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No effect of vitamin D supplementation on markers of immune function in apparently-healthy young adults

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1,25-Dihydroxyvitamin D, the hormonally-active form of vitamin D has been shown to be an effective immunomodulator, leading to a cytokine profile that is less inflammatory[(1)]. Vitamin D supplementation has been shown to significantly reduce serum concentrations of TNFα by 10 % and significantly increase serum concentrations of IL-10 by 40 %, albeit in patients with congestive heart failure[(2)]. The effect of vitamin D supplementation on immune function in apparently-healthy individuals has not been investigated. Thus, the aim of the present study was to assess the effect of vitamin D supplementation on markers of immune function in a group of young adults.

A total of 236 apparently-healthy young males and females aged 20–40 years were recruited from Coleraine and Cork and randomly assigned to receive 5, 10 or 15 μg cholecalciferol/d or placebo for 22 weeks[(3)]; 211 volunteers completed the study with >85 % compliance (males 107; females 104). Vitamin D status (serum 25-hydroxyvitamin D, S-25(OH)D concentrations) and serum concentrations of the pro-inflammatory cytokine TNFα and anti-inflammatory cytokine IL-10 were assessed at baseline and post intervention using commercially-available ELISA kits.

One-way between-groups analysis of covariance (ANCOVA) was conducted to assess the effect of treatment on vitamin D status and markers of immune function, controlling for age, gender, BMI and baseline concentrations. Vitamin D supplementation significantly affected S-25(OH)D concentrations (as shown in Table) but did not have an effect on serum concentrations of TNFα or IL-10.

	Treatment group (μg cholecalciferol/d)								
	Placebo (*n* 56)		5 (*n* 47)		10 (*n* 55)		15 (*n* 53)		
	Median	IQR	Median	IQR	Median	IQR	Median	IQR	*P**
S-25(OH)D (nmol/l)									
Pre	66.1	57.2–95.5	60.1	50.0–91.5	72.2	53.2–95.4	75.9	55.4–89.4	
Post	36.9[a]	30.9–48.1	50.4[b]	45.0–60.4	59.6[c]	51.3–70.3	69.0[d]	59.1–84.4	<0.0001
Serum TNFα (pg/ml)									
Pre	1.62	1.29–2.14	1.53	1.16–1.86	1.38	1.20–1.88	1.48	1.29–1.90	
Post	1.51	1.15–1.98	1.35	1.05–1.66	1.45	1.11–1.92	1.440	1.10–1.97	0.942
Serum IL-10 (pg/ml)									
Pre	0.87	0.76–1.07	0.80	0.71–0.96	0.87	0.79–1.06	0.85	0.71–1.03	
Post	0.89	0.78–1.0	0.88	0.72–1.07	0.96	0.80–1.14	0.91	0.74–1.01	0.346

IQR, interquartile range. [a,b,c,d]Means with unlike superscript letters were significantly different between groups (ANOVA; $P<0.05$). *Effect of treatment assessed by ANCOVA controlling for age, gender, BMI and baseline concentrations.

In conclusion, vitamin D supplementation had a significant effect on vitamin D status in a dose-responsive manner, but did not affect serum concentrations of TNFα or IL-10 in young adults. It has however, been suggested that circulating S-25(OH)D concentrations >100 nmol/l are required to optimise all vitamin D-dependent functions, levels higher than those observed in the present study, even after supplementation.

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