	1.28	-3.00 to 5.56	0.5505
LDL-2	19.60 (13.44)	-4.68	-7.84 to -1.52	0.0045	-3.44	-6.60 to -0.28	0.0335
LDL-3	1.32 (1.93)	-0.08	-1.02 to 0.86	0.8692	0.00	-0.94 to 0.94	1.0000

Data are presented as mean (standard deviation);

C - cholesterol; LDL - low density lipoprotein; HDL - high density lipoprotein; Atherogenic Index - Total cholesterol:HDL cholesterol; TAG - triacylglycerols; hsCRP - high sensitivity C-reactive protein; VLDL - very low density lipoprotein; IDL - intermediate density lipoprotein,

^aTo change to mmol/l, multiply the value with 0.02586.

*P-value derived with mixed model.

Riduzione qualitativa colesterolemia

Fitosteroli 1.3 g

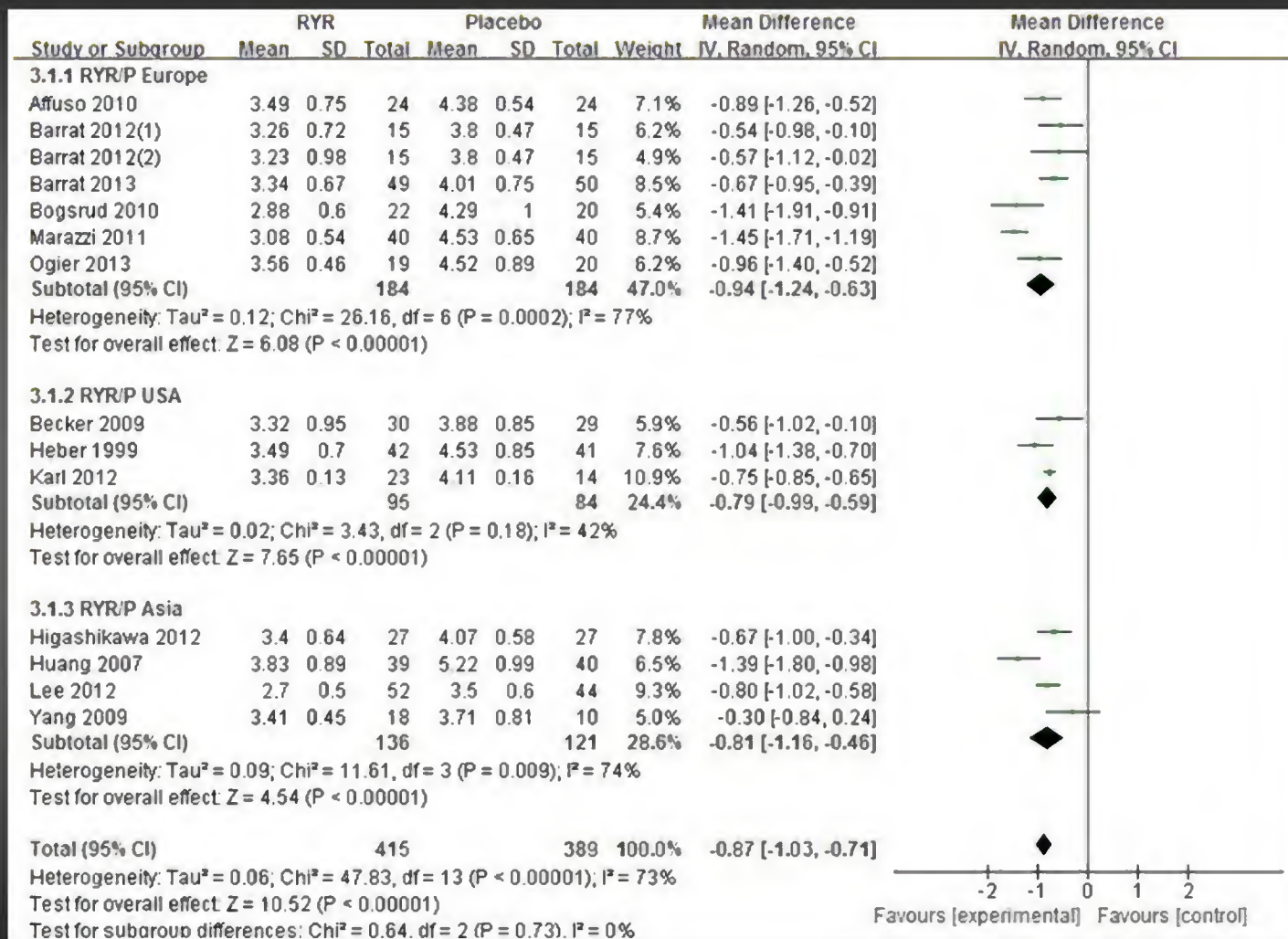
**W-3 1 g
(EPA+DHA)**

**Vitamina B12 50
μg**

B6 2.5 mg

**Acido Folico
800 μg**

Meta-analisi sul RYR: un approccio alternativo efficace e relativamente sicuro nelle dislipidemie



The treatment of hypercholesterolemic children: Efficacy and safety of a combination of red yeast rice extract and policosanols*

O. Guardamagna ^{a,*}, F. Abello ^a, V. Baracco ^a, B. Stasiowska ^a, F. Martino ^b

LO STUDIO

- 38 bambini (11.5 media anni) con FH o FCH
- Trattamento: 3 mg/die monacolina K + 10 mg policosanoli x 8 settimane (cross-over: 4 sett. washout e switch)
- No effetti collaterali rilevanti



ASPETTI RILEVANTI

- Tipo di estratto e titolazione
- Dosaggi
- Contaminanti (citrinina)

Table 3 Serum lipids at baseline and at the end of each treatment period.

Parameter	Baseline (n = 38)	Dietary supplement (n = 38)	Placebo (n = 38)	Mean absolute change (95% CI)	p*
TC, mmol/L	5.86 (4.96–9.15)	4.94 (3.80–8.45)	5.98 (4.50–9.20)	–0.94 (–1.13 to –0.75)	<0.001
LDL-C, mmol/L	3.99 (3.53–7.68)	3.23 (2.27–6.84)	4.30 (3.15–7.60)	–0.84 (–1 to –0.68)	<0.001
ApoB, g/L	1.06 (0.76–1.92)	0.88 (0.65–1.67)	1.14 (0.76–1.75)	–0.22 (–0.26 to –0.18)	<0.001
HDL-C, mmol/L	1.37 ± 0.27	1.37 ± 0.26	1.38 ± 0.24	–0.005 (–0.007 to 0.006)	0.867
TG, mmol/L	0.80 (0.41–2.40)	0.75 (0.38–2.53)	0.85 (0.43–2.95)	–0.20 (–0.35 to –0.50)	0.006
ApoA-I, g/L	1.33 ± 0.13	1.28 ± 0.13	1.23 ± 0.16	0.05 (–0.006 to 0.1)	0.081
nonHDL-C, mmol/L	4.47 (3.26–8.27)	3.58 (2.61–7.31)	4.65 (3.41–8.06)	–0.93 (–1.1 to –0.76)	<0.001

Values are mean ± SD or median (min–max). *Statistical significance for comparison between the treatments by paired *t* test or Wilcoxon rank-sum test.



Bifidobacteria Supplementation: Effects on Plasma Lipid Profile in Dyslipidemic Children

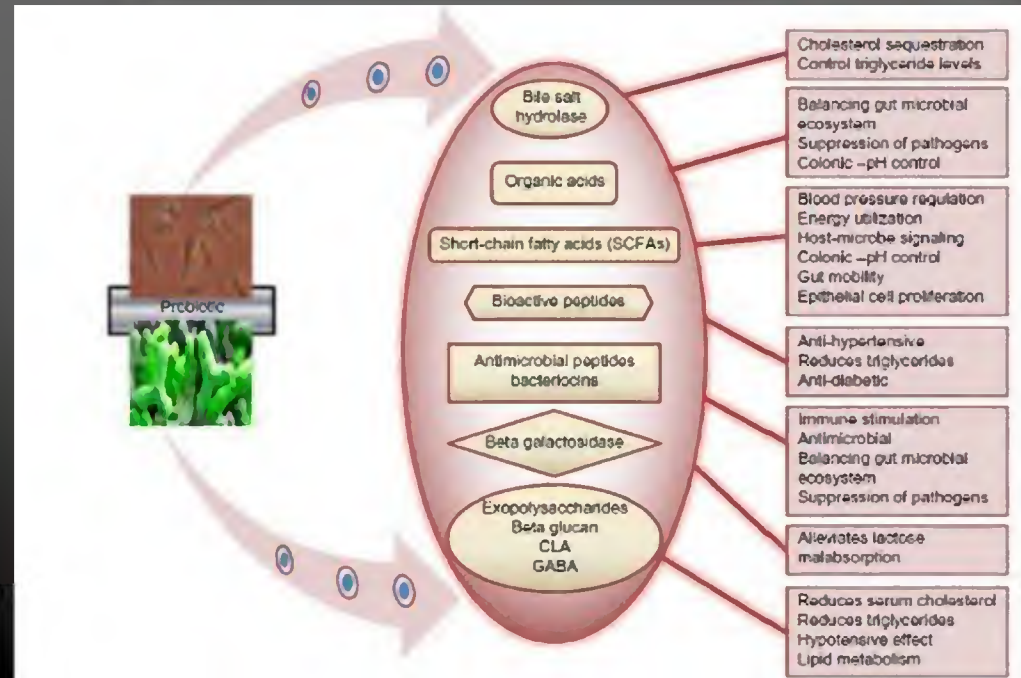
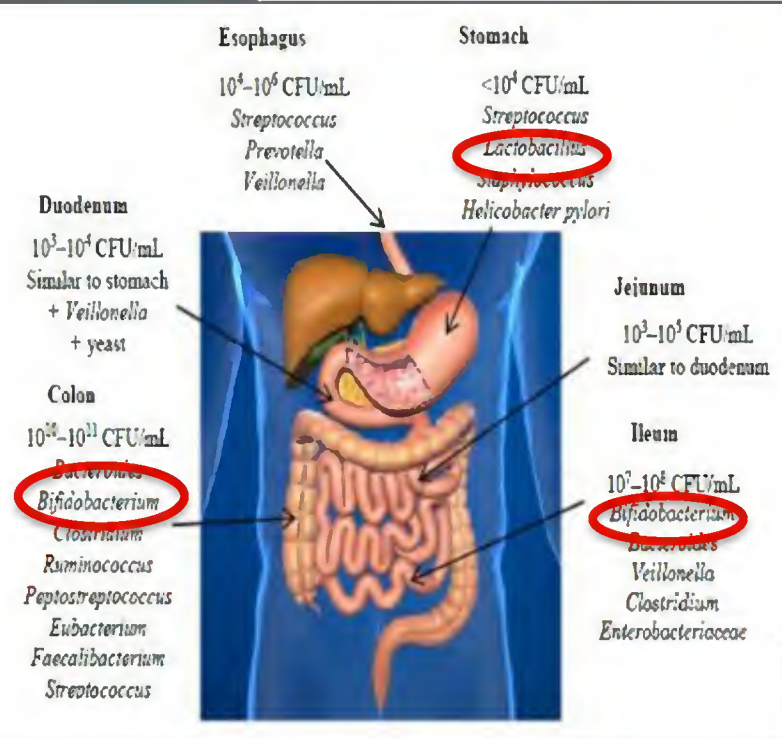
Ornella Guardamagna, MD Alberto Amaretti, PhD Paolo Emilio Puddu, MD Stefano Raimondi, PhD Francesca Abello, MD Paola Cagliero, DR Maddalena Rossi, DR

LO STUDIO

- 38 bambini (11 media anni) con FCH o dislipidemia non definita
- Trattamento: 1 MLD *B. animalis*, 1 MLD *B. bifidum* e 1 MLD *B. longum* o placebo per 3 mesi

Parameter	Baseline (n=38)	Probiotic (n=37)		
	Value	Value	Δ	P*
TC, mg/dl	222.8±23.2	211.9±27.0	- 4.6%	0.0001
HDL-C, mg/dl	55.8±12.2	60.7±14.2	+8.6%	0.0002
TG, mg/dl	99.0±61.7	79.5±34.5	-7.1%	0.2492
LDL-C, mg/dl	147.2±21.9	135.3±24.2	-8.2%	0.0001

Values are mean ± SD



Probiotici: NON TUTTI SONO UGUALI

“EVIDENCE BASED MEDICINE”:

- **Veicolo:** Latte/Yogurt meglio di capsule e compresse
- **Ceppo probiotico:** *Lactobacillus A.* vs Altri
- **Associazioni probiotico-probiotico / probiotico-nutraceutico**
- **DURATA del trattamento**
- **Stato di salute del soggetto**

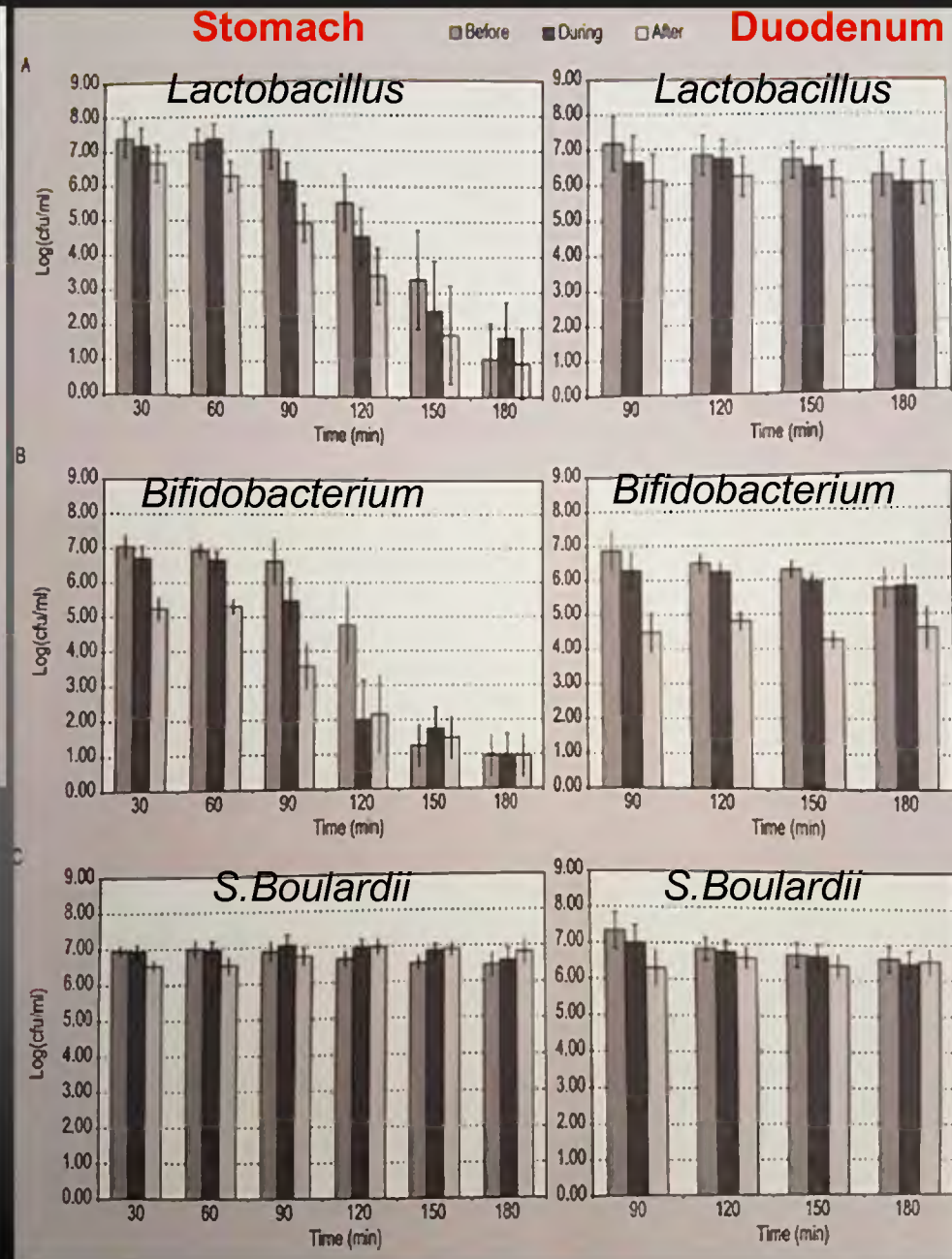
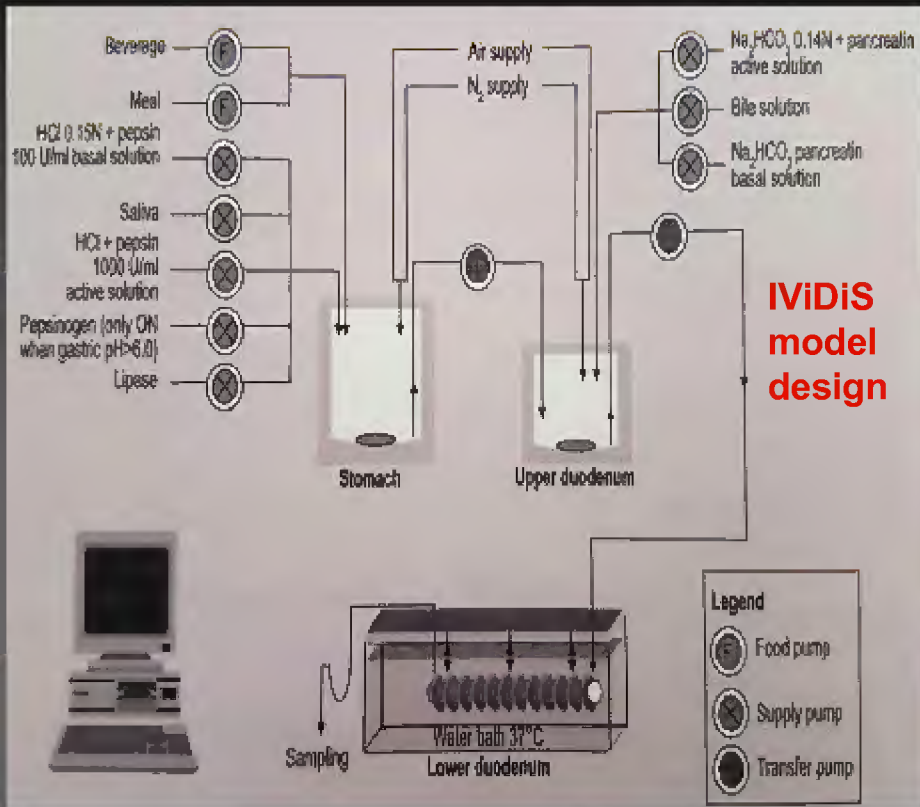
Table II. The subgroup analyses of the effect of probiotics on total cholesterol and LDL-C by probiotics administration criteria.

Subgroups	Total cholesterol					LDL-C				
	Studies (n)	I ²	Q test	Mean difference (95% CI)	P between	Studies (n)	I ²	Q test	Mean difference (95% CI)	P between
Form of probiotics					0.67					0.65
Capsule	3	76.2%	8.4	-0.21 (-0.70, 0.28)		4	79.9%	9.9	-0.30 (-1.01, 0.41)	
Milk or yogurt	10	4.8%	6.3	-0.31 (-0.42, -0.20)***		11	0%	1.8	-0.47 (-0.70, -0.25)***	
Probiotics dosage					0.40					0.79
Large dose (≥ 10 ⁹ CFU)	4	71.3%	36	-0.30 (-0.50, -0.10) ***		5	72.1%	10.8	-0.37 (-0.64, -0.16)***	
Small dosage (< 10 ⁹ CFU or milk)	6	0%	21	-0.32 (-0.41, -0.24)		5	0%	1.6	-0.44 (-0.72, -0.16)***	
Number of strains of probiotics					0.69					0.47
Single strain of probiotics	4	64.3%	8.4	-0.22 (-0.65, 0.21)		6	55.1%	11.2	-0.34 (-0.68, -0.00)**	
Multiple strains of probiotics	6	20.6%	6.3	-0.31 (-0.47, -0.16)***		4	0%	0.8	-0.52 (-0.85, -0.18)***	
Duration of probiotics administration					0.93					0.81
Probiotic use for < 8 weeks	2	0%	0.1	-0.22 (-0.50, -0.05)		4	0%	0.4	-0.45(-0.72, -0.17)***	
Probiotic use for ≥ 8 weeks	8	50.5%	14.1	-0.32 (-0.53, -0.11)***		6	58.1%	11.9	-0.24 (-0.78, -0.01)**	
Health status of study sample					0.68					0.30
Hypercholesterolemic patients	7	33.6%	9.0	-0.30 (-0.38, -0.21)***		5	7.6%	4.3	-0.29 (-0.56, -0.03)***	
Hypertension	3	28.1%	2.8	-0.51 (-0.73, -0.28)***		4	51.6%	6.2	-0.55 (-0.97, -0.14)***	
By specific probiotic strains					0.63					0.64
Acidophilus strain	3	50.9%	4.1	-0.50 (-0.95, -0.05)**		3	0%	0.8	-0.52 (-0.85, -0.18)***	
Non-acidophilus strains	7	52.4%	10.5	-0.26 (-0.46, -0.06)**		5	62.8%	10.8	-0.26 (-0.75, 0.02)	
By baseline level										
< 5.5 mmol/L TC or < 3.5 mmol/L LDL	5	34.5%	18	-0.20 (-0.38, -0.02)*	0.02*	3	10%	2.2	-0.18 (-0.33, -0.03)*	0.08
≥ 5.5 mmol/L TC or ≥ 3.5 mmol/L LDL	5	0%	7	-0.54 (-0.75, -0.33)***		6	0%	3.4	-0.38 (-0.38, -0.16)***	

*Effect size significant at $P < 0.05$; **effect size significant at $P < 0.01$; ***effect size significant at $P < 0.001$.

LDL-C = low-density lipoprotein cholesterol.

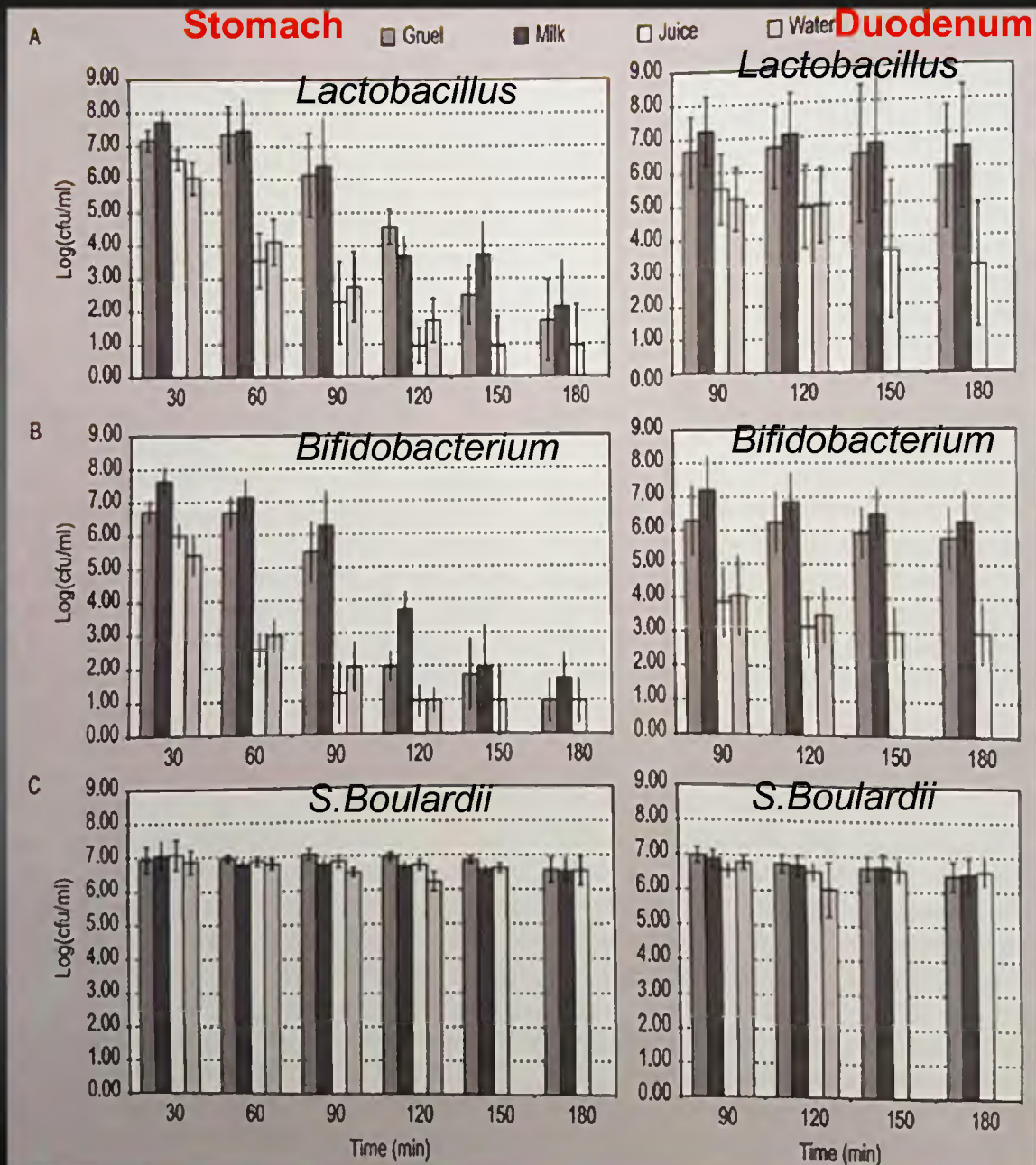
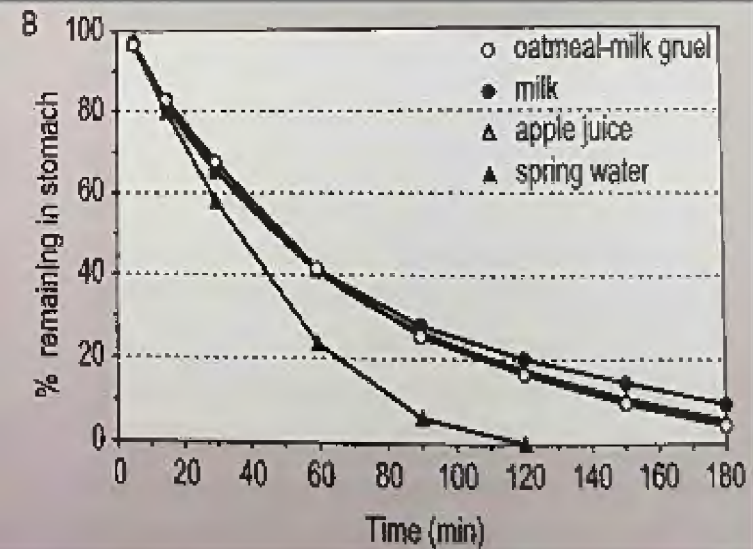
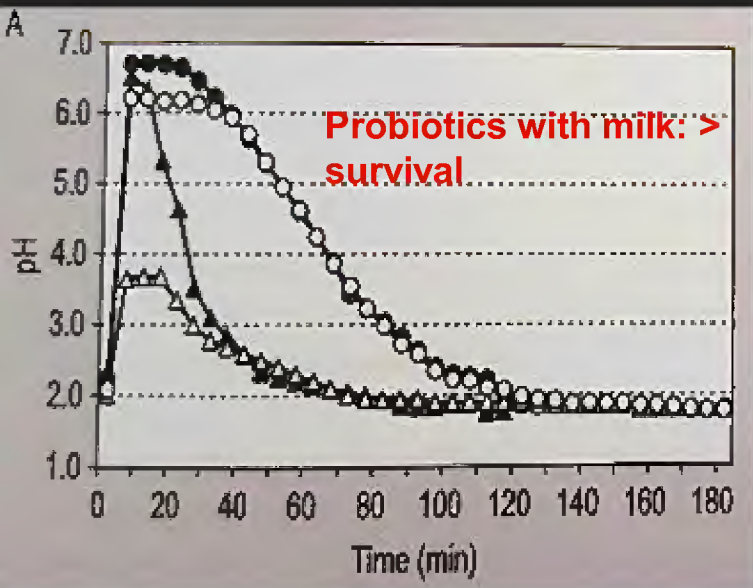
Somministrazione dei probiotici: in fase FED o FASTED?



Considerazioni:

- *Lactobacillus* e *Bifidobacterium*: > sopravvivenza se somministrati prima (30 min.) o durante i pasti. Se somministrati dopo il pasto (>60 min.) si assiste ad un calo marcato della popolazione [L. and B.]
- *S. Boulardii*: no grandi differenze

Somministrazione di probiotici: con o senza bevande?



Systematic review with meta-analysis: *Lactobacillus reuteri* DSM 17938 for diarrhoeal diseases in children

M. Urbańska, D. Gieruszczak-Białek & H. Szajewska

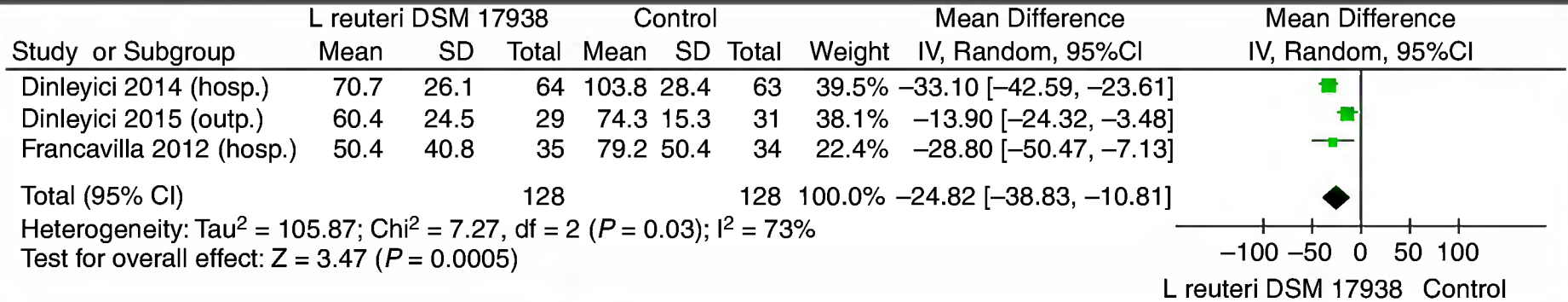
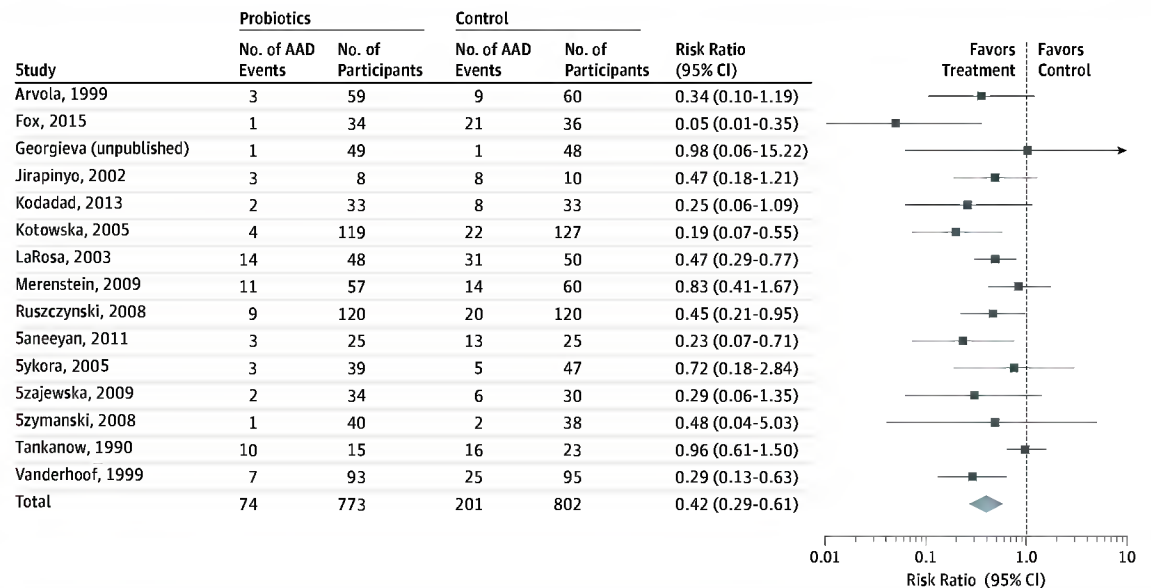


Figure. Probiotics for Antibiotic-Associated Diarrhea (AAD) Prevention in 15 Placebo-Controlled Trials



JAMA Clinical Evidence Synopsis

Probiotics and the Prevention of Antibiotic-Associated Diarrhea in Infants and Children

Bradley C. Johnston, PhD; Joshua Z. Goldenberg, ND; Patricia C. Parkin, MD

The Evidence for the Role of Nutraceuticals in the Management of Pediatric Migraine: a Review

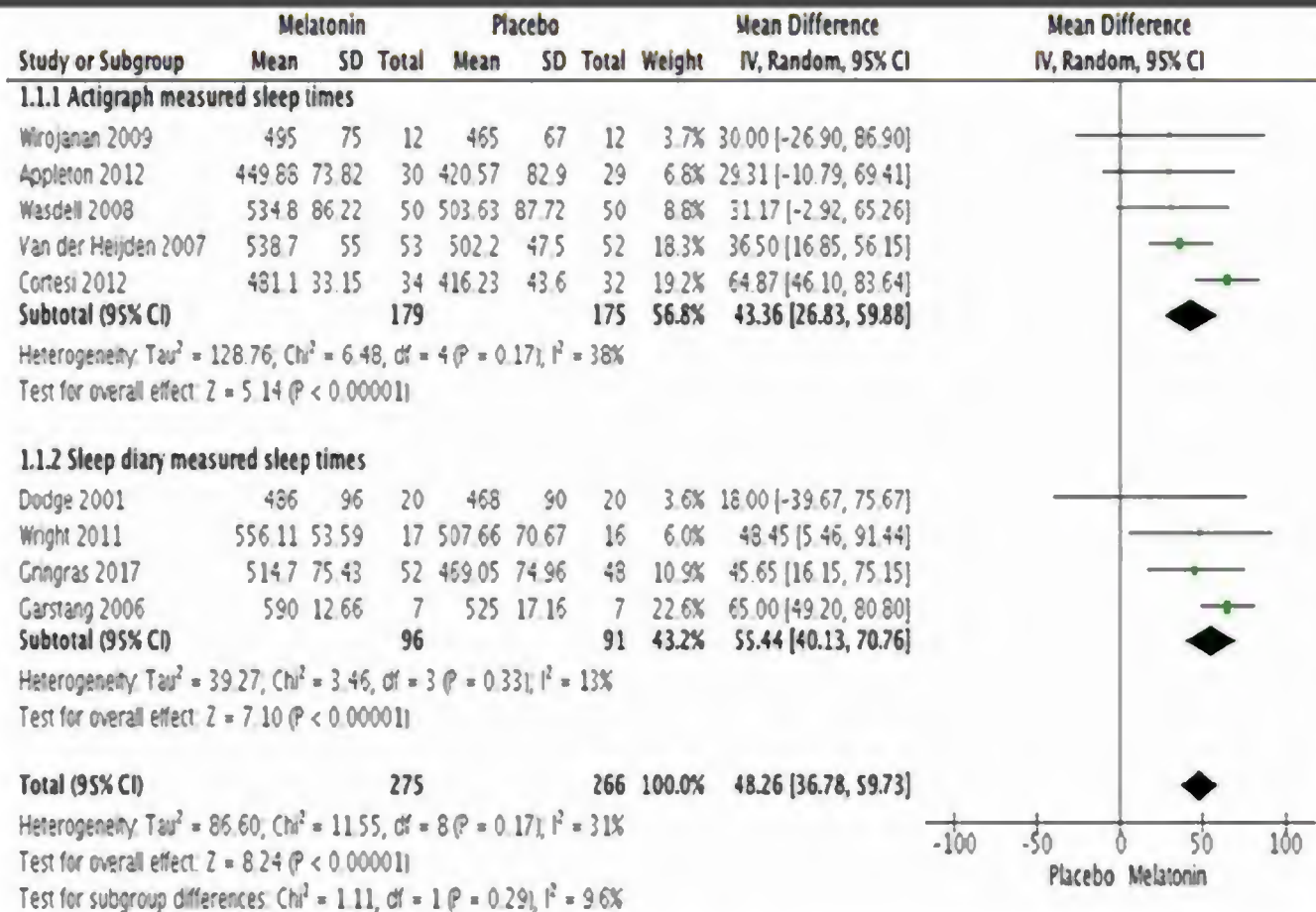
Serena L. Orr¹

- **PUFAs: 2 small RCTs, 1 observational**
- **Magnesium: 2 RCTs**
- **Coenzyme Q10: 1 large open study, 1 small RCT**
- **Riboflavin (>200 mg) : 2 small retrospective studies and 2 small RCTs**
- **Vitamin D: 2 small non RCTs**

The effects of melatonin administration on disease severity and sleep quality in children with atopic dermatitis: A randomized, double-blinded, placebo-controlled trial

Variables	Placebo group (n = 35)		Melatonin group (n = 35)		Difference in outcome measures between melatonin and placebo treatment groups ^a	
	Baseline	End of trial	Baseline	End of trial	β (95% CI)	p^b
SCORAD index ^c	49.4 ± 17.4	46.8 ± 16.3	52.6 ± 16.9	46.0 ± 15.3	-3.55 (-6.11, -0.98)	0.007
Objective SCORAD index ^d	39.1 ± 15.8	37.6 ± 15.2	41.7 ± 15.4	36.8 ± 14.1	-3.23 (-5.08, -1.38)	0.001
Pruritus score ^e	5.0 ± 1.7	4.5 ± 1.7	5.2 ± 1.7	4.6 ± 1.7	0.04 (-0.60, 0.68)	0.90
Total IgE level (kU/L)	1915.5 ± 795.5	1982.9 ± 781.2	1957.0 ± 796.8	1859.2 ± 788.6	-153.94 (-260.39, -47.49)	0.005
hs-CRP (mg/L)	1.6 ± 0.8	1.5 ± 0.7	1.5 ± 0.7	1.5 ± 0.6	-0.03 (-0.20, 0.13)	0.68
CSHQ score						
Resistance to going to bed	10.2 ± 2.0	9.8 ± 2.0	11.4 ± 2.1	10.3 ± 2.1	-0.58 (-0.94, -0.22)	0.002
Delay in sleeping time	2.3 ± 0.4	2.2 ± 0.4	2.6 ± 0.5	2.5 ± 0.5	-0.02 (-0.09, 0.03)	0.38
Sleeping duration	5.3 ± 1.0	5.5 ± 1.0	5.7 ± 1.0	5.9 ± 1.0	0.05 (-0.01, 0.12)	0.14
Sleep anxiety	3.9 ± 0.8	3.8 ± 0.7	3.9 ± 0.7	3.5 ± 0.7	-0.20 (-0.33, -0.07)	0.003
Night walking	5.4 ± 1.0	5.2 ± 1.1	5.4 ± 1.0	4.9 ± 1.0	-0.27 (-0.45, -0.10)	0.003
Parasomnia	14.4 ± 2.8	13.8 ± 2.8	14.3 ± 2.6	13.5 ± 2.6	-0.25 (-0.70, 0.20)	0.27
Sleep breathing disorders	5.9 ± 1.1	5.7 ± 1.2	6.0 ± 1.1	5.6 ± 1.1	-0.14 (-0.33, 0.04)	0.14
Daytime sleepiness	18.2 ± 3.5	17.0 ± 3.6	19.2 ± 3.5	16.8 ± 3.5	-1.12 (-1.72, -0.52)	<0.001
Total CSHQ scores	65.6 ± 12.6	62.8 ± 12.8	68.4 ± 12.5	62.9 ± 12.3	-2.55 (-4.34, -0.75)	0.006
Sleep-onset latency (min)	38.8 ± 10.8	34.0 ± 10.7	43.5 ± 17.1	31.4 ± 11.5	-4.07 (-8.91, 0.77)	0.09
Total sleep time (min/night)	425.1 ± 75.4	429.7 ± 78.6	404.5 ± 75.0	420.7 ± 83.0	12.64 (-1.06, 26.34)	0.07

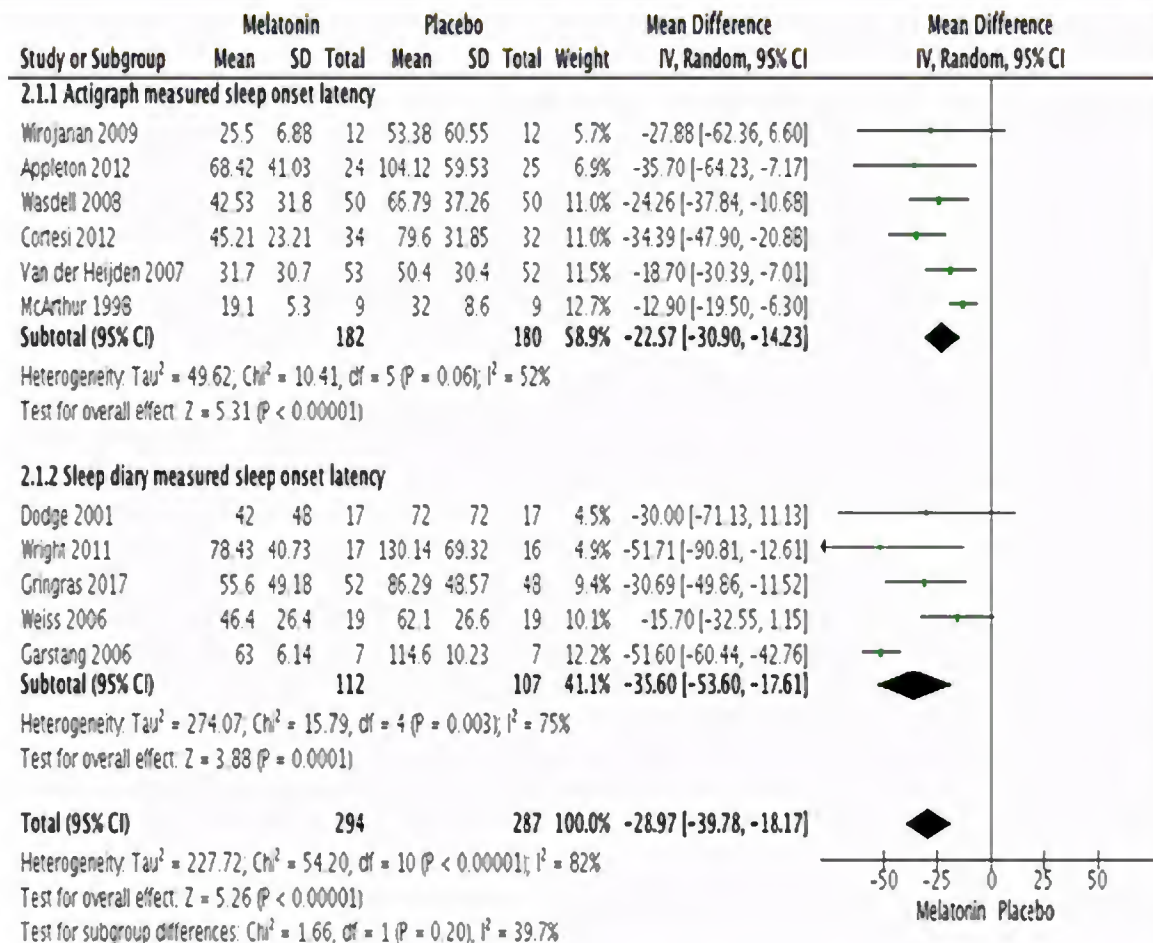
Melatonin for the management of sleep problems in children with neurodevelopmental disorders



Mean difference in total sleep time (min) for melatonin versus placebo.

To cite: Abdelgadir IS, Gordon MA, Akobeng AK. *Arch Dis Child* Epub ahead of print: [please include Day Month Year]. doi:10.1136/archdischild-2017-314181

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Use of Performance-Enhancing Substances

Michele LaBotz, MD, FAAP, Bernard A. Griesemer, MD, FAAP, COUNCIL ON SPORTS MEDICINE AND FITNESS

- **La maggior parte venduti come supplementi alimentari**
- **Spesso presenti direttamente in “cibi o bevande arricchite”**
- **Spesso difficile per il consumatore distinguere i prodotti ad alto controllo rispetto a quelli a basso controllo**
- **Per alcuni prodotti che contengono proteine concentrate o a.a. particolari, come la creatina in etichetta è obbligatorio riportare il divieto della somministrazione del prodotto in gravidanza e nei bambini senza prima il consulto del medico**



Consumo di creatina

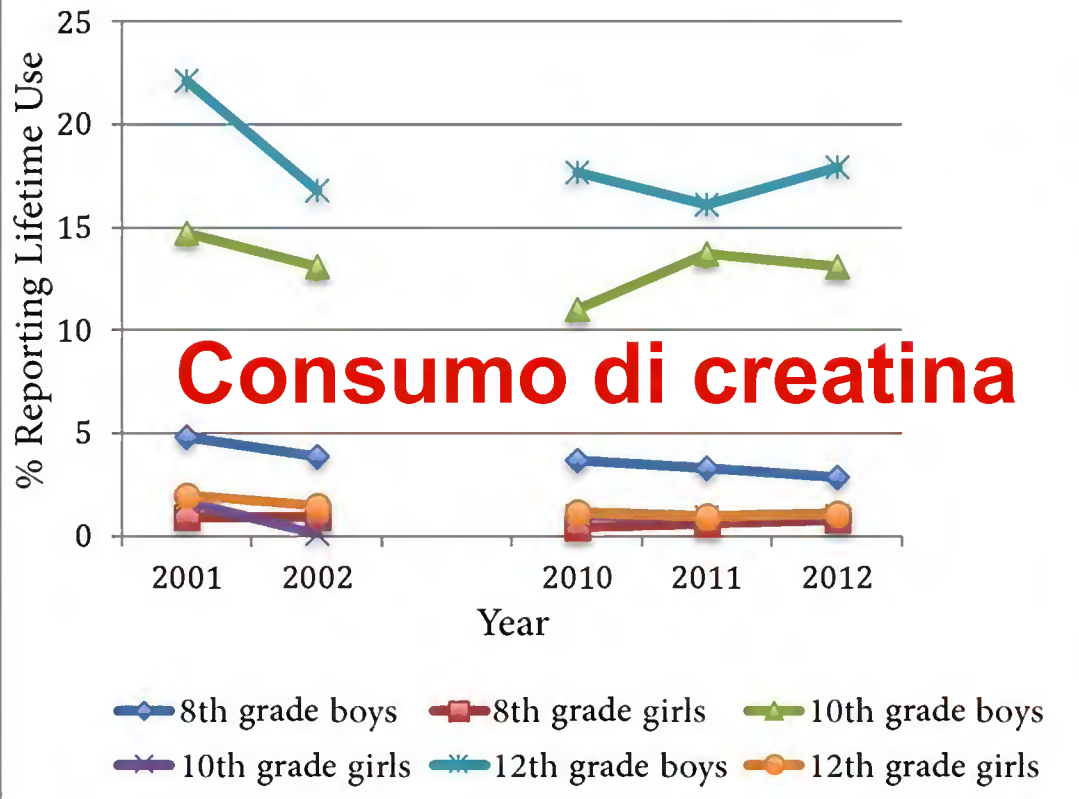


FIGURE 2

Percentage of eighth, tenth, and twelfth graders reporting any lifetime use of creatine by year and sex (data from MTF, 2014).⁵

- Benefici sulla performance: poco chiari e non significativi (eccetto sport ad alta intensità e di resistenza)
- Profilo di sicurezza: non chiaro negli adolescenti
- Possibile nefrotossicità (metaboliti metilamina e formaldeide)

Evidenze:

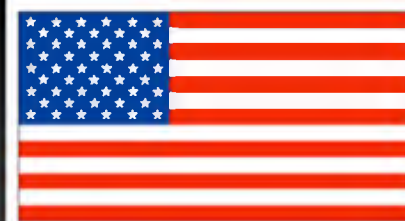
- Una buona % di bambini/adolescenti fa uso di potenziatori della performance
- Una buona % di bambini/adolescenti li assume senza lo stretto controllo del medico
- La maggior parte della % dei soggetti degli studi, non avrebbe bisogno di tali supplementazioni !

I METODI

- 8245 bambini americani (0-19 anni)
- Esame regime dietetico attraverso il National Health and Nutrition Examination Survey

I RISULTATI

- 31% dei bambini usava supplementi alimentari (>90% multivitaminici e minerali)
- 15% dei bambini ha assunto i supplementi sul consiglio medico
- La maggior parte dei bambini è stata oggetto di influenzatori "non-sanitari": genitori o familiari, palestre, ecc.



Why U.S. children use dietary supplements



Regan L. Bailey, Jaime J. Gahche, Paul R. Thomas and Johanna T. Dwyer

I METODI

- 187 atleti canadesi (11-18 anni)
- Esame regime dietetico attraverso il 24-h food recall and dietary sup. questionnaire

I RISULTATI

- Altissima % di supplementazioni a base di: minerali, Vit C, Vit D, proteine, Acidi grassi, probiotici, estratti fito.
- Con l'eccezione di Vit D e CHO durante le sessioni lunghe di allenamento, le altre supplementazioni erano considerate non necessarie



nutrients



Article
Dietary Intakes and Supplement Use in Pre-Adolescent and Adolescent Canadian Athletes

Jill A. Parnell ^{1,*}, Kristin P. Wiens ² and Kelly A. Erdman ³

Abstract: In this study, we determined the prevalence of nutritional supplements (NS) usage, the type of supplements used, the reasons for usage, and the source of nutritional advice among Portuguese athletes. Two hundred ninety-two athletes (68 % male, 12–37 years old) from 13 national sports federations completed a questionnaire that sought information on socio-demographics, sports data, and NS usage. Most athletes (66 %) consumed NS, with a median consumption of 4 supplements per athlete. The most popular supplements included multivitamins/minerals (67 %), sport drinks (62 %), and magnesium (53 %). Significant differences for the type of NS consumed were found between gender and age groups and the number of weekly training hours. Most athletes used NS to accelerate recovery (63 %), improve sports performance (62 %), and have more energy/reduce fatigue (60 %). Athletes sought advice on supplementation mainly from physicians (56 %) and coaches (46 %). Age and gender were found to influence reasons for use and the source of information. Reasons for NS usage were supported scientifically in some cases (e. g., muscle gain upon protein supplementation), but others did not have a scientific basis (e. g., use of glutamine and magnesium). Given the high percentage of NS users, there is an urgent need to provide athletes with education and access to scientific and unbiased information, so that athletes can make assertive and rational choices about the utilization of these products.

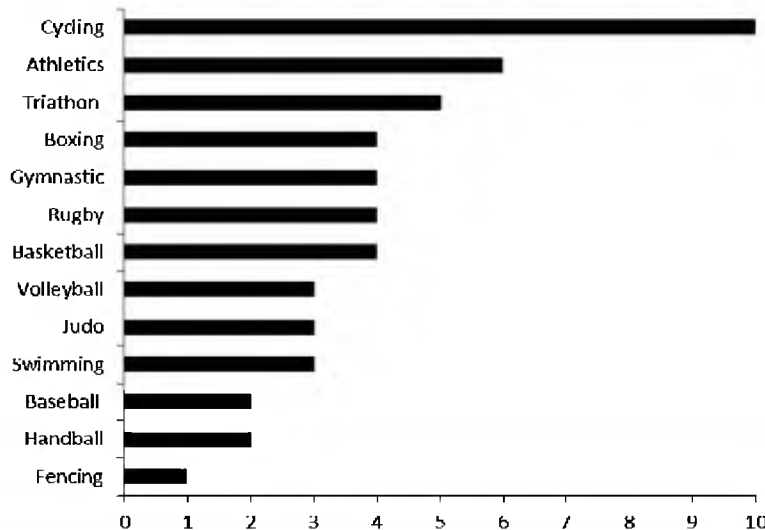


Figure 1: Median number of nutritional supplements consumed per athlete per sport.

Original Communication

Nutritional Supplements Usage by Portuguese Athletes

Mónica Sousa¹, Maria João Fernandes², Pedro Moreira^{2,3}, and Vítor Hugo Teixeira^{2,3}

Original Communication

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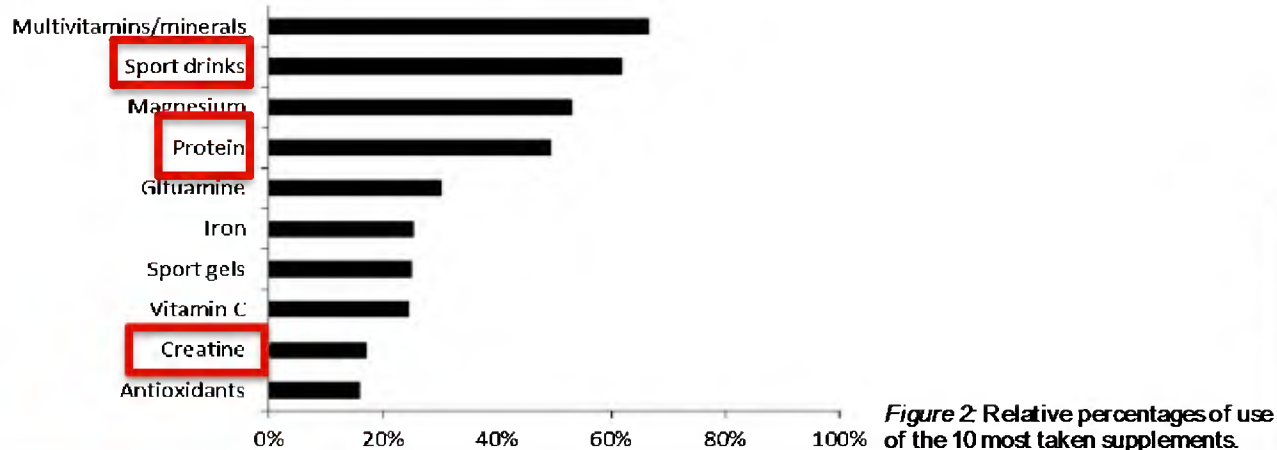


Figure 2 Relative percentages of use of the 10 most taken supplements.

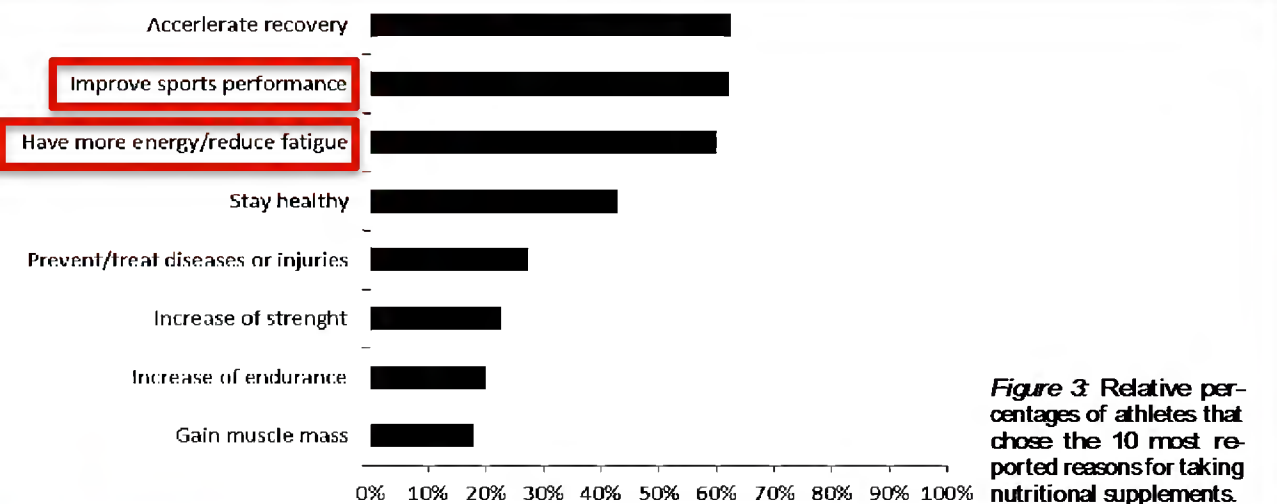


Figure 3 Relative percentages of athletes that chose the 10 most reported reasons for taking nutritional supplements.

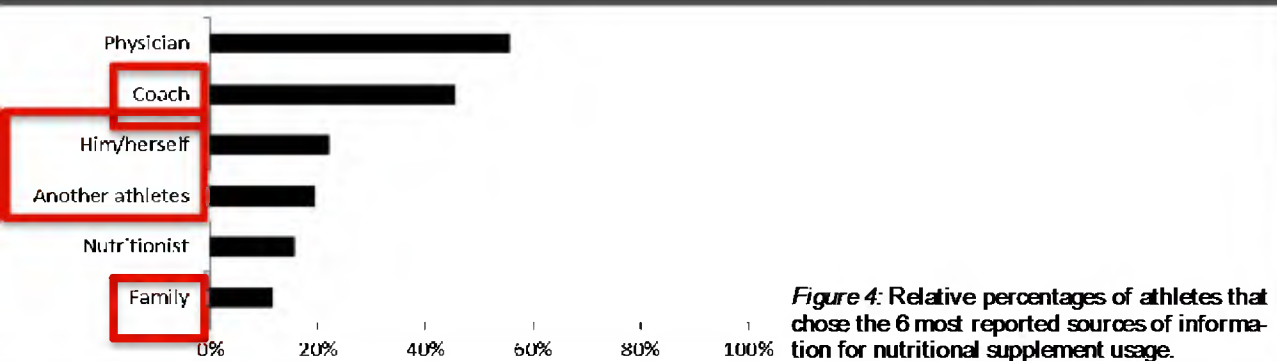


Figure 4 Relative percentages of athletes that chose the 6 most reported sources of information for nutritional supplement usage.



**AMATORI/ATTIVI (?)
ATLETI
ADOLESCENTI**



- MEDIO/BASSO CONSUMO ENERGETICO
- RISCHIO DI MALNUTRIZIONE DOVUTO AD "ECESSI"



**ATLETI ADOLESCENTI
COMPETITIVI (AGONISTI)**



- ALTO CONSUMO ENERGETICO
- RISCHIO DI MALNUTRIZIONE DOVUTO A MANCATA INTEGRAZIONE

Ma chi è "attivo" e chi
"competitivo" ?

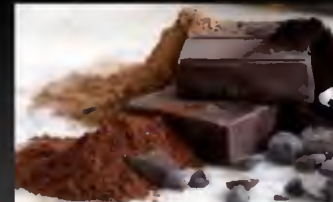
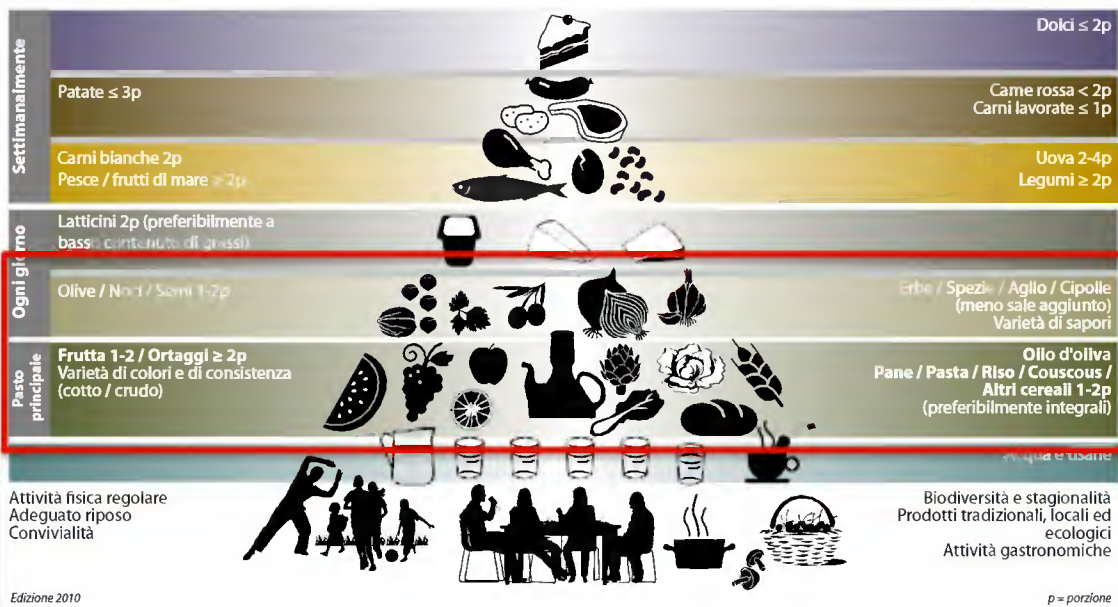
Sports Dietitians Australia Position Statement: Sports Nutrition for the Adolescent Athlete

Atleti amatori attivi: età compresa tra i 12 e i 18 anni che pratica **uno sport in un contesto più o meno specifico**, associato ad un impegno nella formazione, nello sviluppo delle competenze, e/o **competizioni “formali”**.

Atleti agonisti competitivi: età compresa tra i 12 e i 18 anni, che dimostra talento attraverso le prestazioni in uno sport specifico al punto da indicarne il potenziale futuro nell'agonismo. Questo atleta può essere impegnato in **allenamenti sostenuti, attraverso elevati volumi ad alto impegno psico-fisico che possono portare al raggiungimento di traguardi e alte prestazioni**.

Piramide Alimentare Mediterranea: uno stile di vita quotidiano
Linee Guida per la popolazione adulta

Porzioni frugali e secondo le abitudini locali
Vino con moderazione e secondo le abitudini sociali



Per un atleta attivo:

In generale: il rischio di accumulo di energia in eccesso (diete ipercaloriche) >> rischio di periodi prolungati a bassa disponibilità di energia

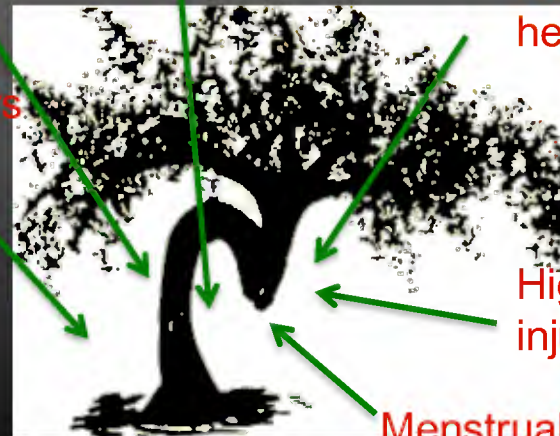
Specialmente per un atleta agonista:

- Rischio di carenze nutrizionali (qualitative e/ o quantitative)
- Possibile utilizzo di enhancers della prestazione

Short stature Delayed puberty

Poor bone health

Eating disorders



High risk of injury

Menstrual irregularities

Deficit micronutrienti

- Diete restrittive in alcuni sport (ginnastica ritmica, sport di combattimento ecc.)
- Atlete vegane
- Diete squilibrate o carenti per problemi di organizzazione, patologie ansiose o disturbi dell'alimentazione

Le più frequenti:

- ACQUA!
- Ferro
- Calcio
- Magnesio
- Potassio
- Vitamine
- W-3



Un esempio: supplementazione con Ferro

Eur J Appl Physiol (2012) 112:513–523

DOI 10.1007/s00421-011-2002-4

ORIGINAL ARTICLE

Iron status in elite young athletes: gender-dependent influences of diet and exercise

Karsten Koehler · Hans Braun · Silvia Achtzehn ·
Ursula Hildebrand · Hans-Georg Predel ·
Joachim Mester · Wilhelm Schänzer

Abstract Iron depletion seems to occur more frequently among athletes than in the general population and may affect performance capacity. Only little information is available about the prevalence of iron status abnormalities in young elite athletes and whether iron depletion is associated with gender, sport, age or nutrition- and exercise-related factors in this group. Hence, diet, exercise and haematological data from 193 elite athletes (96 males, 97 females; 16.2 ± 2.7 years) from 24 different sports were analyzed retrospectively. Most female athletes failed to meet the recommended daily allowance for iron, even though dietary iron density was higher than in males (5.75 ± 0.78 vs.

6.17 ± 0.98 mg/1,000 kcal; $P = 0.001$). Iron depletion (serum ferritin < 35 µg/L) occurred in 31% of male and 57% of female athletes ($P < 0.001$). Low haemoglobin (males: <13 g/dL; females: <12 g/dL) and haematocrit (males: <40%; females: <36%) values were equally prevalent in both genders [haemoglobin: 7.3% (males), 6.2% (females); haematocrit: 13.5% (males); 15.5% (females)]. In females, reduced ferritin levels were associated with a lower dietary iron density (5.9 ± 0.8 vs. 6.6 ± 1.1 mg/1,000 kcal; $P = 0.002$). Males with iron depletion had a significantly higher estimated energy expenditure (48.7 ± 7.0 vs. 44.4 ± 7.6 kcal/kg/day; $P = 0.009$).

Succo di barbabietola



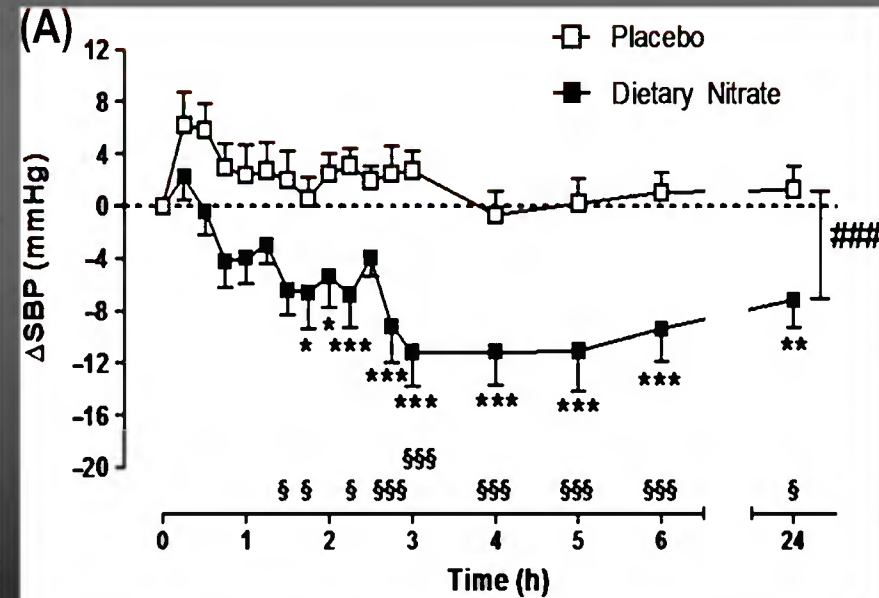
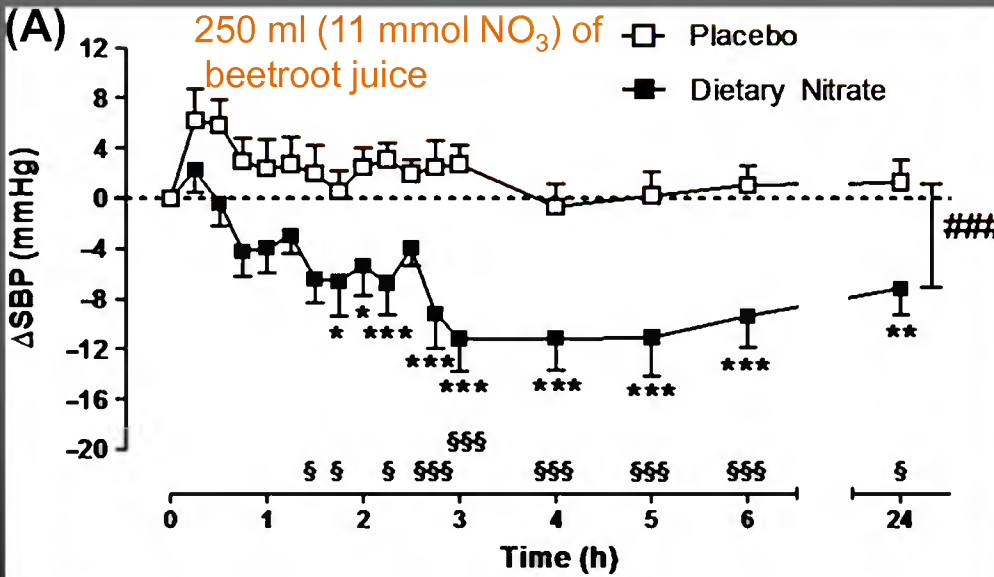
Bond H, Morton L, Braakhuis AJ.

Dietary nitrate supplementation improves rowing performance in well-trained rowers.

Int J Sport Nutr Exerc Metab. 2012 Aug;22(4):251-6.



Miglioramento della performance del 2%



Caffeina

RCTs su adulti: miglioramento performance, tempi di reazione, riduzione fatica (3-6 mg/Kg).

Tolleranza: aumento BP, mal di testa, irritabilità, tremori, alterazione del sonno, tremori, irritazione gastrica.

A dosaggi elevati (>250/300 mg/die): aritmie cardiache (contrazione ventricolare prematura) e potenziamento effetti collaterali



40 mg/lattina

Nessun dato di sicurezza su bambini/adolescenti ANCHE SE....
Attenzione agli energy drink!

Tamponi

Nuotatori agonisti (11-13 anni):

- trattati con **Na₂CO₃**: miglioramento performance di 1s nel 200 m stile libero
- Trattati con **B-alanina**: miglioramento performance nel lungo termine (dopo 1 h di attività) del 2.85%. Risultati simili con **L-Carnosina**
- Supplementazione con **vitamine**: riduzione markers infiammatorii e perossidazione lipidica dopo trattamento per 1 mese

Cavas L, Tarhan L. Effects of vitamin-mineral supplementation on cardiac marker and radical scavenging enzymes, and MDA levels in young swimmers. Int J Sport Nutr Exerc Metab. 2004

Take home messages

1) Adolescenti impegnati in allenamenti saltuari e a bassa intensità:

- Aumento del rischio di malnutrizione da **cattive abitudini alimentari** e non da un aumento delle esigenze nutrizionali
- E' più facile l'aumento degli **adolescenti "sovralimentati"** (cibi spazzatura) = aumento del rischio CV
- Necessità di promuovere una **dieta sana ed equilibrata** (IDRATAZIONE)
- **Raramente** necessità di **supplementazione**

2) Adolescenti impegnati in allenamenti frequenti e ad alta intensità:

- Più **alto rischio di carenze nutrizionali** (elevate esigenze nutrizionali, problemi organizzativi e pressioni psicologiche)
- Più comune la necessità di supplementazione

3) **Pochi studi** disponibili sulla efficacia e sulla sicurezza di nutraceutici negli sport = cautela nei loro prescrizione

4) **Ruolo cruciale del medico** (o nutrizionista) nella prescrizione: NO allenatori, membri della famiglia o altri influenzatori

5) **Personalizzazione della prescrizione**: salute mentale e fisica, valutazione nutrizionale, tipo, intensità e volume dello sport praticato dal soggetto

TRATTATO ITALIANO DI NUTRACEUTICA CLINICA

a cura di
Arrigo F. G. Cicero
Società Italiana di Nutraceutica

coadiutori
Alessandro Colletti e Francesco Di Pierro



SINut
Società Italiana di Nutraceutica



Handbook of Nutraceuticals for Clinical Use

Arrigo F.G. Cicero
Alessandro Colletti

 Springer