

Using exposomics to uncover the environmental contributors to AD/ADRD

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Editorial

Complementing the Genome with an “Exposome”: The Outstanding Challenge of Environmental Exposure Measurement in Molecular Epidemiology

Christopher Paul Wild

Molecular Epidemiology Unit, Centre for Epidemiology and Biostatistics, Leeds Institute of Genetics, Health and Therapeutics, Faculty of Medicine and Health, University of Leeds, Leeds, United Kingdom

Wild, 2005

REVIEW

The exposome and health: Where chemistry meets biology

Roel Vermeulen^{1,2*}, Emma L. Schymanski³, Albert-Laszlo Barabási^{4,5,6}, Gary W. Miller^{7*}

Ecosystems

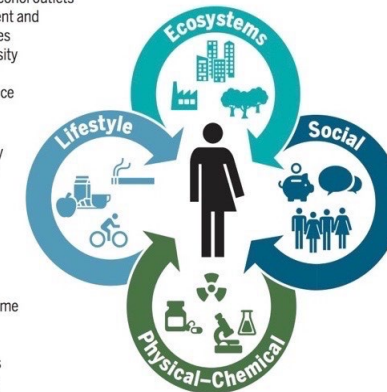
Food outlets, alcohol outlets
Built environment and urban land uses
Population density
Walkability
Green/blue space

Lifestyle

Physical activity
Sleep behavior
Diet
Drug use
Smoking
Alcohol use

Social

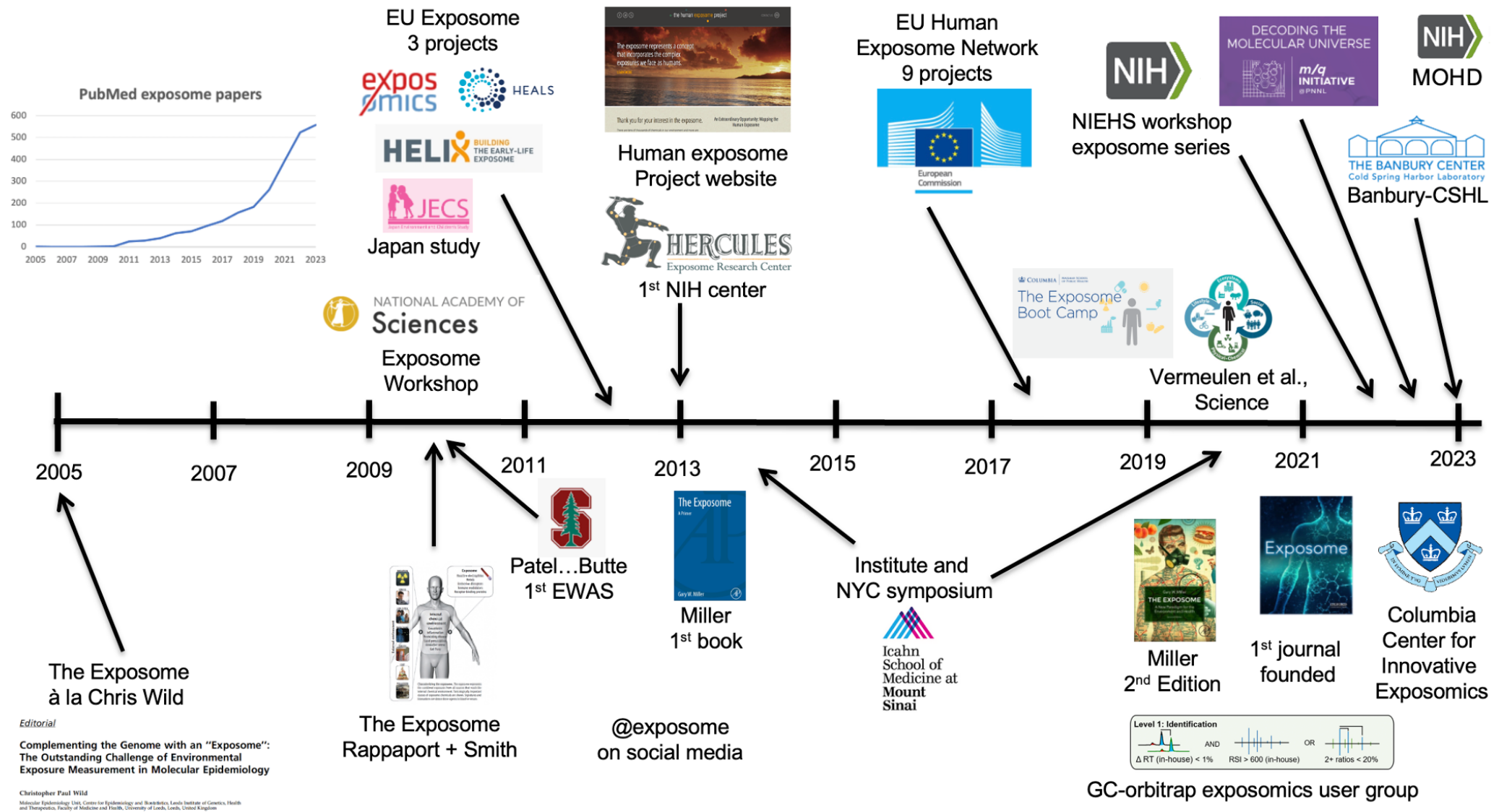
Household income
Inequality
Social capital
Social networks
Cultural norms
Cultural capital
Psychological and mental stress



Physical-Chemical

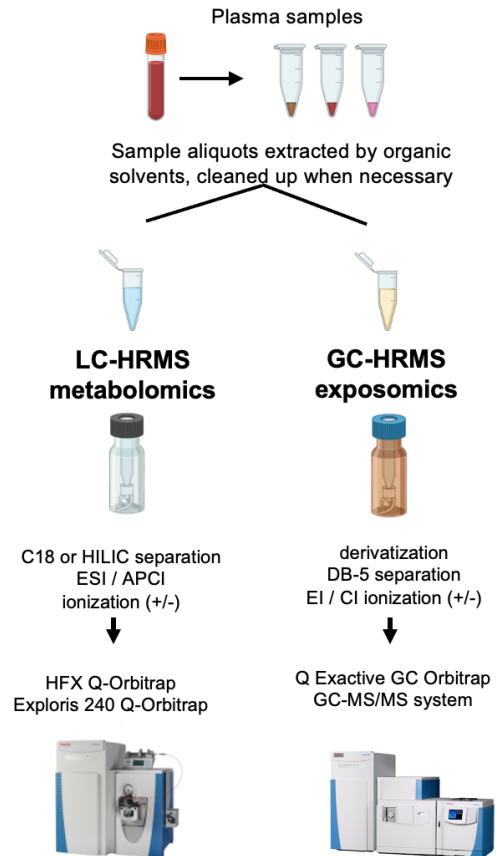
Temperature/humidity
Electromagnetic fields
Ambient light
Odor and noise
Point, line sources, e.g. factories, ports
Outdoor and indoor air pollution
Agricultural activities, livestock
Pollen/mold/fungus
Pesticides
Fragrance products
Flame retardants (PBDEs)
Persistent organic pollutants
Plastic and plasticizers
Food contaminants
Soil contaminants
Drinking water contamination
Groundwater contamination
Surface water contamination
Occupational exposures

Vermeulen, Schymanski, Barabasi, Miller, Science, 2020



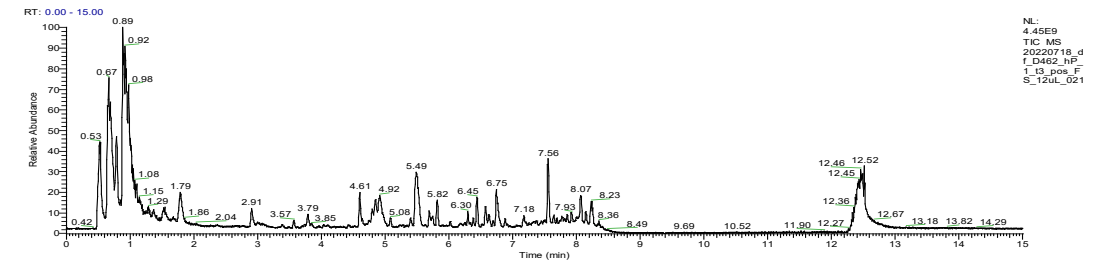
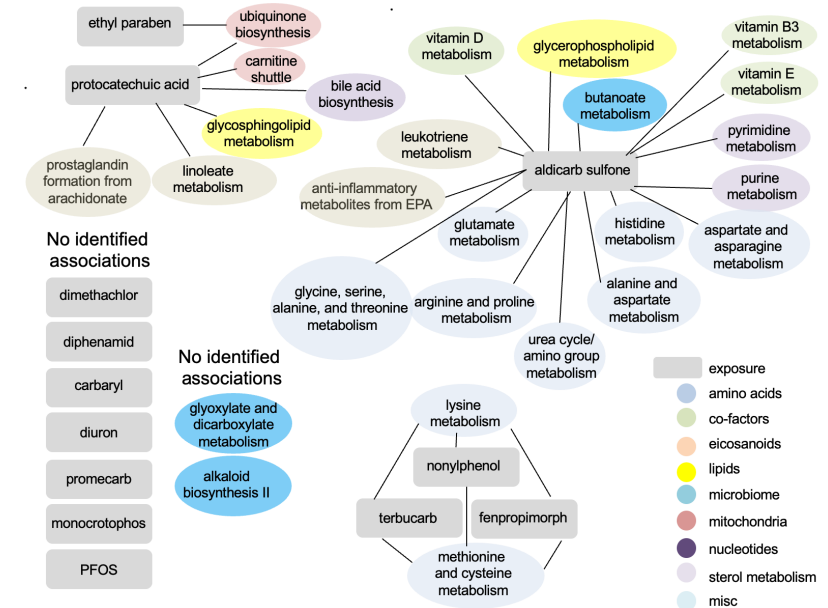
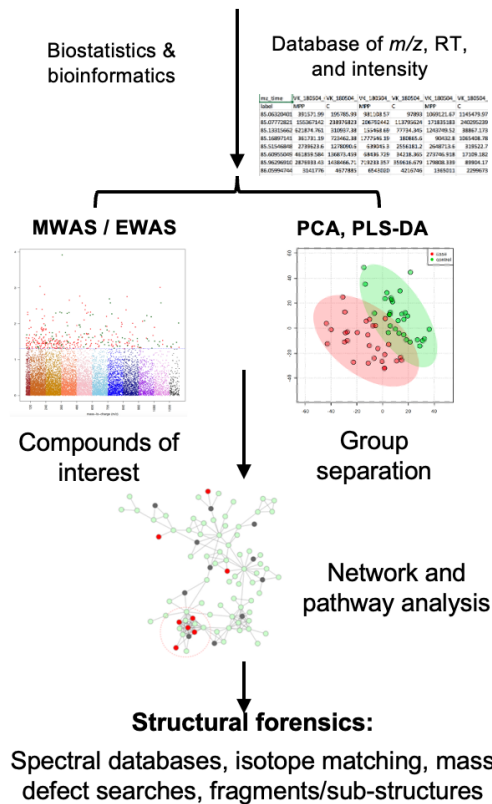
LC- and GC-based high-resolution mass spectrometry (HRMS) to detect exogenous chemicals and endogenous metabolites (including drugs)

SAMPLE PREPARATION



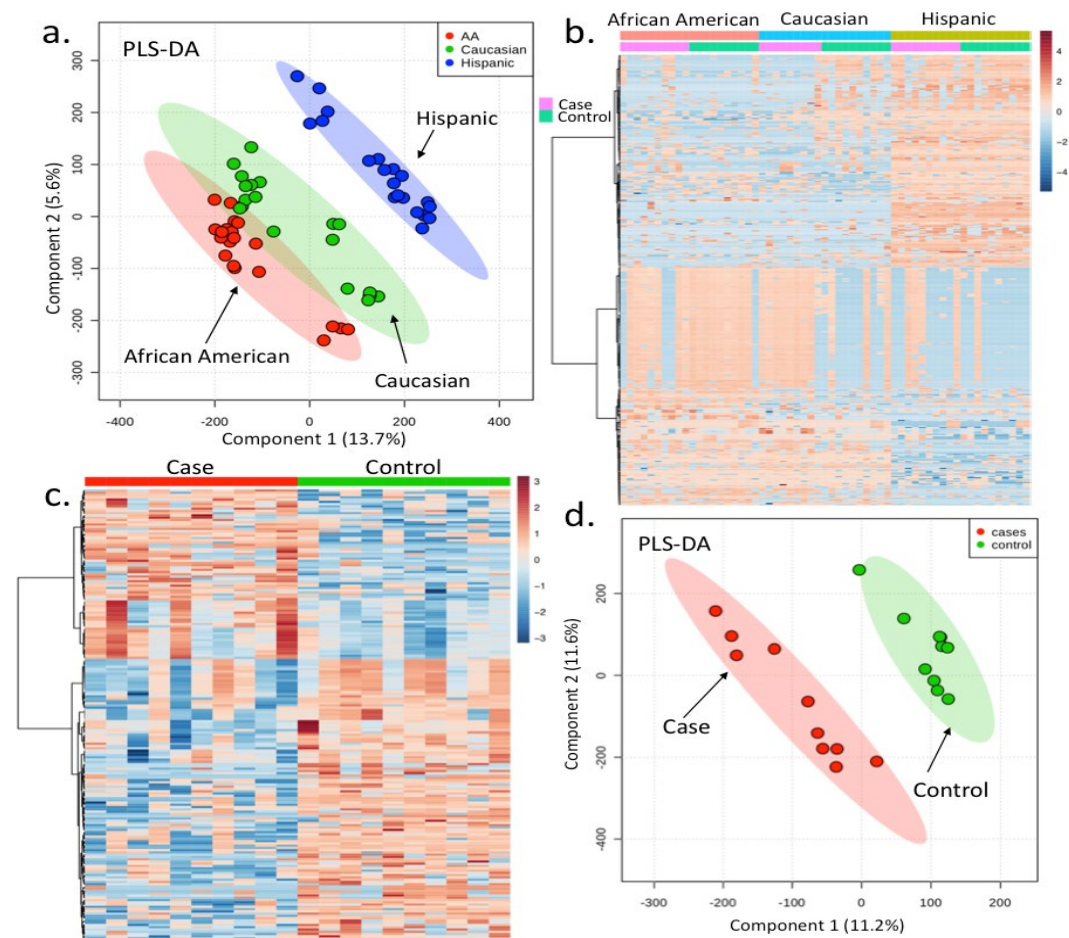
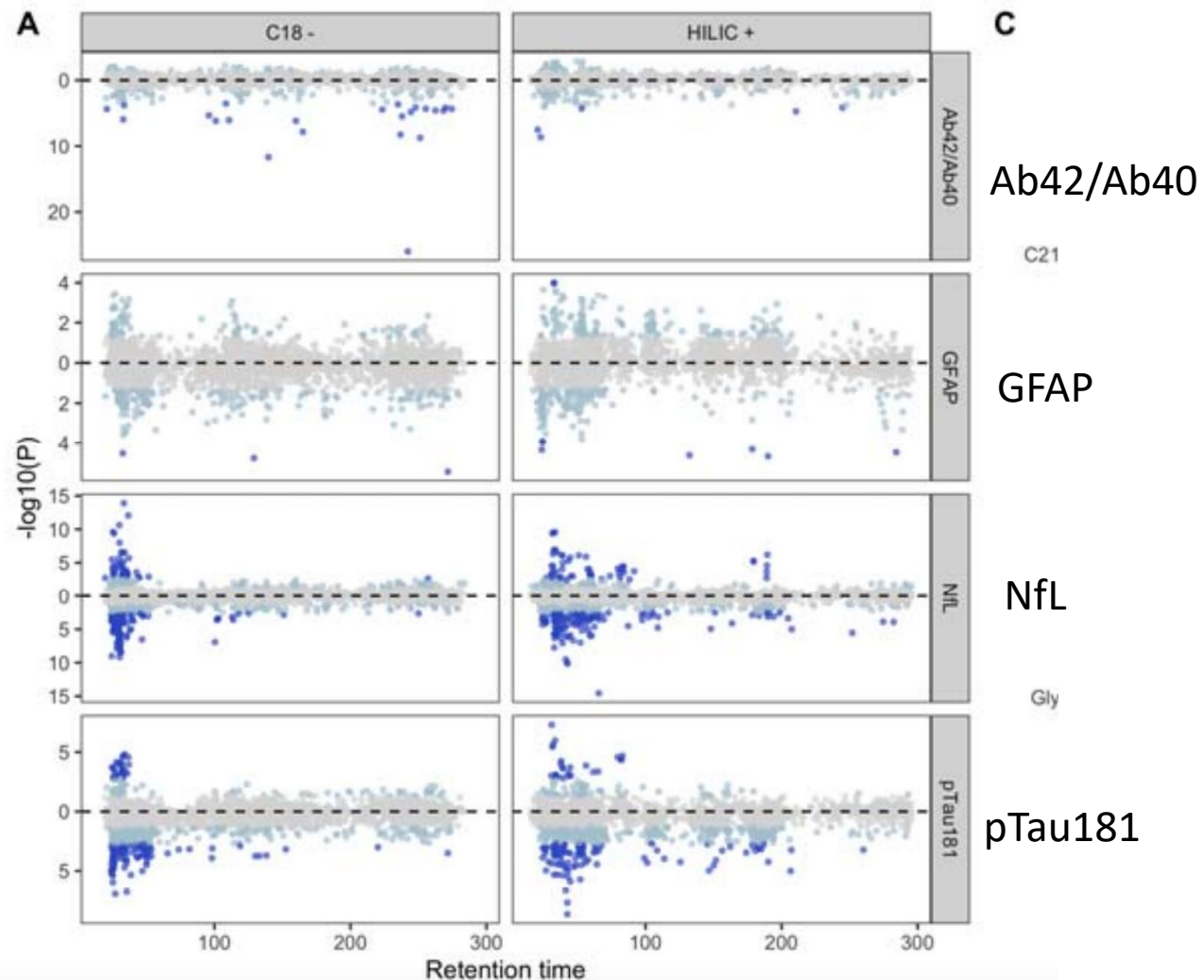
DATA PROCESSING

Extraction: m/z , RT, Intensity Quality metrics,
Peak grouping / deconvolution / alignment



In nontargeted format 100,000s of peaks are detected with varying levels of confidence in identification

Alzheimer's disease in cohorts





Exposomics Research Ecosystem