

Increased phosphate intake elevates blood pressure in healthy adults

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Phosphates make processed cheese spreadable, prevent coffee from clumping and preserve many meat products. They are a common additive in industrially produced foodstuffs. But phosphates consumed with food raise blood pressure and pulse rates in healthy young adults, according to a study led by the University of Basel and published in the

Journal of the American Society of Nephrology.

Natural foods also contain phosphates, but modern eating habits have led to a higher intake of them. Increased consumption of processed foodstuffs has significantly increased [phosphate](#) intake in recent years, which now often exceeds the daily intake of 700 mg recommended in the U.S. As a high phosphate level can lead to such conditions as deposits in blood vessels, a low-phosphate diet has long been recommended for people with chronic kidney problems.

However, an increase in dietary phosphate also increases the likelihood of developing or even dying from arteriosclerosis or a cardiovascular disease in healthy people. This has been shown by epidemiological studies that examine the connection between potential risk factors and certain diseases.

Physiological study with young adults

Now, a research team led by Professor Reto Krapf from the University of Basel has verified this statistical connection for the first time in a qualitative study with 20 healthy test subjects. Over 11 weeks, half of the participants received an additional dose of sodium phosphate in tablet form alongside their normal diet. This increased the phosphate content in their blood to an above-average level, albeit one that is widespread in the population.

The second group took a phosphate binder that inhibits its availability in the body. They also received salt as sodium chloride to equal the first group's sodium intake.

After six weeks, the doctors examined the effects of the diets on various cardiovascular indicators such as blood pressure and pulse. A comparison of the two groups showed that the increased phosphate

intake significantly increased systolic and diastolic blood pressure in healthy young adults—by 4.1 and 3.2 mmHg, respectively. At the same time, pulse rate increased by an average of four beats per minute.

The researchers show that increased phosphate intake, more specifically, an increased serum phosphate level, activates the sympathetic nervous system, which accelerates cardiac activity and increases [blood pressure](#). The study demonstrated the effect to be reversible—two months after the end of the study, the participants' levels had returned to normal.

Vitamin D is increasingly prescribed for various reasons. It stimulates intestinal phosphate absorption, thus further increasing phosphate load, but also has putative cardioprotective effects. Therefore, in the second phase of this study, the effect of an additional supplement of vitamin D was examined. However, no measurable influence on the cardiovascular values was found in either group.

"Our results provide an important explanation for the association of dietary phosphate intake with increased cardiovascular morbidity and mortality in the general population," says study leader Reto Krapf.

"These conclusions are important for public health and should be further examined in larger studies in various population groups."

More information: Jaber Mohammad et al, A Controlled Increase in Dietary Phosphate Elevates BP in Healthy Human Subjects, *Journal of the American Society of Nephrology* (2018). [DOI: 10.1681/ASN.2017121254](https://doi.org/10.1681/ASN.2017121254)

Provided by University of Basel

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