

Abstract

Am J Clin Nutr. 2007 Nov;86(5):1420-1425.

Higher serum vitamin D concentrations are associated with longer leukocyte telomere length in women

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BACKGROUND: Vitamin D is a potent inhibitor of the proinflammatory response and thereby diminishes turnover of leukocytes. Leukocyte telomere length (LTL) is a predictor of aging-related disease and decreases with each cell cycle and increased inflammation.

OBJECTIVE: The objective of the study was to examine whether vitamin D concentrations would attenuate the rate of telomere attrition in leukocytes, such that higher vitamin D concentrations would be associated with longer LTL.

DESIGN: Serum vitamin D concentrations were measured in 2160 women aged 18-79 y (mean age: 49.4) from a large population-based cohort of twins. LTL was measured by using the Southern blot method.

RESULTS: Age was negatively correlated with LTL ($r = -0.40$, $P < 0.0001$). Serum vitamin D concentrations were positively associated with LTL ($r = 0.07$, $P = 0.0010$), and this relation persisted after adjustment for age ($r = 0.09$, $P < 0.0001$) and other covariates (age, season of vitamin D measurement, menopausal status, use of hormone replacement therapy, and physical activity; P for trend across tertiles = 0.003). The difference in LTL between the highest and lowest tertiles of vitamin D was 107 base pairs ($P = 0.0009$), which is equivalent to 5.0 y of telomeric aging. This difference was further accentuated by increased concentrations of C-reactive protein, which is a measure of systemic inflammation.

CONCLUSION: Our findings suggest that higher vitamin D concentrations, which are easily modifiable through nutritional supplementation, are associated with longer LTL, which underscores the potentially beneficial effects of this hormone on aging and age-related diseases.

PMID: 17991655