13 Settembre 2012

Relazione tra Vitamina D, Obesità infantile, Diabete e Sindrome Metabolica: un puzzle in via di risoluzione

Emanuele Miraglia del Giudice
Seconda Università degli Studi di Napoli
Dipartimento di Pediatria

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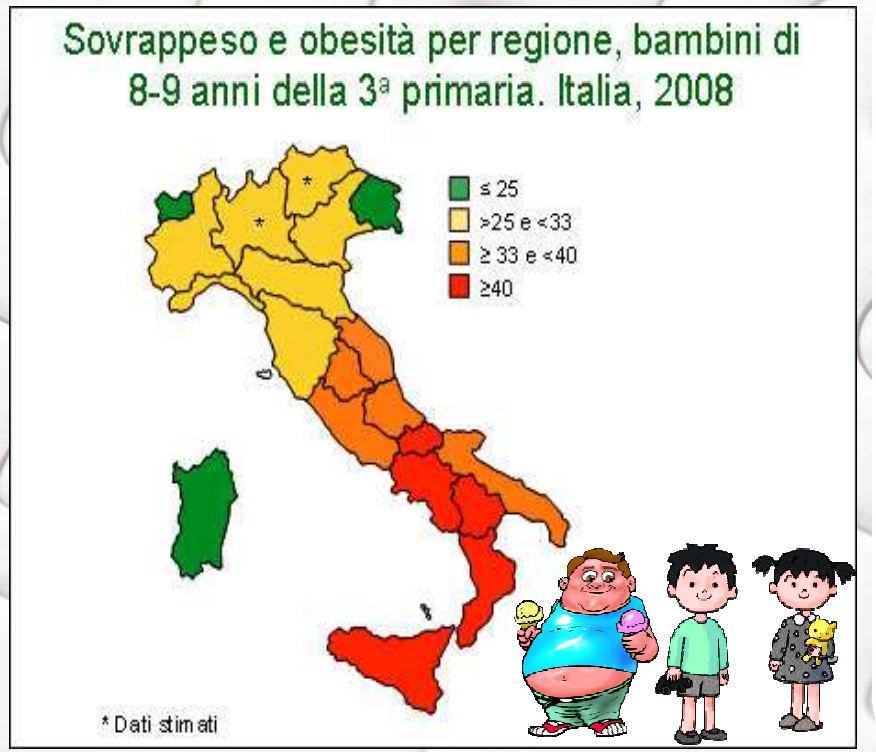
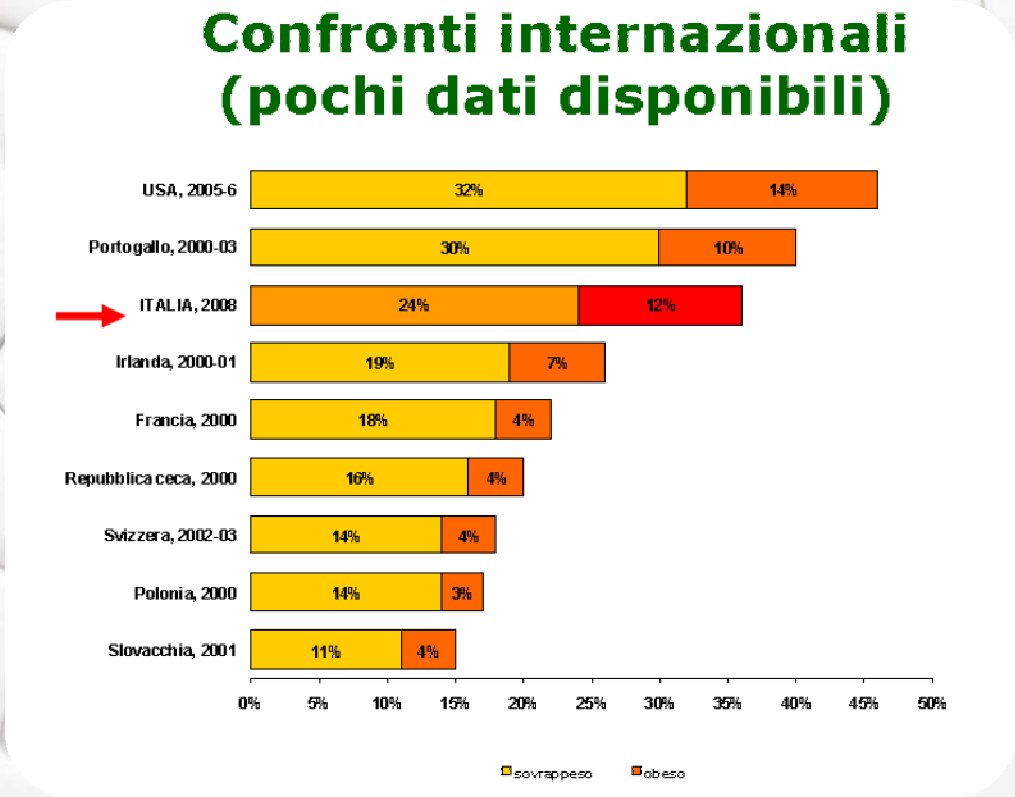
È sempre più preoccupante la situazione dell'obesità in Italia:

Il 23,6% dei bambini è sovrappeso, il 12,3% obeso

Più di 1 bambino su 3 ha un peso superiore a quello che dovrebbe avere per l' età





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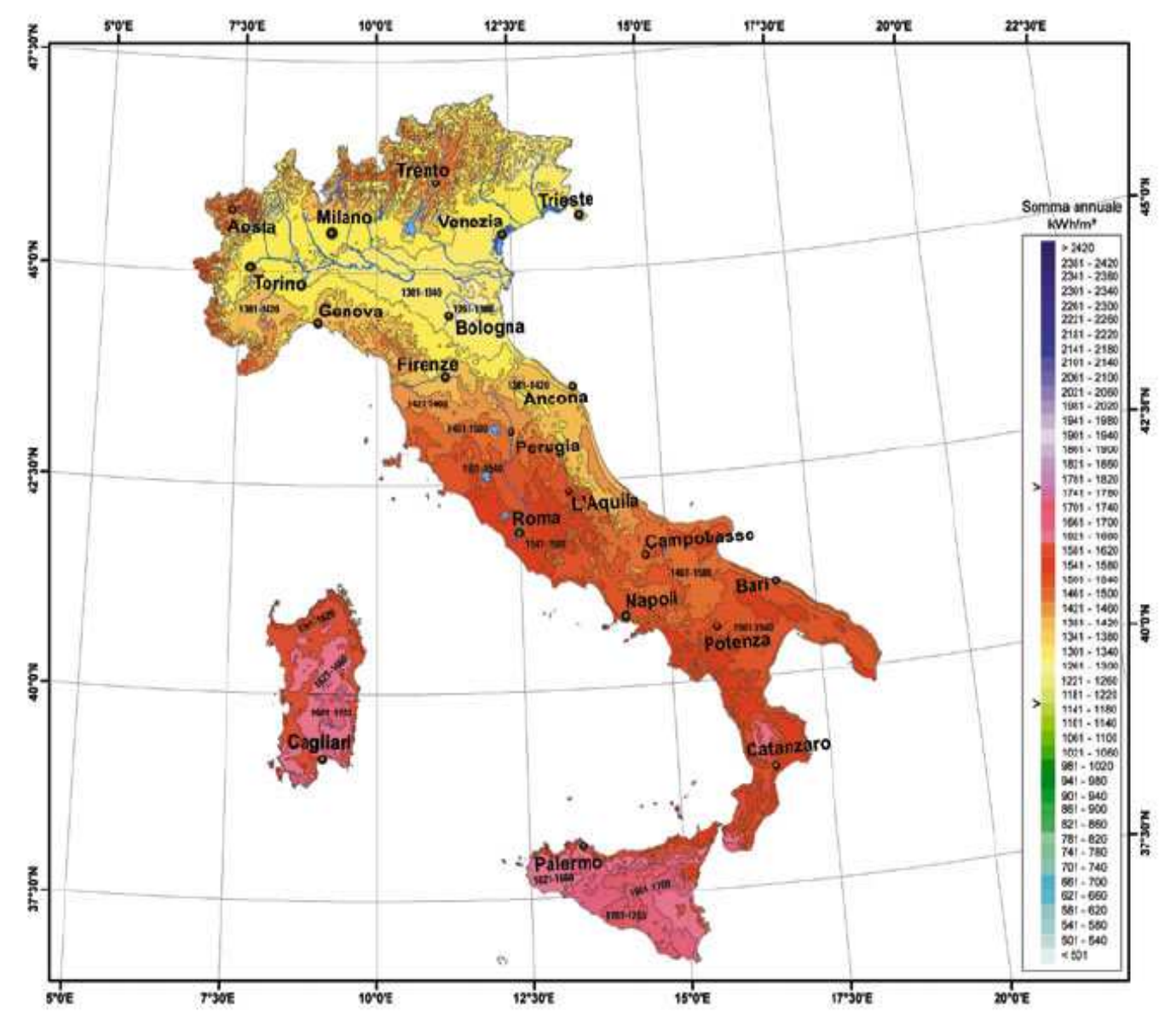

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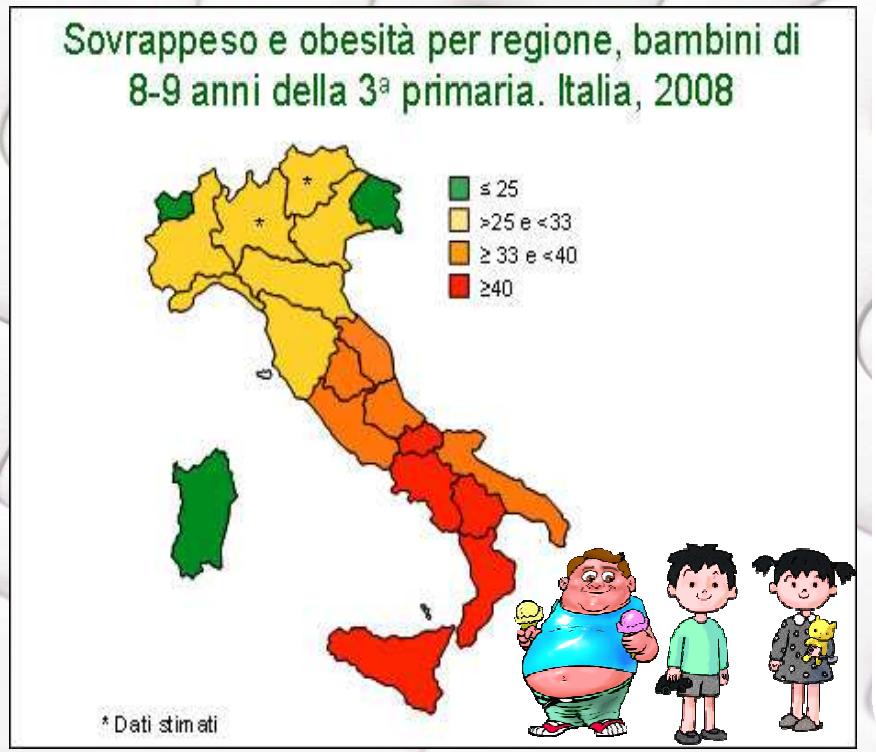

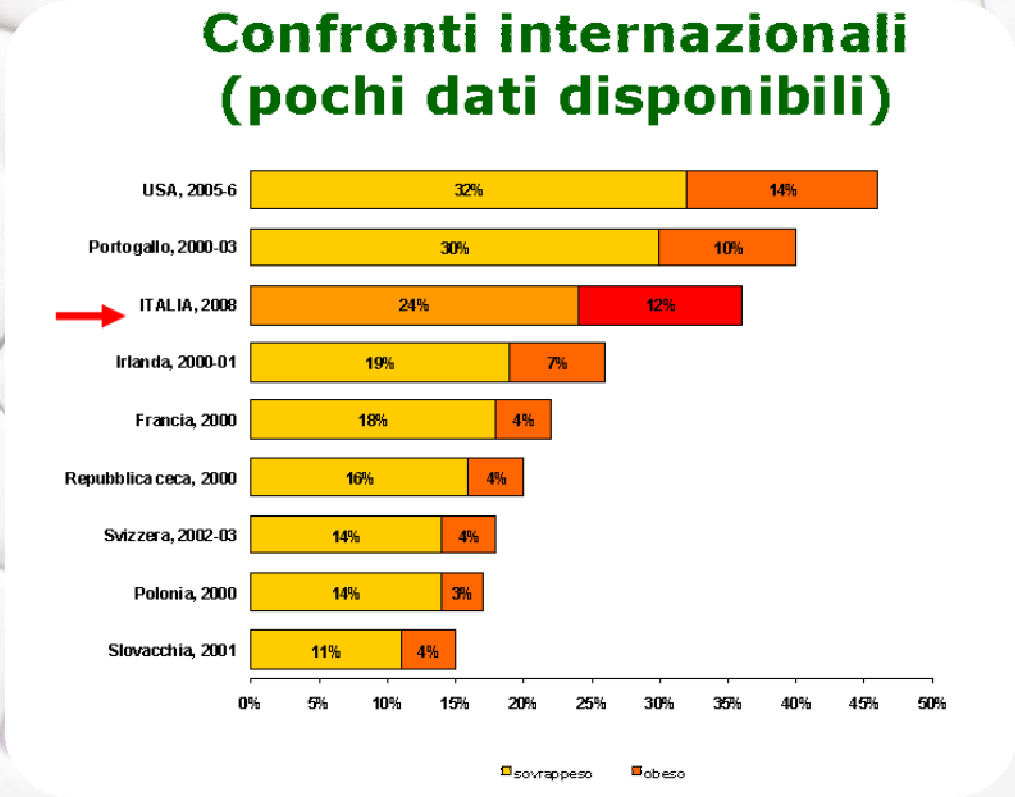

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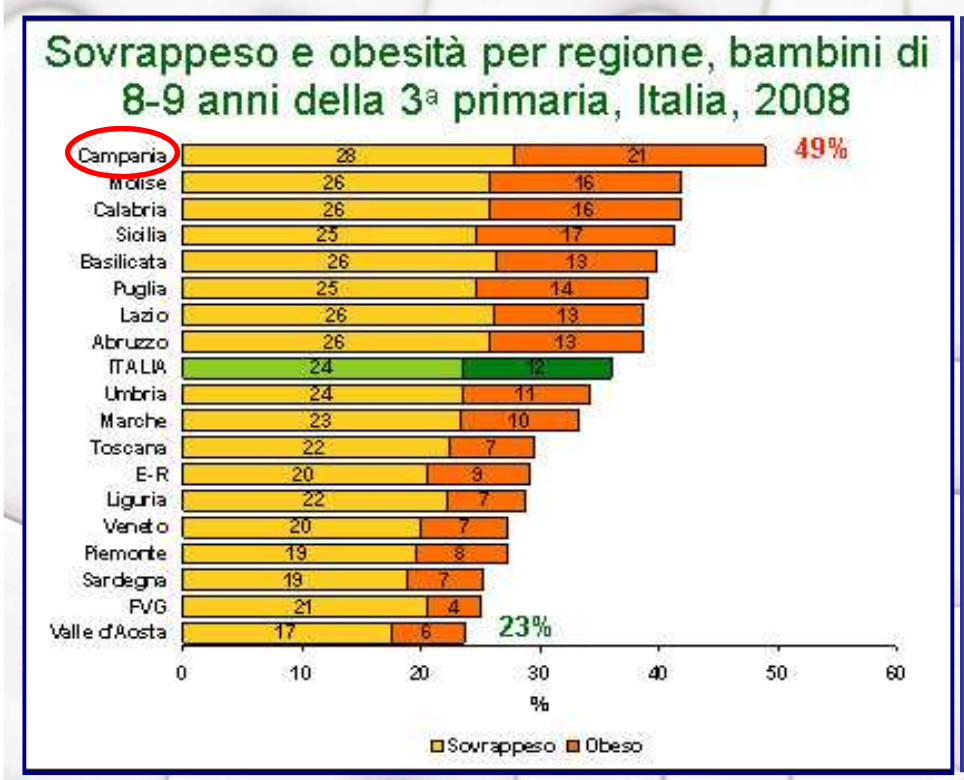
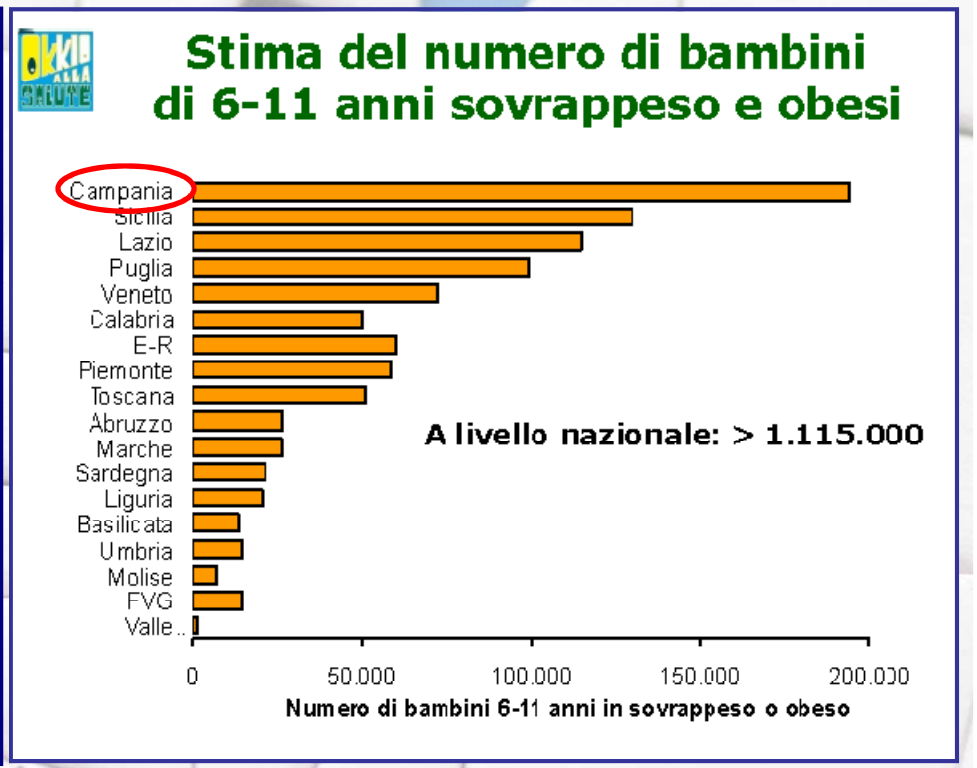




Circa 80.000 bambini obesi, tra i 6 e gli 11 anni nella sola Campania!

SINDROME METABOLICA
in età pediatrica

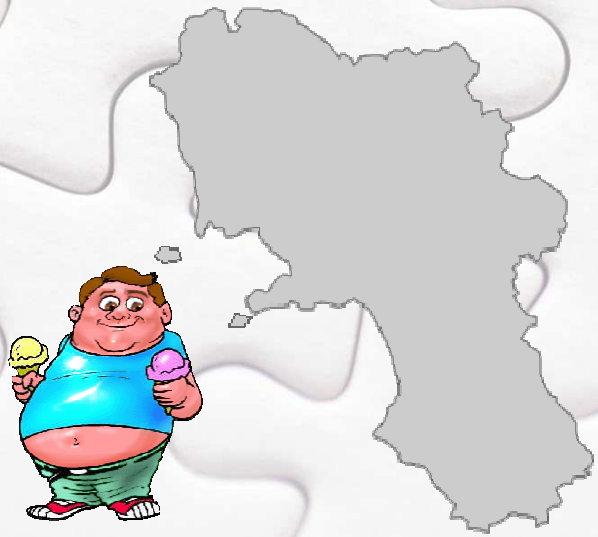
PREVALENZA DELLA SINDROME METABOLICA

	ETÀ MEDIA	CRITERI	PREVALENZA (%)	REFERENZA
Dietz et al 2003	14	NCEP	28.7	APAM 157;821
Weiss et al 2004	12	NCEP*	49	NEJM 50;2362
Goodman et al 2004	15.2	NCEP	19.5	J.Ped 145;445
Goodman et al 2004	15.2	WHO	38.9	J.Ped 145;445
Miraglia del Giudice et al 2006	10.4	NCEP*	40	JCEM 91;4641

**Criteri modificati in base a quelli NCEP (National Cholesterol Education Panel)*

SINDROME METABOLICA in età pediatrica in Campania

Da questi dati possiamo indirettamente stimare che in Campania ci siano approssimativamente **30.000- 35.000** bambini in età scolare con sindrome metabolica!



COMPLICANZE dell'OBESITÀ PEDIATRICA

Psicosociali
- Scarsa autostima
- Isolamento sociale e stigmatizzazione
- Disturbi del comportamento alimentare
- Depressione

Neurologiche
- Pseudotumore cerebri

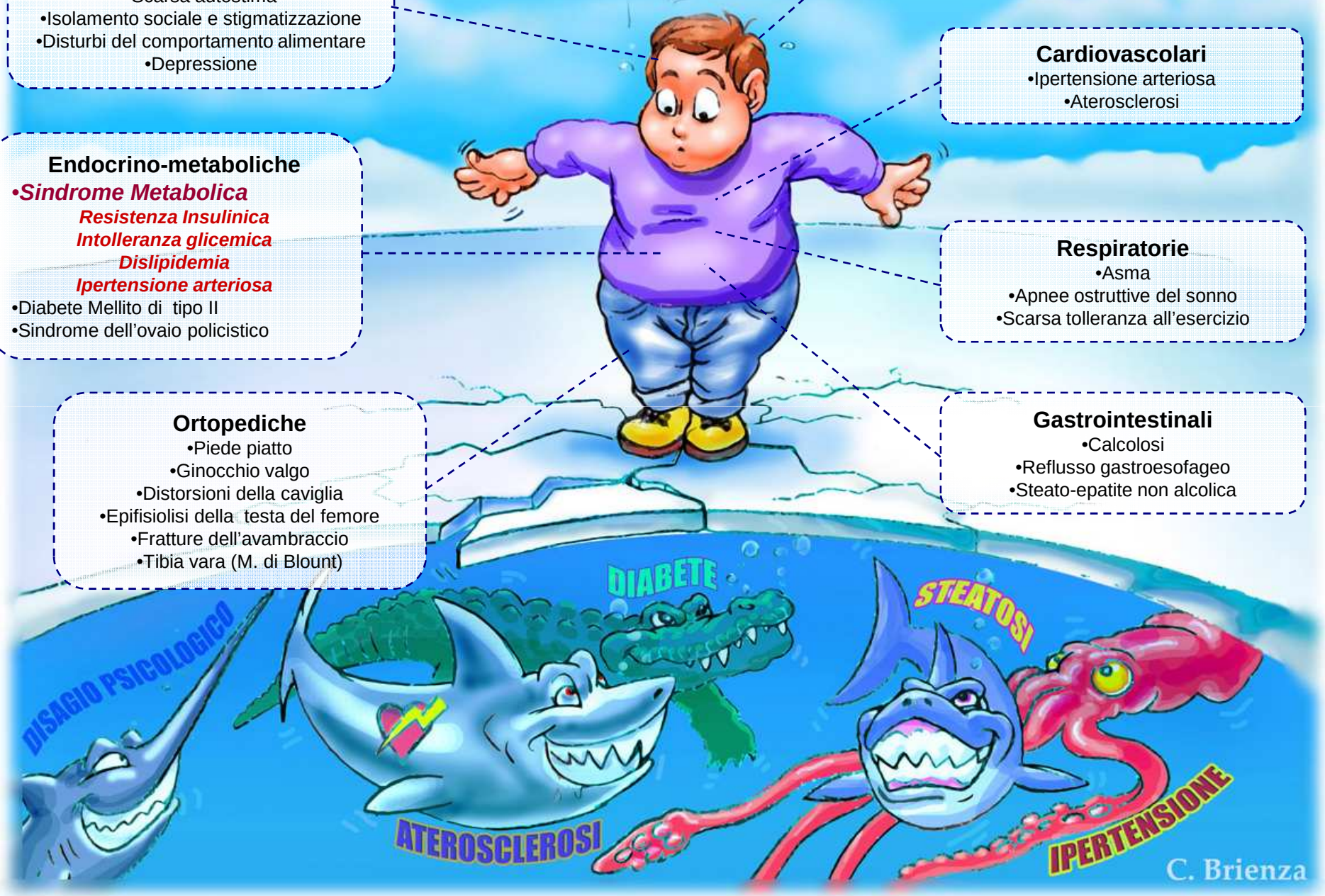
Cardiovascolari
- Ipertensione arteriosa
- Aterosclerosi

Endocrino-metaboliche
- ***Sindrome Metabolica***
  - ***Resistenza Insulinica***
  - ***Intolleranza glicemica***
  - ***Dislipidemia***
  - ***Ipertensione arteriosa***
- Diabete Mellito di tipo II
- Sindrome dell'ovaio policistico

Respiratorie
- Asma
- Apnee ostruttive del sonno
- Scarsa tolleranza all'esercizio

Ortopediche
- Piede piatto
- Ginocchio valgo
- Distorsioni della caviglia
- Epifisiolisi della testa del femore
- Fratture dell'avambraccio
- Tibia vara (M. di Blount)

Gastrointestinali
- Calcolosi
- Reflusso gastroesofageo
- Steato-epatite non alcolica



CRITERI DIAGNOSTICI DELLA SINDROME METABOLICA in età pediatrica

Definizione da:	Obesità	Pressione Arteriosa	Trigliceridi	Colesterolo HDL	Intolleranza Glicemica
Weiss et al	ZS BMI ≥ 2	>95° percentile	>95° percentile	<5° percentile	Intolleranza glicemica
Cook et al	Circonf. vita ≥ 90° percentile	≥ 90° percentile	≥ 110 mg/dl	≤40 mg/dl	Glic a digiuno ≥ 110mg/dl o Intolleranza glicemica
Ford et al	Circonf. vita ≥ 90° percentile	≥ 90° percentile	≥ 110 mg/dl	≤10° percentile	Glic a digiuno ≥ 100mg/dl o Intolleranza glicemica

Per la diagnosi di Sindrome Metabolica si neccessita la presenza di 3 criteri su 5

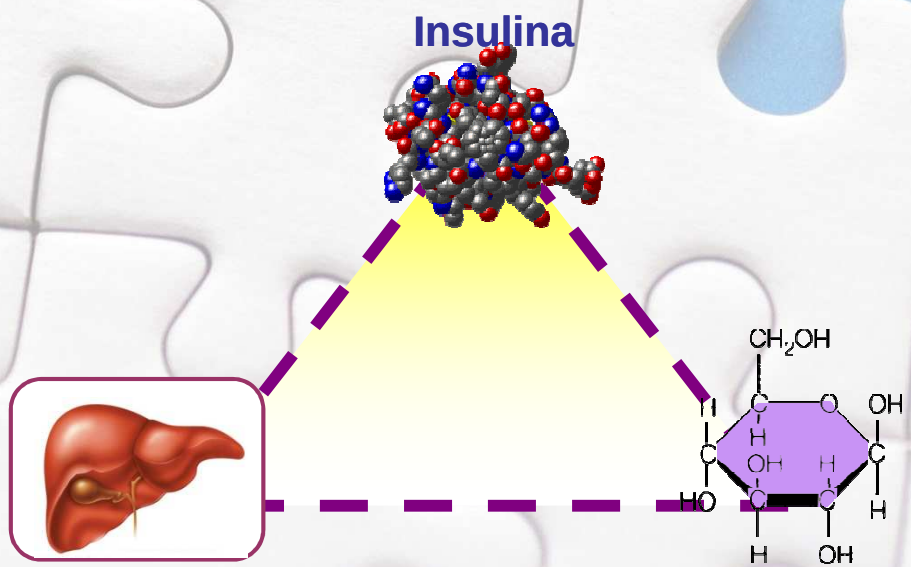
SINDROME METABOLICA:

Il meccanismo patogenetico del cluster di alterazioni che la identifica

INSULINO RESISTENZA

INSULINO RESISTENZA:
Definizione

"Incapacità di livelli determinati di insulina di indurre una adeguata utilizzazione di glucosio in periferia e di sopprimere adeguatamente la produzione epatica di glucosio"



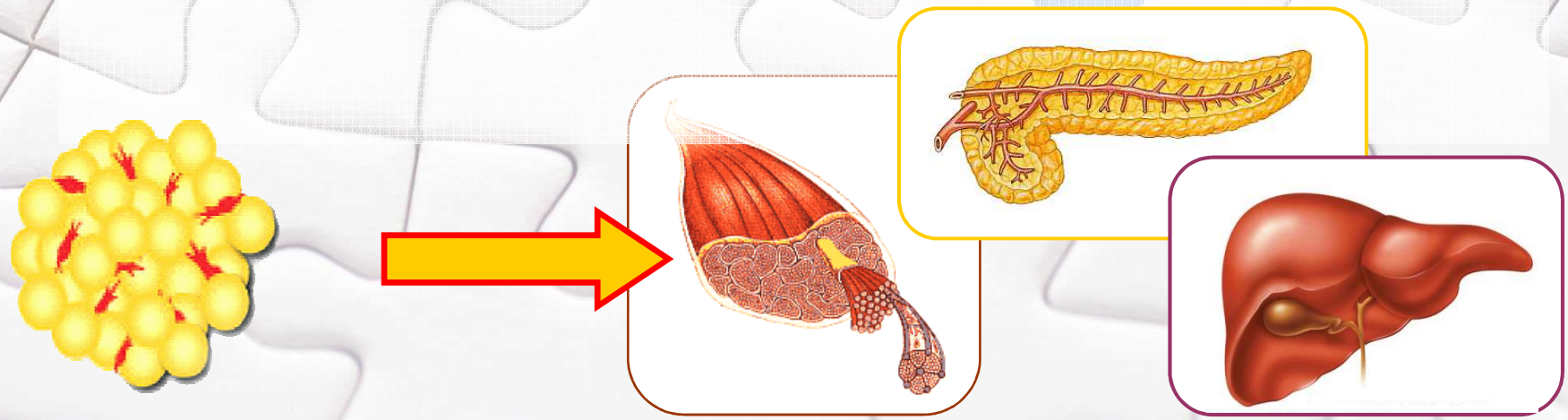
INSULINO RESISTENZA

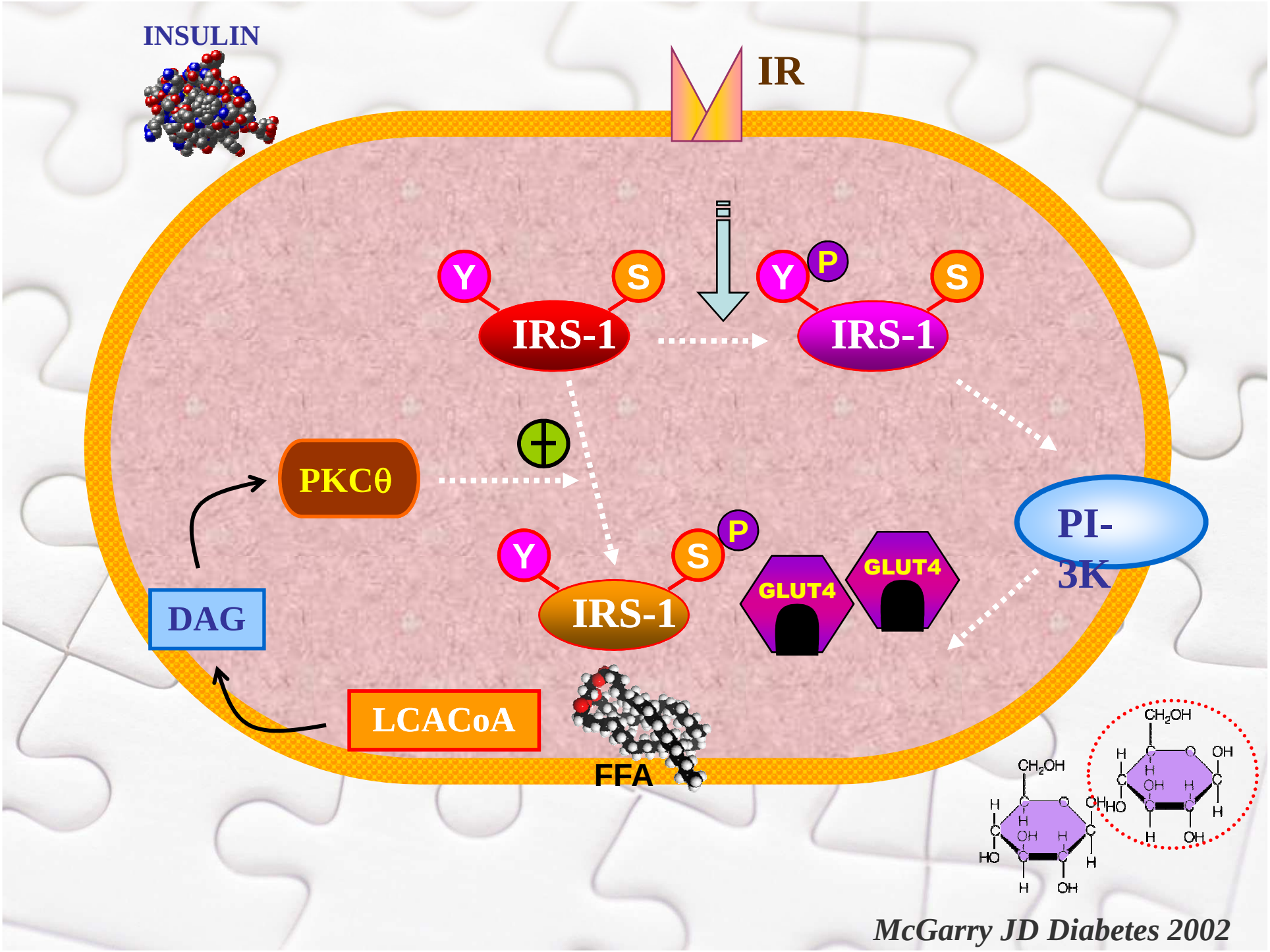
Ipotesi patogenetica della deposizione ectopica dei grassi

Quando gli adipociti raggiungono il massimo della loro capacità di immagazzinamento di lipidi ed il loro processo di proliferazione è esaurito

il grasso viene accumulato in tessuti non idonei a tale scopo

Van Gaal et al, Nature, 2006

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Curr Osteoporos Rep (2012) 10:4–15
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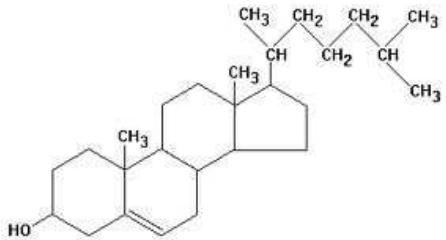
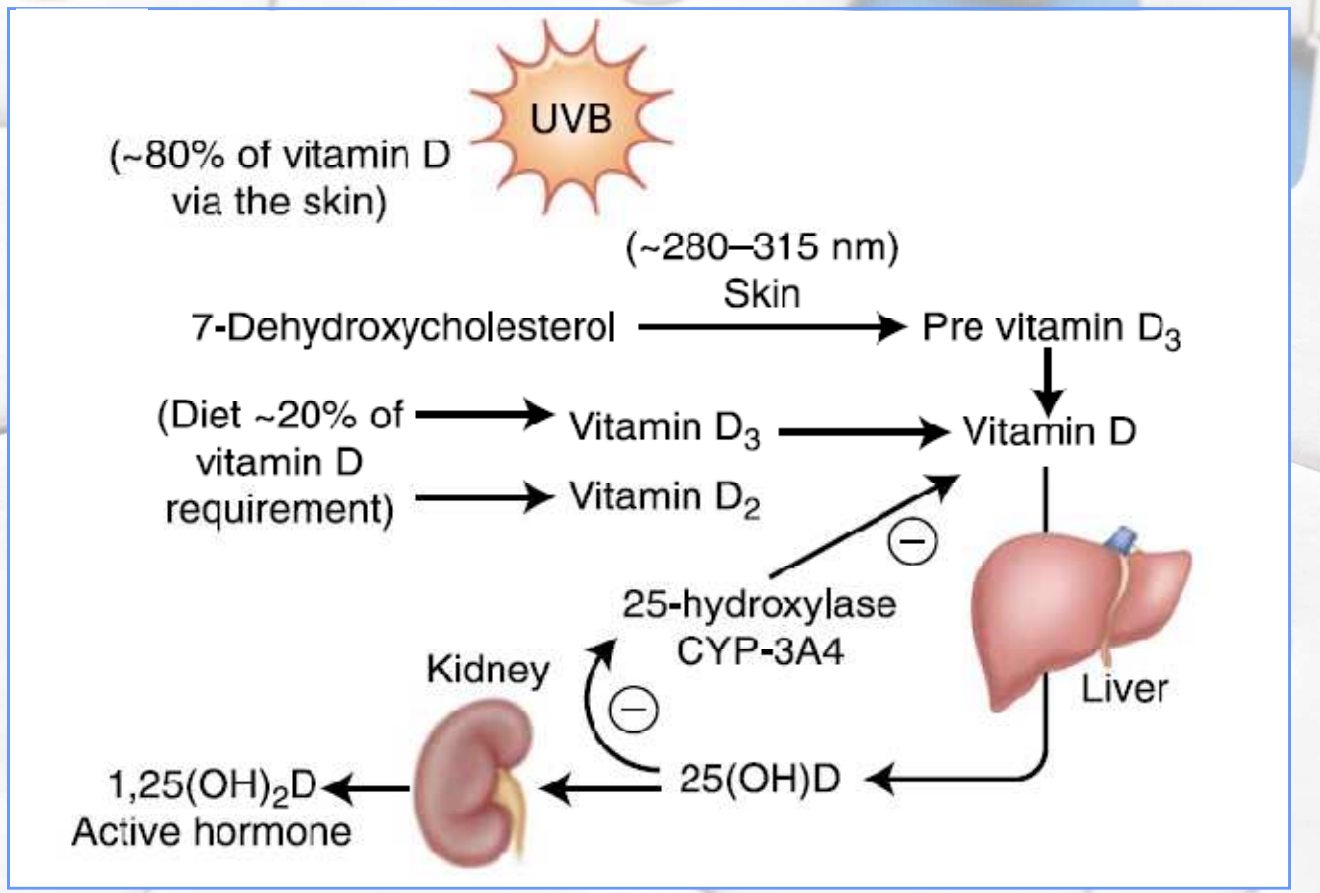


Vitamin D in the New Millennium

Sunil J. Wimalawansa



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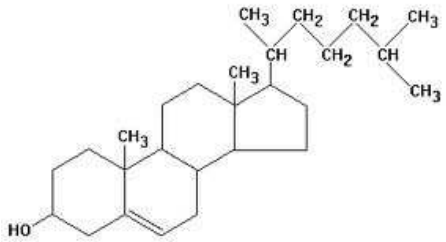

Vitamin D in the New Millennium

Sunil J. Wimalawansa

LIVELLI EMATICI DI 25(OH) VIT D

DEFINIZIONE	ng/mL	nmol/L
Carenza Grave	<10	<25
Carenza	10-19	25-49
Insufficienza	20-29	50-74
Ottimale	30-60	75-150
Intossicazione	>100	>250

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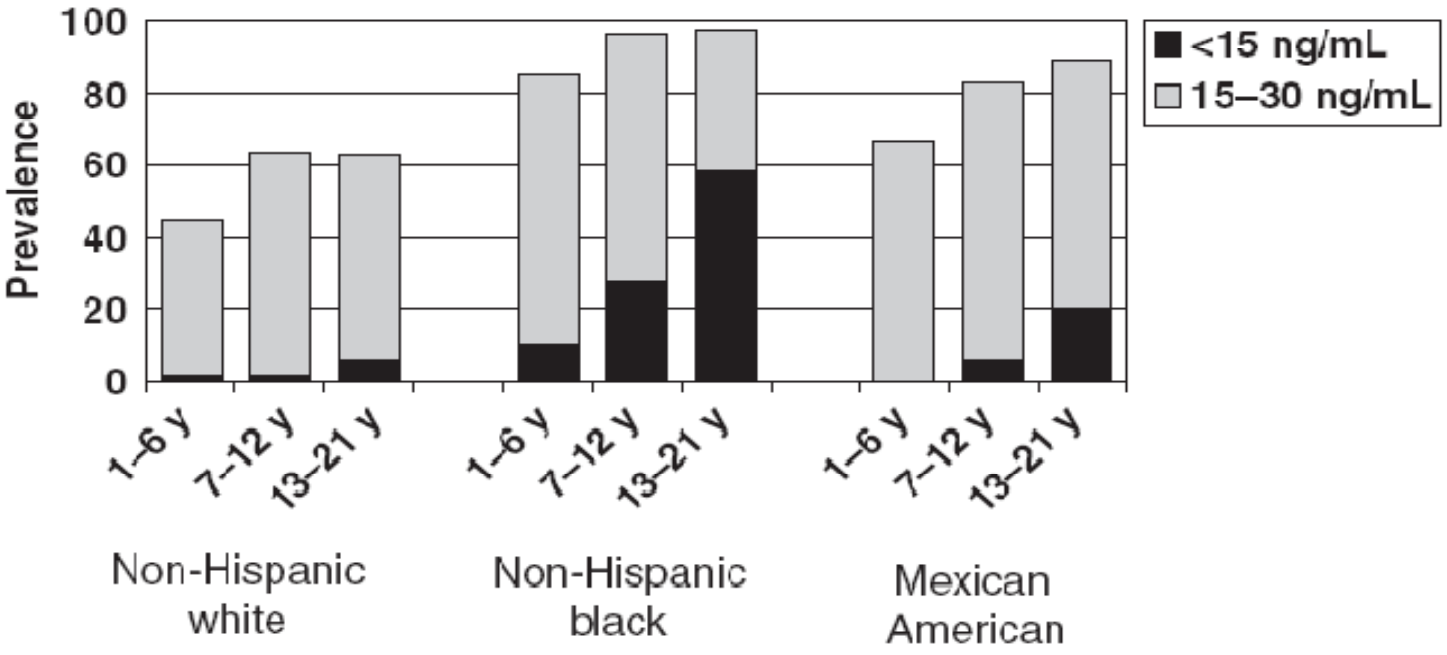
Prevalence and Associations of 25-Hydroxyvitamin D Deficiency in US Children: NHANES 2001 –2004

Juhi Kumar, Paul Muntner, Frederick J. Kaskel, Susan M. Hailpern and Michal L. Melamed

Pediatrics 2009;124;e362; originally published online August 3, 2009;
DOI: 10.1542/peds.2009-0051

PREVALENZA DI CARENZA E INSUFFICIENZA DI VIT D TRA LE FEMMINE (3012 PZ)



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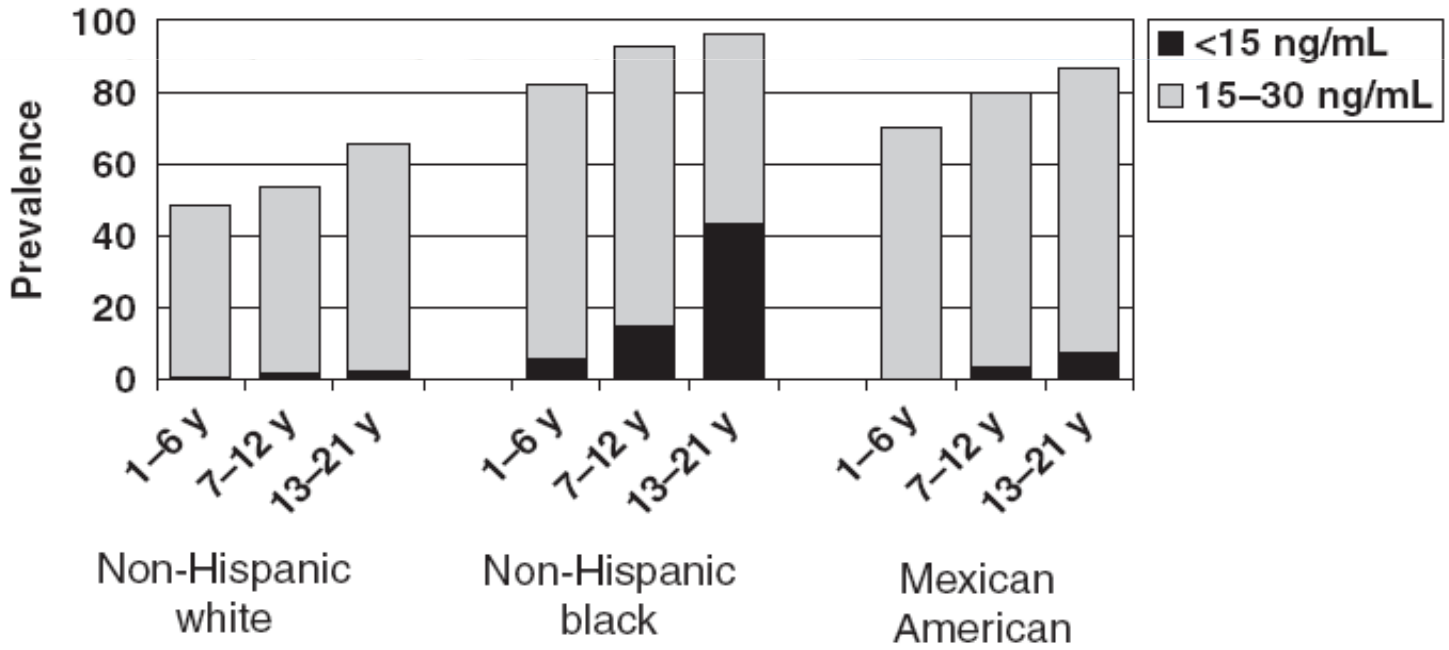
PREVALENZA DI CARENZA E INSUFFICIENZA DI VIT D TRA I MASCHI (3263 PZ)



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CARATTERISTICHE DEI PZ IN FUNZIONE DEI LIVELLI DI VIT D (6275 pz di età da 1 a 21 anni)

Characteristic	25 (OH)D Levels, ng/ml			*P*
	≥30	15–29	<15	
Age, mean ± SE, y	11.0 ± 0.3	13.0 ± 0.2	15.0 ± 0.3	<.001
Female gender, % ± SE	47.0 ± 2.0	47.0 ± 1.0	60.0 ± 2.0	.01
Race/ethnicity, % ± SE				
Non-Hispanic white	82.0 ± 2.0	57.0 ± 3.0	19.0 ± 3.0	<.001
Non-Hispanic black	3.0 ± 0.4	14.0 ± 2.0	55.0 ± 3.0	<.001
Mexican American	11.0 ± 2.0	22.0 ± 3.0	17.0 ± 3.0	<.001
Other	4.0 ± 1.0	6.0 ± 0.7	10.0 ± 2.0	.02
Country of birth, % ± SE				
Born in United States	97.0 ± 0.9	91.0 ± 0.8	89.0 ± 2.0	<.001
Born outside United States	3.0 ± 0.8	9.0 ± 0.8	11.0 ± 2.0	<.001
PIR, % ± SE				
≥5.00	19.0 ± 20	11.0 ± 0.9	7.0 ± 2.0	<.001
1.10–4.99	64.0 ± 2.0	62.0 ± 20	52.0 ± 3.0	.01
0.00–1.00	17.0 ± 2.0	27.0 ± 2.0	40.0 ± 3.0	<.001
Obese, % ± SE				
No	91.0 ± 1.0	82.0 ± 1.0	72.0 ± 2.0	<.001
Yes	9.0 ± 1.0	18.0 ± 1.0	28.0 ± 2.0	<.001
Milk intake, % ± SE				
Daily	82.0 ± 1.0	76.0 ± 1.0	56.0 ± 2.0	<.001
More than once per week	14.0 ± 1.0	18.0 ± 1.0	28.0 ± 2.0	<.001
Less than once per week	4.0 ± 0.6	6.0 ± 0.6	17.0 ± 2.0	<.001
Fish eater (n = 3790), % ± SE				
Yes	26.0 ± 2.0	21.0 ± 2.0	27.0 ± 3.0	.47
No	74.0 ± 2.0	79.0 ± 2.0	73.0 ± 3.0	
Television and computer use, hours per day, % ± SE				
None	1.0 ± 0.5	1.0 ± 0.3	2.0 ± 0.7	.54
≤2 h	42.0 ± 2.0	33.0 ± 1.0	26.0 ± 2.0	<.001
3–4 h	39.0 ± 2.0	40.0 ± 1.0	34.0 ± 2.0	.32
>4 h	18.0 ± 2.0	26.0 ± 1.0	38.0 ± 3.0	<.001

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RISCHIO CARDIOVASCOLARE E CARENZA DI VIT D

Outcome	25 (OH)D Levels 15–29 ng/mL			25 (OH)D Levels <15 ng/mL		
	Data	95% CI	*P*	Data	95% CI	*P*
Serum calcium, mg/dL (*n* = 3926)	−0.03[a]	−0.09 to 0.02	.21	−0.09[a]	−0.15 to −0.04	.002
Serum phosphate, mg/dL (*n* = 3926)	−0.03[a]	−0.10 to 0.04	.39	−0.04[a]	−0.15 to 0.06	.40
Systolic blood pressure, mm Hg (*n* = 4989)	0.78[a]	−0.08 to 1.64	.08	2.24[a]	0.98 to 3.50	.001
Diastolic blood pressure, mm Hg (*n* = 4989)	1.68[a]	0.20 to 3.16	.03	1.60[a]	−0.54 to 3.75	.14
Total cholesterol, mg/dL (*n* = 6036)	−3.66[a]	−7.09 to −0.23	.04	−2.92[a]	−8.15 to 2.30	.26
HDL cholesterol, mg/dL (*n* = 6036)	−2.29[a]	−3.57 to −1.01	.001	−3.03[a]	−5.02 to −1.04	.004
PTH >65 pg/mL (*n* = 2664)	2.0[b]	1.10 to 3.80	.04	3.6[b]	1.80 to 7.10	.001
Hypertension (*n* = 4989)	1.0[b]	0.50 to 2.00	.96	2.5[b]	1.00 to 5.90	.04
Diabetes mellitus (*n* = 6275)	2.8[b]	0.80 to 10.40	.12	1.9[b]	0.40 to 9.70	.41
Elevated CRP (*n* = 6275)	0.7[b]	0.50 to 0.90	.003	0.7[b]	0.50 to 1.00	.07
Albuminuria (*n* = 6275)	1.2[b]	0.80 to 1.80	.32	1.3[b]	0.70 to 2.40	.47

Data were multivariable adjusted for age, gender, race/ethnicity, obesity, PIR, television and computer use, milk intake, and vitamin D supplementation.

[a] Data show Δ, which represents the difference between those with 25 (OH) D levels <15 ng/mL or 15 to 29 ng/mL compared with those with levels ≥30 ng/mL and OR is compared to those with 25 (OH)D ≥30 ng/mL.

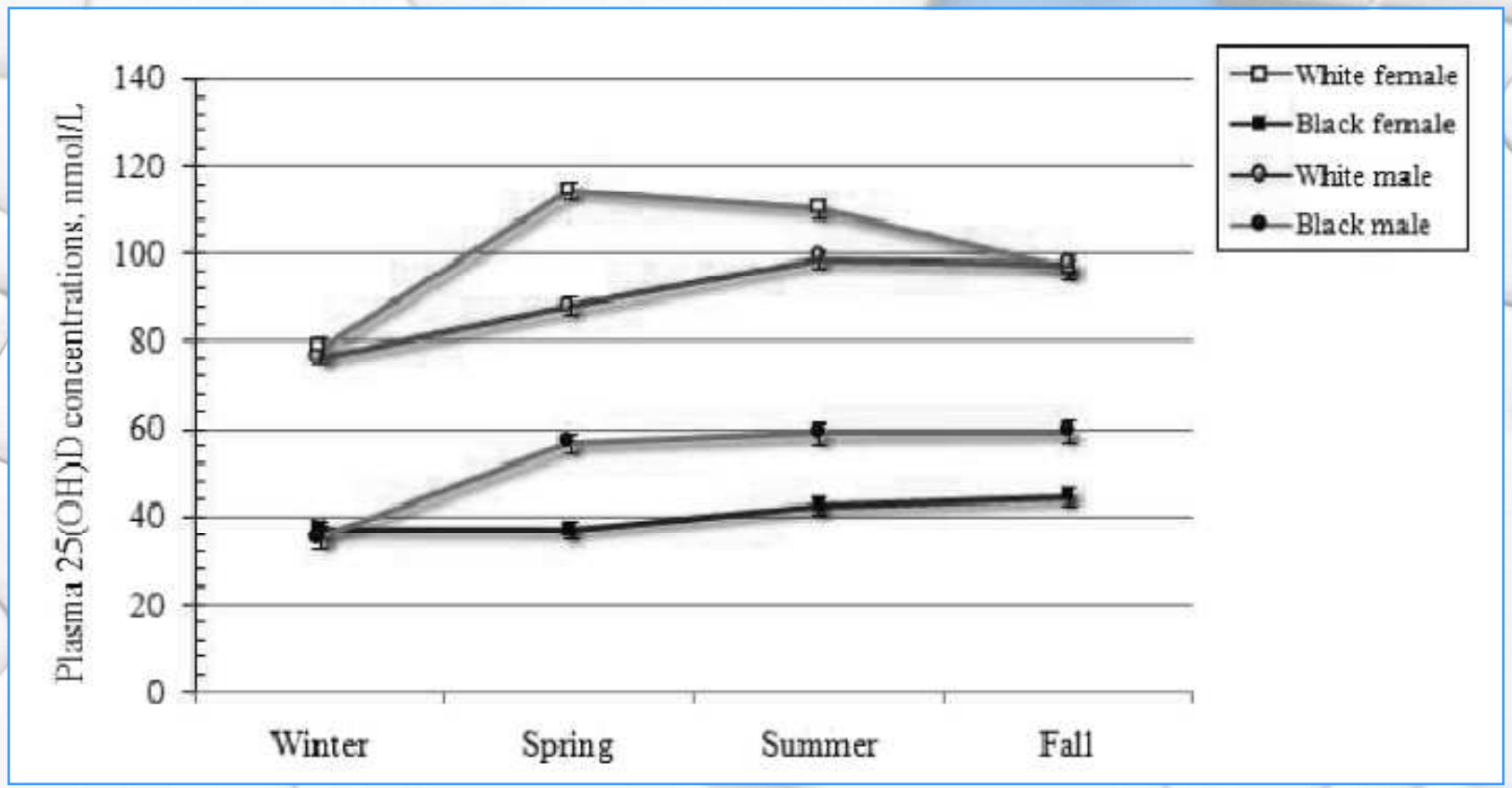
[b] Data show odds ratio, which represents the difference between those with 25 (OH)D levels <15 ng/mL or 15 to 29 ng/mL compared with those with 25 (OH)D ≥30 ng/mL.

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Low 25-Hydroxyvitamin D Levels in Adolescents: Race, Season, Adiposity, Physical Activity, and Fitness

Yanbin Dong, Norman Pollock, Inger Susanne Stallmann-Jorgensen, Bernard Gutin, Ling Lan, Tai C. Chen, Daniel Keeton, Karen Petty, Michael F. Holick and Haidong Zhu

Pediatrics 2010;125;1104; originally published online May 3, 2010;
DOI: 10.1542/peds.2009-2055



BioMed Centra

RESEARCH ARTICLE Open Access

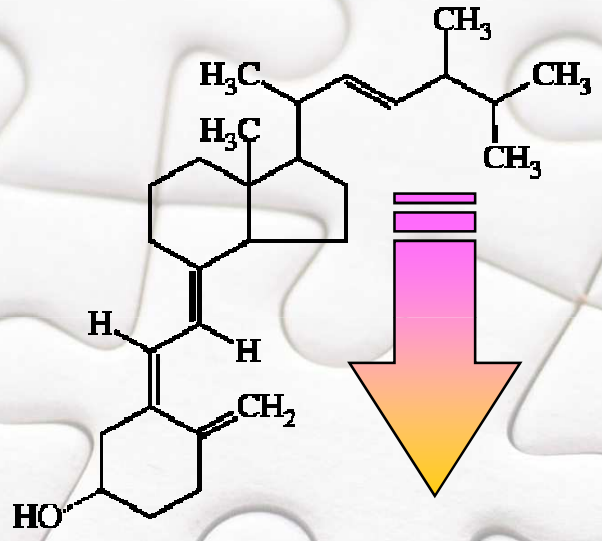
High prevalence of vitamin D insufficiency and its association with BMI-for-age among primary school children in Kuala Lumpur, Malaysia

Geok L Khor[1*], Winnie SS Chee[1], Zalilah M Shariff[2], Bee K Poh[3], Mohan Arumugam[4], Jamalludin A Rahman[5], Hannah E Theobald[6]

Correlazione tra BMI per l'età e i Livelli di Vit D

BMI-for-age Status	Boys (n = 180)				Girls (n = 222)				Total (n = 402)			
	Vitamin D status				Vitamin D status				Vitamin D status			
	*Low		**Normal		*Low		**Normal		*Low		**Normal	
	N	%	N	%	N	%	N	%	N	%	N	%
Severe thinness	3	2.5	2	3.3	1	0.6	0	0.0	4	1.2	2	3.4
Thinness	6	5	5	8.2	10	5.8	4	8.0	20	5.8	5	8.6
Normal	54	45.4	34	55.7	109	63.4	36	72.0	194	56.4	39	67.2
Overweight	20	16.8	11	18.0	34	19.8	7	14.0	66	19.2	6	10.3
Obese	36	30.3	9	14.8	18	10.5	3	6.0	60	17.4	6	10.3
χ^2 (df = 1)	5.958				1.160				5.832			
p-trend (Monte Carlo)	0.016				0.330				0.013			

↓LIVELLI DI VITAMINA D ED OBESITÀ



CAUSA?

O

EFFETTO?

↓LIVELLI DI VITAMINA D E OBESITÀ

↓LIVELLI DI VITAMINA D CAUSANO OBESITÀ

1) ***Effetto della Vit D su geni che regolano la differenzizione degli adipociti***

2) ***Effetto della Vit D su geni espressi negli adipociti e coinvolti nella lipolisi***

↓LIVELLI DI VITAMINA D CONSEGUONO ALL'OBESITÀ

1) ***Sequestro di Vit D da parte del tessuto adiposo*** *(aumento dei livelli di Vit D nelle prime fasi della perdita di peso)*

2) ***Riduzione della sintesi epatica di 25(OH) Vit D a causa della NAFLD***

3) ***Minore esposizione alla luce solare per stile di vita sedentario***

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Vitamin D Status and Cardiometabolic Risk Factors in the United States Adolescent Population

Jared P. Reis, Denise von Mühlen, Edgar R. Miller III, Erin D. Michos and Lawrence J. Appel

Pediatrics 2009;124;e371; originally published online August 3, 2009;
DOI: 10.1542/peds.2009-0213

Fattori di Rischio Cardiovascolare e Livelli di Vit D negli adolescenti

Variable	Quartile of Serum 25 (OH) D, Adjusted OR (95% CI), ng/mL				*P* for Trend
	I (<15.0)	II (15.0–21.0)	III (21.1–26.0)	IV (>26.0)	
BMI ≥95th percentile[a]					
Prevalence, %	30.7 (25.8–36.1)	22.6 (19.6–25.9)	16.5 (13.9–19.4)	10.4 (7.9–13.6)	<.001
Adjusted OR (95% CI)[b]	5.24 (3.47–7.91)	2.99 (1.98–4.53)	2.02 (1.34–3.06)	1.00 (referent)	<.001
Waist circumference ≥90th percentile[a]					
Prevalence, %	26.9 (22.1–32.4)	20.8 (18.1–23.8)	16.1 (13.7–18.8)	9.7 (7.7–12.1)	<.001
Adjusted OR (95% CI)[b]	7.21 (4.36–11.94)	3.64 (2.14–6.2)	2.19 (1.25–3.83)	1.00 (referent)	<.001
High blood pressure[c]					
Prevalence, %	11.2 (7.6–16.2)	6.7 (5.1–8.7)	4.4 (3.1–6.3)	3.7 (2.6–5.3)	.013
Adjusted OR (95% CI)[d]	2.36 (1.33–4.19)	1.26 (0.65–2.44)	1.04 (0.55–1.97)	1.00 (referent)	.046
Fasting glucose ≥100 mg/dL					
Prevalence, %	6.4 (3.8–10.7)	2.9 (2.0–4.4)	3.0 (1.9–4.8)	1.3 (0.7–2.3)	.144
Adjusted OR (95% CI)[d]	2.54 (1.01–6.40)	1.18 (0.50–2.79)	0.85 (0.39–1.88)	1.00 (referent)	.101
HDL cholesterol ≤40 mg/dL					
Prevalence, %	29.9 (25.8–34.3)	20.9 (17.9–24.4)	18.8 (15.7–22.3)	12.5 (10.2–15.2)	<.001
Adjusted OR (95% CI)[d]	1.54 (0.99–2.39)	1.33 (0.89–1.99)	1.1 (0.72–1.7)	1.00 (referent)	.084
Triglycerides ≥110 mg/dL					
Prevalence, %	23.0 (18.1–28.8)	20.7 (17.4–24.5)	17.6 (15.1–20.4)	17.0 (14.6–19.7)	.119
Adjusted OR (95% CI)[d]	1.0 (0.49–2.04)	1.03 (0.59–1.8)	0.91 (0.66–1.26)	1.00 (referent)	.371
Metabolic syndrome[e]					
Prevalence, %	14.6 (10.4–20.1)	6.9 (5.2–9.2)	5.2 (3.6–7.5)	2.2 (1.5–3.2)	<.001
Adjusted OR (95% CI)[d]	3.88 (1.57–9.58)	2.35 (1.09–5.07)	2.05 (0.89–4.70)	1.00 (referent)	.003

NHANES indicates the National Health and Nutrition Examination Survey.

J Clin Endocrinol Metab, January 2012, 97(1):279–285

Vitamin D Deficiency in Obese Children and Its Relationship to Glucose Homeostasis

Micah L. Olson, Naim M. Maalouf, Jon D. Oden, Perrin C. White, and Michele R. Hutchison

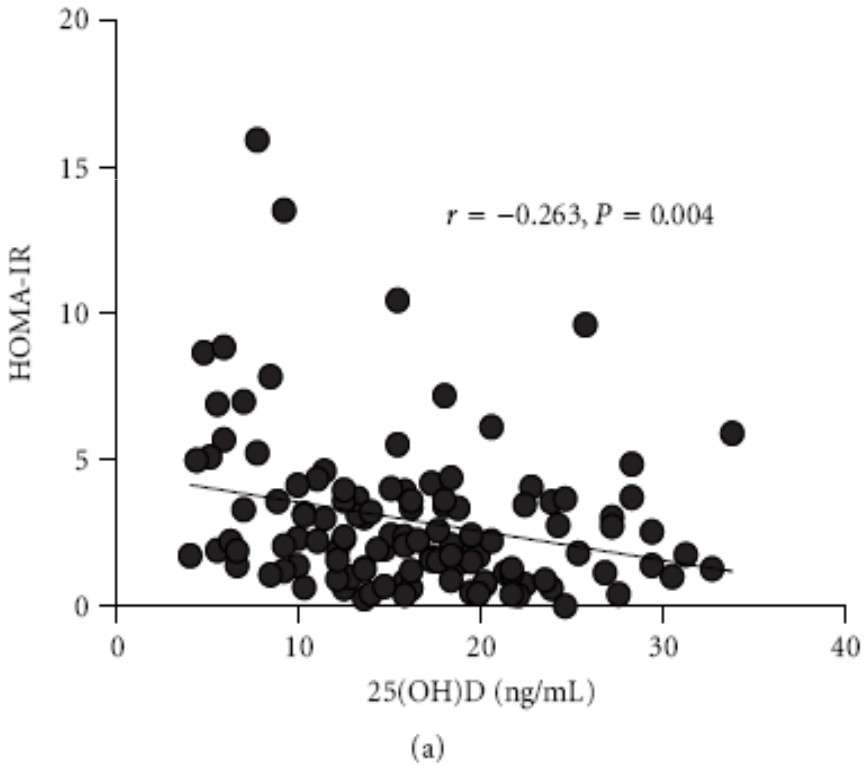
Livelli di 25(OH) Vit D e Omeostasi Glicemica /Pressione Arteriosa

		Unadjusted		Adjusted[a]	
Variable	n	*r*	*P*	*R*	*P*
HOMA-IR	327	−0.27	<0.0001	−0.19	0.001
2-h Glucose	298	−0.14	0.02	−0.12	0.04
HgbA1c	384	−0.11	0.04	−0.07	0.18
SBP	406	−0.10	0.04	−0.07	0.14
DBP	406	0.01	0.77	−0.01	0.86

Vitamin D Deficiency in Obese Children and Its Relationship to Insulin Resistance and Adipokines

Christian L. Roth,[1,2] Clinton Elfers,[1] Mario Kratz,[3,4,5] and Andrew N. Hoofnagle[4,6]

Livelli di 25(OH) Vit D e HOMA-IR

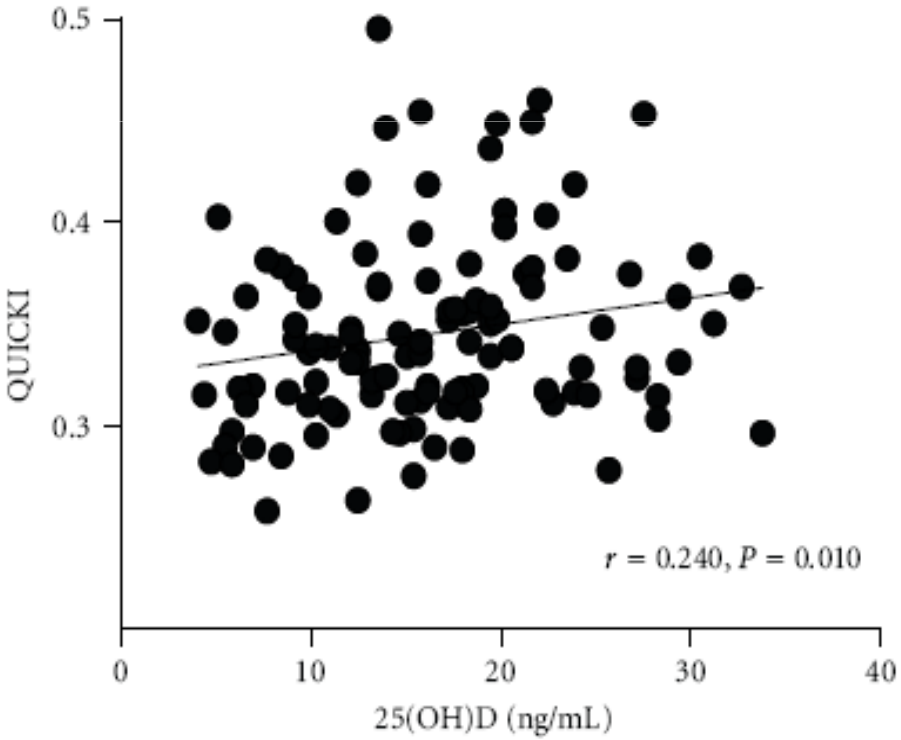


Hindawi Publishing Corporation
Journal of Obesity
Volume 2011, Article ID 495101, 7 pages
doi:10.1155/2011/495101

Vitamin D Deficiency in Obese Children and Its Relationship to Insulin Resistance and Adipokines

Christian L. Roth,[1,2] Clinton Elfers,[1] Mario Kratz,[3,4,5] and Andrew N. Hoofnagle[4,6]

Livelli di 25(OH) Vit D e QUICKI



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Vitamin D Deficiency in Obese Children and Its Relationship to Insulin Resistance and Adipokines

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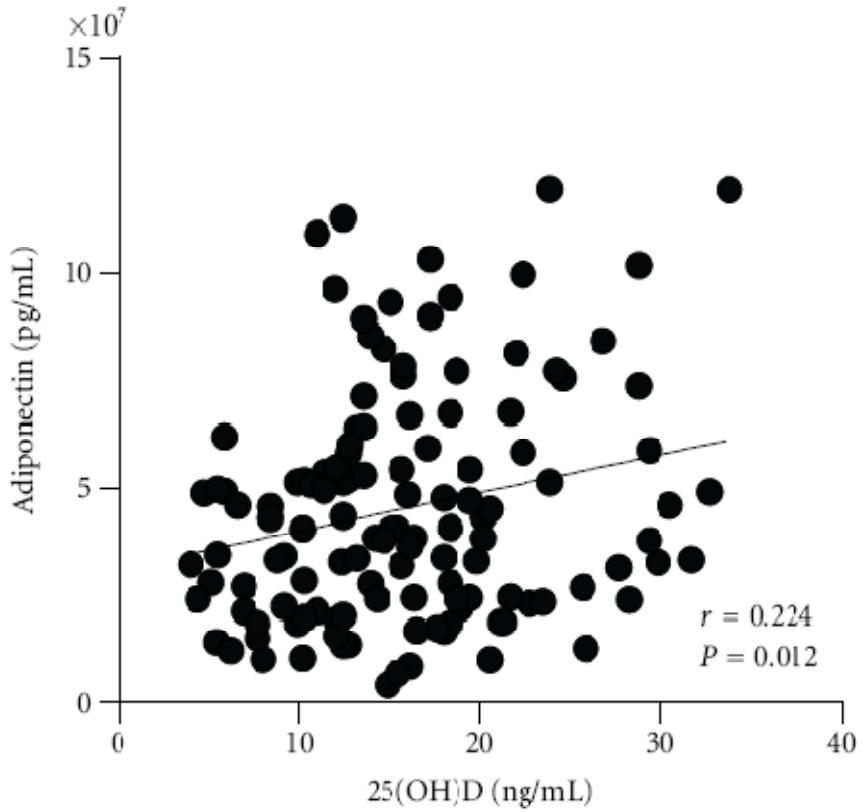
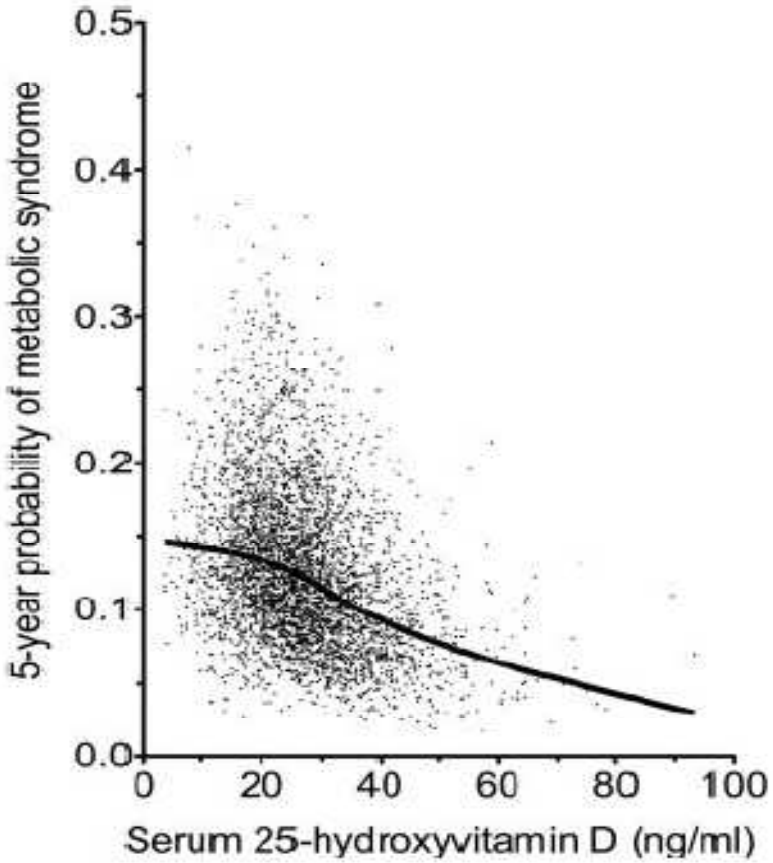


Hindawi Publishing Corporation
Journal of Obesity
Volume 2011, Article ID 495101, 7 pages
doi:10.1155/2011/495101

J Clin Endocrin Metab. First published ahead of print March 22, 2012 as doi:10.1210/jc.2011-3187

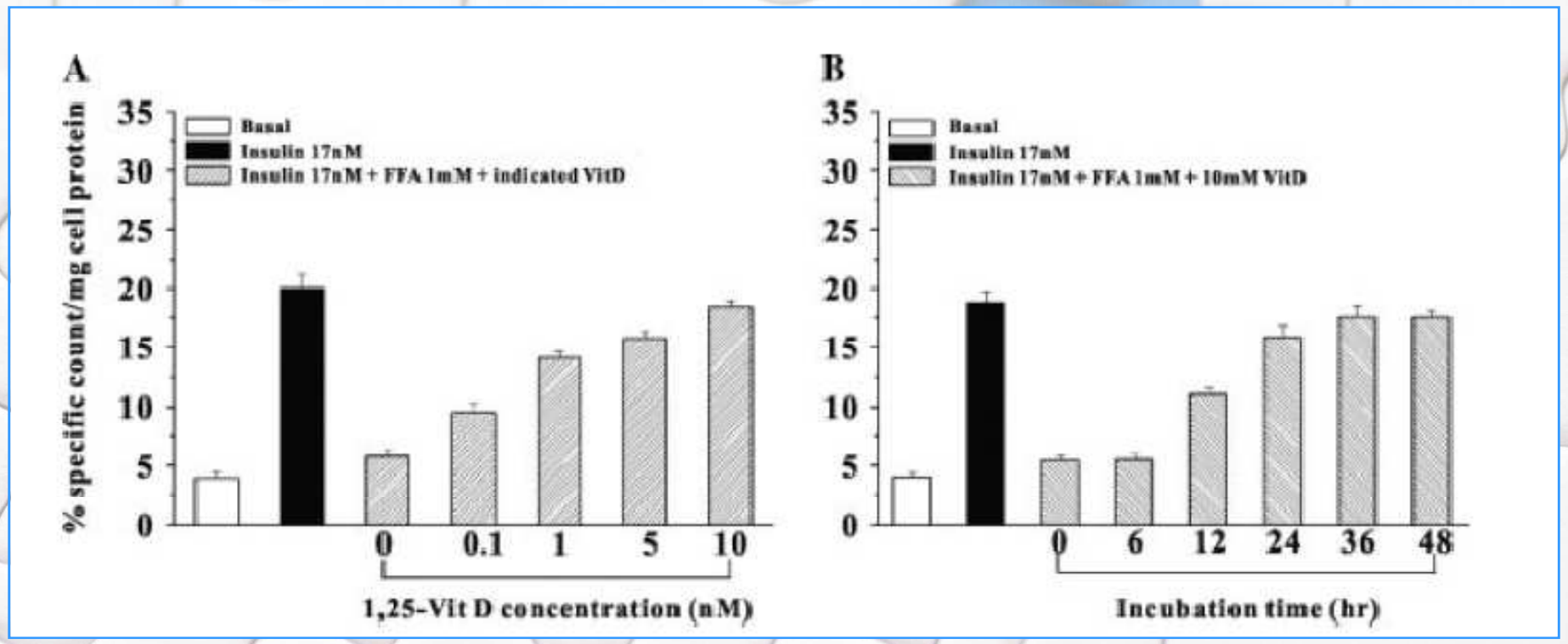
Low Serum 25-Hydroxyvitamin D Is Associated with Increased Risk of the Development of the Metabolic Syndrome at Five Years: Results from a National, Population-Based Prospective Study (The Australian Diabetes, Obesity and Lifestyle Study: AusDiab)

Livelli di 25(OH) Vit D e rischio di Sindrome Metabolica dopo 5 anni



Diabetes Metab Res Rev 2008; **24**: 459–464.

1,25-Dihydroxyvitamin D improved the free fatty-acid-induced insulin resistance in cultured C2C12 cells



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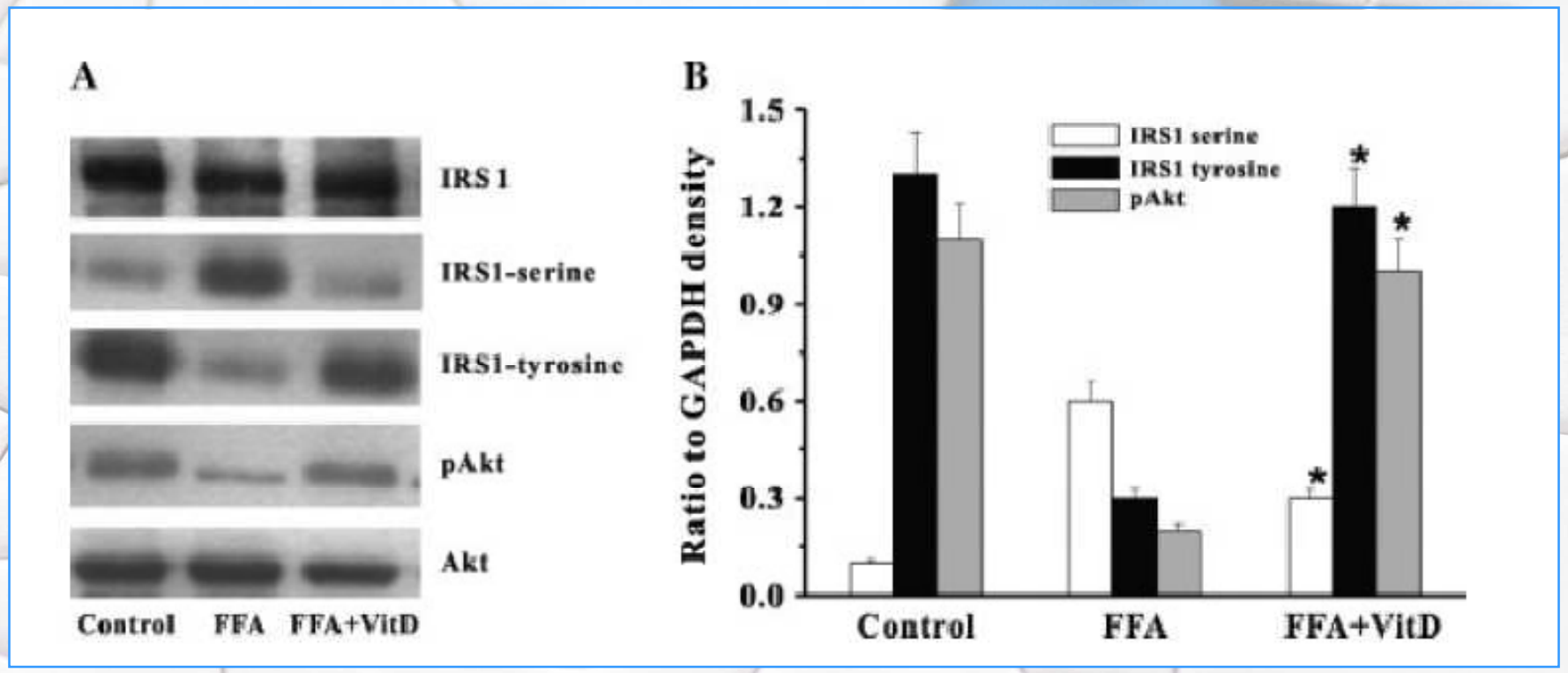

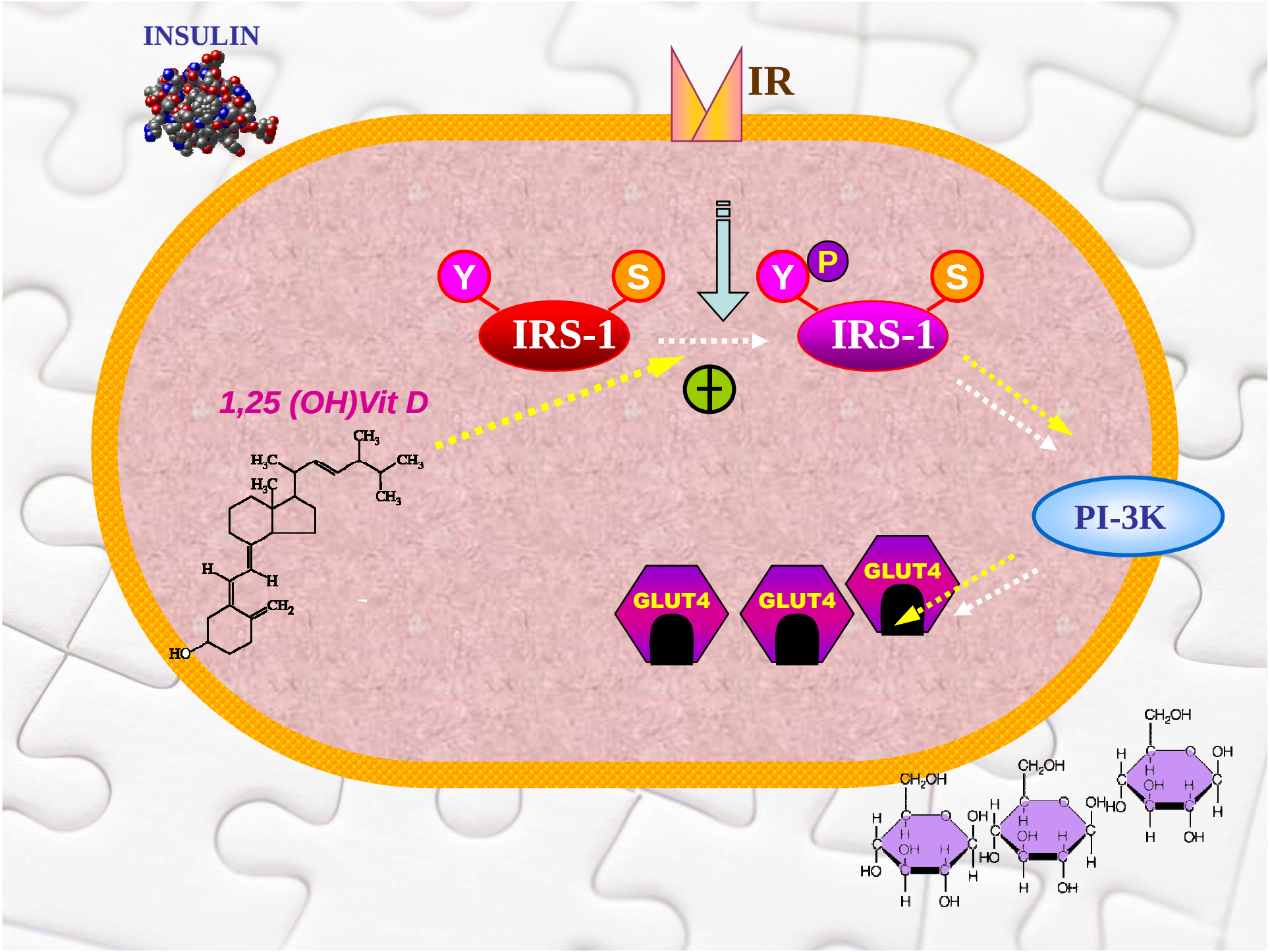
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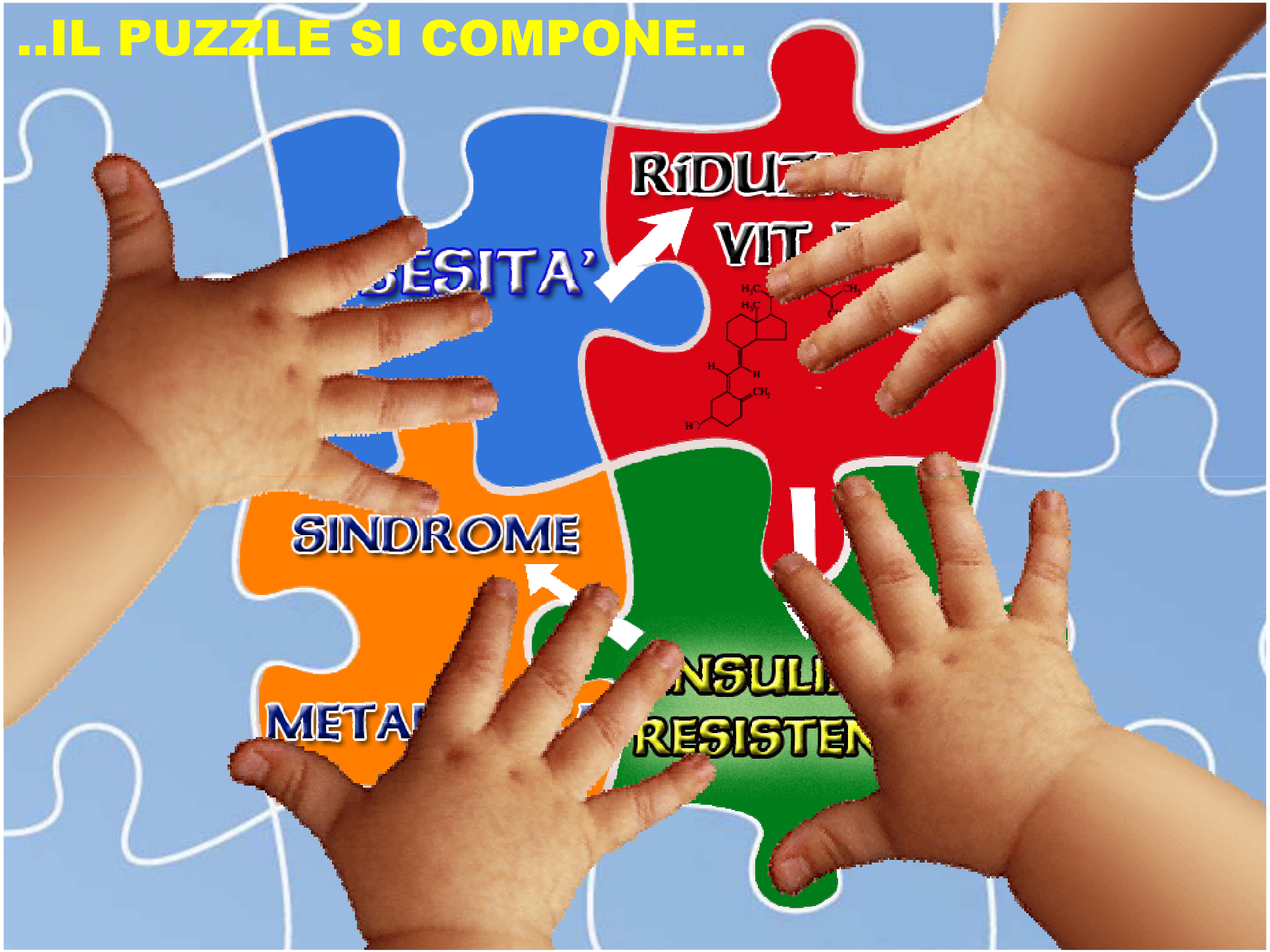
GLUT4
GLUT4

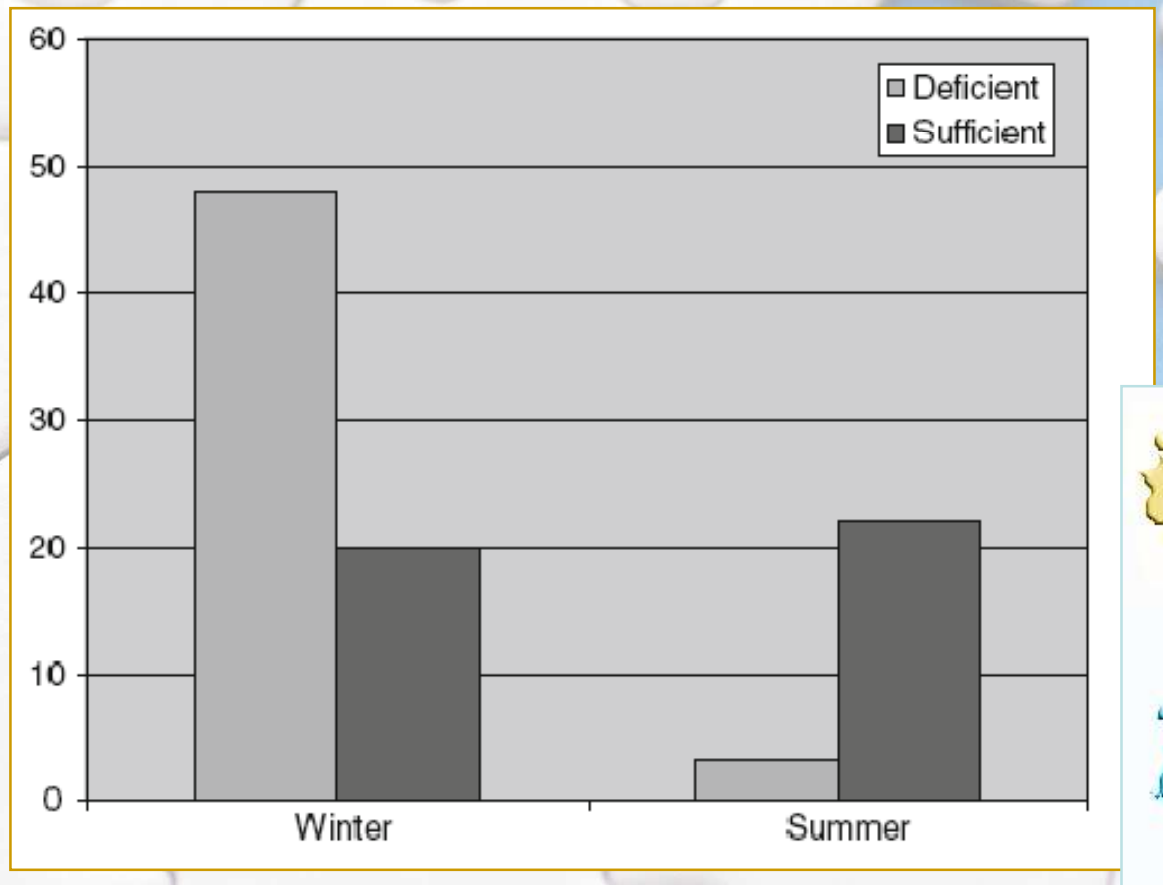
..IL PUZZLE SI COMPONE...



Eur J Nutr (2012) 51:143–149

Is vitamin D status known among children living in Northern Italy?

Livelli di 25(OH) Vit D in Inverno (Nov-Mag) e in Estate (Giu- Ott)



Eur J Nutr (2012) 51:143–149

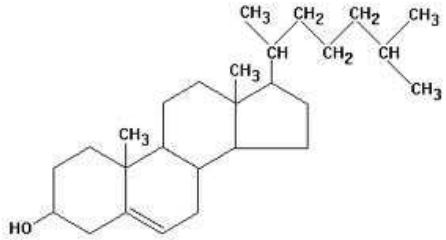
Is vitamin D status known among children living in Northern Italy?

Variabili correlate ai livelli di 25(OH) Vit D

	OR	95% CI		*p*-value
Children (vs. infants)	0.89	0.22	3.57	0.8769
Adolescents (vs. infants)	4.19	0.62	28.19	0.1405
Non-Caucasian race (vs. caucasian)	35.00	1.34	912.66	0.0326
Non-catholic religion (vs. catholic)	6.12	0.33	113.24	0.2233
Italian (vs. other)	1.05	0.18	6.00	0.9520
Malabsorption (yes vs. no)	1.23	0.20	7.40	0.8212
Obesity (yes vs. no)	39.47	1.17	>999.99	0.0405
Season (November–May)	26.77	4.73	151.52	0.0002

J Clin Endocrinol Metab, January 2011, 96(1):53–58

The 2011 Report on Dietary Reference Intakes for Calcium and Vitamin D from the Institute of Medicine: What Clinicians Need to Know



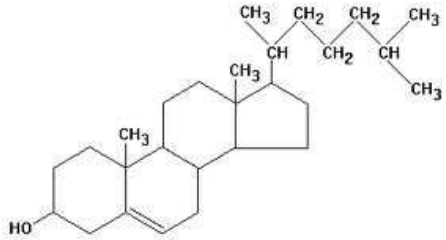
1- Le evidenze scientifiche sono più che sufficienti per supportare un ruolo chiave per il Calcio e la Vitamina D nello stato di salute dell'osso

2- Sono considerati sufficienti per tale scopo concentrazioni plasmatiche di Vitamina D superiori a 20 ng/ml

3- Le evidenze scientifiche sono inconsistenti, non conclusive ed insufficienti per supportare un ruolo specifico della Vitamina D nello stato di salute dell'uomo a prescindere dal metabolismo dell'osso

J Clin Endocrinol Metab, January 2011, 96(1):53–58

The 2011 Report on Dietary Reference Intakes for Calcium and Vitamin D from the Institute of Medicine: What Clinicians Need to Know



Valori di riferimento dell'apporto di Calcio e Vit D in relazione all'età

Life-stage group (age and gender)	Calcium: RDA (mg/d) (intake that covers needs of ≥97.5% of population)	Calcium: UL (mg/d)[a]	Vitamin D: RDA (IU/d) (intake that covers needs of ≥97.5% of population)	Vitamin D: Serum 25OHD level (ng/ml) (corresponding to the RDA)[b]	Vitamin D: UL (IU/d)[a]
1–3 yr (M–F)	700	2500	600	20	2500
4–8 yr (M+F)	1000	2500	600	20	3000
9–13 yr (M+F)	1300	3000	600	20	4000
14–18 yr (M+F)	1300	3000	600	20	4000
19–30 yr (M+F)	1000	2500	600	20	4000
31–50 yr (M+F)	1000	2500	600	20	4000
51–70 yr (M)	1000	2000	600	20	4000
51–70 yr (F)	1200	2000	600	20	4000
71+ yr (M+F)	1200	2000	800	20	4000
Pregnant or lactating (F)					
14–18 yr	1300	3000	600	20	4000
19–50 yr	1000	2500	600	20	4000
Infants					
0–6 months (M+F)	200[c]	1000	400[c]	20	1000
6–12 months (M+F)	260[c]	1500	400[c]	20	1500

Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline

J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

1- Individuazione di categorie a rischio di deficit di Vitamina D a cui si consiglia di effettuare il dosaggio di tale vitamina. Tra queste categorie anche quella degli obesi, sia adulti che bambini

2- Livelli ottimali di vitamina D superiori a 30 ng/ml. Ciò per evitare potenziali effetti negativi sulla salute non ossea legati alla Insufficienza di Vitamina D (Valori compresi tra 20 e 30 ng/ml)

3- Le categorie a rischio, e quindi anche gli obesi, sia adulti che bambini, devono avere un intake di Vitamina D doppio rispetto a quello raccomandato per il loro gruppo di età

4- Non è raccomandata la supplementazione di Vitamina D oltre quella usualmente raccomandata con lo scopo di prevenire o curare potenziali effetti negativi non ossei della deficienza o insufficienza di Vitamina D

J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline

Indicazioni al dosaggio dei livelli ematici di 25(OH) Vit D

- Rickets
- Osteomalacia
- Osteoporosis
- Chronic kidney disease
- Hepatic failure
- Malabsorption syndromes
  - Cystic fibrosis
  - Inflammatory bowel disease
  - Crohn's disease
  - Bariatric surgery
  - Radiation enteritis
- Hyperparathyroidism
- Medications
  - Antiseizure medications
  - Glucocorticoids
  - AIDS medications
  - Antifungals, *e.g.* ketoconazole
  - Cholestyramine
- African-American and Hispanic children and adults
- Pregnant and lactating women
- Older adults with history of falls
- Older adults with history of nontraumatic fractures
- Obese children and adults (BMI > 30 kg/m^2)
- Granuloma-forming disorders
  - Sarcoidosis
  - Tuberculosis
  - Histoplasmosis
  - Coccidiomycosis
  - Berylliosis
- Some lymphomas

IOM Committee Members Respond to Endocrine Society Vitamin D Guideline

J Clin Endocrin Metab. First published ahead of print March 22, 2012 as doi:10.1210/jc.2011-2218

1- Per la salute dell'osso è sufficiente una concentrazione di Vitamina D superiore a 20 ng/ml. Non vi è alcuna evidenza che arrivare a 30 ng/ml possa migliorare o prevenire patologie non legate al metabolismo dell'osso

2- No alla supplementazione degli Obesi, sia adulti che bambini in misura maggiore rispetto ai non obesi perchè non esiste alcuna prova conclusiva che ciò migliori il metabolismo dell'osso in tali pazienti e tanto meno altre patologie

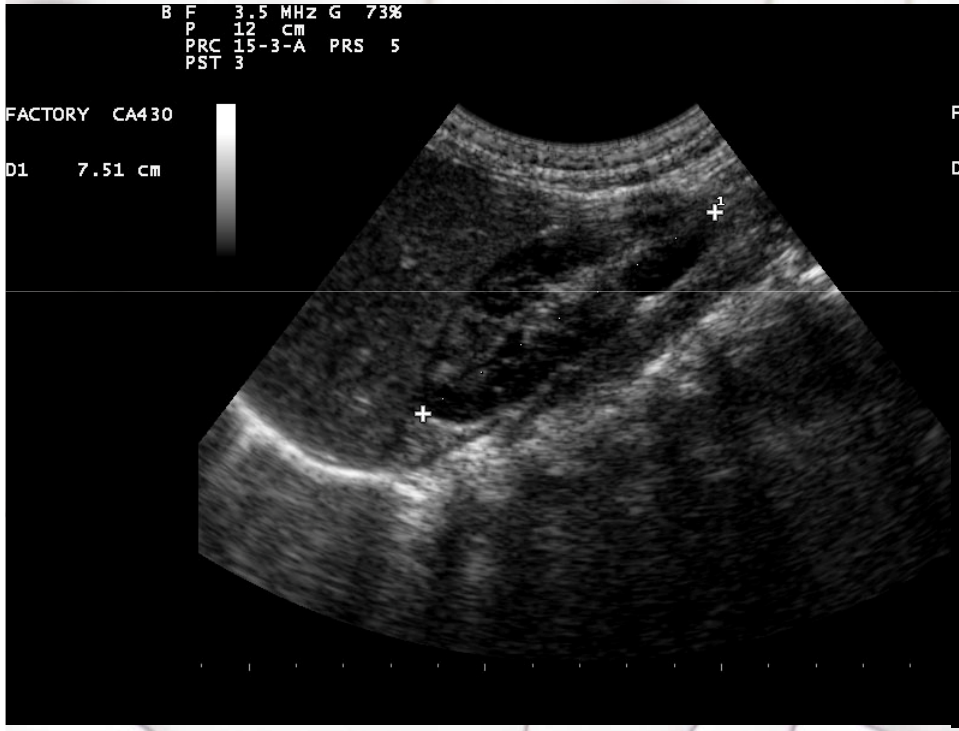
J Clin Endocrin Metab. First published ahead of print March 22, 2012 as doi:10.1210/jc.2011-2601

Guidelines for Preventing and Treating Vitamin D Deficiency and Insufficiency Revisited

1- Vengono fornite ulteriori prove a favore del fatto che la concentrazione ottimale di Vitamina D per la salute dell'osso deve essere superiore a 30 ng/ml

2- Si attendono studi addizionali tuttora in corso, randomizzati e controllati per ampliare lo spettro dell'utilizzo della Vitamina D

Un caso d’intossicazione da vit D



Un caso d'intossicazione da vit D

Test	Risultat	Unità	Valori normali
ALBUMINA	4.92	g/dl	(3.8- 5.4)
UREA	69 H	mg/dl	(8- 45)
GLUCOSIO	81	mg/dl	(70- 115)
CREATININA	0.49 H	mg/dl	(0.15- 0.42)
ACIDO URICO	7.8 H	mg/dl	(3.4- 7.0)
PROTEINE TOTALI	7.1	g/dl	(6.6- 8.7)
COLESTEROLO	125	mg/dl	(50- 220)
TRIGLICERIDI	143	mg/dl	(50- 200)
FOSFATASI ALCALINA	130	U/l	(30- 449)
AST / GOT	41 H	U/l	(0- 37)
ALT / GPT	27	U/l	(0- 41)
Y-GT	18	U/l	(8- 60)
CPK	28 L	U/l	(60- 190)
LDH	440	U/l	(230- 850)
COLINESTERASI II	10722	U/l	(5320- 12920)
AMILASI TOTALE	26 L	U/l	(28- 100)
BILIRUBINA TOTALE	0.28	mg/dl	(0.00- 1.00)
BILIRUBINA DIRETTA	0.08	mg/dl	(0.00- 0.30)
BILIRUBINA INDIRETTA	0.20	mg/dL	(0.00- 0.75)
SODIO	142	mEq/l	(135- 146)
POTASSIO	4.62	mEq/l	(3.50- 5.0)
CLORO	102	mEq/l	(98- 110)
CALCIO	18.67 H	mg/dl	(9.0- 11.0)
MAGNESIO	2.8 H	mg/dl	(1.58- 2.55)
FOSFORO	5.8	mg/dl	(4.0- 7.0)
SIDEREMIA	35 L	µg/dl	(59- 158)
FERRITINA	119	µg/l	(20- 200)

Valori Gas Ematici		
? pH	7,342	
pCO_2	40,2	mmHg
pO_2	39,2	mmHg
Valori Ossimetrici		
ctHb	11,1	g/dL
sO_2	70,2	%
FO_2Hb	68,6	%
FCOHb	1,2	%
FHHb	29,1	%
FMetHb	1,1	%
Valori Elettroliti		
cK^+	3,7	meq/L
↓ cNa^+	134	meq/L
↑ cCa^{2+}	6,03	mg/dL
↓ cCl	96	meq/L
Valori Metaboliti		
cGlu	81	mg/dL
cLac	23	mg/dL
Valori Corretti con la Temperatura		
? pH(T)	7,342	
$pCO_2(T)$	40,2	mmHg
$pO_2(T)$	39,2	mmHg
Stato di Ossigenazione		
ctO_{2c}	10,7	Vol%
? $p50_c$	28,69	mmHg
Stato Acido Base		
? $cBase(Ecf)_c$	-3,6	mmol/L
? $cHCO_3^-(P,st)_c$	20,9	mmol/L

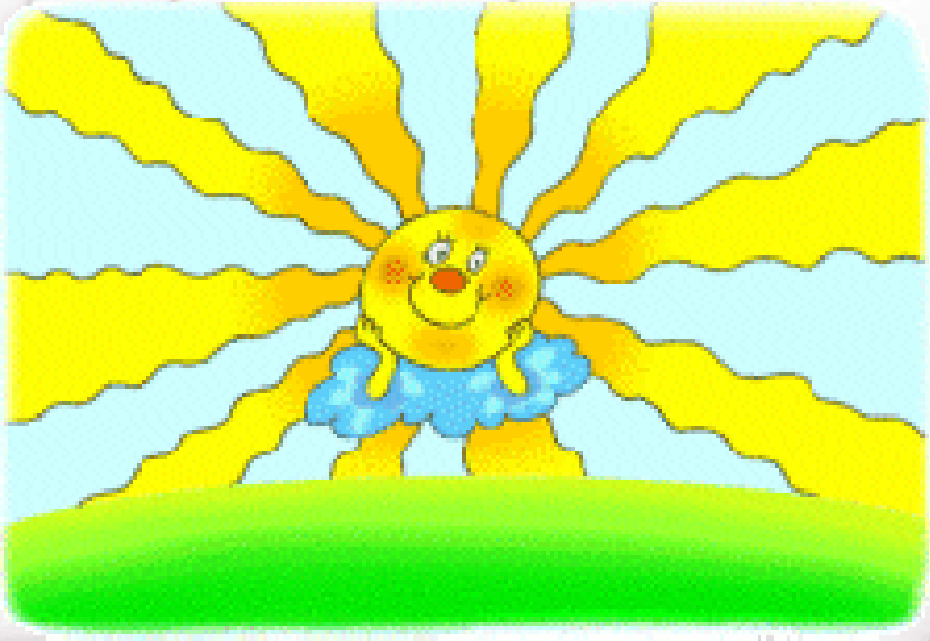
Un caso d’intossicazione da vit D

Un caso d’intossicazione da vit D

Concentrazione plasmatica di Vit D: > 200 ng/ml

Totale Vit D somministrata: 4.000.000 IU

GRAZIE PER L'ATTENZIONE!



J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline

Fonti di Vit D_2 e Vit D_3

Cod liver oil	~400–1,000 IU/teaspoon vitamin D_3
Salmon, fresh wild caught	~600–1,000 IU/3.5 oz vitamin D_3
Salmon, fresh farmed	~100–250 IU/3.5 oz vitamin D_3, vitamin D_2
Salmon, canned	~300–600 IU/3.5 oz vitamin D_3
Sardines, canned	~300 IU/3.5 oz vitamin D_3
Mackerel, canned	~250 IU/3.5 oz vitamin D_3
Tuna, canned	236 IU/3.5 oz vitamin D_3
Shiitake mushrooms, fresh	~100 IU/3.5 oz vitamin D_2
Shiitake mushrooms, sun-dried	~1,600 IU/3.5 oz vitamin D_2
Egg yolk	~20 IU/yolk vitamin D_3 or D_2
Sunlight/UVB radiation	~20,000 IU equivalent to exposure to 1 minimal erythemal dose (MED) in a bathing suit. Thus, exposure of arms and legs to 0.5 MED is equivalent to ingesting ~3,000 IU vitamin D_3.
Fortified foods	
Fortified milk	100 IU/8 oz, usually vitamin D_3
Fortified orange juice	100 IU/8 oz vitamin D_3
Infant formulas	100 IU/8 oz vitamin D_3
Fortified yogurts	100 IU/8 oz, usually vitamin D_3
Fortified butter	56 IU/3.5 oz, usually vitamin D_3
Fortified margarine	429 IU/3.5 oz, usually vitamin D_3
Fortified cheeses	100 IU/3 oz, usually vitamin D_3
Fortified breakfast cereals	~100 IU/serving, usually vitamin D_3
Pharmaceutical sources in the United States	
Vitamin D_2 (ergocalciferol)	50,000 IU/capsule
Drisdol (vitamin D_2) liquid	8,000 IU/cc
Supplemental sources	
Multivitamin	400, 500, 1,000 IU vitamin D_3 or vitamin D_2
Vitamin D_3	400, 800, 1,000, 2,000, 5,000, 10,000, and 50,000 IU