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Vitamin D and Cathelicidin Concentrations in Elite Irish Athletes

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Cathelicidin (LL-37, hCAP18) concentrations are partially modulated *in vivo* by vitamin D. This potent antimicrobial peptide is involved in numerous antifungal, antiviral and antibacterial processes, which has led to its recognition as an important contributor to upper respiratory host defence. Upper respiratory tract infections are a problem widely reported in athletes and are associated with impaired training capacity[1]. Recent research has implicated 1, 25-dihydroxyvitamin D_3 (1, $25(OH)_2D_3$) in cathelicidin biosynthesis, via vitamin D receptor complex-driven epigenetic modifications to the cathelicidin gene[2, 3]. The aim of this pilot study was to identify if wintertime vitamin D_3 supplementation of athletes (from November-March/April) influences plasma cathelicidin concentrations, compared to non-supplemented controls.

An enzyme-linked immunosorbant assay (ELISA) was used to quantify baseline and endpoint plasma cathelicidin concentrations in 44 stored samples obtained from 22 elite Irish athletes (18 male; 4 females)[4] (Hycult Biotech, Fronstraat, The Netherlands). Serum 25-hydroxyvitamin D (25(OH)D) concentration was measured in the previous study by ELISA (IDS Limited, Boldon, UK).

Mean (SD) age of athletes in the control and supplemented groups was 30(8) years and 23(7) years, respectively. Age was significantly different between treatment groups ($P = 0{\cdot}027$).

	Treatment Group			
	Control (*n* 10)		Supplemented (*n* 12)	
Measure	Median	IQR	Median	IQR
25(OH)D (nmol/L)				
Baseline	55·99	31·74	60·45	33·12
Endpoint	43·15	19·12	78·80	21·85
P value*	0·150		0·004	
LL-37 (ng/ml)				
Baseline	62·03	33·24	59·56	34·07
Endpoint	34·80	19·35	45·31	30·32
P value*	0·004		0·256	

* Difference between baseline and endpoint (significance $P < 0{\cdot}05$, paired t-test).

Change in cathelicidin concentration from baseline was not significantly different between groups (median (IQR); control group −34·94(50·66) ng/ml vs. supplemented group −17·18 (51·80) ng/ml, $P = 0{\cdot}076$). Wintertime vitamin D_3 supplementation significantly increased 25(OH)D concentrations from baseline. There was no significant change in plasma cathelicidin concentration in the supplemented group. In the control group, 25(OH)D concentration did not significantly change from baseline however a significant decrease in plasma cathelicidin concentration was identified.

These findings may be owing to the small sample size and because both treatment groups were vitamin D sufficient (>50 nmol/L) at baseline[5]. Nevertheless such results indicate that maintenance of vitamin D status over the winter months, with vitamin D_3 supplementation, may attenuate the wintertime decrease in cathelicidin concentrations. Whether such maintenance of cathelicidin concentrations translates into a reduced incidence of upper respiratory tract infection and/or enhanced physical performance remains to be elucidated.

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