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### Sugars and derivatives in the human metabolome: what they can tell us

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Sugar compounds (mono- and disaccharides, polyols and sugar acids) are part of the metabolome. Although numerous sugar compounds occur in nature, mostly only a very few common and well-known compounds are analyzed. Metabolomics often requires a compromise between detecting as many different metabolites and substance classes as possible and satisfactory separation of compounds within each substance class. Sugars with their high structural similarity present a particular challenge with usually insufficient chromatographic and mass spectrometric separation. More comprehensive and highly selective methods to assess the diversity of the human body fluid sugar profile are thus needed because sugar compounds may serve as markers of dietary intake and may act as reporter molecules of the health status.

We developed a semitargeted GC-MS based profiling method enabling detection of known and unknown sugar compounds in urine and plasma. 24 h urine samples of the observational *Karlsruhe Metabolomics and Nutrition* study with 300 healthy participants were analyzed and markers for dietary intake were identified amongst the sugars, such as mannoheptulose and perseitol for avocado consumption. In an additional intervention study including an oral glucose tolerance test, plasma samples of healthy, prediabetic and diabetic participants were analyzed and revealed, next to glucose, a variety of sugars and derivatives with marked postprandial differences dependent on health status, such as trehalose. Overall, the application of the sugar profiling in these human studies revealed a more complex sugar profile than described or expected so far with potential for finding novel markers.