Titel des Beitrags:
Childhood Obesity Is Associated with Changes in the Serum Metabolite Profile

Abstract:
Objective: The human serum metabolite profile is reflective of metabolic processes, including pathophysiological changes characteristic of diseases. Therefore, investigation of serum metabolite concentrations in obese children might give new insights into biological mechanisms associated with childhood obesity. Methods: Serum samples of 80 obese and 40 normal-weight children between 6 and 15 years of age were analyzed using a mass spectrometry-based metabolomics approach targeting 163 metabolites. Metabolite concentrations and metabolite ratios were compared between obese and normal-weight children as well as between children of different pubertal stages. Results: Metabolite concentration profiles of obese children could be distinguished from those of normal-weight children. After correction for multiple testing, we observed 14 metabolites (glutamine, methionine, proline, nine phospholipids, and two acylcarnitines, p < 3.8 × 10–4) and 69 metabolite ratios (p < 6.0 × 10–6) to be significantly altered in obese children. The identified metabolite markers are indicative of oxidative stress and of changes in sphingomyelin metabolism, in β-oxidation, and in pathways associated with energy expenditure. In contrast, pubertal
stage was not associated with metabolite concentration differences. Conclusion: Our study shows that childhood obesity influences the composition of the serum metabolome. If replicated in larger studies, the altered metabolites might be considered as potential biomarkers in the generation of new hypotheses on the biological mechanisms behind obesity.

**Stichworte:**
BMI; Childhood obesity; Lipid metabolism; Metabolite profile; Serum; Biomarker; Metabolomics

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