

Exploring the “dark side” of the exposome

Tuesday, 23 March 2021 17:00 (6 minutes)

Only half of the global deaths in 2010 could be associated with known risk factors, namely smoking, alcohol, diet, environmental factors. It remains critical to build understanding around the remaining half of deaths occurring worldwide, and to identify other risk factors currently unknown or underestimated.

As a rule, extensive questionnaires are utilized to outline lifestyle and environmental exposures. Biomarkers also constitute a powerful and more objective way to assess such exposures. The advancement in mass spectrometry (MS) technologies has considerably expanded the coverage of the exposome. However, progress has been slowed down by limitations in our capacity to annotate unknown MS features and by the limited sensitivity to detect compounds present at low concentrations.

In this work, we applied a suspect screening approach to two epidemiological studies nested in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort (n=258 and n=466). Samples were analyzed on a UHPLC-QTOF-MS system with reversed-phase chromatography in both polarities.

In total, 101 metabolites derived from drugs, diet and food additives, contaminants, and gut microbial metabolism could be identified with high confidence (level 1 according to MSI standard). A large number of other MS features could also be annotated at level of confidence 2 or 3. Frequency of detection in the two sample sets will be presented. This new data will be used in future exposome-wide association studies in various cohorts.

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Session Classification: Poster session