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Lower cathelicidin concentrations in Irish athletes compared to controls: a role for vitamin D?

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Despite strong in vitro evidence supporting pleiotropic actions of vitamin D in the immune system⁽¹⁾, including synthesis of LL-37 antimicrobial peptide⁽²⁾, human studies have yielded inconsistent results. LL-37 has been linked with total 25-hydroxyvitamin D [25(OH)D] concentrations and the number of self-reported upper respiratory tract infection symptoms in endurance athletes⁽³⁾. This observational study investigated whether LL-37 concentration varied between athletes and a general population control group and also tested if total 25(OH)D was a positive predictor of LL-37 concentration.

Overall, 221 stored plasma samples from male and female athletes (n 101) and a healthy control group (n 120) were obtained from four previous studies and analysed for LL-37 using an ELISA. Total 25(OH)D concentration was quantified by LC-MS/MS during each original study. Prior to statistical analyses, outliers (n = 24) were removed.

Measure	Athletes (n 96)		Healthy controls (n 101)	
	Mean	SD	Mean	SD
Age, years	21 ^a	3	24	5
Height, cm	170 ^b	10	173	9
Weight, kg	67·50 ^a	12.59	75.17	13.21
BMI, kg/m ²	23·27 ^a	2.57	25.16	4.38
Total 25(OH)D, nmol/L	59·26 ^a	30-11	35.87	18-93
PTH, pg/mL	39.24	17.10	41.37	18.19
LL-37, ng/mL	29.93 ^b	18-89	43.76	26.63

BMI, body mass index; 25(OH)D, total 25-hydroxyvitamin D, PTH, parathyroid hormone; LL-37, biologically active cathelicidin antimicrobial peptide. ^a P < 0.001, ^b P < 0.05 versus healthy controls (independent t test).

Athletes had a significantly lower mean LL-37 concentration than controls. In contrast, the athlete group exhibited a higher mean total 25(OH)D concentration compared to the control group. Total 25(OH)D concentration did not predict LL-37 concentration overall ($\beta = 0.073$, P = 0.386), or in either group after adjusting for age, sex, BMI and season of sampling (athletes $\beta = -0.033$, P = 0.762; controls $\beta = 0.145$, P = 0.197). These findings question the purported link between vitamin D and LL-37 in vivo. Although significantly lower LL-37 concentrations were observed in athletes compared to controls, the clinical implications of this disparity require further investigation.

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