

Online Appendix Table 1. Characteristics of study participants

	Tertiles of 25-hydroxyvitamin D3 (nmol/l)			P
	T1 < 41.9	T2 ≥41.9 -63.1	T3 ≥ 63.1	
<i>N</i>	149	148	149	
Age (years)	53 ± 8.9	55 ± 8.7	56 ± 9.2	< 0.001
Sex, males	63 (42.3)	72 (48.6)	70 (47)	0.52
Education (years)*				0.14
0-6	6 (4.03)	9 (6.08)	5 (3.36)	
7-9	82 (55)	86 (58.1)	87 (58.4)	
≥ 10	58 (38.9)	50 (33.8)	49 (32.9)	
Smoking†				0.19
Never	77 (51.7)	65 (43.9)	71 (47.7)	
Former	38 (25.5)	57 (38.5)	47 (31.5)	
Current	31 (20.8)	23 (15.5)	24 (16.1)	
Drinking alcohol, yes‡	96 (64.4)	101 (68.2)	120 (80.5)	< 0.001
Physical Activity Level (AU)‡	7.6 ± 1.3	7.7 ± 1.2	8.0 ± 1.2	0.034
Energy intake (kcal)§	2063 ± 648	2159 ± 624	2090 ± 609	0.73
Using vitamin supplements, yes	28 (18.8)	29 (19.6)	52 (34.9)	0.002
Systolic blood pressure (mmHg)¶	140 ± 13.5	139 ± 15.8	138 ± 14.8	0.29
Diastolic blood pressure (mmHg)¶	86 ± 8.9	87 ± 9.2	86 ± 8.9	0.98
Fasting glucose (mmol/l)	5.8 (5.5–6.3)	5.8 (5.4–6.4)	5.8 (5.5–6.3)	0.74
Fasting triglycerides (mmol/l)	1.55 (1.1–2.15)	1.58 (1.16–2.30)	1.63 (1.23–2.34)	0.30
Fasting HDLcholesterol (mmol/l)	1.05 (0.93–1.27)	1.02 (0.91–1.20)	1.06 (0.88–0.28)	0.41
Waist circumference (cm)	107 ± 11	107 ± 9.3	104 ± 12	0.028
BMI (kg/m ²)	33 ± 4.2	33 ± 3.9	31 ± 4.2	< 0.001
BMI Category				0.002
Normal (BMI < 25 kg/m ²)	4 (2.68)	0 (0)	8.0 (5.37)	
Overweight (BMI 25-29.9 kg/m ²)	29 (19.5)	43 (29.1)	56 (37.6)	
Obese (BMI > 30 kg/m ²)	116 (77.9)	105 (71)	85 (57)	
Fat mass (kg)#	34.8 (9.5)	33.5 (8.1)	31.9 (9.2)	0.006

Values are mean ± SD, median (interquartile range), or n (%). Abbreviations: AU, arbitrary units; **n*=432, †*n*= 433, ‡*n*=319 §*n*=421, ||*n*=439, ¶*n*=423 #*n*=426. Differences between groups were assessed by ANOVA or Kruskal-Wallis Test for continuous variables and the chi-square test for categorical variables.

Online Appendix Table 2. Parameters of insulin action and secretion across tertiles of vitamin 25(OH) D₃.

	n	Tertiles of 25-hydroxyvitamin D ₃ (nmol/l)			P
		T1 <41.9	T2 ≥41.9 - 63.1	T3 ≥63.1	
Fasting insulin (μU/ml)	446	10 (7.2–14.3)	9.5 (6.8–12.5)	8.2 (5.7–11.6)	0.013
HOMA-IR	446	1.49 (1.11–2.14)	1.49 (1.04–1.90)	1.28 (0.87–1.80)	0.015
HOMA B (%)	446	86.3 (73.8–117)	84.6 (67.2–106)	76.8 (61.9–104)	0.013
Si ((mU/l) ⁻¹ min ⁻¹)	406	2.4 (1.6–3.5)	2.5 (1.7–3.2)	2.7 (1.8–3.7)	0.31
AIR (mU l ⁻¹ min ⁻¹)	406	315 (145–507)	278 (155–411)	255 (157–512)	0.41
DI	406	748 (375–1196)	697 (260–1245)	712 (392–1203)	0.59

Values are given as medians (interquartile range). Abbreviations: 25(OH)vitamin D₃, 25-hydroxyvitamin D₃; HOMA-IR, homeostasis model assessment of insulin resistance; HOMA β, homeostasis model assessment of beta cell function; Si, insulin sensitivity index; AIR, acute insulin response; DI, disposition index. Differences between groups were assessed by Kruskal-Wallis Test for continuous variables.