Vitamin D u šećernoj bolesti

Davorka Herman Mahečić

KBC Sestre milosrdnice

fashion

/ˈfaʃ(ə)n/

noun

1. a popular or the latest style of clothing, hair, decoration, or behaviour.
   "the latest Parisian fashions"
   sinonimi: vogue, trend, craze, rage, mania, mode, fad, fancy, passing fancy; Više
2. a manner of doing something.
   "the work is done in a rather casual fashion"
   sinonimi: manner, way, style, method, mode; Više

verb

make into a particular form.
"the bottles were fashioned from green glass"
sinonimi: construct, build, manufacture, make, create, fabricate, contrive; Više

Google

vitamin D

Sve | Slike | Videozapisi | Karte | Knjige | Više | Postavke | Alati

Oko 606.000.000 rezultata (0,30 sek)

Vitamin D | Super Cijena, Brza Dostava | ShopBuilder E-trgovina

Oglas www.shopbuilder.hr/Vitamin_D3/protein-buzz ▾ 01 7757 017

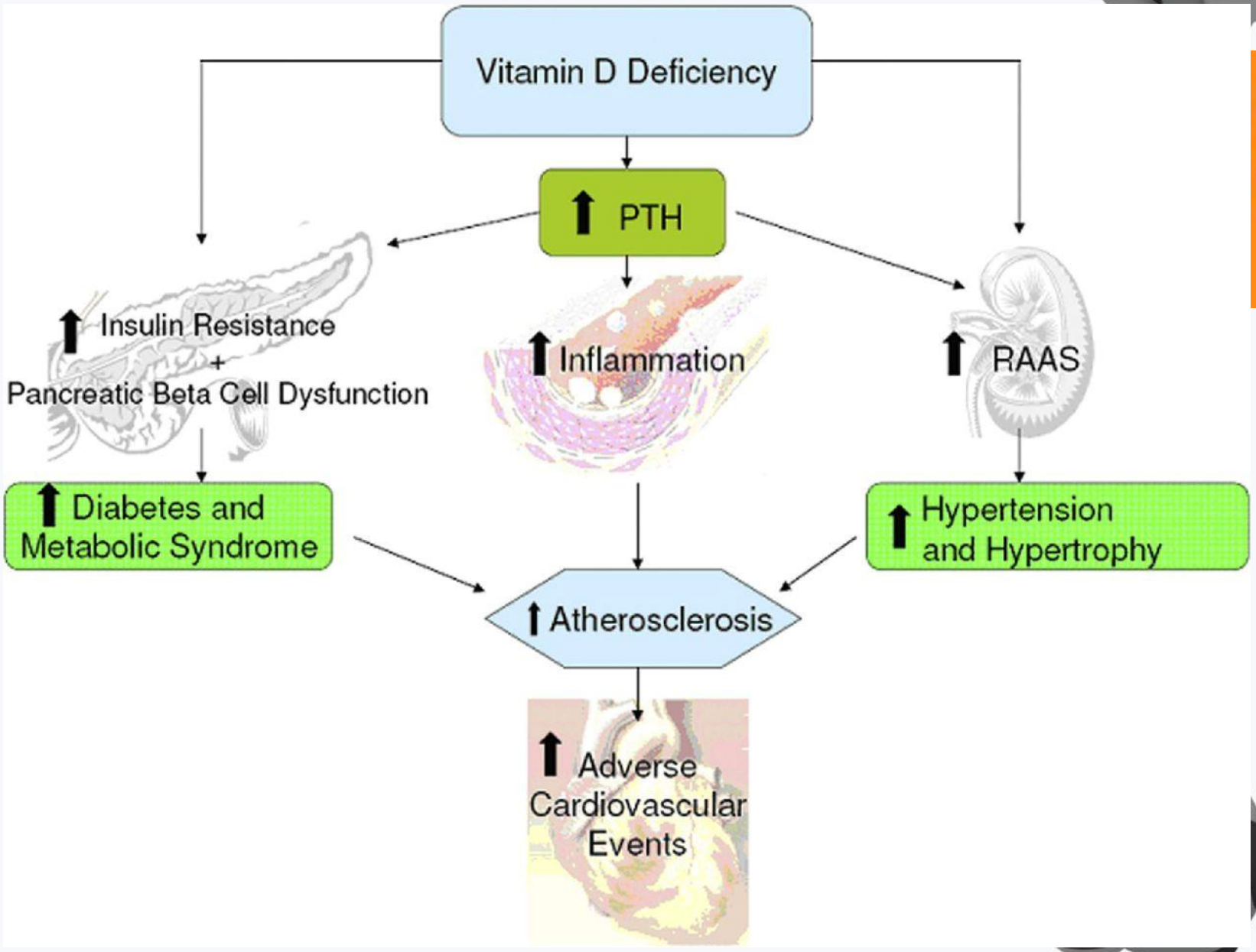
Široki izbor dodataka prehrani za bodybuilding. Povoljna cijena, brza isporuka! **Vitamin** D3 snažan je suplement u oblikovanju tijela. Naruči s brzom dostavom! Čak besplatna dostava. Odlična cijena. BioTech USA akcija. Velik BioTech izbor. Puno proteina. Outlet suplemenata.

Novi suplementi · Scitec Nutrition akcija · Akcijska ponuda proteina · Builder Članci

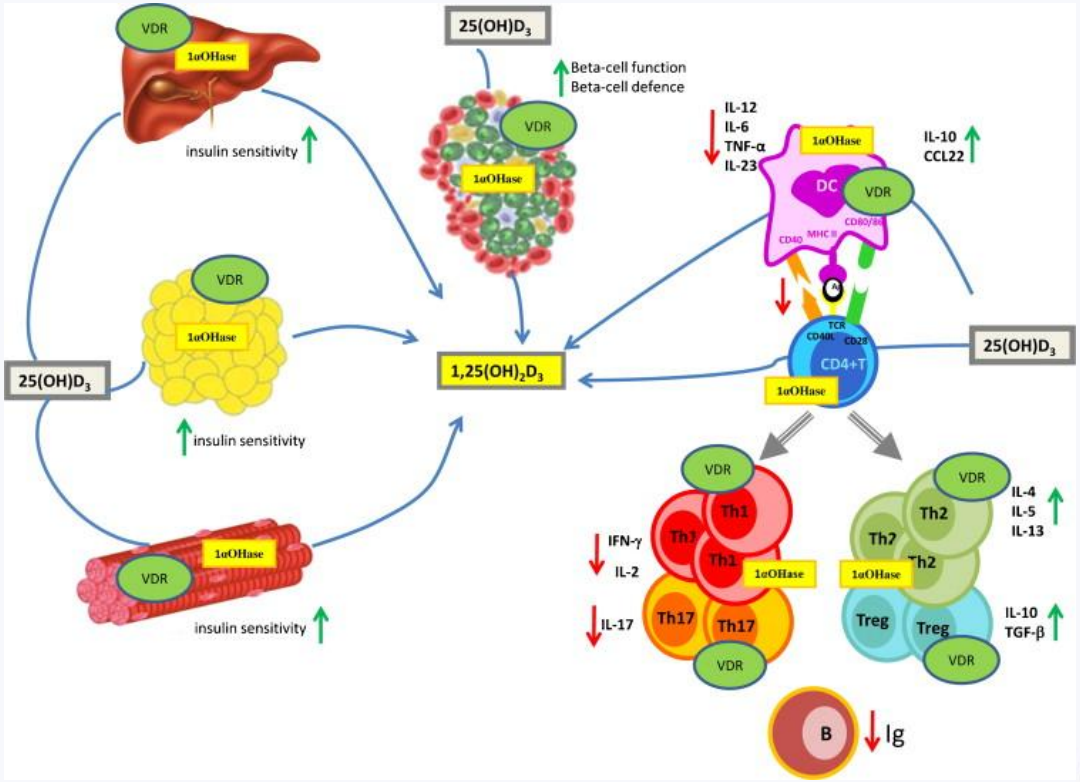
Vitamin D – zaštitnik od bolesti civilizacije - Ordinacija.hr

ordinacija.vecernji.hr › zdravlje › preventiva › vitamin-d-zastitnik-od-bole... ▾

16. lip 2015. - **Vitamin D** (ili od milja zvan "sunčev vitamin") uzimaju i djeca i starije osobe, jer je dobar za kosti; međutim, to nije sve što trebate znati o njemu!


Vitamin D Deficiency
PTH
Insulin Resistance
+
Pancreatic Beta Cell Dysfunction
Inflammation
RAAS
Diabetes and Metabolic Syndrome
Hypertension and Hypertrophy
Atherosclerosis
Adverse Cardiovascular Events

Utjecaj na inzulinsku senzitivnost i IR



Mit ili zbilja?
Kliničke implikacije?

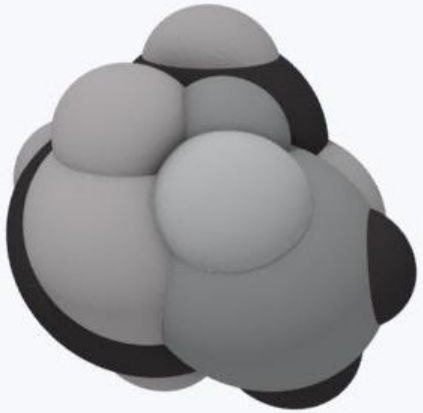
Vitamin D i dijabetes - pandemije

- Dijabetičari imaju niži D vitamin
- Hipovitaminoza D kao moguć čimbenik rizika za razvoj dbt

→ nadomjesna terapija kao mjera prevencije???

→ nadomjesna terapija kao mjera liječenja???

- Hipovitaminoza D = dokazana promjena na razini beta stanice i u IR
- Opservacijske studije obećavajući rezultati



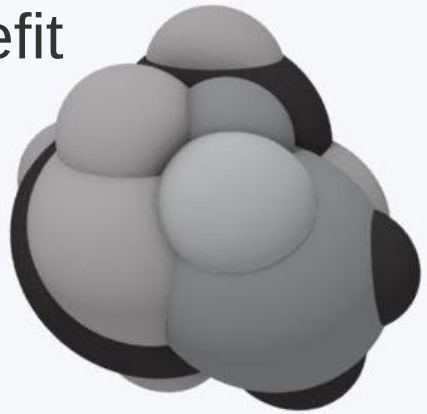
↓ D vitamin

Razvoj dijabetesa
Kontrola dijabetesa
Inzulinska senzitivnost
Inzulinska rezistencija

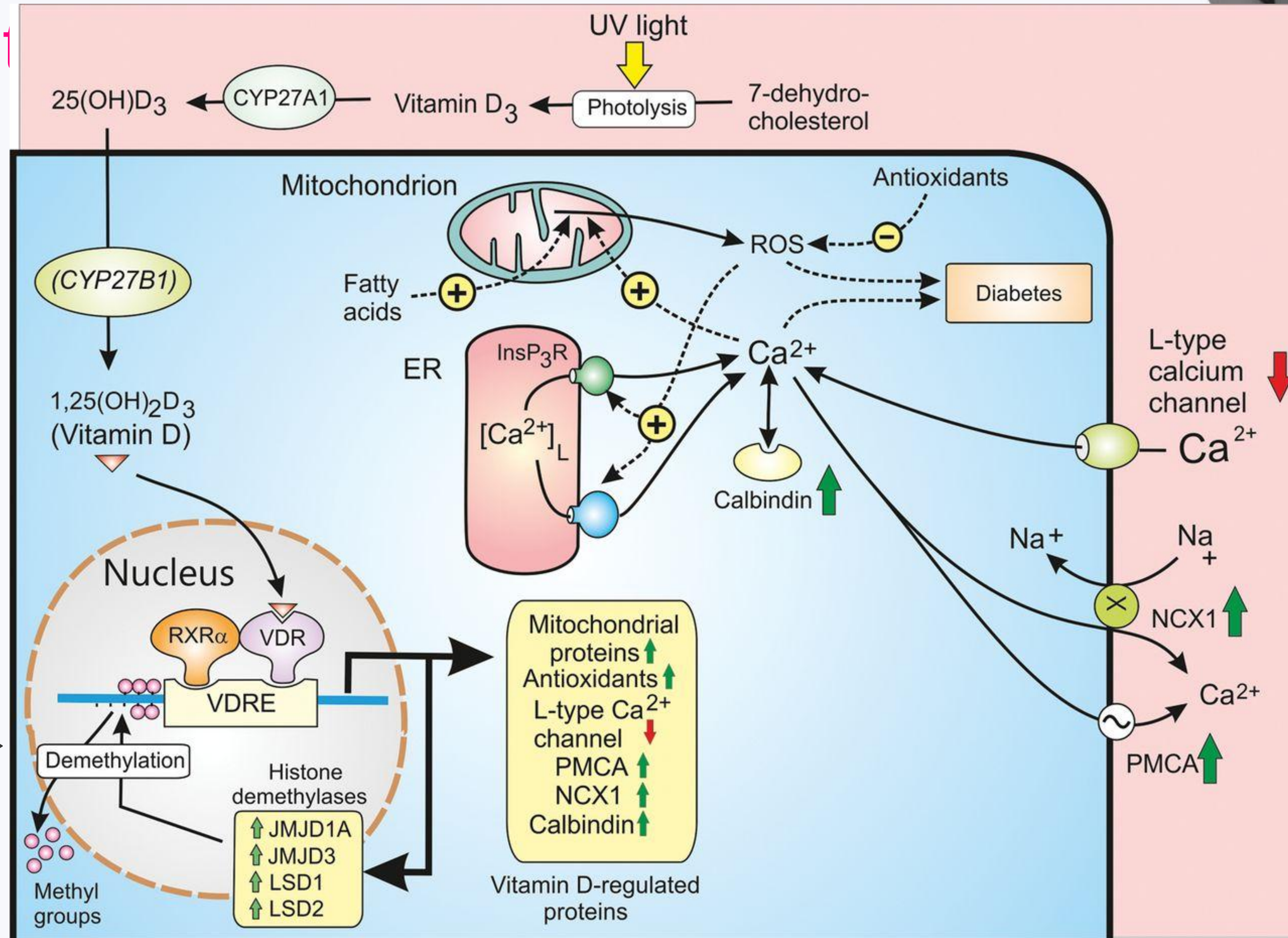
Potencijalni mehanizmi kod hipovitaminoze D

- Smanjena produkcija inzulina
  - Direktno i indirektno preko kalcija
- Smanjena ekspresija inzulinskog receptora
- Utjecaj na sustavnu upalu
- Receptori za D vitamin na beta stanici?
- Aktivacija PPAR-δ?

→ brojne opservacijske studije „*dokazale*” benefit



Pot D



UV light
Photolysis
7-dehydro-cholesterol
Vitamin D_3
CYP27A1
$25(OH)D_3$
(CYP27B1)
$1,25(OH)_2D_3$
(Vitamin D)
Mitochondrion
Antioxidants
ROS
Fatty acids
Diabetes
ER
$InsP_3R$
$[Ca^{2+}]_L$
Ca^{2+}
L-type calcium channel
Ca^{2+}
Calbindin
Na^+
Na^+
NCX1
Ca^{2+}
PMCA
Nucleus
RXRα
VDR
VDRE
Demethylation
Methyl groups
Histone demethylases
JMJD1A
JMJD3
LSD1
LSD2
Mitochondrial proteins
Antioxidants
L-type Ca^{2+} channel
PMCA
NCX1
Calbindin
Vitamin D-regulated proteins

na

→

Opservacijske studije

Table 1
Prospective (longitudinal) observational cohort studies of vitamin D status and diabetes.

Study, year (reference) cohort [country]	Gender, mean baseline age (range), y	Vitamin D measure; comparison[a]	Mean follow-up, y	Results, adjusted RR, OR, or HR (95% CI)	Ascertainment method of diabetes	Adjustments
Type 1 diabetes						
Hypponen et al., 2001 [11] [Finland]		Vitamin D supplementation during infancy; "regular" vs. "none"	14	0.12 (0.03, 0.51)	Central drug national registry	Neonatal, anthropometric and social
Type 2 diabetes						
Liu et al., 2005 [16] Women's Health Study [US]	Women, 52 (45–75)	Vitamin D intake (total); ≥511 IU/d vs. ≤159 IU/d	9	0.73 (0.54, 0.99)	Validated self-report	Age
Pittas et al., 2006 [17] Nurses Health Study [US]	Women, 46 (30–55)	Vitamin D intake (total); >800 IU/d vs. ≤200 IU/d	20	0.87 (0.69, 1.09)	Validated self-report	Age, BMI, exercise, residence, family history of diabetes, hypertension, calcium intake, smoking, alcohol, coffee, other dietary factors
Knekt et al., 2008 [18] Finnish Mobile Clinic Health Examination Survey [Finland]	Men, ND (40–74)	25(OH)D; 75 nmol/L vs. 25 nmol/L	9	0.49 (0.15, 1.64)	Medication-treated, registry-based	Age, BMI, exercise, season, residence, smoking, education, medications
	Women, ND (40–74)	25(OH)D; 61 nmol/L vs. 22 nmol/L		0.91 (0.37, 2.23)		
Knekt et al., 2008 [18] Mini-Finland Health Survey [Finland]	Men, 53 (40–69)	25(OH)D; 75 nmol/L vs. 22 nmol/L	9	0.17 (0.05, 0.52)	Medication-treated, registry-based	Age, BMI, exercise, season, residence, smoking, education, medications
	Women, 53 (40–69)	25(OH)D; 61 nmol/L vs. 20 nmol/L		1.45 (0.58, 3.62)		

Only studies where the predictor (vitamin D status) was assessed prior to the outcome (type 1 or type 2 diabetes) are included. 25(OH)D, serum or plasma 25-hydroxyvitamin D; BMI, body mass index; HR, hazard ratio; IU, international units; ND, no data; OR, odds ratio; RR, relative risk. To convert 25(OH)D concentration from nmol/L to ng/mL divide by 2.459.

[a] Highest/lowest risk category vs. reference category.

Pittas AG et al: Vitamin D and diabetes. Journal of Steroid Biochemistry & Molecular Biology 121 (2010) 425–429

Na početku bijaše randomizirana studija...

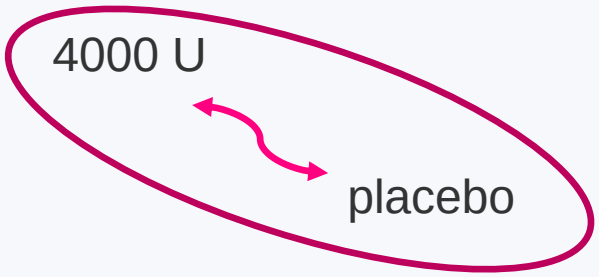
Preddijabetes

- Randomizirana, dvostruko slijepa, plecebom kontrolirana prospektivna studija
- Glikemija NT 5,6 – 6,9 mmol/l

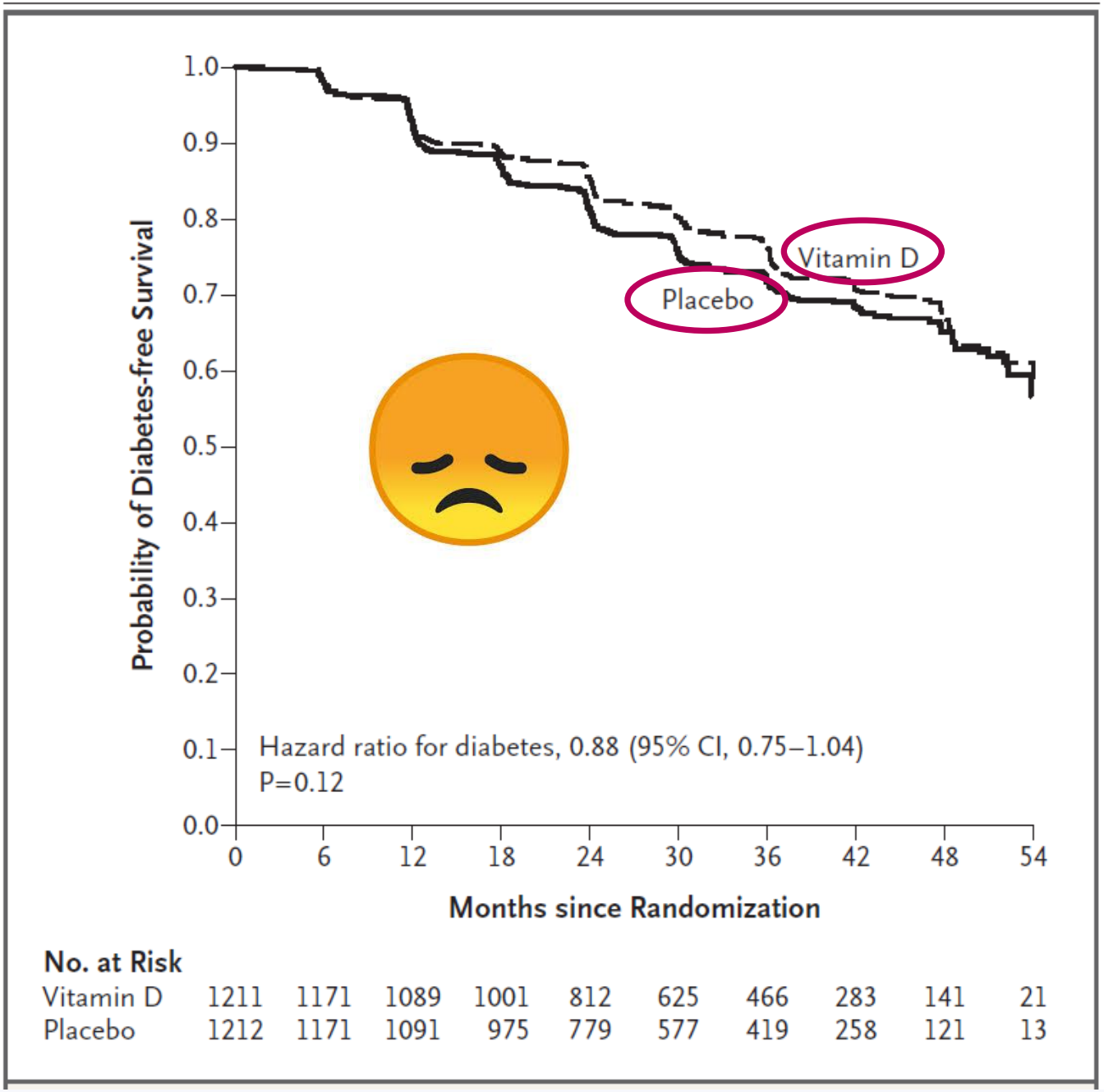
  oGTT – 7,8 – 11,0 mmol/l

  HbA1c 5,7-6,3%

2 od 3



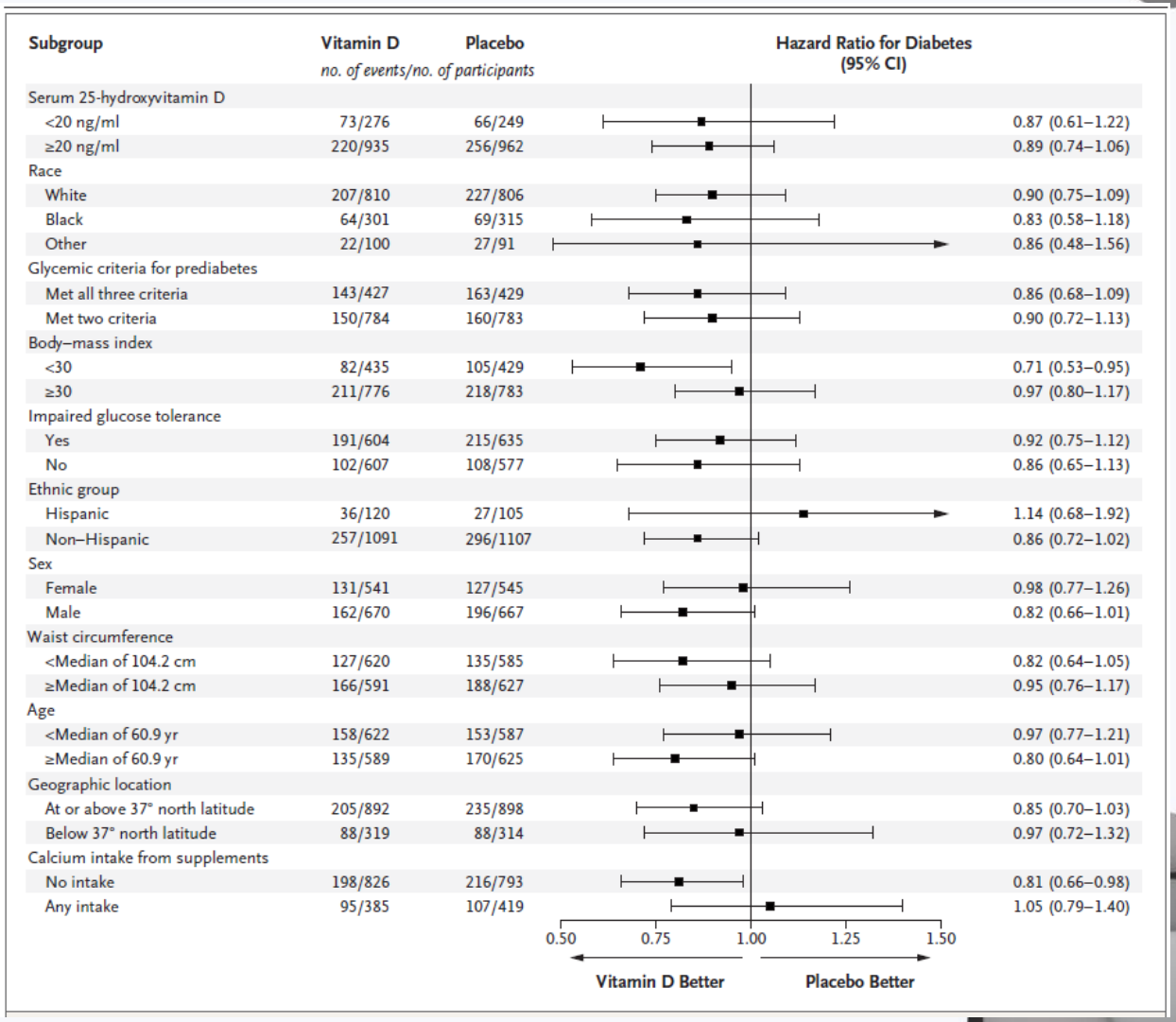
Pittas AG et al: Vitamin D Supplementation and Prevention of Type 2 Diabetes. N Engl J Med 2019; 381:520-530



n kontrolirana

00 U

placebo



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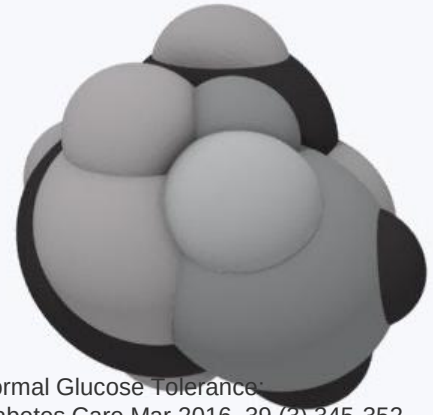
Tip 1 dijabetesa

- Povezanost niskog D vitamina i dijabetesa
- hipoteza o nadmorskoj visini i sezoni trudnoće, odnosno poroda
- Smanjen unos D vitamina u trudnoći i laktaciji?
- ne postoji randomizirana studija

- Studija na 70 pacijenata s T1DM
  - povećano rezidualno tkivo beta stanice, ali bez učinka na HbA1c

Pittas AG et al: Vitamin D and diabetes. Journal of Steroid Biochemistry & Molecular Biology 121 (2010) 425–429
Pitocco D et al:. The effects of calcitriol and nicotinamide on residual pancreatic beta-cell function in patients with recent-onset Type 1 diabetes (IMDIAB XI) Diabet Med. 2006;23(8):920–923

- Preddijabetes, intolerancija, povišena glikemija natašte
- Bez terapije
- 30 000 U jednom tjedno, kroz 8 tjedana
- Hiperglikemijski klampovi
  - Prva faza sekrecije inzulina
  - Druga faza sekrecije inzulina
  - Inzulinska senzitivnost
  - Disposition idex (DI
  - oGTT
  - HbA1c i glikemija natašte
  - lipidogram

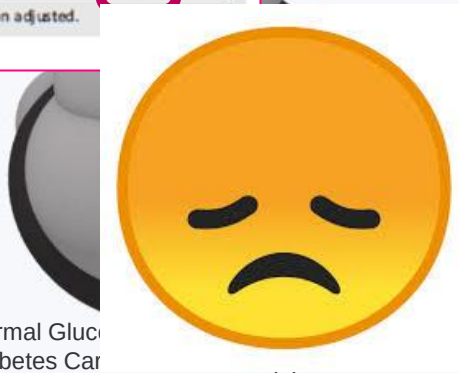


No Effect of High-Dose Vitamin D Treatment on β-Cell Function, Insulin Sensitivity, or Glucose Homeostasis in Subjects With Abnormal Glucose Tolerance: A Randomized Clinical Trial. Henrik Wagner, Michael Alvarsson, Buster Mannheimer, Marie Degerblad, Claes-Göran Östenson Diabetes Care Mar 2016, 39 (3) 345-352

Table 2—Effects of intervention

	Vitamin D			Placebo			Between-group effect
	Baseline	Δ study end	*P**	Baseline	Δ study end	*P**	*P*†
BMI (kg/m^2)	28.3 (24.5–29.4)	−0.1 (−0.4 to 0.4)	0.63	28.6 (26.4–29.9)	0.0 (−0.1 to 0.3)	0.28	0.39
Waist (cm)	100 (94–106)	0.0 (−1 to 2)	0.92	101 (95–112)	0.0 (−1 to 1)	0.44	0.88
Fat mass (%)	30.0 (22.4–41.1)	+0.6 (−0.3 to 1.9)	0.03	33.0 (29.2–37.0)	−0.4 (−0.9 to 0.6)	0.49	0.047
Fat-free mass (kg)	58.6 (45.8–68.7)	−0.6 (−1.4 to 0.2)	0.03	54.5 (44.0–67.3)	+0.3 (−0.8 to 1.2)	0.28	0.02
HbA_{1c} (%) HbA_{1c} (mmol/mol)	6.1 (5.6–6.2) 43 (38–44)	−0.1 (−0.3 to 0.1) −1 (−3 to 1)	0.06	6.2 (6.0–6.4) 44 (42–46)	−0.1 (−0.3 to 0.1) −1 (−3 to 1)	0.11	0.84
Fasting p-glucose (mmol/L)	6.3 (5.5–6.6)	−0.1 (−0.5 to 0.4)	0.58	6.3 (6.1–6.6)	0.0 (−0.3 to 0.4)	0.94	0.78
2-h p-glucose OGTT (mmol/L)	9.3 (7.1–9.7)	−0.5 (−1.4 to 1.0)	0.96	9.7 (8.2–10.3)	−0.9 (−1.5 to 1.8)	0.95	0.62
P-glucose OGTT‡ (mmol · L^{-1} · min)	386 (237–440)	−36 (−125 to 132)	0.88	410 (309–442)	−9 (−131 to 81)	0.43	0.69
n glycemic tolerance category (better/worse/unchanged)		6/4/11			5/2/15		0.74§
25(OH)D (nmol/L)	42 (35–55)	+41 (27–50)	<0.001	47 (42–53)	−1 (−3 to 5)	0.90	<0.001
25(OH)D (nmol/L) adjusted#	43 (36–50)	+42 (32–50)	<0.001	43 (37–54)	0.0 (−7 to 11)	0.53	<0.001
Free calcium (mmol/L)	1.22 (1.19–1.25)	0.0 (−0.01 to 0.01)	0.52	1.23 (1.21–1.24)	−0.01 (−0.02 to 0.00)	0.047	0.10
PTH (ng/L)	62 (50–72)	−8 (−18 to −2)	0.001	55 (42–63)	−3 (−8 to 0.0)	0.25	0.07
Triglycerides (mmol/L)	1.3 (0.9–1.6)	+0.1 (0.0–0.2)	0.16	1.4 (1.0–2.2)	−0.2 (−0.5 to 0.1)	0.06	0.02
Cholesterol (mmol/L)	5.0 (4.4–5.7)	−0.1 (−0.5 to 0.1)	0.07	5.5 (5.0–5.7)	−0.4 (−0.8 to 0.0)	0.004	0.14
LDL (mmol/L)	3.0 (2.7–3.8)	−0.1 (−1.0 to 0.5)	0.04	3.5 (3.1–3.8)	−0.2 (−1.4 to 0.7)	0.005	0.74
HDL (mmol/L)	1.3 (1.1–1.6)	0.0 (−0.1 to 0.1)	0.44	1.2 (1.0–1.6)	−0.1 (−0.2 to 0.1)	0.34	0.48
ApoB/ApoA1	0.6 (0.5–0.7)	0.0 (0.0–0.1)	0.27	0.7 (0.5–0.8)	0.0 (0.0–0.1)	0.07	0.69
Step count/day	5,645 (4,277–8,316)	−783 (−1,535 to 640)	0.18	7,099 (4,414–9,376)	−572 (−2,832 to 1,441)	0.37	0.91
$ISec_{0-120}$ (mU · L^{-1} · min)	168 (122–231)	+44 (−3 to 63)	0.06	137 (51–363)	+45 (−5 to 136)	0.02	0.45
$ISec_{120-120}$ (mU · L^{-1} · min)	5,689 (2,865–8,118)	+547 (−1,053 to 960)	0.79	4,509 (3,000–6,508)	+56 (−934 to 1,006)	0.51	0.84
GIR/I (mg · min^{-1} · kg^{-1} · mU^{-1} · L · 100)	6.7 (4.7–11.4)	+0.3 (−0.3 to 1.4)	0.09	5.9 (4.6–9.7)	+0.5 (−0.5 to 1.8)	0.25	0.59
DI_{0-120} (mg · kg^{-1} · 100)	1,449 (986–1,922)	+512 (64–1,082)	0.005	1,113 (389–2,324)	+260 (−7 to 963)	0.006	0.66
$DI_{120-120}$ (mg · kg^{-1} · 100)	34,464 (31,500–42,144)	+4,608 (−2,345 to 12,360)	0.06	29,157 (22,429–40,285)	+4,210 (−4,457 to 12,524)	0.21	0.95

Continuous data are medians (IQR). *Wilcoxon matched-pairs signed rank test. †Mann-Whitney *U* test on relative changes. ‡Area under the curve. §Fisher exact test. #Season adjusted.



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A Randomized Clinical Trial. Henrik Wagner, Michael Alvarsson, Buster Mannheimer, Marie Degerblad, Claes-Göran Östenson Diabetes Car

Meta-analiza

- 35 RCT, 43 407 ispitanika
- Bolesnici s urednom tolerancijom glukoze, intolerancijom i dijabetesom
- Srednja dnevna doza 3332 U
- Praćenje od 4 tjedna do 7 godina (medijan 16 tjedana)

Seida JC, Mitri J, Colmers IN, et al. Clinical review: Effect of vitamin D3 supplementation on improving glucose homeostasis and preventing diabetes: a systematic review and meta-analysis [published correction appears in J Clin Endocrinol Metab. 2015 Aug;100(8):3219]. *J Clin Endocrinol Metab*. 2014;99(10):3551–3560. doi:10.1210/jc.2014-2136

Vitamin D_3 vs no vitamin D_3 za inzulinsku senzitivnost (HOMA–IR).

Study or Subgroup	Vitamin D3 Mean	SD	Total	No Vitamin D3 Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
1.3.1 Normal glucose tolerance								
Ardabili 2012	0.53	2.2	24	-0.061	1.06	26	5.0%	0.59 [-0.38, 1.56]
Carrillo 2013	0.2	1.6	10	-0.2	1.7	13	3.0%	0.40 [-0.96, 1.76]
Grimnes 2011	0.19	1.41	49	0.05	1.2	45	10.0%	0.14 [-0.39, 0.67]
Jorde 2010	0.23	5.29	114	0.36	3.4	112	3.9%	-0.13 [-1.29, 1.03]
Nagpal 2009	0.14	0.9	35	0.16	1	36	11.3%	-0.02 [-0.46, 0.42]
Pittas 2007	0.25	0.79	108	0.25	0.79	114	15.2%	0.00 [-0.21, 0.21]
Wamberg 2013	2.7	1.5	22	2.9	1.3	21	6.1%	-0.20 [-1.04, 0.64]
Wood 2012	1.18	2	81	1.25	1.7	74	9.1%	-0.07 [-0.65, 0.51]
Subtotal (95% CI)			**443**			**441**	**63.7%**	**0.02 [-0.14, 0.18]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.32$, df = 7 (P = 0.94); $I^2 = 0\%$								
Test for overall effect: Z = 0.21 (P = 0.84)								
1.3.2 Prediabetes								
Davidson 2013	2.2	1.5	52	2.4	1.7	47	8.4%	-0.20 [-0.83, 0.43]
de Boer 2008	0.25	3.79	171	0.05	3.5	173	6.8%	0.20 [-0.57, 0.97]
Harris 2012	0.32	2.36	43	-0.06	2.37	46	4.9%	0.38 [-0.60, 1.36]
Pittas 2007	0.05	1.27	45	0.91	2.13	47	7.4%	-0.86 [-1.57, -0.15]
Subtotal (95% CI)			**311**			**313**	**27.6%**	**-0.17 [-0.69, 0.35]**
Heterogeneity: $Tau^2 = 0.13$; $Chi^2 = 5.66$, df = 3 (P = 0.13); $I^2 = 47\%$								
Test for overall effect: Z = 0.64 (P = 0.52)								
1.3.3 Established type 2 diabetes								
Breslavsky 2013	6.1	5.3	19	12.2	22.5	13	0.0%	-6.10 [-18.56, 6.36]
Heshmat 2012	0.2	1.4	21	-0.9	1.6	21	5.5%	1.10 [0.19, 2.01]
Jorde 2009	0.3	23.5	16	-0.2	13.7	16	0.0%	0.50 [-12.83, 13.83]
Nikooyeh 2011	3	1.5	30	5.5	3.7	30	2.8%	-2.50 [-3.93, -1.07]
Parekh 2010	-0.71	5.31	14	0.81	7.17	13	0.3%	-1.52 [-6.31, 3.27]
Witham 2010	0.1	11.2	33	11.7	28.1	20	0.0%	-11.60 [-24.49, 1.29]
Subtotal (95% CI)			**133**			**113**	**8.7%**	**-1.46 [-4.27, 1.34]**
Heterogeneity: $Tau^2 = 5.51$; $Chi^2 = 21.80$, df = 5 (P = 0.0006); $I^2 = 77\%$								
Test for overall effect: Z = 1.02 (P = 0.31)								

Mean Difference IV, Random, 95% CI

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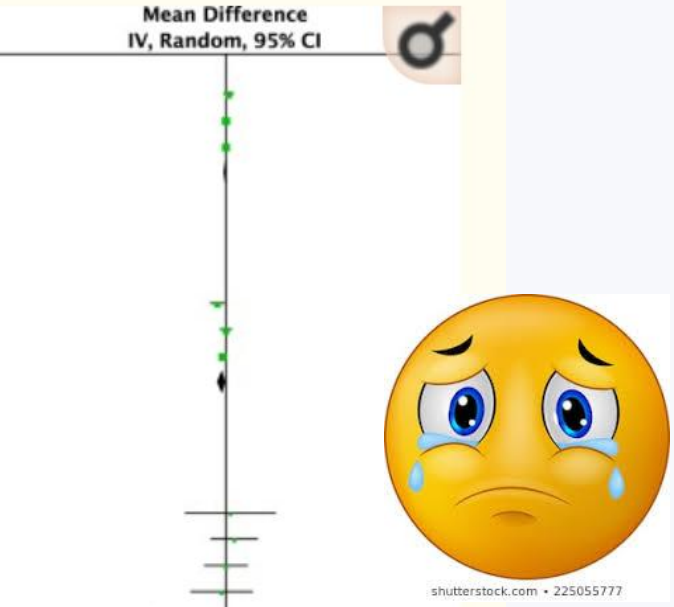
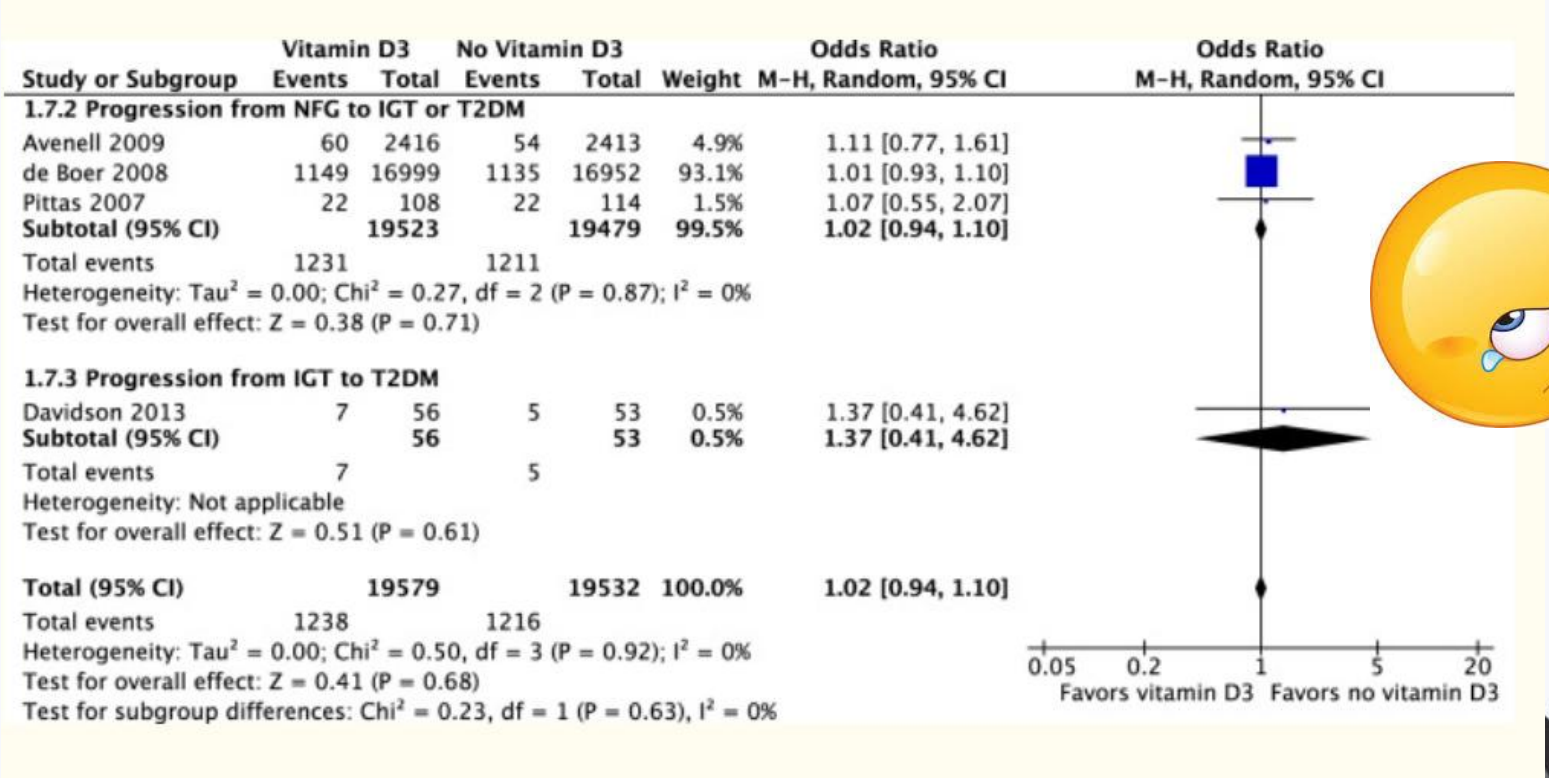
Vitamin D_3 vs no vitamin D_3 za hemoglobin A1c

Study or Subgroup	Vitamin D3 Mean	SD	Total	No Vitamin D3 Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
1.5.1 Normal glucose tolerance								
Grimnes 2011	0.11	0.32	49	0.05	0.28	45	13.1%	0.06 [-0.06, 0.18]
Jorde 2010	0.09	0.22	114	0.09	0.23	112	18.0%	0.00 [-0.06, 0.06]
Zittermann 2009	-0.25	0.23	82	-0.25	0.23	83	17.1%	0.00 [-0.07, 0.07]
Subtotal (95% CI)			**245**			**240**	**48.2%**	**0.01 [-0.03, 0.05]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.83$, df = 2 (P = 0.66); $I^2 = 0\%$								
Test for overall effect: Z = 0.34 (P = 0.74)								
1.5.2 Prediabetes								
Davidson 2013	6	0.3	52	6.2	0.5	47	10.1%	-0.20 [-0.36, -0.04]
Harris 2012	-0.05	0.33	43	-0.05	0.34	46	11.8%	0.00 [-0.14, 0.14]
Mitri 2011	0.06	0.2	46	0.14	0.2	46	16.2%	-0.08 [-0.16, 0.00]
Subtotal (95% CI)			**141**			**139**	**38.1%**	**-0.08 [-0.18, 0.01]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 3.31$, df = 2 (P = 0.19); $I^2 = 40\%$								
Test for overall effect: Z = 1.81 (P = 0.07)								
1.5.3 Established type 2 diabetes								
Breslavsky 2013	7.3	1.1	19	7.2	1.7	13	0.5%	0.10 [-0.95, 1.15]
Heshmat 2012	-0.01	0.9	21	-0.2	0.9	21	1.7%	0.19 [-0.35, 0.73]
Jorde 2009	-0.2	0.9	16	-0.2	0.5	16	1.9%	0.00 [-0.50, 0.50]
Kota 2011	7.7	0.9	15	7.8	1.1	15	1.0%	-0.10 [-0.82, 0.62]
Nikooyeh 2011	7.3	1.3	30	8.7	1.4	30	1.1%	-1.40 [-2.08, -0.72]
Parekh 2010	0.09	0.69	14	-0.18	0.87	13	1.4%	0.27 [-0.33, 0.87]
Shab-Bidar 2011	-0.9	1.4	50	-0.4	1.7	50	1.4%	-0.50 [-1.11, 0.11]
Soric 2012	-0.4	1.2	19	0.1	0.6	18	1.4%	-0.50 [-1.11, 0.11]
Witham 2010	-0.06	0.36	33	-0.06	0.81	20	3.2%	0.00 [-0.38, 0.38]
Subtotal (95% CI)			**217**			**196**	**13.6%**	**-0.20 [-0.52, 0.11]**
Heterogeneity: $Tau^2 = 0.13$; $Chi^2 = 19.98$, df = 8 (P = 0.01); $I^2 = 60\%$								
Test for overall effect: Z = 1.27 (P = 0.20)								
Total (95% CI)			**603**			**575**	**100.0%**	**-0.05 [-0.12, 0.03]**
Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 31.16$, df = 14 (P = 0.005); $I^2 = 55\%$								
Test for overall effect: Z = 1.27 (P = 0.20)								
Test for subgroup differences: $Chi^2 = 4.62$, df = 2 (P = 0.10), $I^2 = 56.7\%$								



Seida JC, Mitri J, Colmers IN, et al. Clinical review: Effect of vitamin D3 supplementation on improving glucose homeostasis and preventing diabetes: a systematic review and meta-analysis [published correction appears in J Clin Endocrinol Metab. 2015 Aug;100(8):3219]. *J Clin Endocrinol Metab*. 2014;99(10):3551–3560. doi:10.1210/jc.2014-2136

Vitamin D_3 vs no vitamin D_3 za progresiju u dijabetes



Study or Subgroup	Vitamin D3 Events	Vitamin D3 Total	No Vitamin D3 Events	No Vitamin D3 Total	Weight	Odds Ratio M-H, Random, 95% CI
1.7.2 Progression from NFG to IGT or T2DM						
Avenell 2009	60	2416	54	2413	4.9%	1.11 [0.77, 1.61]
de Boer 2008	1149	16999	1135	16952	93.1%	1.01 [0.93, 1.10]
Pittas 2007	22	108	22	114	1.5%	1.07 [0.55, 2.07]
Subtotal (95% CI)		**19523**		**19479**	**99.5%**	**1.02 [0.94, 1.10]**
Total events	1231		1211			
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.27$, df = 2 (P = 0.87); $I^2 = 0\%$						
Test for overall effect: Z = 0.38 (P = 0.71)						
1.7.3 Progression from IGT to T2DM						
Davidson 2013	7	56	5	53	0.5%	1.37 [0.41, 4.62]
Subtotal (95% CI)		**56**		**53**	**0.5%**	**1.37 [0.41, 4.62]**
Total events	7		5			
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.51 (P = 0.61)						
Total (95% CI)		**19579**		**19532**	**100.0%**	**1.02 [0.94, 1.10]**
Total events	1238		1216			
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.50$, df = 3 (P = 0.92); $I^2 = 0\%$						
Test for overall effect: Z = 0.41 (P = 0.68)						
Test for subgroup differences: $Chi^2 = 0.23$, df = 1 (P = 0.63), $I^2 = 0\%$						

IGT, impaired glucose tolerance; NFG, normal fasting glucose; T2DM, type 2 diabetes mellitus.

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Meta-analiza

- 35 RCT, 43 407 ispitanika
- Bolesnici s urednom tolerancijom glukoze, intolerancijom i dijabetesom
- Srednja dnevna doza 3332 U
- Praćenje od 4 tjedna do 7 godina (medijan 16 tjedana)

Conclusions:

Evidence from available trials shows no effect of vitamin D_3 supplementation on glucose homeostasis or diabetes prevention. Definitive conclusions may be limited in the context of the moderate degree of heterogeneity, variable risk of bias, and short-term follow-up duration of the available evidence to date.

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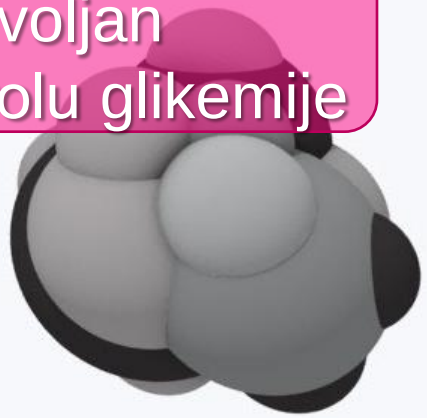
Zaključak

- D vitamin ima brojne učinke i izvan koštanog sustava
- Opservacijske studije povezale su ove dvije pandemije u uzročno posljedičnu vezu
- Liječenje i prognoza dijabetesa ne mogu se svesti na preparate D vitamina

Randomizirane studije nisu dokazale povoljan učinak na prevenciju dijabetesa ili kontrolu glikemije

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