

Researchers discover molecule behind the benefits of exercise

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While it's clear that exercise can improve health and longevity, the changes that occur in the body to facilitate these benefits are less clear. Now researchers publishing in the January issue of Cell Press journal *Cell Metabolism* have discovered a molecule that is produced during exercise and contributes to the beneficial effects of exercise on metabolism.

"Our finding bolsters the underlying notion that signals generated in one organ—such as exercising muscle—are released into the circulation and influence other tissues such as [fat cells](#) and liver," says senior author Dr. Robert Gerszten, of the Cardiology Division and Cardiovascular Research Center at Massachusetts General Hospital, Harvard Medical School.

Seminal studies by the Spiegelman laboratory, which collaborated on this study, have demonstrated that a protein called PGC-1 α regulates metabolic genes in muscle and contributes to the response of muscle to exercise, but how the PGC-1 α -mediated response to exercise in muscle conveys signals to other tissues is unclear. Through experiments conducted in cells and mice, Gerszten and his colleagues forced the expression of PGC-1 α in [muscle cells](#) and then looked for metabolites that were secreted from the cells. They identified β -aminoisobutyric acid (BAIBA) as one such metabolite and found that it increased fat cells' expression of genes that are involved with burning calories. It also decreased weight gain and helped balance blood sugar levels in mice.

Analyses done in human exercise studies and participants in the Framingham Heart Study revealed that BAIBA levels rise during exercise and are inversely associated with [metabolic risk factors](#). Specifically, BAIBA levels were inversely correlated with fasting [blood sugar levels](#), insulin, triglycerides, and total cholesterol. In addition, there was a trend toward an inverse association with [body mass index](#).

The findings suggest that BAIBA may contribute to exercise-induced protection from metabolic diseases. "Manipulating BAIBA—or the enzymes that generate BAIBA—may have therapeutic potential," says Gerszten. "Burning fat is likely to impact multiple aspects of metabolic health related to diabetes, heart disease, and other conditions."

More information: *Cell Metabolism*, Roberts et al. "Beta-Aminoisobutyric Acid Induces Browning of White Fat and Hepatic Beta-Oxidation and Is Inversely Correlated with Cardiometabolic Risk Factors". [dx.doi.org/10.1016/j.cmet.2013.12.003](https://doi.org/10.1016/j.cmet.2013.12.003)

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