

Researchers report successful measurement of vitamin D in human hair

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A new study by researchers from Trinity College Dublin and St James's Hospital has reported for the first time that vitamin D can be measured in human hair. The paper has been published in the international, peer-reviewed journal of human nutrition, *Nutrients*.

Vitamin D deficiency has reached epidemic proportions world-wide, with over 1 billion people estimated to be affected. Deficiency has been linked with bone health, but it could also be a risk factor for depression, cardiovascular disease, inflammation, diabetes and cancer. At present, the best way of assessing vitamin D is to measure the concentration of vitamin D in the blood. However, this can be painful, requires expertise and training along with hygienic conditions/equipment so getting a sample is not always workable. In addition, the blood result represents vitamin D status at a single time point, which is problematic because vitamin D changes with the seasons: it's not uncommon for someone to be sufficient in vitamin D in the summer time, and very deficient in the winter. This means that a single snapshot of vitamin D status is not able to provide information

on vitamin D year-round.

The current study is the first in the world to publish that it is possible to extract and measure vitamin D in [human hair](#). This is a major step forward in assessing vitamin D status, potentially one of the major innovations in vitamin D measurement. Traditional blood analysis captures just a moment in time; in contrast, [hair](#), which grows at approximately 1cm per month, could reflect vitamin D status over several months capturing the large seasonal differences in vitamin D status.

The lead author of the study, Associate Professor in Epidemiology, Trinity College Dublin, Lina Zgaga said:

"This study presents the first step towards the development of a novel test for assessing vitamin D status over time. The idea is that vitamin D is being deposited continuously in the hair as it grows; more might be deposited at times when vitamin D concentration in the blood is high, and less when it's low. Therefore, test based on the hair sample might be able to give doctors a measure of vitamin D status over time—if hair is long enough, this even might be over a few years!

"Further research is needed to establish the exact relationship between vitamin D concentration in the blood and in hair over time. We also need to investigate different factors that might affect vitamin D levels in hair, the most obvious ones being hair colour and thickness, or use of hair products such as hair dye."

Nutrition Research Fellow, Trinity College Dublin and co-author Dr. Eamon Laird, added:

"Other applications could also include historical samples from archaeological sites. Hair (along with teeth) are some of the longest lasting surviving biological materials after death and thus it could be possible to for the first time assess the vitamin D

status of historical populations—Elizabethans, Viking, Celtic, Roman, ancient Chinese, Egyptian. Similarly, hair samples could also be used to assess longer-term vitamin D status in animals with applications to farming. The vitamin D status of ancient species could be measured given the well preserved and copious amounts of for example mammoth or ancient ice age animal hair that is often found from the warming permafrost and in museum specimens."

Principal Biochemist from the Biochemistry Department in St. James's Hospital and co-author Dr. Martin Healy said:

"The presence of vitamin D in hair could be interpreted as a personal record of a person's vitamin D status. Having a knowledge of an individual's long-term vitamin D status through analysis of hair samples may allow for better strategies to maintain stable and adequate vitamin D concentrations over an extended period".

"The finding that vitamin D can be measured in hair samples potentially opens up a new approach to epidemiological studies relating the [vitamin](#) to bone and non-bone related medical conditions which have been associated with its deficiency."

More information: Lina Zgaga et al, 25-Hydroxyvitamin D Measurement in Human Hair: Results from a Proof-of-Concept study, *Nutrients* (2019). [DOI: 10.3390/nu11020423](https://doi.org/10.3390/nu11020423)

Provided by Trinity College Dublin

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