

Increased levels of active vitamin D can help to optimize muscle strength

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Researchers at the University of Birmingham have shown that increasing the levels of active vitamin D can help to optimise muscle strength in humans.

The team hope that the findings will inform the design of future supplementation studies, and begin to answer questions as to the optimal levels of vitamin D required for healthy muscles.

The study, published in *PLOS ONE*, builds on previous knowledge showing levels of inactive vitamin D to be associated with a lack of [muscle](#) mass.

The research is the result of a cutting edge technique that allowed both active and inactive forms of vitamin D to be assessed alongside their impact on various muscle functions.

Dr Zaki Hassan-Smith, from the University of Birmingham, explained, "We have a good understanding of how vitamin D helps bone strength, but we still need to learn more about how it works for muscles. When you look at significant challenges facing healthcare providers across the world, such as obesity and an ageing population, you can see how optimising muscle function is of great interest."

"Previous studies have tested for the inactive forms of vitamin D in the bloodstream, to measure vitamin D deficiency. Here, we were able to develop a new method of assessing multiple forms of vitamin D, alongside extensive testing of [body composition](#), muscle function and muscle gene expression."

116 healthy volunteers, aged between 20-74, were recruited to the trial. Participants had both active and inactive levels of vitamin D measured alongside physical characteristics including [body fat](#) and 'lean mass', a measure of muscle bulk.

Women with a healthy body composition, and lower body fat, were less likely to have high levels of inactive vitamin D, a marker of vitamin D deficiency. This was echoed by the finding that levels of inactive vitamin

D were lower in women with increased body fat. This would suggest a relationship between vitamin D and body composition.

However, the active form of vitamin D was not associated with body fat, but was associated with lean mass.

Individuals with an increased lean mass, and muscle bulk, had a higher level of active vitamin D in the bloodstream.

Dr Hassan Smith added, "By looking at multiple forms in the same study, we can say that it is a more complex relationship that previously thought. It may be that body fat is linked to increased levels of inactive vitamin D, but lean mass is the key for elevated levels of active vitamin D. It is vital to understand the complete picture, and the causal mechanisms at work, so we can learn how to supplement vitamin D intake to enhance [muscle strength](#)."

In this study some of the positive associations between active [vitamin D](#) and muscle bulk were not seen in men.

Future studies with larger cohorts will help to identify if this is due to biological differences. The team will now work alongside international collaborators to further investigate the mechanisms at work through lab-based studies and clinical trials.

More information: *PLOS ONE*, [DOI: 10.1371/journal.pone.0170665](https://doi.org/10.1371/journal.pone.0170665)

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