Title of the Contribution:
Alcohol-induced metabolomic differences in humans.

Abstract:
Alcohol consumption is one of the world’s major risk factors for disease development. But underlying mechanisms by which moderate-to-heavy alcohol intake causes damage are poorly understood and biomarkers are sub-optimal. Here, we investigated metabolite concentration differences in relation to alcohol intake in 2090 individuals of the KORA F4 and replicated results in 261 KORA F3 and up to 629 females of the TwinsUK adult bioresource. Using logistic regression analysis adjusted for age, body mass index, smoking, high-density lipoproteins and triglycerides, we identified 40/18 significant metabolites in males/females with P-values<3.8E-04 (Bonferroni corrected) that differed in concentrations between moderate-to-heavy drinkers (MHD) and light drinkers (LD) in the KORA F4 study. We further identified specific profiles of the 10/5 metabolites in males/females that clearly separated LD from MHD in the KORA F4 cohort. For those metabolites, the respective area under the receiver operating characteristic curves were 0.812/0.679, respectively, thus providing moderate-to-high sensitivity and specificity for the discrimination of LD to MHD. A number of alcohol-related metabolites could be replicated in the KORA F3 and TwinsUK studies. Our data suggests that metabolomic profiles based on
diacylphosphatidylcholines, lysophosphatidylcholines, ether lipids and sphingolipids form a new class of biomarkers for excess alcohol intake and have potential for future epidemiological and clinical studies.

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