

Vitamin D proven to boost energy—from within the cells

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Vitamin D is vital for making our muscles work efficiently and boosting energy levels, new research from Newcastle University has shown.

A study led by Dr Akash Sinha has shown that [muscle function](#) improves with Vitamin D supplements which are thought to enhance the activity of the mitochondria, the batteries of the cell.

A hormone normally produced in the skin using energy from sunlight, Vitamin D can also be found in a few foods – including fish, fish liver oils, egg yolks and fortified cereals but it can also be effectively boosted with Vitamin D supplements.

It is thought around 60% of people in the UK are vitamin D deficient, with children under five, people with dark skin and the elderly being particularly vulnerable. While it has a well-established association with helping in [bone formation](#) and a deficiency can lead to rickets, its role in other health issues is just emerging.

The researchers used non-invasive [magnetic resonance](#) scans to measure the response to exercise in 12 patients with severe deficiency before and after treatment with vitamin D.

Lead author Dr Akash Sinha who also works within the Newcastle upon Tyne Hospitals NHS Foundation Trust said: "The scans provided a unique window into what is really going on in the muscle as it works.

"Examining this small group of patients with [vitamin D deficiency](#) who experienced symptoms of muscle fatigue, we found that those with very low vitamin D levels improved their muscle efficiency significantly when their vitamin D levels were improved."

Alongside poor [bone health](#), [muscle fatigue](#) is a common symptom in vitamin D deficient patients. This fatigue could be due to reduced efficiency of the mitochondria: the 'power stations' within each cell of the body.

Mitochondria use glucose and oxygen to make energy in a form that can be used to run the cell - an energy-rich molecule called ATP. [Muscle cells](#) need large amounts of ATP for movement and they use phosphocreatine as a ready and available energy source to make ATP. The mitochondria also replenish this phosphocreatine store after muscle contraction and measuring the time taken to replenish these stores is a measure of mitochondrial efficiency: better mitochondrial function is associated with shorter phosphocreatine recovery times.

The team found that these recovery rates significantly improved after the patients took a fixed dose of oral vitamin D for 10-12 weeks. The average phosphocreatine recovery half time decreased from 34.4 sec to 27.8 sec. All patients reported an improvement in symptoms of fatigue after having taken the supplements. In a parallel study, the group demonstrated that low Vitamin D levels were associated with reduced mitochondrial function.

Dr Sinha added: "We have proved for the first time a link between vitamin D and [mitochondria](#) function.

"Of the patients I see, around 60% are vitamin D deficient and most people living north of Manchester will struggle to process enough vitamin D from sunlight alone, particularly during winter and spring. So

a simple [vitamin D](#) tablet could help boost your energy levels – from within the cells."

More information: Improving the Vitamin D status of Vitamin D deficient adults is associated with improved mitochondrial oxidative function in skeletal muscle. Akash Sinha, Kieren Hollingsworth, Steve Ball, Tim Cheetham, jcem.endojournals.org/content/98/3/E509.long

Provided by Newcastle University

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