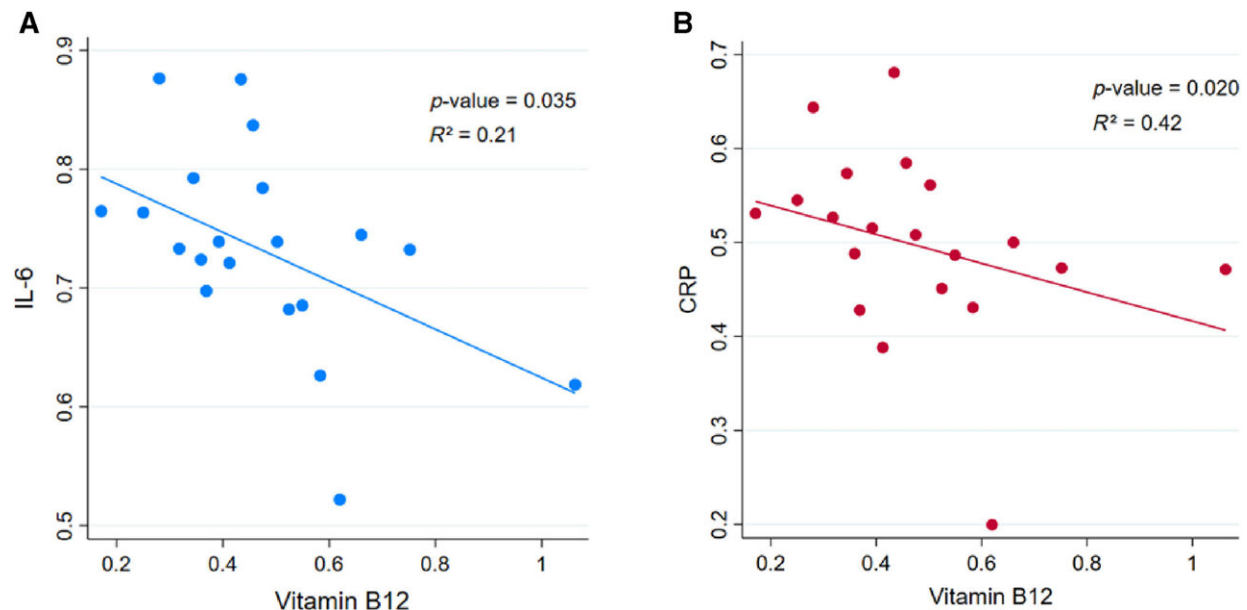


B12 deficiency: A hidden trigger of inflammation?

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Binned scatterplot of the relationship between vitamin B12 and IL-6 (A) and CRP (B) in humans adjusted for sex, age, education level, smoking habit, BMI, physical activity, diabetes, hypertension, hypercholesterolemia, aspirin, medication, energy intake, alcohol consumption and Mediterranean diet adherence. IL-6, interleukin-6. CRP, C-reactive protein. Credit: *Journal of the Science of Food and Agriculture* (2023). DOI: 10.1002/jsfa.12976

A new study has identified a compelling link between vitamin B12 deficiency and chronic inflammation, which is associated with a range of health problems including cardiovascular disease, diabetes, and

neurodegenerative disorders.

[Published](#) in the *Journal of the Science of Food and Agriculture*, the research examined the effects of circulating B12 concentration on the levels of two key inflammatory markers in both humans and mice.

Vitamin B12, an essential nutrient with roles in various physiological processes, is known to be critical for overall health. Its deficiency can be the result of dietary insufficiency, particularly in vegetarian and vegan populations, or inefficient absorption in the body. This can lead to a range of complications, including neurological disorders. While previous research has hinted at the potential anti-inflammatory properties of vitamin B12, the precise relationship is not fully understood.

Now, a team of researchers in Spain have investigated the effects of vitamin B12 on the levels of two molecules in the body which promote inflammation, specifically interleukin (IL)-6 and C-reactive protein (CRP).

Rosa M. Lamuela-Raventós, co-corresponding author of the study and Professor of Nutrition, Food Sciences and Gastronomy at INSA-University of Barcelona and Inés Domínguez López, a predoctoral researcher at the University of Barcelona and co-first author of the study explained the motivations behind the study.

"Since [chronic inflammation](#) is associated with a wide range of diseases, understanding how vitamin B12 status influences inflammation could have significant implications for disease prevention and management. IL-6 and CRP are widely recognized as key markers of inflammation in [clinical practice](#), as elevated levels of these markers are associated with various inflammatory conditions and chronic diseases."

"Establishing the relationship between inflammatory markers like IL-6

and CRP [and vitamin B12 levels] could have direct clinical relevance and open doors to novel therapeutic strategies."

The study utilized samples from a randomized subsection of participants in PREDIMED, a large clinical trial based in Spain, designed to assess the effect of the Mediterranean diet on the primary prevention of [cardiovascular disease](#). An assessment of the serum levels of vitamin B12 and the concentrations of the inflammatory markers revealed a correlation between the two.

"Our study found that in general, the more vitamin B12 an individual has, the lower their inflammatory markers are—we call this an inverse relationship," explained Marta Kovatcheva, a postdoctoral researcher at the Institute for Research in Biomedicine (IRB Barcelona) and co-first author of the study.

"With regards to vitamin B12 deficiency, we must point out that we did not specifically look at deficient individuals in this study. Nevertheless, our results raise some important questions. We already know that vitamin B12 deficiency can be harmful in many ways, but what we have reported here is a novel relationship. This might help us better understand why some unexplained symptoms of human B12 deficiency, like neurologic defects, occur."

To validate the findings of the research within the [general population](#), Domínguez López noted, "It will be important to expand the cohorts, to look at [sex-specific differences](#) (as males and females often have different biology) and also to investigate the specific situations such as B12 deficiency, infection, or aging in humans."

The study also observed the same relationship between vitamin B12 and inflammatory markers in naturally aged mice, offering a valuable avenue of using mouse models to delve deeper into the underlying mechanisms

of the inverse correlation. Lamuela-Raventós explained, "This will help us understand the biology of this relationship we've observed, and will help us to ascertain any dietary and/or clinical recommendations that could be made in the future."

Surprisingly, the researchers noted that unlike humans, mice do not become B12 deficient with age. "We didn't know this before, and it poses the possibility that studying mice could potentially help us understand how we could prevent B12 deficiency in older humans," said Kovatcheva.

The team now hopes to explore the link between vitamin B12 and inflammation, within the context of specific high-inflammation conditions, such as infection, obesity, and irritable bowel syndrome. "We already know that vitamin B12 deficiency is not good for an individual, and that dietary measures should be taken to correct it. It will be interesting to understand if vitamin B12 supplementation can play a role in disease management," noted Lamuela-Raventós.

More information: Inés Domínguez-López et al, Higher circulating vitamin B12 is associated with lower levels of inflammatory markers in individuals at high cardiovascular risk and in naturally aged mice, *Journal of the Science of Food and Agriculture* (2023). [DOI: 10.1002/jsfa.12976](https://doi.org/10.1002/jsfa.12976)

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