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Could a ketogenic diet alleviate gout?

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More than 8 million individuals in the United States have gout, a disease that can cause intense recurrent episodes of debilitating pain, inflammation, and fever. The cause of gout is the accumulation of urate crystals in joints, which continuously reactivate the immune system, leading to activation of the most common type of immune cell in the blood, neutrophils. These periods of immune reactivation are known as flares, and are driven by a protein complex called the NLRP3 inflammasome.

Recent work from the laboratory of Vishwa Deep Dixit, Professor of Comparative Medicine and Immunobiology, has shown that the ketone body β-hydroxybutyrate can specifically inhibit the NLRP3 inflammasome. Ketones are byproducts of fat break down in the liver that can serve as alternative metabolic fuels for the brain and heart during periods of low carbohydrate intake, such as fasting, or ketogenic diet. To test if elevating ketones protected against inflammation during gout, a Postdoctoral Fellow in Dixit's lab, Emily Goldberg, and Associate Research Scientist and Clinical Veterinarian in Comparative Medicine, Jennifer Asher, and their colleagues collaborated to develop a novel model of gout flares in rats.

They found that feeding rats a high-fat, low-carbohydrate ketogenic diet increased β-hydroxybutyrate levels and protected rats from joint swelling, tissue damage, and systemic inflammation normally seen during gout.

"In isolated neutrophils, β-hydroxybutyrate completely blocked NLRP3

inflammasome activation, even when provided at low concentrations that are physiologically achievable through dietary modification," said Goldberg. She speculated that specifically targeting the NLRP3 inflammasome to reduce inflammation during a flare could improve gout patients' outcomes, but more studies need to be performed to test this possibility.

Read the full study published in *Cell Reports*.

More information: *Cell Reports* , www.cell.com/cell-reports/fulltext/S2211-1247 , DOI: 10.1016/j.celrep.2017.02.004

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