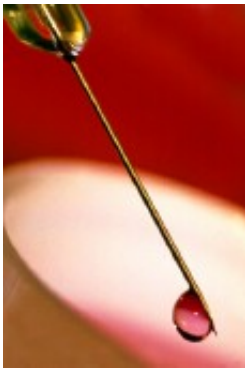


Metabolites linked to insulin resistance in normoglycemia

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(HealthDay) -- Twenty metabolites, including amino acids, intermediates in glucose synthesis, ketone bodies, and fatty acids, are associated with insulin resistance, according to a study published online April 17 in *Diabetes*.

Peter Würtz, Ph.D., from the University of Oulu in Finland, and colleagues performed metabolic profiling using high-throughput nuclear magnetic resonance spectroscopy in 7,098 Finns (mean age, 31 years; 52 percent women).

The researchers identified 20 metabolites that were significantly associated with the homeostasis model assessment of [insulin resistance](#) (HOMA-IR). These included branched-chain and aromatic amino acids,

intermediates in gluconeogenesis, ketone bodies, and fatty acid composition and saturation. Associations for amino acids Leu, Ile, Val, and Tyr were sex- and obesity-dependent, with significant associations only seen in abdominally obese women. Protein energy intake was associated with some [amino acids](#) (Val, Phe, Tyr, and Gln) but not with the insulin resistance index. One of 12 genetic determinants of HOMA-IR, a variant in *GCKR*, was significantly associated with 12 [metabolites](#).

"Metabolic signatures extending beyond obesity and lipid abnormalities reflected the degree of insulin resistance evidenced in young, normoglycemic adults with sex-specific fingerprints," Würtz and colleagues conclude.

More information: [Abstract](#)

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