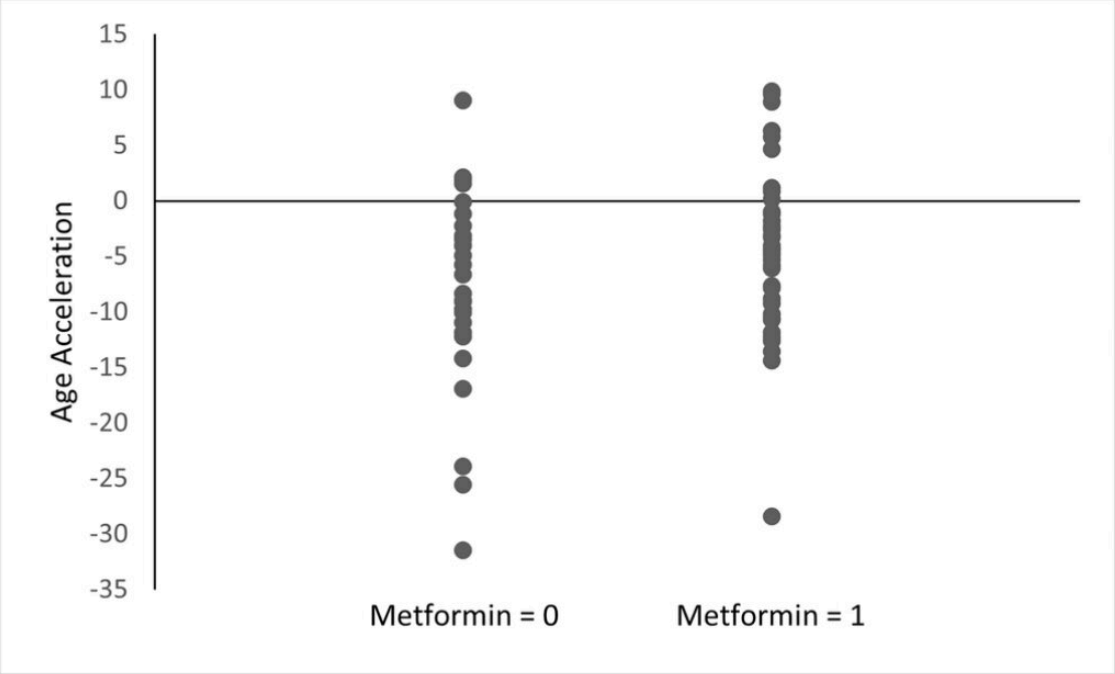
Study: Metformin's impact on aging and longevity through DNA methylation

February 22 2023



Age acceleration between metformin users and nonusers among the diabetes group. Credit: *Aging* (2023). DOI: 10.18632/aging.204498

A new research paper was published in *Aging*, titled "Metformin use history and genome-wide DNA methylation profile: potential molecular mechanism for aging and longevity."

Metformin, a commonly prescribed anti-diabetic medication, has repeatedly been shown to hinder aging in pre-clinical models and to be associated with lower mortality for humans. It is, however, not well understood how metformin can potentially prolong lifespan from a biological standpoint.

In this recent study, researchers from Stanford University School of Medicine, University of Iowa, Tottori University Faculty of Medicine, University of Nebraska Medical Center College of Medicine, and Oregon Health and Science University School of Medicine hypothesized that metformin's potential mechanism of action for longevity is through its epigenetic modifications.

"To test our hypothesis, we conducted a post-hoc analysis of available genome-wide DNA methylation (DNAm) data obtained from whole blood collected from inpatients with and without a history of metformin use," say the researchers.

The researchers assessed the methylation profile of 171 patients (first run) and only among 63 diabetic patients (second run) and compared the DNAm rates between metformin users and nonusers. Enrichment analysis from the Kyoto Encyclopedia of Genes and Genome (KEGG) showed pathways relevant to metformin's mechanism of action, such as longevity, AMPK and inflammatory pathways. They also identified several pathways related to delirium whose risk factor is aging.

Moreover, top hits from the Gene Ontology (GO) included HIF-1α pathways. However, no individual CpG site showed genome-wide statistical significance (p

"This study may elucidate metformin's potential role in longevity through epigenetic modifications and other possible mechanisms of action," conclude the researchers.

More information: Pedro S. Marra et al, Metformin use history and genome-wide DNA methylation profile: potential molecular mechanism for aging and longevity, *Aging* (2023). DOI: 10.18632/aging.204498