SUPPLEMENTARY DATA

Supplementary Table 1. Baseline Characteristics* of the two treatment groups

	Placebo (N = 53)	Vitamin D (N = 56)
Age (years)	52.5 ±7.0	52.3 ±8.0
Sex (females)	71%	64%
Latino	83%	91%
BMI (weight/[height]^2)	32.9 ±4.3	32.1 ±4.7
FPG (mg/dL)	97.5 ± 9.4	98.7 ±8.7
2-hour glucose (mg/dL)	162 ±18	158 ± 22
HbA1c (%)	6.1 ± 0.4	6.1 ± 0.3
serum 25-OHD (ng/mL)	22.0 ± 4.8	22.0 ± 4.5

*Means ± SD

Supplementary Table 2. Association of Vitamin D Levels with Insulin Sensitivity and Insulin Secretion

	Positive	Negative
Insulin Sensitivity	References 1-11, 12*, 13†,14‡, 15§	References 14‡, 15§, 16
Insulin Secretion	References 9, 11‖	References 3, 5, 6, 15

*Negative when adjusted for adiposity; †Negative when adjusted for physical activity; ‡Positive in obese African-American youths but negative when adjusted for adiposity, negative in obese White youths; §Positive in Mexican-Americans and Whites but not in African-Americans; ‖Negative when adjusted for BMI

Supplementary Table 3. Effects of Vitamin D Supplementation on Insulin Secretion and Insulin Sensitivity

Reference	Population	Vitamin D Dose & Duration	Outcomes	25-OHD Level (ng/mL)	Results
1	14 men with IGT and no 25-OHD deficiency	2 µg 1 alpha OH D3 per day x 18 months; No placebo	IVGTT Euglycemic clamp	Not reported	**Sensitivity** – no change; **Secretion** –transient increase
13	NGT and low 25-OHD	20,000 IU D3 PO twice a week; 45 Placebo; 49 D3	Hyperglycemic clamp	Placebo 16.1* →17.1;25-OHD 16.1* →57.1; *mean of both groups	**Sensitivity** – no difference; **Secretion** –no difference
20	Men aged 61-65 years; 56 IGT; 9 type 2 DM treated with diet	0.75 µg 1 alpha (OH)-D3 twice a day x 3 months;32 Placebo; 33 D3	IVGTT	Placebo 37 →42; Vitamin D 39 → 54	**Sensitivity** – no difference; **Secretion** – no difference
21	Non-diabetic and IFG	700 IU D3 per day x 3 years; 114 Placebo-(NFG); 108 D3 (NFG); 47 Placebo (IFG); 45 D3 (IFG)	HOMA-IR	Placebo (NFG) 28.2 → 27.8; 25-OHD (NFG) 32.6 → 44.4; Placebo (IFG) 32.5 →	**Sensitivity** - no change in NFG; increased in IFG

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				35.6; 25-OHD (IFG) 28.5 → 41.0	
22	33 NGT; 12 IGT	2 doses of 100,000 IU D3 PO every 2 weeks; No placebo	OGTT (2 weeks after 2nd dose); HOMA-IR QUICKI	16.0 → 36.1	**Sensitivity** – no change by HOMA-IR, QUICKI or Avignon's or Gutt's modeling of OGTT
23	23 young healthy volunteers with low 25-OHD	300,000 IU/month IM x 3 (specific preparation not specified; No placebo	OGTT HOMA-IR	8.2 → 46.8	**Sensitivity** – no change by HOMA-IR or Matsuda's modeling of OGTT; **Secretion** – no change in insulin AUC
24	42 IFG/IGT;4 type 2 DM treated with diet	2,000 IU D3 per day x 4 months;No placebo	FSIVGTT	24.4 → 30.8	**Sensitivity** - no change; **Secretion** – increased
19	Healthy centrally obese Asian Indian men	120,000 IU D3 per 2 weeks PO x 3 weeks; 35 Placebo; 36 D3	3-hr OGTT HOMA-IR QUICKI	Placebo 12.2 →12.5; 25-OHD 14.6 →28.6	**Sensitivity** – no difference in HOMA-IR or QUICKI but increased with Mari's modeling of OGTT
18	Insulin resistant South Asian women	4,000 IU D3 per day x 6 months; 35 Placebo; 42 D3	HOMA-IR HOMA-B	Placebo 7.6 → 11.6; 25-OHD 8.4 →32.0	**Sensitivity** – increased; **Secretion** - no difference
17	8 IFG with 25-OHD deficiency	10,000 IU D3 per day x 1 month; No placebo	FSIVGTT	20.6 → 44.8	**Sensitivity** – increased; **Secretion** –acute insulin response decreased
25	Type 2 DM treated with metformin & bedtime insulin (withheld night before study)	4,000 IU D3 per week PO x 6 months; 16 Placebo; 16 D3	HOMA-IR HOMA-B	Placebo 23.4→ 22.9; 25-OHD 24.0 → 67.3	**Sensitivity** – no difference; **Secretion** – no difference
26	Asian Indian type 2 DM treated with diet or oral drugs not changed during study	300,000 IU D3 per week IM x 4; 14 Placebo; 14 D3	OGTT HOMA-IR	Placebo 16.7 → <30; 25-OHD 14.9 →41.6	**Sensitivity** – no difference; **Secretion** – no difference in insulin AUC
27	4 patients with osteomalacia stated to have 25-OHD deficiency	2,000 IU D3 per day x 6 months	OGTT	Not reported	**Secretion** – increased insulin AUC
28	14 non-obese type 2 DM	2 µg 1 alpha-OH D3 per day x 3 weeks;7 Control;7 D3	OGTT	Not reported	**Secretion** increased insulin AUC
29	10 type 2 DM women treated with oral drugs not changed during study	1332 IU D3 per day x 1 month; No placebo	IVGTT HOMA-IR	14.1→ 25.3	**Sensitivity** – no change; **Secretion** small but significant increase in 1st phase and no change in 2nd phase

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AUC – area under the curve; DM – diabetes mellitus; FSIVGTT – frequently sampled intravenous glucose tolerance test; HOMA-B – reflects insulin secretion; HOMA-IR – reflects insulin sensitivity; IFG – impaired fasting glucose; IGT – impaired glucose tolerance; IM –intramuscular; IU – international units; IVGTT – intravenous glucose tolerance test; NFG – normal fasting glucose; NGT – normal glucose tolerance; OGTT – oral glucose tolerance test; PO – per oral; QUICKI – reflects insulin sensitivity, D2–ergocalciferol, D3–cholecalciferol

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