Scientists devise new platform to view metabolism

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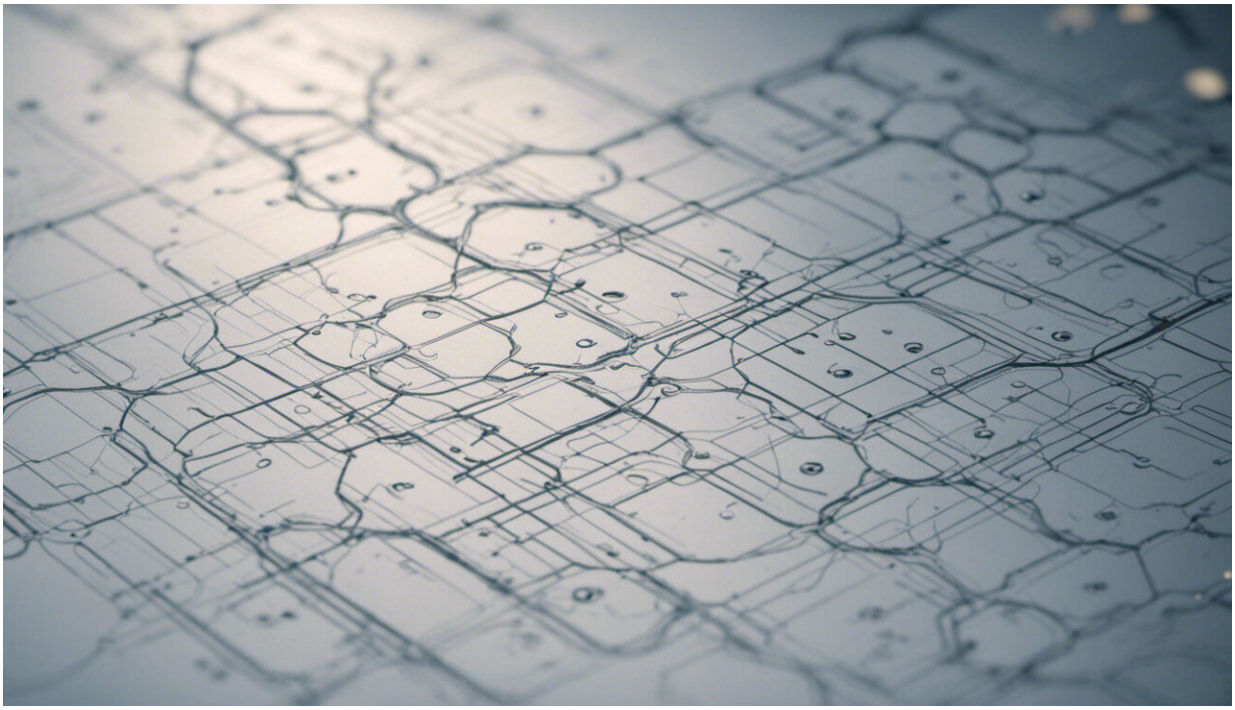

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Metabolism is essential for the maintenance of life, in organisms ranging from yeast to humans. To deepen understanding of metabolism and its role in diseases such as type 2 diabetes, Yale researchers have developed a new analytical platform they call MIMOSA. Their research published online Sept. 24 in *Cell Metabolism*.

Until now, scientists could only study a single feature of the chemical processes that comprise metabolism at one time. With MIMOSA—short for Mass Isotopomeric Multi-Ordinate Spectral Analysis—the Yale-led team devised a way to observe these complex processes simultaneously. MIMOSA merges the strengths of nuclear magnetic resonance spectroscopy and mass spectroscopy into a single technique.

"We now have an almost completed picture of mitochondrial metabolism," said senior author Dr. Richard Kibbey, associate professor of endocrinology. "That's a very big step forward in terms of understanding how metabolism interfaces with function in the cell."

With MIMOSA, Kibbey and his colleagues have zoomed in on a metabolic pathway that will help reveal how pancreatic beta-cell metabolism is coupled to insulin secretion—a process that goes awry in diabetes.

The platform has many potential applications, according to Kibbey and first author Tiago C. Alves. "It can be used to understand the function of normal cells and the function of cells under metabolic disease states," such as type 2 diabetes and cancer, Kibbey noted. This knowledge will inform future research on metabolism, as well as drug design for related diseases, he said.

More information: "Integrated, Step-Wise, Mass-Isotopomeric Flux Analysis of the TCA Cycle." DOI: dx.doi.org/10.1016/j.cmet.2015.08.021

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