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Stockholm Convention
Regional Centre

Thank you for having us!

Kateřina Šebková, Ph.D (Katka)
katerina.sebkova@recetox.muni.cz

the Stockholm Convention Regional Centre in the Czech Republic (SCRC)
RECETOX, Faculty of Science, Masaryk University, Brno, Czech Republic

Education course: Evaluation de riesgos químicos: Protegiendo la salud y el ambiente
18 November 2025 - Online

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Regional Centre

Opportunities and collaboration in the Chemical Risk Assessment: the RECETOX, PARC and EIRENE experience

Kateřina Šebková, Ph.D
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the Stockholm Convention Regional Centre in the Czech Republic (SCRC)
RECETOX, Faculty of Science, Masaryk University, Brno, Czech Republic

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18 November 2025 - Online

Objectives

- to meet you!
- to provide capacity building for regulatory risk assessment in sharing our story with you
- to inform about ongoing activities and tools (PARC) - opportunities to join community of practice
- to establish new cooperations and build on existing ones - biobank facility, human bio monitoring, open access research infrastructure

Mecanics

- 2 parts: “story of growing, new approaches and opportunities” (Katka) and biocides “learning by doing” crash-course (Pavla)
- questions and comments welcome!
- presentations will be shared, many slides in KaSe presentation - for inspiration and further reading

MEET THE RECETOX

HOST OF THE STOCKHOLM CONVENTION
REGIONAL CENTRE IN THE CZECH REPUBLIC

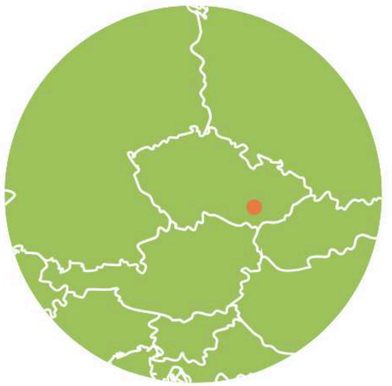
RECETOX in Brief

The RECETOX is a leading Czech research institute covering a broad range of basic and applied research on toxic compounds in the environment and their effect on human health.

Functions of RECETOX:

- Research activities
- Education programmes
- Open-Access Research Infrastructure
- Science to Policy and Society platforms (National Centre for Toxic Compounds, **Stockholm Convention Regional Centre for Capacity Building and the Transfer of Technology**)
- Application of research results

RECETOX
Faculty of Science
Masaryk University
Brno, Czech Republic



BRNO - BOHUNICE CAMPUS

history

culture

architecture

science

BRNO
city for life

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RECETOX in a glimpse - keywords and selected numbers

40 years - on the way to a healthy future

studying the relationship between humans and the environment, with a particular focus on the environmental and health risks associated with toxic substances.

175	**22**	**60**
Research staff	**Research groups**	**PhD students**
2	**3**	**3**
Study programmes	**RI Core facilities**	**Science to Policy Platforms**

1983 – 1993: POLLUTION

1993 – 2003: EXPOSURE, HAZARD, RISK

2003 – 2013: SAFETY and SCIENCE-to-POLICY

2013 – 2022: HUMAN HEALTH

2023 – …… : EXPOSOME, partnerships and networks

Modern campus and state of the art facilities in Brno Bohunice, CZ

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ABOUT
Stockholm Convention Regional Centre for Capacity Building and the Transfer of Technology in the Czech Republic

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Stockholm Convention Regional Centre

- Hosted by the RECETOX + uses its capacity
- established in 2007
- endorsed in 2009 + successfully evaluated in 2013, 2015, 2019 and 2023 (mandates extended for additional 4 years)
- provides support to the Stockholm Convention on POPs contracting Parties (countries) in its geographical region of the Central and Eastern Europe and beyond*.
- chemicals management and management of wastes containing toxic chemicals by providing training, capacity building, expertise support in a number of fields

Our mission is to provide technical assistance, build capacities to implement the Stockholm Convention on POPs and to protect the planet for future generations by combatting global environmental challenges and address triple planetary crises

** We cover issues related to chemicals management, exposome research, monitoring, legal and institutional arrangements and governance including synergies. We support the work under Basel, Rotterdam, Stockholm and Minamata Conventions, SAICM and new Global Chemical Framework and negotiations of the Science Policy Panel (UNEA resolution 5/8) and also partly the INC process for the plastics treaty (UNEA resolution 5/14).*

Support in the wider European region (WHO region)

WHO Collaborating Centre for Chemical Exposure and Risks

- RECETOX officially endorsed in January 2023 for 4 years, working in WHO European region and also globally

Workplan and topics of collaboration with WHO:

- assistance and technical support on assessment of exposure to chemicals of public health concern with the main focus on human biomonitoring
- addressing emerging and other policy issues relating to chemical safety
- laboratory capacity building

Specific new requests for support:
Minamata convention on Mercury - use RI - data warehouse for mercury HBM,
lectures, trainings, governance case study, update of the National Action Plan - Czech Republic

CETOX

CETOCOEN Excellence

MUNI FNUSA ICRC UCL ETH zürich BBMRI-ERIC

Teaming for a healthy future

Mission

Building a healthy future with environmental, economic and social sustainability and improved well-being.

Healthy planet

We conserve the planet for future generations by combating global environmental challenges.

Sustainable societies

We research smart technologies and provide innovative solutions enabling communities to thrive.

Human well-being

We investigate factors affecting the development of chronic health conditions and generate new tools for diagnosis and treatment.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857560

recetox.muni.cz

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science

For many years we have studied the human impact on the environment & now we also assess environmental impacts on human health. Our research infrastructure supports the international research community.

recetox.muni.cz

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education

We train the future generation of professionals and provide them the multi-disciplinary skills across education, research, policy and practice needed to address environmental health challenges.

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application

We translate our research results to practical application and legislation. We transfer our knowledge to industry and government and inform regulatory decision-making processes to promote environmental, economic and social sustainability.

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society

We contribute to improving the quality of life. We generate data and provide new tools, technologies and solutions to benefit the community and secure a stable and prosperous future.

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Brno Living Lab

MUNI FAKULTNÍ NEMOCNICE BRNO FNUSA ICRC B|R|N|O jihomoravský kraj

Partnership for a healthy future

We collaborate to build a community that works together towards a healthy future. We form research partnerships with academic institutions and university hospitals and reach out to local businesses, regional and state authorities to share knowledge. We engage with citizens and welcome them to join our community to co-create positive change.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857560

muni.recetox.cz

Research Programmes and Infrastructures

Research Programmes

Detailed information see slides 15 - 37

Environmental exposure and modelling
- Multiresidual assessment of toxic mixtures
- Internal exposure of population to chemical mixtures
- Environmental exposures in local, regional and global context
- Linking internal and external exposures through modelling

Adverse Outcome Pathways: from exposure to health
- Aquatic and soil toxicology
- Biotechnology tools for mechanistic toxicology
- Uncovering toxicological events beyond priority health outcomes
- Building adverse outcome pathways and AOP-based models

Environmental Epidemiology
- Development of the omics approaches
- Systemic hallmarks of adverse health outcomes
- Biomarkers of susceptibility and effect
- Development of methods for integrative analysis of omics data

Chemical Tools for Diagnostics and Therapy
- Phototriggers of signaling molecules
- Photoactivatable compounds and fluorescent tags for biology
- Nanocarriers

Protein Engineering
- Assessment of the biomembrane composition
- Development of microfluidic chips
- Effects of pathogens
- Development of diagnostic kits

Research Infrastructure

MONET monitoring networks
CELSPAC population studies
Biobanking facility

Trace Analytical Laboratory
Omics laboratories

Toxicology
Photochemistry
Microfluidics

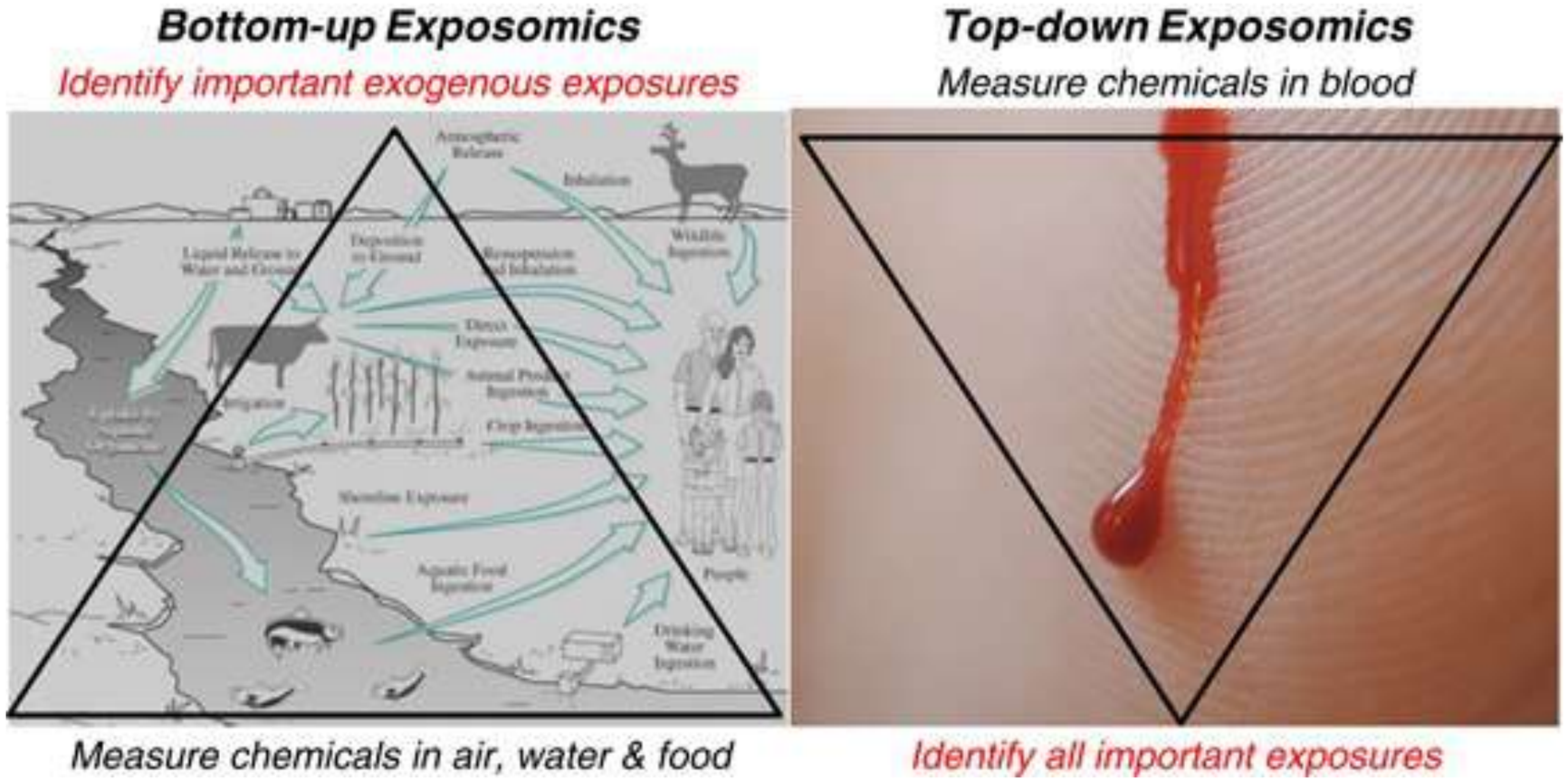
IT platforms, databases and information systems
Bioinformatics and Biostatistics

Detailed information see slides 15 - 37

CETOCOEN Excellence

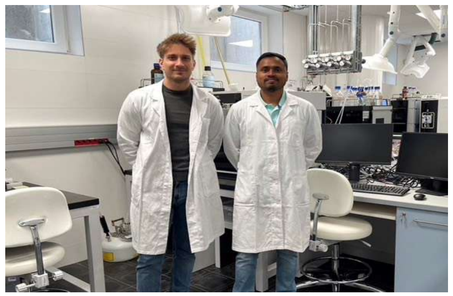
Complimentary slides - Researchers (15-37)

Human exposome: Bottom-up vs. Top-down Exposomics



Rappaport SM. *J Expo Sci Environ Epidemiol* **21**:5–9 (2011).

2 MSCA grants
Joint PhD with University of Rennes



CETOCOEN Excellence

Human [chemical] exposome

Research goal:

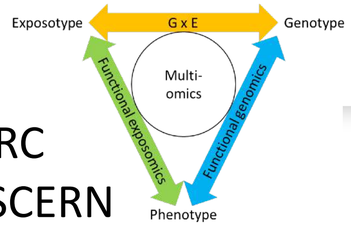
Development and application of the human exposome concept

Comprehensive & systematic identification of chemical exposure agents in human population & association with disease (e.g. fertility & metabolic disorders)

Major projects:

- H2020 ATHLETE
- H2020 EXPANSE
- Horizon Europe PARC
- Horizon Europe DISCERN
- Horizon Europe ENDOMIX
- ESIF SALVAGE

ATHLETE EXPANSE



ARTICLES · Volume 54, 101314, July 2025 · *Open Access* Download Full Issue

External exposome and incident asthma across the life course in 14 European cohorts: a prospective analysis within the EXPANSE project

Zhebin Yu [a] · Sara Kress [b] · Natalia Blay [c,d] · Petr Gregor [e] · Hanna-Maria Kukk [f,g] · Miriam Leskien [h,i] · et al. Show more

Science Current Issue

HOME > SCIENCE > VOL. 388, NO. 6745 > INTEGRATING EXPOSOMICS INTO BIOMEDICINE

PERSPECTIVE | BIOMEDICINE

Integrating exposomics into biomedicine

Assessing a full range of environmental exposures will improve human health

GARY W. MILLER AND BANBURY EXPOSOMICS CONSORTIUM Authors Info & Affiliations

SCIENCE · 24 Apr 2025 · Vol 388, Issue 6745 · pp. 356-358 · DOI: 10.1126/science.adr0544

Articles

Worldwide trends in diabetes prevalence and treatment from 1990 to 2022: a pooled analysis of 1108 population-representative studies with 141 million participants

*NCD Risk Factor Collaboration (NCD-RisC)**

bio-protocol Open Access

Published: Mar 05, 2025

Automated Sequential Derivatization for Gas Chromatography-[Orbitrap] Mass Spectrometry-based Metabolite Profiling of Human Blood-based Samples

Akrem Jbebli[1,*], Kateřina Coufalíková[1,2], Moira Zanaboni[3], Manuela Bergna[3], Renzo Picenoni[4], Jana Klánová[1,2] and Elliott J. Price[1,2,*]

ELSEVIER Analytica Chimica Acta

Volume 1356, 22 June 2025, 343942

Dual LC column characterization for mass spectrometry-based small molecule profiling of human plasma and serum

Žiga Tkalec [a,b], Štěpán Koudelka [a], Jana Klánová [a], Elliott J. Price [a]

analytical chemistry

Open Access

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pubs.acs.org/ac Article

Quantum Chemistry-Based Prediction of Electron Ionization Mass Spectra for Environmental Chemicals

Helge Hecht,* Wudmir Y. Rojas,* Zargham Ahmad,* Aleš Křenek,* Jana Klánová,* and Elliott J. Price*

Cite This: *Anal. Chem.* 2024, 96, 13652−13662 Read Online

External exposome

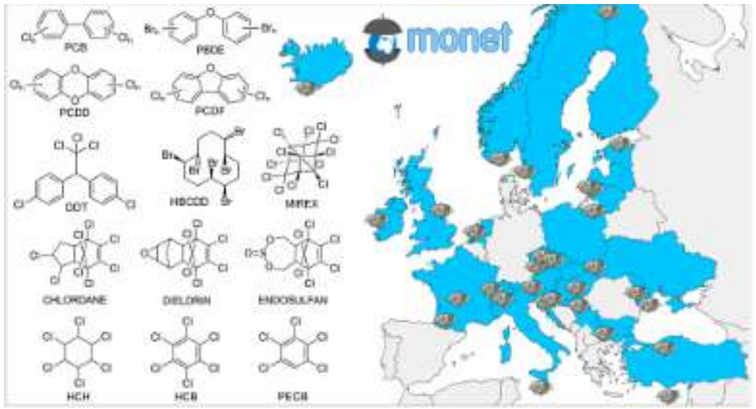
Research goal:

Assessment of spatial and temporal trends in chemical exposure of the environment and human population – shift to human data

PARC WPs 7 and 8

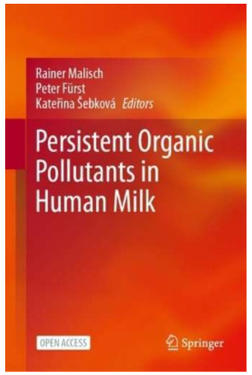
Large-scale data collection and interpretation, uncertainty assessment

Science-to-policy



Guidance on the Global Monitoring Plan for Persistent Organic Pollutants

January 2025



ELSEVIER

Environmental Pollution

Volume 345, 15 March 2024, 123445

Cross sectional study on exposure to BPA and its analogues and semen parameters in Czech men ☆

Michal Jeseta [a b], Jiri Kalina [c], Katerina Franzova [a], Sandra Fialkova [c], Jan Hosek [d i], Lenka Mekinova [a], Igor Crha [a e], Bartosz Kempisty [f g h], Pavel Ventruba [a], Jana Navratilova [c]

CETOCOEN Excellence

Chemical Pollutants and Human Exposure Routes

Lisa Melymuk

Research Focus -Tools and strategies to understand human exposure to chemical compounds

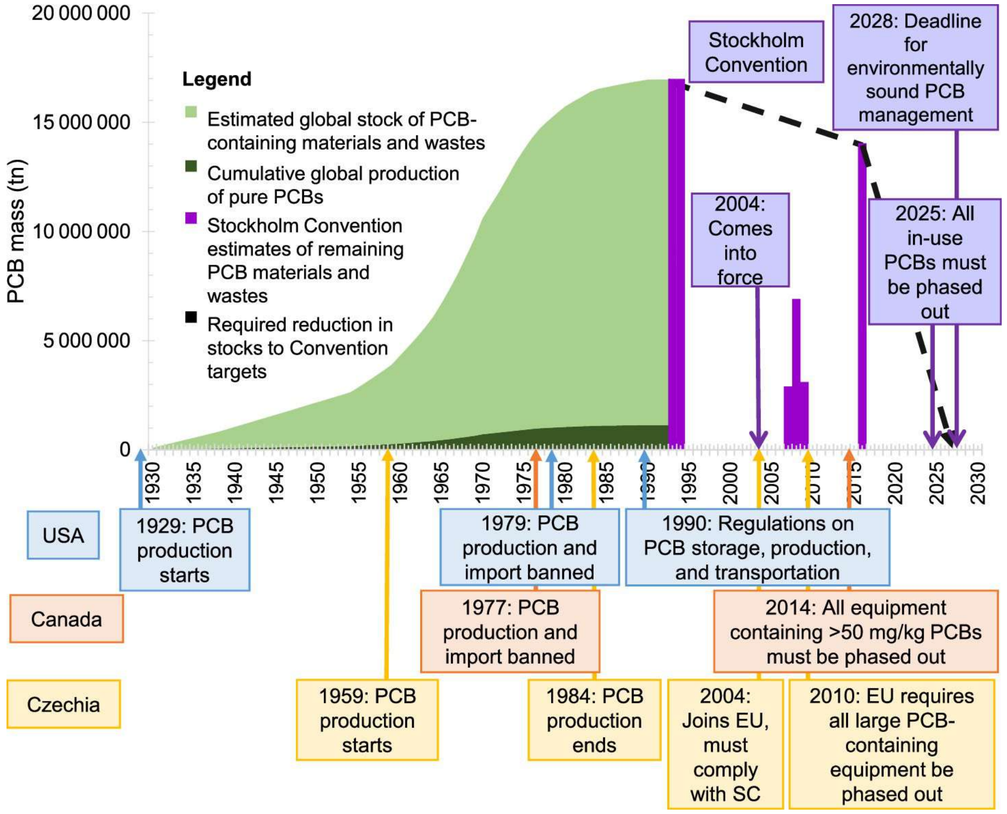
- Link chemical policy with chemical use and exposures to better understand the influence of policy actions on chemical exposures
- Link chemical use and exposure modeling with toxicity to prioritize chemicals for further study, regulation
- Improve our understanding of the behavioural variables in our human exposure – how do individual consumer choices impact our exposures/what is the balance between regulation, external environment and lifestyle in chemical exposures

Current projects

INQUIRE – Improving indoor air quality and health: identification of chemical and biological determinants, their sources, and strategies to promote healthier homes in Europe – Horizon Europe (2022-2027) – WP leader

PARC – WP6 T6.4.3 - Developing databases and analytical testing methodology for chemicals in materials and articles (with Martin Scheringer)

MSCA Fellowship (Veronica van der Schyff)



Timeline of major policy actions on PCBs in the USA, Canada, and Czechia and in the Stockholm Convention.

CETOCOEN Excellence

Chemical Pollutants and Human Exposure Routes

Environmental Science & Technology LETTERS

Open Access

pubs.acs.org/journal/estlcu

Letter

Occurrence of Pharmaceuticals and Other Anthropogenic Compounds in the Wastewater Effluent of Arctic Expedition Cruise Ships

Published as part of Environmental Science & Technology Letters special issue "Ocean Health".

Veronica van der Schyff,* Marek Stiborek, Zdeněk Šimek, Branislav Vrana, Verena Meraldi, Andrew Luke King, and Lisa Melymuk

Environmental Science & Technology

Editors' Choice

Open Access

pubs.acs.org/est

Policy Analysis

Toward Product Safety and Circularity: Understanding the Information Structure of Global Databases on Chemicals in Products and Articles

Chijioke Olisah, Lisa Melymuk,* Robin Vestergren, Karin Rumar, Tonie Wickman, Nina Melander, Petteri Talasniemi, Sicco Brandsma, Urban Boije af Gennäs, and Martin Scheringer

Environ Monit Assess (2025) 197:396
https://doi.org/10.1007/s10661-025-13822-z

RESEARCH

Check for updates

High levels of flame retardants in vehicle dust indicate ongoing use of brominated and organophosphate flame retardants in vehicle interiors

Petra Svobodová · Simona Rozárka Jílková · Jiří Kohoutek · Ondřej Audy · Petr Šenk · Lisa Melymuk

Environmental Science Processes & Impacts

ROYAL SOCIETY OF CHEMISTRY

PAPER

View Article Online
View Journal | View Issue

Check for updates

Cite this: *Environ. Sci.: Processes Impacts*, 2025, **27**, 1054

Characterizing the distribution of aromatic amines between polyester, cotton, and wool textiles and air†

Özge Edebali,[a] Anna Goellner,[b] Marek Stiborek,[a] Zdeněk Šimek,[a] Melis Muz,[b] Branislav Vrana[a] and Lisa Melymuk*[a]

Chemodynamics of environmental pollution

Cooperations with: Actris RI, Max Planck Institute for Chemistry (DE), Aristotle U Thessaloniki (GR), Czech Hydromet I (CZ), NILU Oslo (NO) (and others)

Gerhard Lammel

Aims:

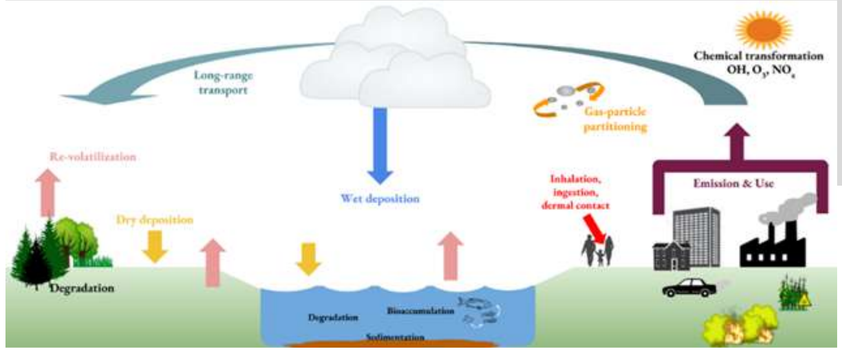
- Characterization of distributions, long-range transport potential and paths of organic pollutants (i.e., polycyclic aromatic compounds, pesticides)
- Determination of inhalation bioaccessibility

Methodology: field measurements, chemical analysis, modelling

Achievements:

- PESPAT project: Simultaneous sampling at 29 rural, mountain and coastal sites across Europe and the European Arctic

- Studied formation of nitro-PAHs in regionally transported plumes (ca. 400 km, Eastern Mediterranean)



Atmospheric Environment 334 (2024) 120680

Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

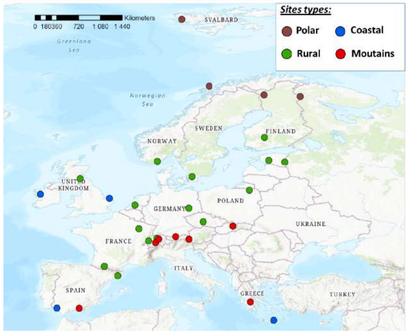
Short communication

Particle size distributions of current-use pesticides in three European atmospheric environments

Ludovic Mayer [a], Lisa Melymuk [a], Darius Ceburnis [b], Adela Holubová Šmejkalová [c], Petra Přibylová [a], Petr Šenk [a], Jakub Vinkler [a], Gerhard Lammel [a,d,*]

Atmospheric Pollution Research

Volume 16, Issue 9, September 2025, 102606



Current-use pesticides in ambient air - evaluation of deposition sampling and soil fugacity techniques

Ludovic Mayer [a], Lisa Melymuk [a], Jakub Vinkler [a], Petr Šenk [a], Marek Šudoma [a], Petra Přibylová [a], Céline Degrendele [a,1], Gerhard Lammel [a,b]

Atmospheric Pollution Research 16 (2025) 102460

Contents lists available at ScienceDirect

Atmospheric Pollution Research

journal homepage: www.elsevier.com/locate/apr

Field validation of a novel passive air sampler and monitoring of semivolatile organic pollutants in the remote marine and continental boundary layer

Gerhard Lammel [a,b,*], Björn Nillius [a], Frank Helleis [a], Adela Holubová Šmejkalová [c], Petr Kukučka [b], Jakub Martiník [b], Petra Přibylová [b], Roman Prokeš [b,d], Pourya Shahpoury [a,e], Daniel Štěpánek [d], Jakub Vinkler [b]

Convention on Long-range Transboundary Air Pollution
emep Co-operative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe

CETOCOEN Excellence

Chemodynamics of environmental pollution

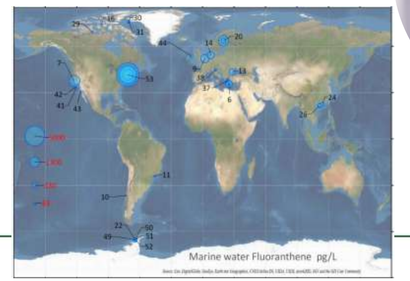
Branislav Vrana

Cooperations with: University of South Bohemia in České Budějovice, NORMAN association, International Commission for the Protection of the Danube River (ICPDR), NIVA (Norway) and others

Aim: Setting up the AQUA-MONET Network for global monitoring
Methodology: field measurements, passive sampling in water, target and suspect screening chemical analysis
Achievement: Setting up the baseline for representative monitoring of trace organic pollutants in large water bodies.

Aim: Analytical and bioanalytical assessments of organic micropollutants in the Danube River using a combination of passive sampling, bioassays and non-target screening
Methodology: field measurements, passive sampling in water, target and suspect screening chemical analysis, bioanalytical tools
Achievement:. Identification of toxicity drivers in complex mixtures.

Aim: Investigation of the relationship between concentrations of hydrophobic organic contaminants (HOCs) in freshwater fish at different trophic levels and in water using passive sampling
Methodology: field measurements, passive sampling in water and fish, chemical analysis
Achievement: The trophic magnification in freshwater food chains rarely amplifies levels of persistent HOCs in fish above those in the surrounding environment.



Environmental Science & Technology
pubs.acs.org/est
Article

AQUA-GAPS/MONET-Derived Concentrations and Trends of PAHs and Polycyclic Musks across Global Waters

Rainer Lohmann,* Branislav Vrana, Derek Muir, Foppe Smedes, Jaromir Sobotka, Eddy Y. Zeng, Lian-Jun Bao, Ian J Allan, Peleg Astrahan, Terry Bidleman, Denis Crowley, Evgen Dykyi, Nicolas Estoppey, Gilberto Fillmann, Liisa Jantunen, Sarit Kaserzon, Keith A. Maruya, Brendan McHugh, Brent Newman, Raimon M. Prats, Manolis Tsapakis, Mats Tysklind, Barend L. van Drooge, and Charles S. Wong

ACS ES&T Water
pubs.acs.org/estwater
Perspective

Achievements and Challenges with Equilibrium and Kinetic Passive Sampling of Hydrophobic and Hydrophilic Organic Compounds in Surface Waters

Kees Booij,* Rachel Mackie, Branislav Vrana, Rainer Lohmann, and Sarit L. Kaserzon*

Contents lists available at ScienceDirect
Journal of Hazardous Materials
journal homepage: www.elsevier.com/locate/jhazmat
ELSEVIER

Biomarker responses in wild brown trout from a headwater stream and their causal link to water pollution assessed through chemical analysis and *in vitro* reporter gene bioassays

Anna Koubová[a,*], Zuzana Toušová[b], Pavel Šauer[a], Carolina de Sales-Ribeiro[c], Branislav Vrana[b], Marie Smutná[b], Hana Kocour Kroupová[a], Kateřina Grabicová[a], Heike Schmidt-Posthaus[c], Tomáš Randák[a], Roman Grabic[a], Klára Hilscherová[b], Vladimír Žlábek[a]

Chemodynamics of environmental pollution

Aim:
Characterization of environmental levels of POPs, PAHs, flame retardands, microplastics
Air-sea and air-soil cycling of organic pollutants
Enhanced collaboration and capacity building in South America
Methodology: field measurements, chemical analysis and modelling



Environmental Pollution 372 (2025) 126005

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Occurrence of current-use pesticides in sediment cores from lakes and peatlands in pristine mountain areas of Brazilian national parks☆

Patrícia C.G. Pereira [a], Cláudio E.T. Parente [a,*], Yago Guida [a], Raquel Capella [a], Gabriel O. Carvalho [a], Pavlína Karásková [b], Jiří Kohoutek [b], Karla Pozo [b,c], Petra Přibylová [b], Jana Klánová [b], João P.M. Torres [d], Paulo R. Dorneles [a], Rodrigo O. Meire [a]

Environmental Pollution

Volume 374, 1 June 2025, 126196

Land-ocean export of microplastic in central Chile: The contribution of the Biobío River using a particle tracking model approach ☆

Tatiana Recabarren [a], Mariett Torres [a], Camila Jacobsen [a], Katerine Pozo [b], Lautaro Girones [c d], Andrés Arias [c d], Roberto Urrutia [e], Guozhu Ye [f], Petra Přibylová [g], Jana Klánová [g], Ramón Ahumada [h], Karla Pozo [a g]

Marine Pollution Bulletin 205 (2024) 116575

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

}Baseline

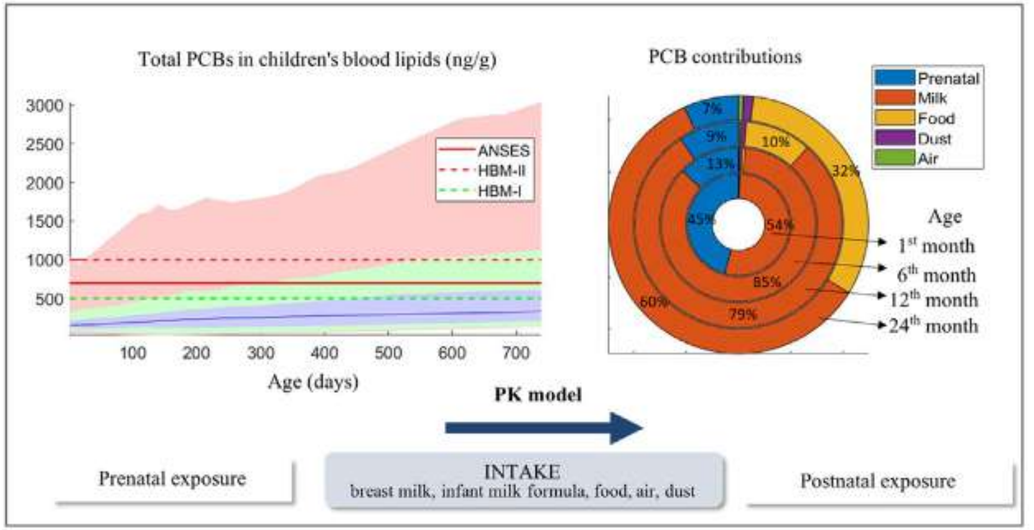
Occurrence of marine plastic litter and plasticizers from touristic beaches of Arauco Gulf in Central Chile

Tatiana Recabarren [a], Mariett Torres [a], Victoria Gómez [b,c], Camila Jacobsen [a], Mathias Villablanca [a], Camila Ahrendt [e], Caroline da Silva Montes [d], Cristóbal Galbán-Malagón [b,c,f], Norma Tombesi [g], Karla Pozo [a,h,*]

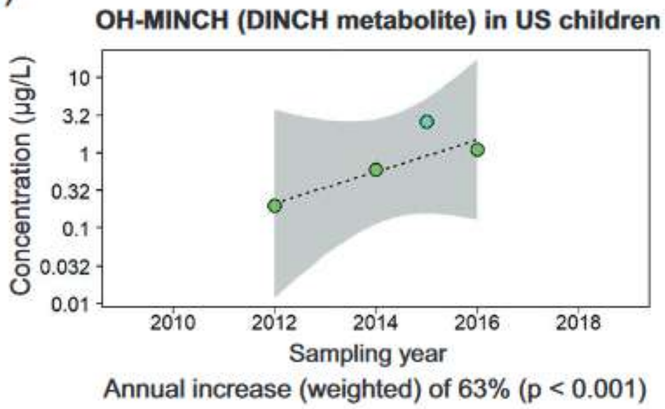
Pharmacokinetic modeling research group – RECETOX – ETH collaboration

Main research goals

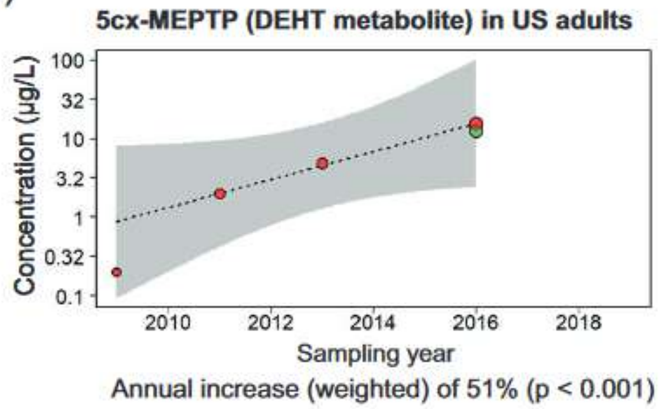
- Modelling of human exposure using pharmacokinetic models
  - estimation of distribution of pollutants and their time trends in human tissue
  - identification of dominant sources of exposure
  - intake calculation, identification of exposed population groups
- Statistical analyses of human biomonitoring data



a)



b)



Projects

- HBM4EU
- PARC
- MSCA Global Fellowship (Brij Sharma at ETH)

MUNI | RECETOX

Pharmacokinetic modeling research group

Achievements

- Characterization of exposure to PCBs of Czech and Slovak children
- Characterization of time trends of human exposure to phthalates and phthalate replacements
- Review of all globally available data on human exposure to mercury, quantification of levels and trends of human exposure to mercury globally
- Focus on Unlocking India's potential

www.nature.com/jes Journal of Exposure Science & Environmental Epidemiology

ARTICLE

Check for updates

Human biomonitoring of essential and toxic trace elements (heavy metals and metalloids) in urine of children, teenagers, and young adults from a Central European Cohort in the Czech Republic

Brij Mohan Sharma[1,2], Klára Komprdová[1]✉, Katarína Lörinczová[1], Jan Kuta[1], Petra Přibylová[1], Martin Scheringer[1,2], Ludmila Šebejová[1], Pavel Piler[1], Martin Zvonař[1,3] and Jana Klánová[1]

Journal of Exposure Science & Environmental Epidemiology www.nature.com/jes

ARTICLE OPEN

Check for updates

Changing pattern of exposure to polycyclic aromatic hydrocarbons over time in the Central European population

Soňa Smetanová[1,5], Akrem Jbebli[1,5], Jiří Kohoutek[1], Vladimíra Puklová[2], Milena Černá[2,3], Andrea Krsková[2], Martin Zvonař[1,4], Zdenko Reguli[4], Lenka Andrýsková[1], Pavel Piler[1], Petra Přibylová[1], Jana Klánová[1], Elliott J. Price[1]✉ and Klára Komprdová[1]✉

ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Environmental Science & Health

An overview of the occurrence and remediation of perfluorooctanoic acid (PFOA) in wastewater-recommendations for cost-effective removal techniques in developing economies

K. Pavithra[1], Brij Mohan Sharma[2,3] and Paromita Chakraborty[4]

iScience

CellPress OPEN ACCESS

Perspective

Complementing global chemicals management through shaping consumer behavior

Brij Mohan Sharma,[1,2,*] Jane Muncke,[3] Justin M. Boucher,[3] Lisa Zimmermann,[3] Thomas A. Brunner,[4] Poonam Arora,[5] and Martin Scheringer[1,2]

[1]RECETOX, Faculty of Science, Masaryk University, Kotlarska 2, Brno, Czech Republic

[2]Institute of Biogeochemistry and Pollutant Dynamics (IBP), ETH Zürich, 8092 Zürich, Switzerland

[3]Food Packaging Forum (FPF) Foundation, 8045 Zürich, Switzerland

[4]Food Science and Management, School of Agricultural, Forest and Food Sciences (HAFL), Bern University of Applied Sciences (BFH), 3052 Zollikofen, Switzerland

[5]School of Business, Quinnipiac University, Hamden, CT 06518, USA

*Correspondence: brij.sharma@recetox.muni.cz

https://doi.org/10.1016/j.isci.2025.112700

Pharmacokinetic modeling research group

Science-to-policy interface

- Strategic panel on Chemical Pollution
- Numerous science-to-policy papers including tw Science editorials

Environmental Science & Technology

Open Access

pubs.acs.org/est

Perspective

From Ambition to Action: Navigating Obstacles and Opportunities of "Safe and Sustainable by Design"

Joanke van Dijk, Anežka Sharma, Bernd Nowack, Zhanyun Wang, and Martin Scheringer*

nature medicine

Review article

https://doi.org/10.1038/s41591-025-03697-5

Health impacts of exposure to synthetic chemicals in food

Received: 7 February 2025

Accepted: 4 April 2025

Jane Muncke[1], Mathilde Touvier[2], Leonardo Trasande[3,4] & Martin Scheringer[5]

Environmental Science & Technology

Open Access

pubs.acs.org/est

Correspondence/Rebuttal

Correspondence on "The Stockholm Convention at a Crossroads: Questionable Nominations and Inadequate Compliance Threaten Its Acceptance and Utility"

iScience

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Perspective

Complementing global chemicals management through shaping consumer behavior

Brij Mohan Sharma,[1,2,*] Jane Muncke,[3] Justin M. Boucher,[3] Lisa Zimmermann,[3] Thomas A. Brunner,[4] Poonam Arora,[5] and Martin Scheringer[1,2]

[1]RECETOX, Faculty of Science, Masaryk University, Kotlarska 2, Brno, Czech Republic
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[4]Food Science and Management, School of Agricultural, Forest and Food Sciences (HAFL), Bern University of Applied Sciences (BFH), 3052 Zollikofen, Switzerland
[5]School of Business, Quinnipiac University, Hamden, CT 06518, USA
*Correspondence: brij.sharma@recetox.muni.cz
https://doi.org/10.1016/j.isci.2025.112700

Environmental toxicology

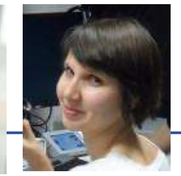
4 Research groups

45 Researchers, PhD students, technicians

2024-2025
54 papers at WoS
(275 citations w/o self-cite)





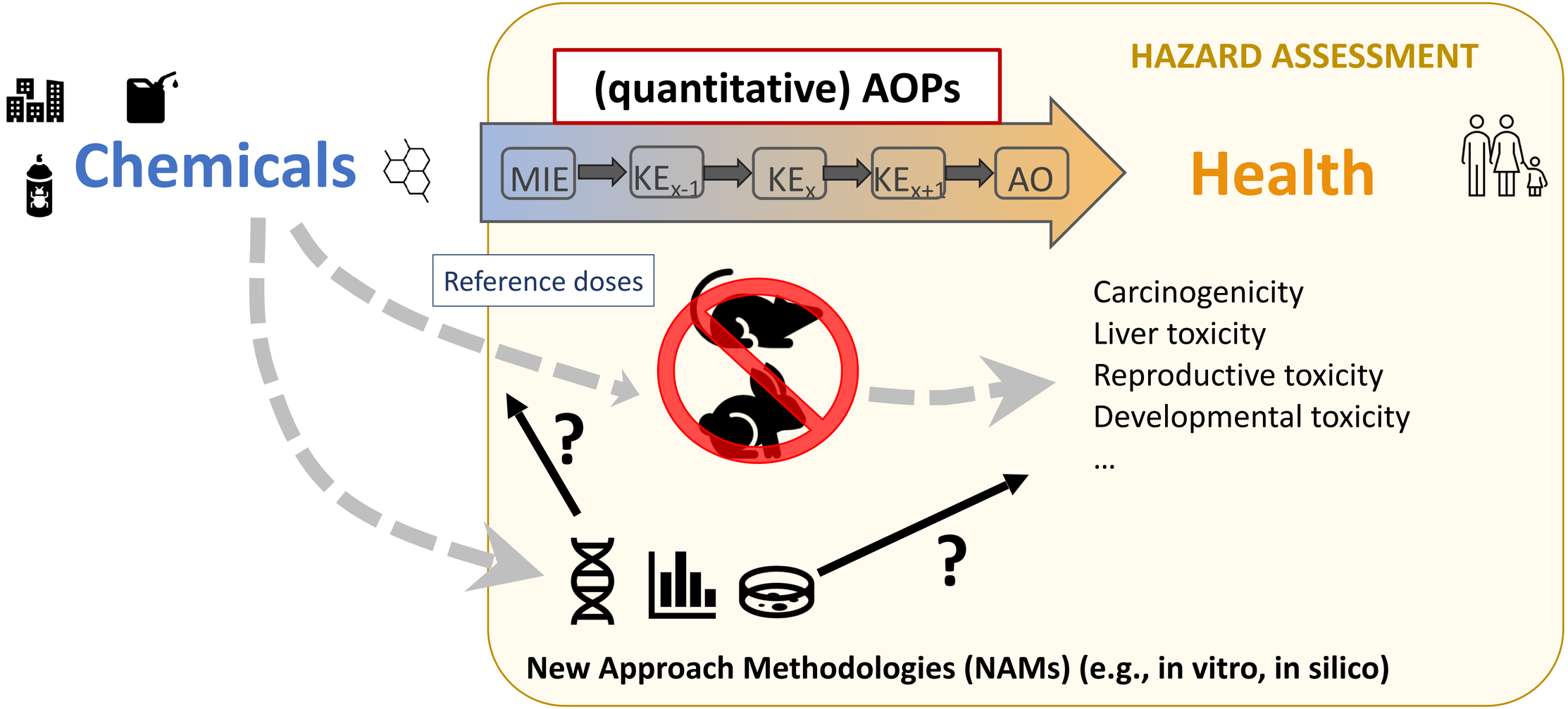



	Bláha Adamovský	Hilscherová	Babica Sovadinová	Hofman
PIs				
PostDocs +experts	Bajard, Bláhová, Ahmad, Dufková, Pelyhe, Sehnal (Bittner)	Novák, Smutná, Toušová, Janečková, Mikušová	Sychrová, Labohá, Bernal	Hochmanová, Chaideftou, Šmídová, da Silva, Radomyski, Šudoma
Doctoral candidates	4	4	3	3
BSc-MSc students	3	4	2	2

+ Secondments & visitors (10+ during 2024-2025)

CETOCOEN Excellence

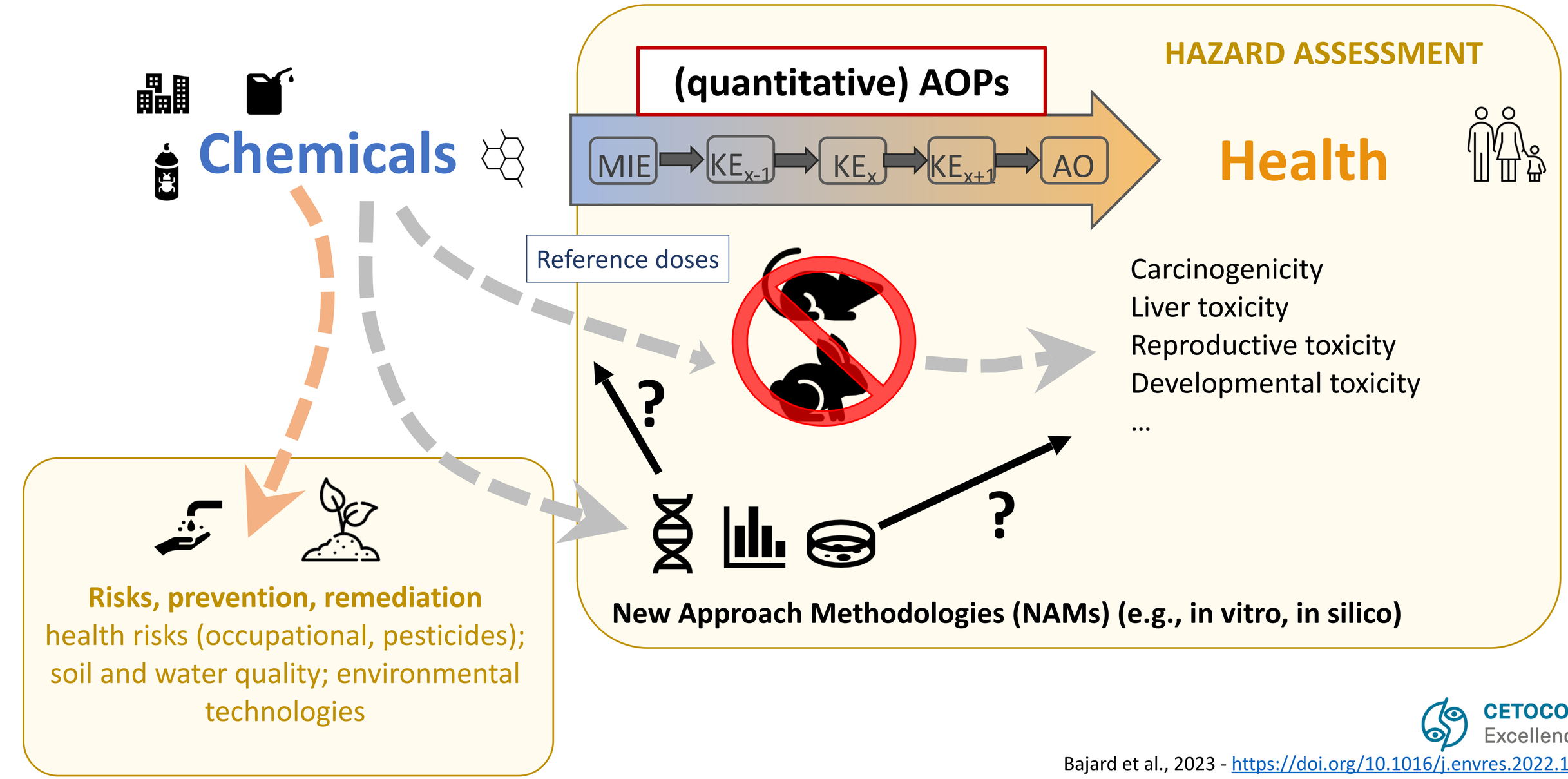
How to (quantitatively) predict toxic effects from NAMs data?



CETOCOEN Excellence

Bajard et al., 2023 - https://doi.org/10.1016/j.envres.2022.114650

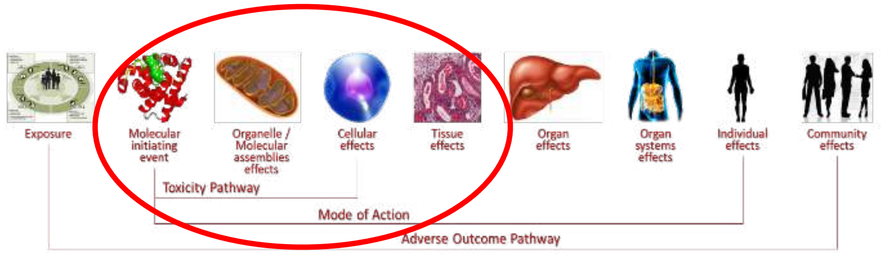
How to (quantitatively) predict toxic effects from NAMs data?



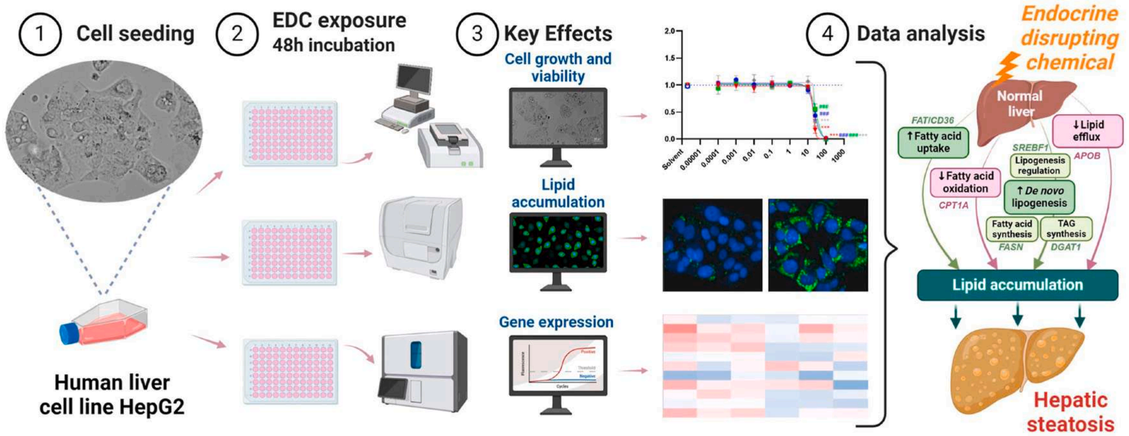
CETOCOEN Excellence

Bajard et al., 2023 - https://doi.org/10.1016/j.envres.2022.114650

NAMs and toxicity mechanisms



Pavel Babica and Iva Sovadinová

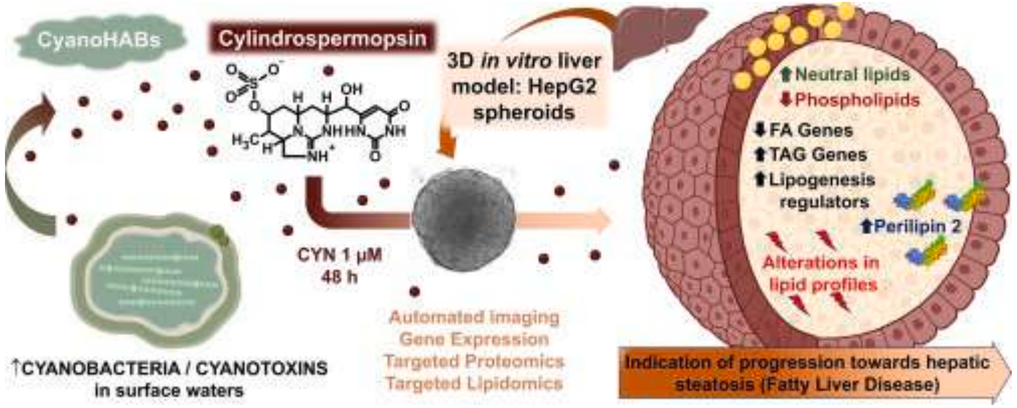


https://doi.org/10.1016/j.fct.2025.115241

2025-2025

- 9 WoS papers (24 citations / excl. self-citations)
- Grants from GAČR (National Science Foundation), Viszegrad Fund (Cyanometa), IFER International Foundation for Ethical Research, HEU (PARC WP5+6)

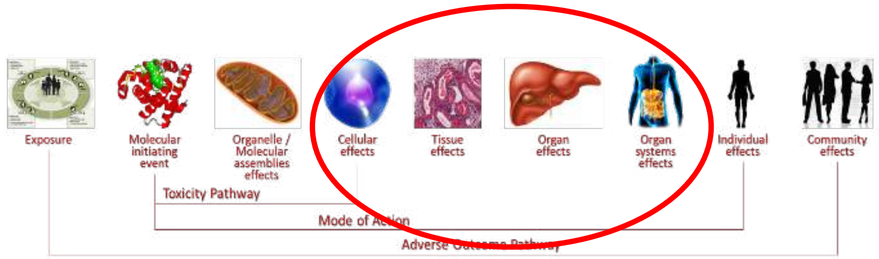
- **International STakeholder NETwork (ISTNET) on the road map for Developmental and Reproductive Toxicity (DART)**



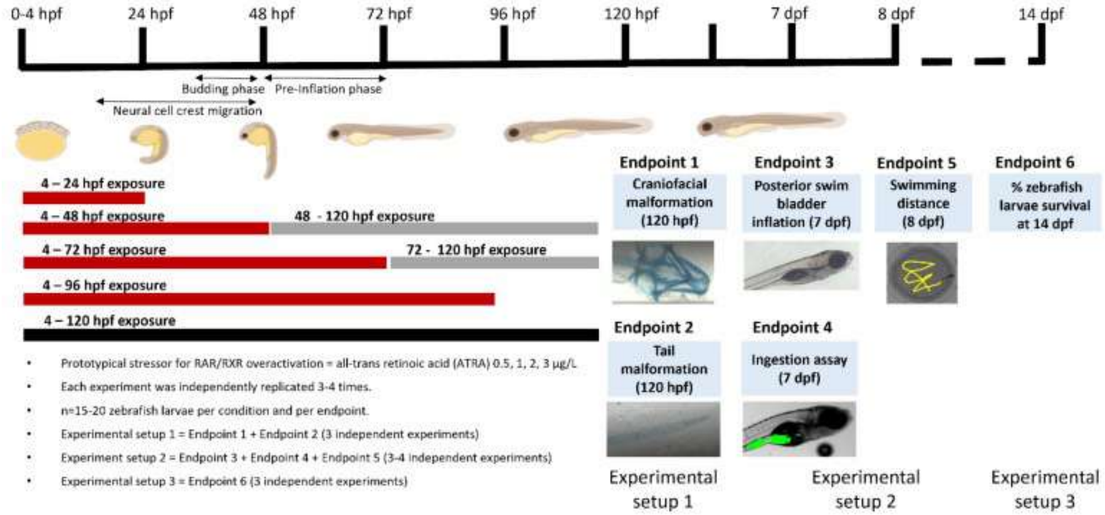
https://doi.org/10.1016/j.cbi.2024.111046

CETOCOEN Excellence

AOPs beyond priority outcomes: neurodevelopment



Klára Hilscherová



https://doi.org/10.1016/j.aquatox.2024.107143

2024-2025

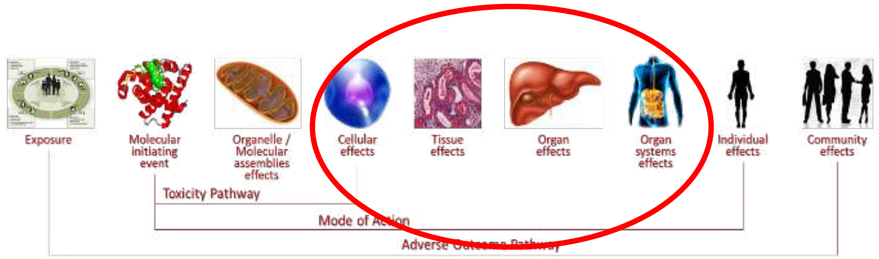
- 13 WoS papers
- Prestigious GAČR Expro grant (National Science Foundation), HEU (PARC, INQUIRE, ENDOMIX)

- **ThD assays for ECHA / EFSA use; the OECD Thyroid Disruption Expert Group**

CETOCOEN Excellence

AOPs beyond priority outcomes: neurodevelopment

NAMs for effect-based environmental monitoring

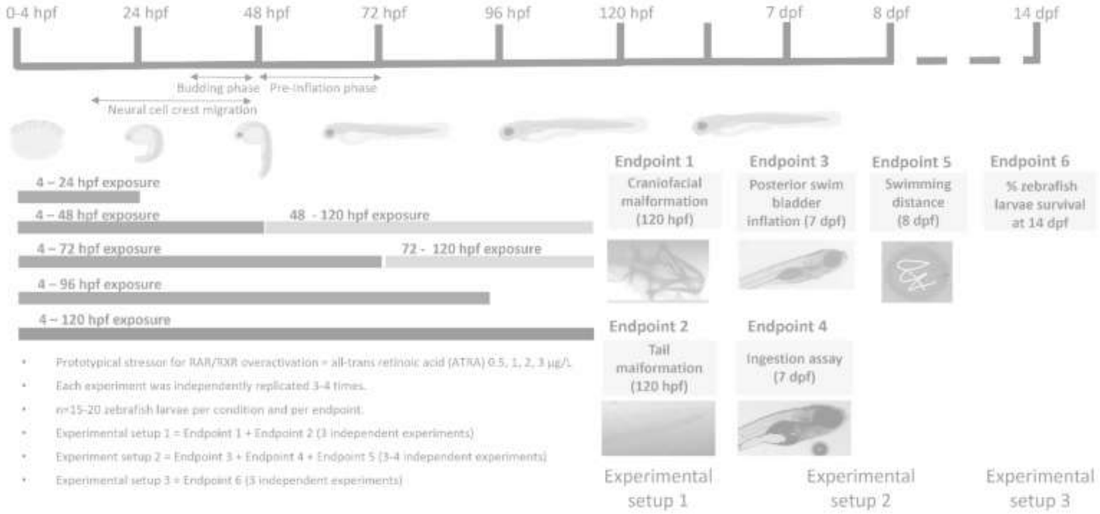


Klára Hilscherová

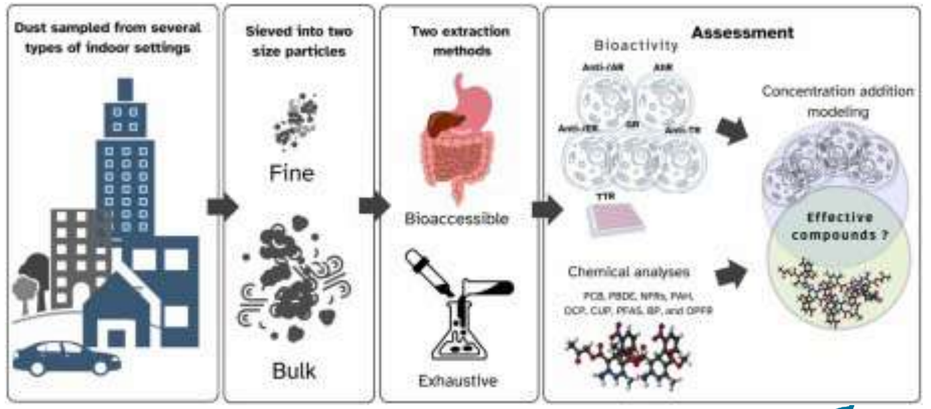
2024-2025

- 13 WoS papers
- Prestigious GAČR Expro grant (National Science Foundation), HEU (PARC, INQUIRE, ENDOMIX)

- **ThD assays for ECHA / EFSA use;**
  the OECD Thyroid Disruption Expert Group



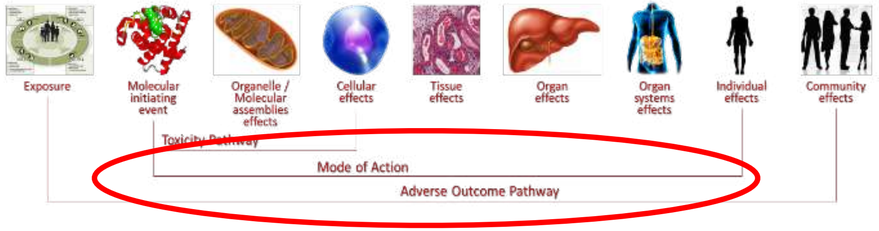
https://doi.org/10.1016/j.aquatox.2024.107143



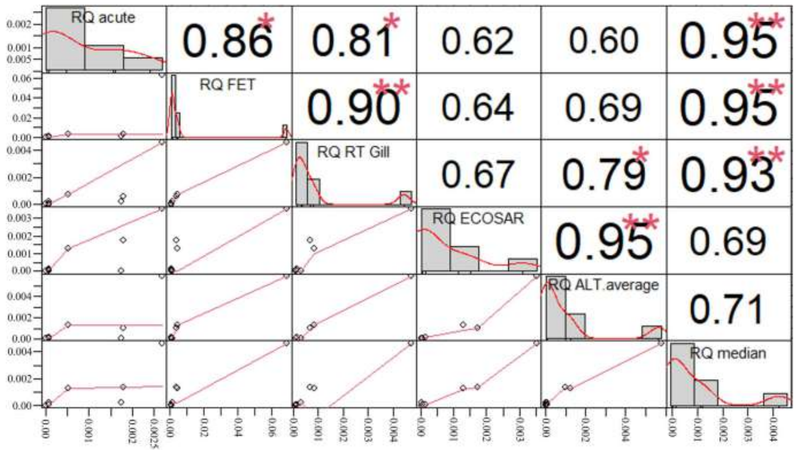
https://doi.org/10.1016/j.jhazmat.2024.133778

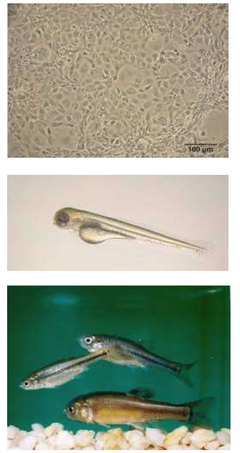
CETOCOEN Excellence

Advancing NAMs and AOPs for Risk Assessment

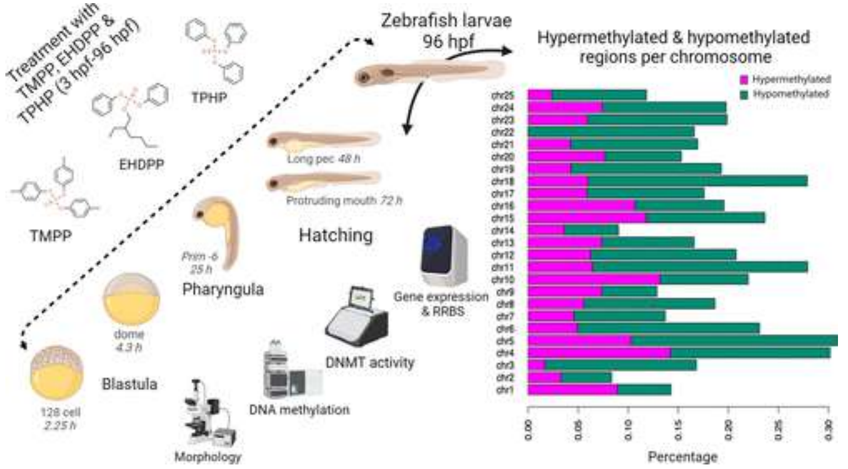


Luděk Bláha





https://enveurope.springeropen.com/articles/10.1186/s12302-024-01015-3



https://pubs.acs.org/doi/10.1021/acs.chemrestox.4c00223

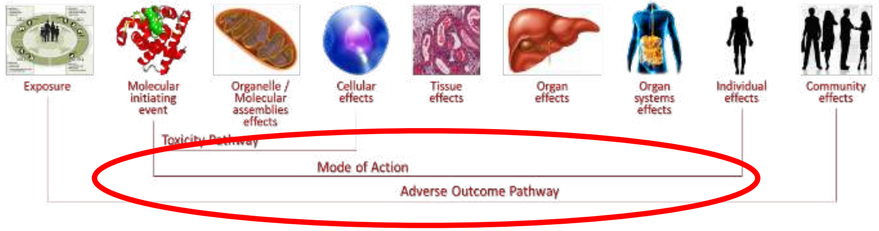
2024-2025

- 10 WoS papers
- HEU (PARC), Applied grants (AZV, TAČR 3x, OP TAK), Japan CONCERT project (InLEDApp)

- **OECD AOPs group, PARC Toxicology**

CETOCOEN Excellence

Gene – Environment – Health Interactions

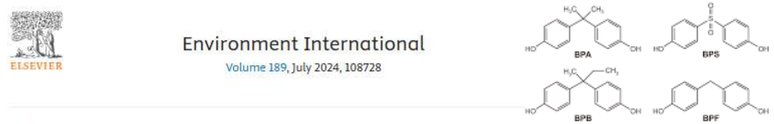


Ondřej Adamovský

2024-2025

- 6 WoS papers (52 citations / excl. self-citations)
- Grants from GAČR (National Science Foundation), EU – PHERITALE, PARC, MSCA IF – EPIC

- **WP5 Task Leader – BPA Alternatives**

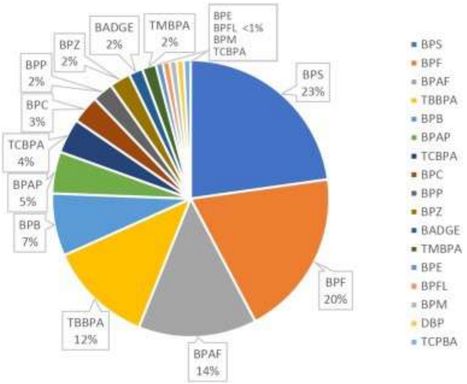


Environment International
Volume 189, July 2024, 108728

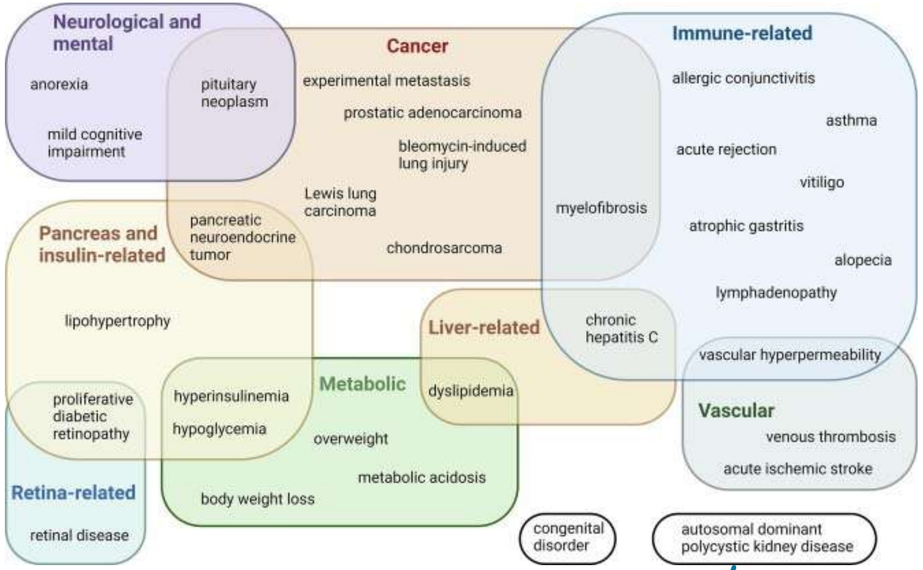
Review article

Exploring BPA alternatives – Environmental levels and toxicity review

Ondrej Adamovsky [a], Ksenia J. Groh [b], Anna Białk-Bielińska [c], Beate I. Escher [d], R. Beaudouin [e], Liadys Mora Lagares [f], Knut Erik Tollefsen [g,oo], Martina Fenske [h], Ewa Mulkiewicz [c], Nicolas Creusot [i], Anita Sosnowska [j], Susana Loureiro [k], Jonny Beyer [g], Guillermo Repetto [l], Alja Štern [m], Isabel Lopes [k], Marta Monteiro [k], Andrea Zikova-Kloas [n,o], Tina Eleršek [m], Marjan Vračko [f], Szymon Zdybel [j], Tomasz Puzyn [j], Weronika Koczur [c], Jane Ebsen Morthorst [p], Henrik Holbech [p], Gunnar Carlsson [q], Stefan Örn [q], Óscar Herrero [r], Ayesha Siddique [s], Matthias Liess [s,t], Georg Braun [d], Vanessa Srebny [d], Bojana Žegura [m], Nathalie Hinfray [u], François Brion [u], Dries Knapen [v], Ellen Vandeputte [v], Evelyn Stinckens [v], Lucia Vergauwen [v], Lars Behrendt [w], Maria João Silva [x,y], Ludek Blaha [a], Katerina Kyriakopoulou [z]



https://doi.org/10.1016/j.envint.2024.108728



https://doi.org/10.1016/j.envint.2024.108879

CETOCOEN Excellence

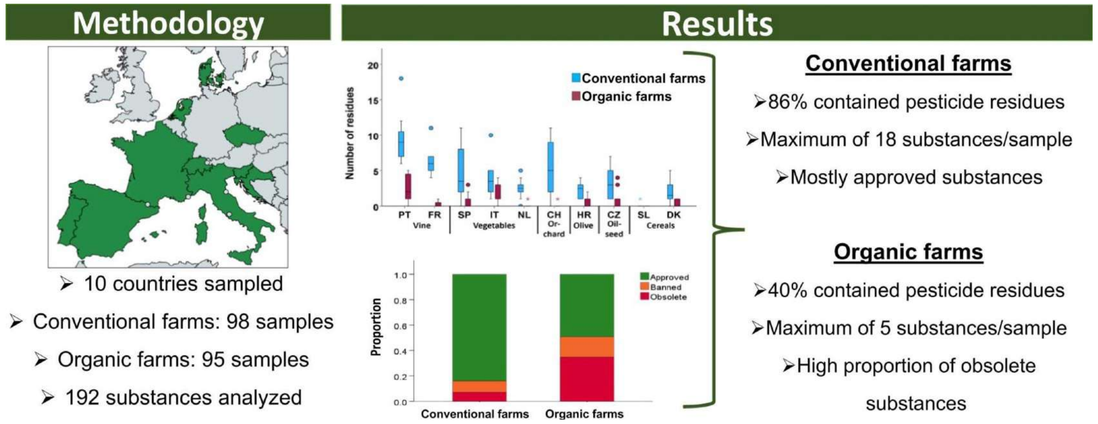
Soil Environmental Chemistry and Toxicology

Jakub Hofman

Journal of Hazardous Materials
Volume 495, 5 September 2025, 139113

Occurrence of pesticide residues in harvested products of various crops from European conventional and organic farming systems

Paula S. Tourinho [a], Zuzana Hochmanová [a], Petr Kukučka [a], Martina Hronová [a], Marek Šudoma [a], Shiva Sabzevari [a], Francisco Alcón [b], Josefina Contreras [b], Nelson Abrantes [c], Isabel Campos [d], Isabelle Baldi [e], Mathilde Bureau [e], Abdallah Alaoui [f], Florian Christ [f], Daniele Mandrioli [g], Daria Sgargi [g], Igor Pasković [h], Marija Polić Pasković [h], Matjaž Glavan [i], Paula Harkes [j]... Jakub Hofman [a]

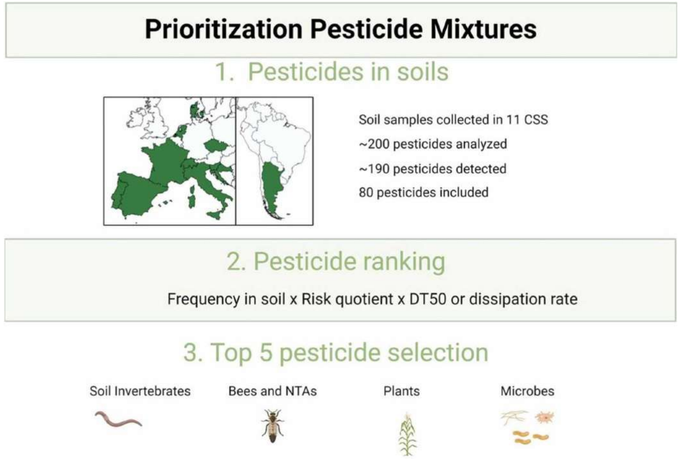


https://doi.org/10.1016/j.jhazmat.2025.139113

2024-2025

- 18 WoS papers
- EU projects PAPILLONS, BENCHMARKS, SPRINT, SOILPROM

- **(Inter)national bodies on RA of plant protection products**



https://doi.org/10.1016/j.jhazmat.2025.138942

CETOCOEN Excellence

Exposure and Health Risk Assessment Group (EHRA)

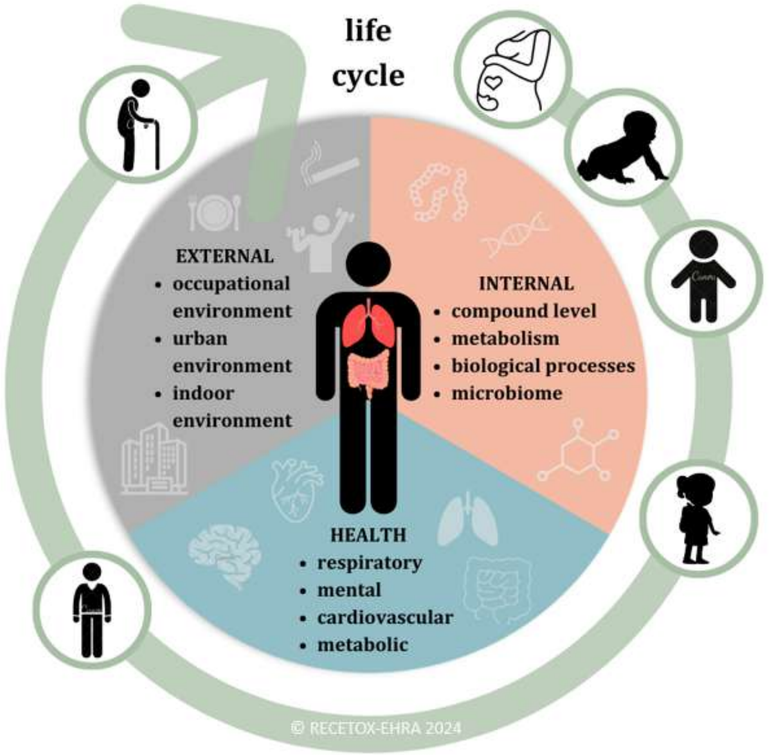
MUNI | RECETOX
Exposure and Health Risk Assessment

- **PI**
  - Pavel Čupr
- **Post-docs**
  - Ondřej Mikeš
  - Tomáš Janoš
  - Kateřina Snopková
- **PhD students**
  - Soňa Skřídlová
  - Petr Gregor
  - Michal Maliszewski
  - Markéta Průšová
  - Aneta Vrzalová

CETOCOEN Excellence

Exposure and Health Risk Assessment - Research

- Main aim: **EXPOSOME approach as a tool for assessing the health outcomes**
- **COHORTS/STUDIES:** Assessment of **internal biomarkers of effect** (**DNA damages *in vivo*, DNA methylation, EPImarkers, Thyroid and Liver Health effects, oxidative stress** and related potential health risks)
- **New NEURO-degenerative cohort** – PD Parkinson diseases and dementia
- **Chemical mixture assessment + Modelling their toxicokinetic pathways** in the human body for exposure reconstruction
- Assessment of **External Exposome** – by geocoding and GIS spatial analysis
- Assessment of potential **relationship between external exposure** and selected health outcomes (**pulmonary diseases - asthma, bronchitis)**.
- **Oncological research**: external exposome and cancer incidences



CETOCOEN Excellence

RECETOX research infrastructure
see EIRENE slides 52-63 and 76-85

Partnership for the Assessment of the Risks from Chemicals

SANDERS Pascal

PARC Coordinator

Geneva, 2025/04/30

PARC

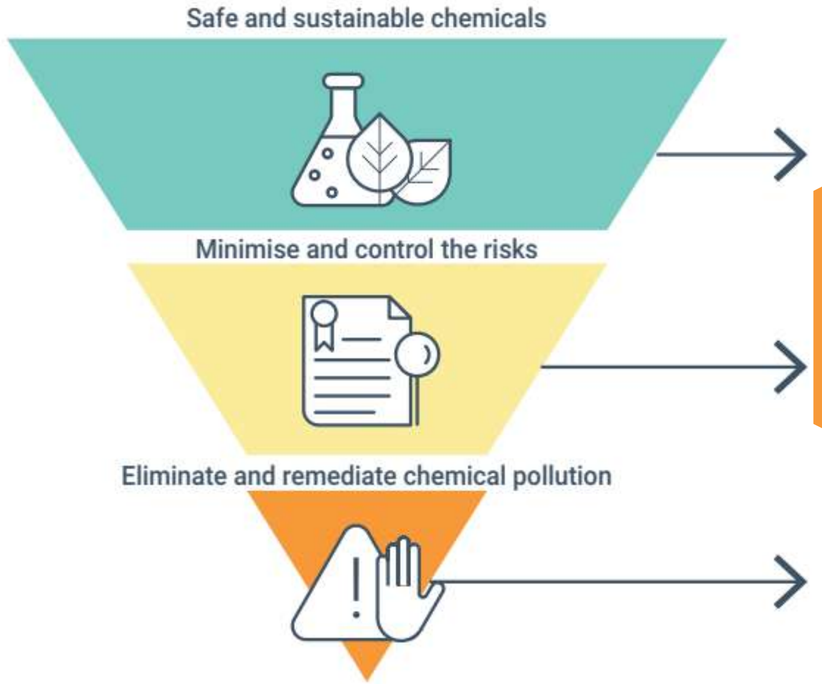
Co-funded by the European Union

Chemicals Strategy for Sustainability towards toxic-free environment

2 Overarching Goals

- Preventing harm to people and the planet from hazardous chemicals and their toxic effects

- Supporting EU Industry in the production of safe and sustainable chemicals



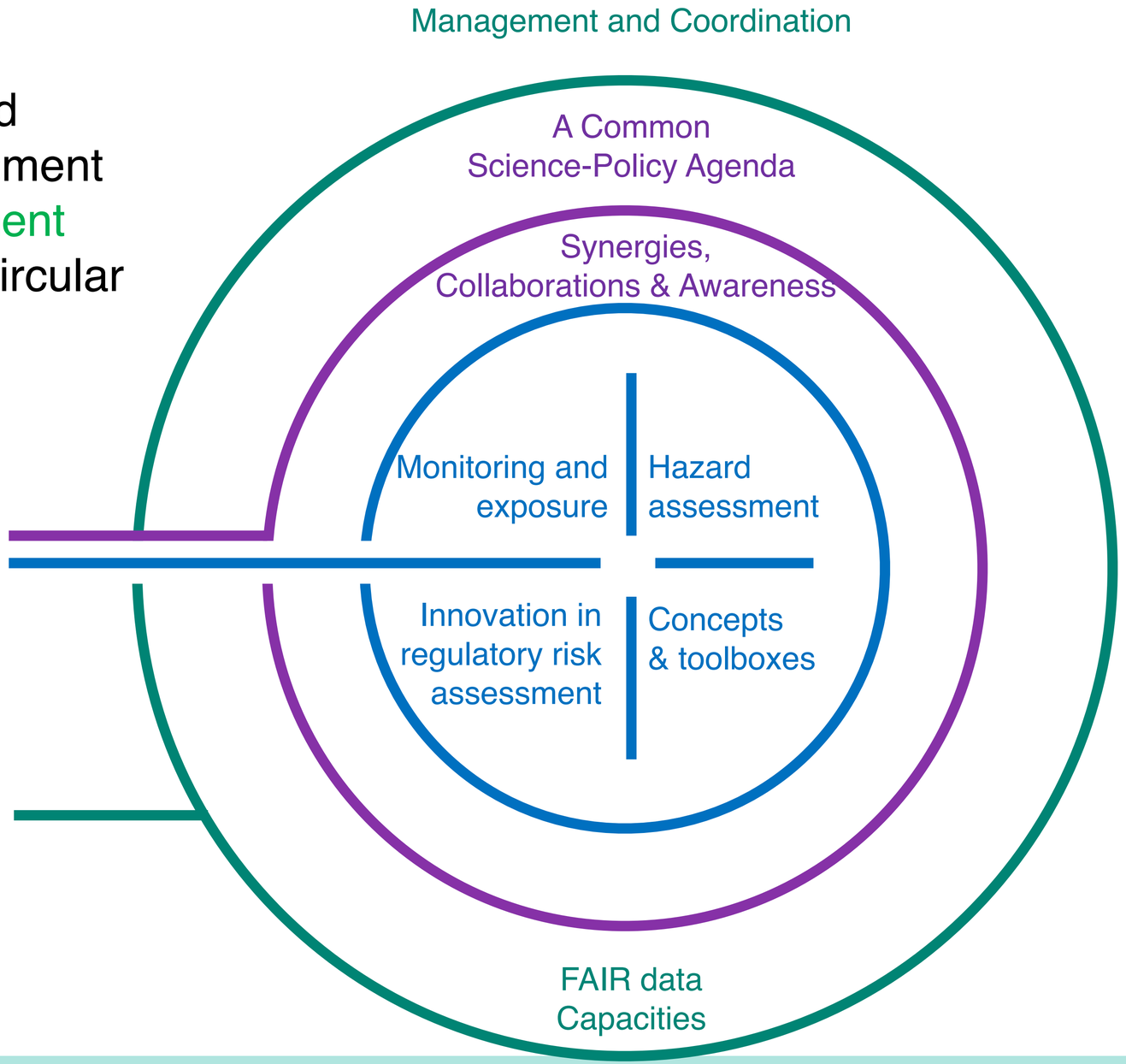
Pollution Action Plan
Towards zero pollution for air, water and s

Global Objective

Consolidate and strengthen the EU's research and innovation (R&I) capacity for chemical risk assessment (CRA) to protect Human Health and the Environment and contribute to a non-toxic environment and a circular economy.

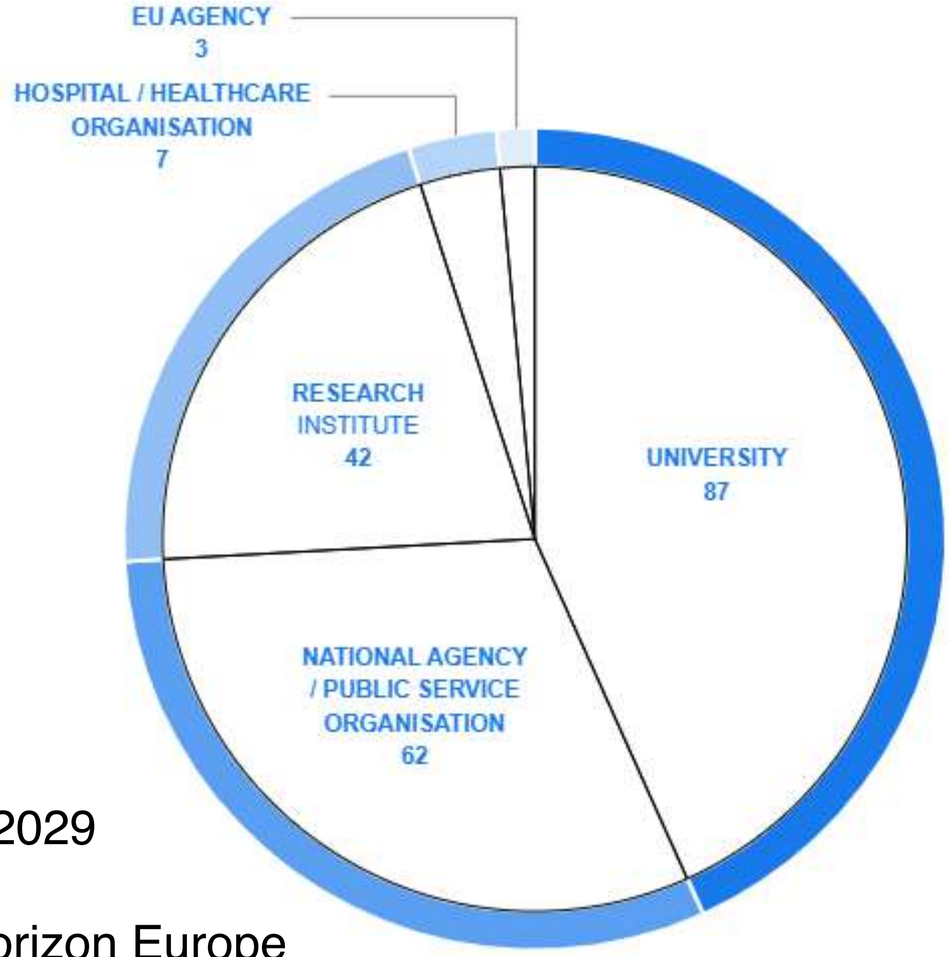
Specific Objectives

- To establish **a cross-disciplinary network** to set priorities for R&I in chemical risk assessment
- To carry out a **joint R&I programme** to respond to the agreed priorities in Chemica Risk assessment.
- To provide **access to the R&I capacities** required to implement innovative CRA

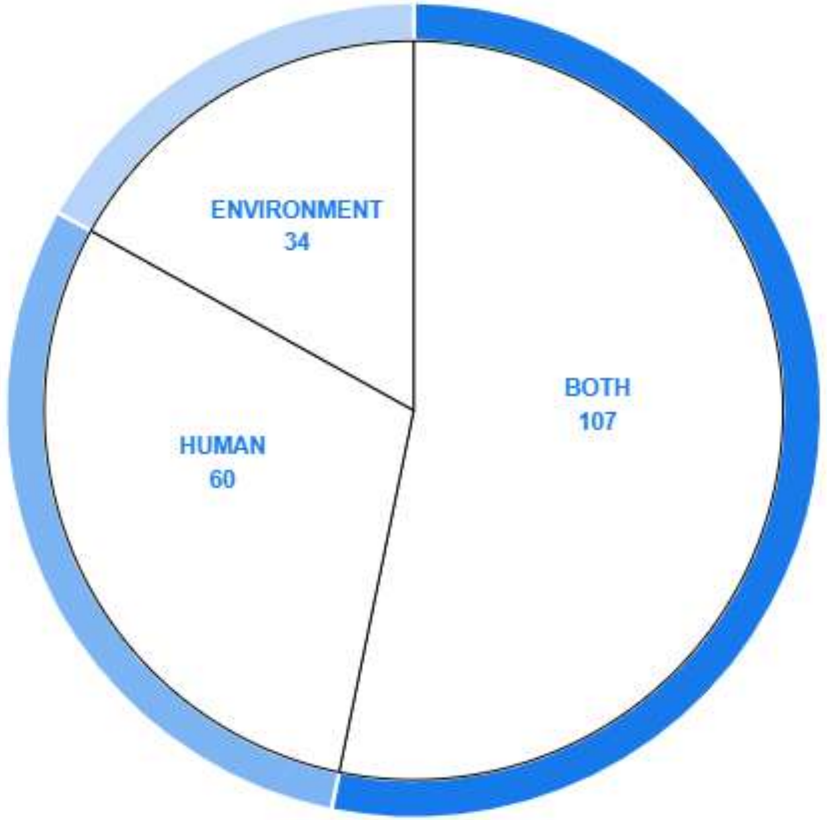


201 Partners

29 Countries

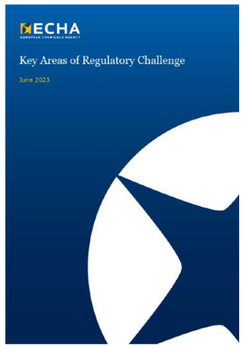


Domains



7 Years
05/2022-04/2029
400 M€
50/50 MS/Horizon Europe

PARC Governance and Impact

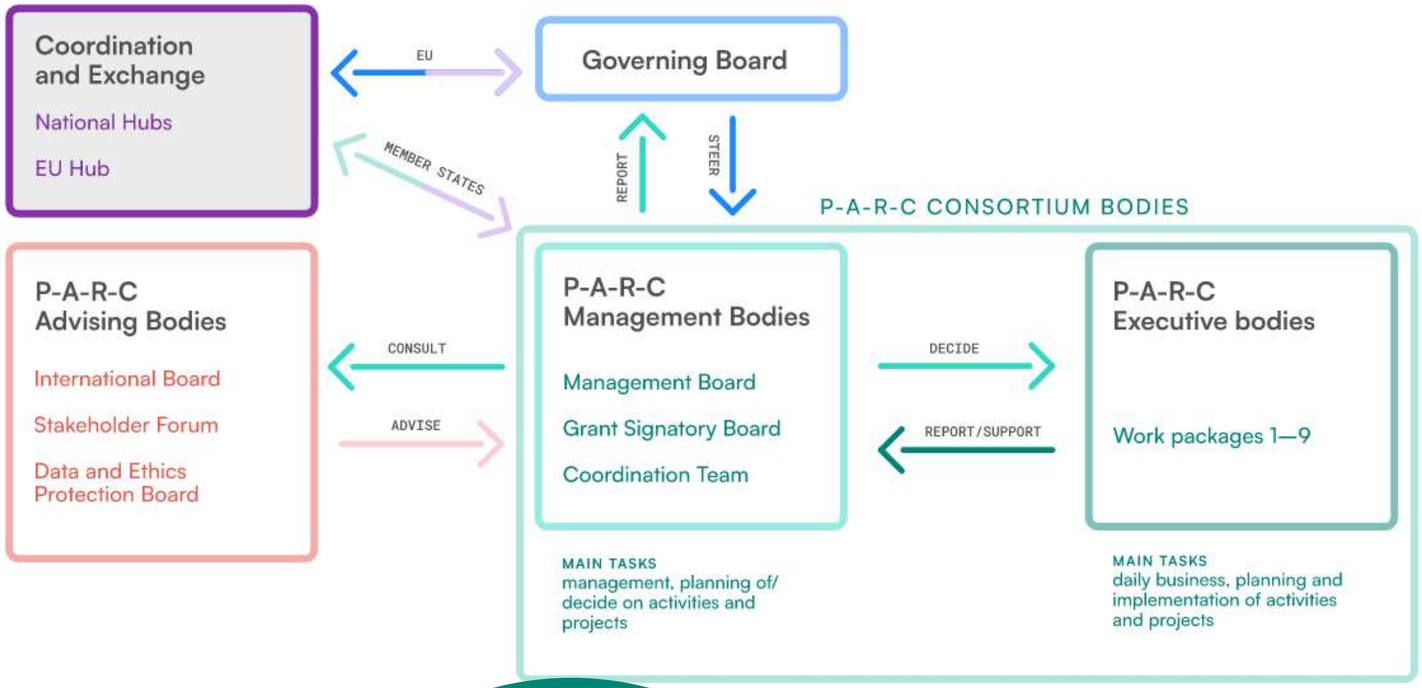


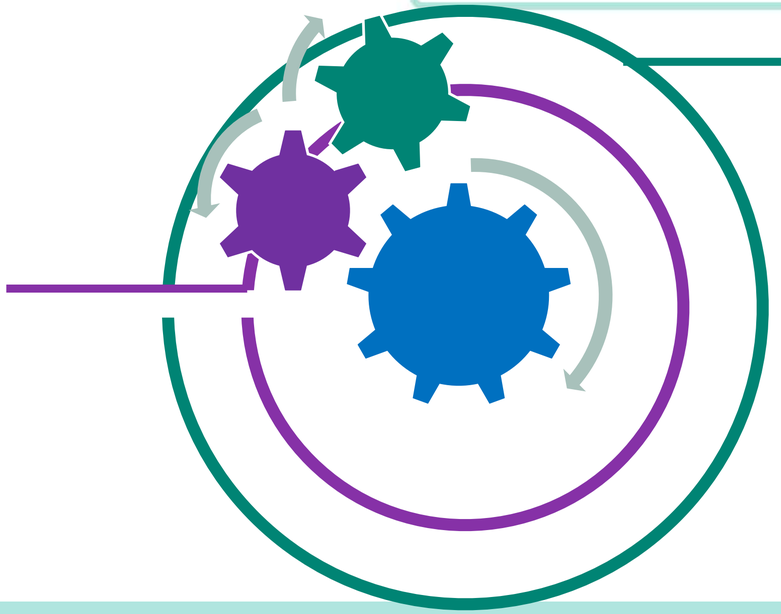
Strategic Research and Innovation Agenda

Mapping of needs

Rapid Response Mechanism

Next Generation Risk Assessment Route





Annual Work Plan
Annual Summary
Reports
Projects/Case Studies
Tools
Dashboards
Scientific productions

WP2

European Environment Agency

Joana Lobo Vicente - EEA

umweltbundesamt
ENVIRONMENT AGENCY AUSTRIA

Maria Uhl - EAA

WP4

Sebastien Denys - SpF

Marike Kolossa - UBA

Human Biomonitoring
- General Population
- Workers

Environmental Monitoring

Innovative methods for sampling and analysis

WP7

Stijn Baken- VITO

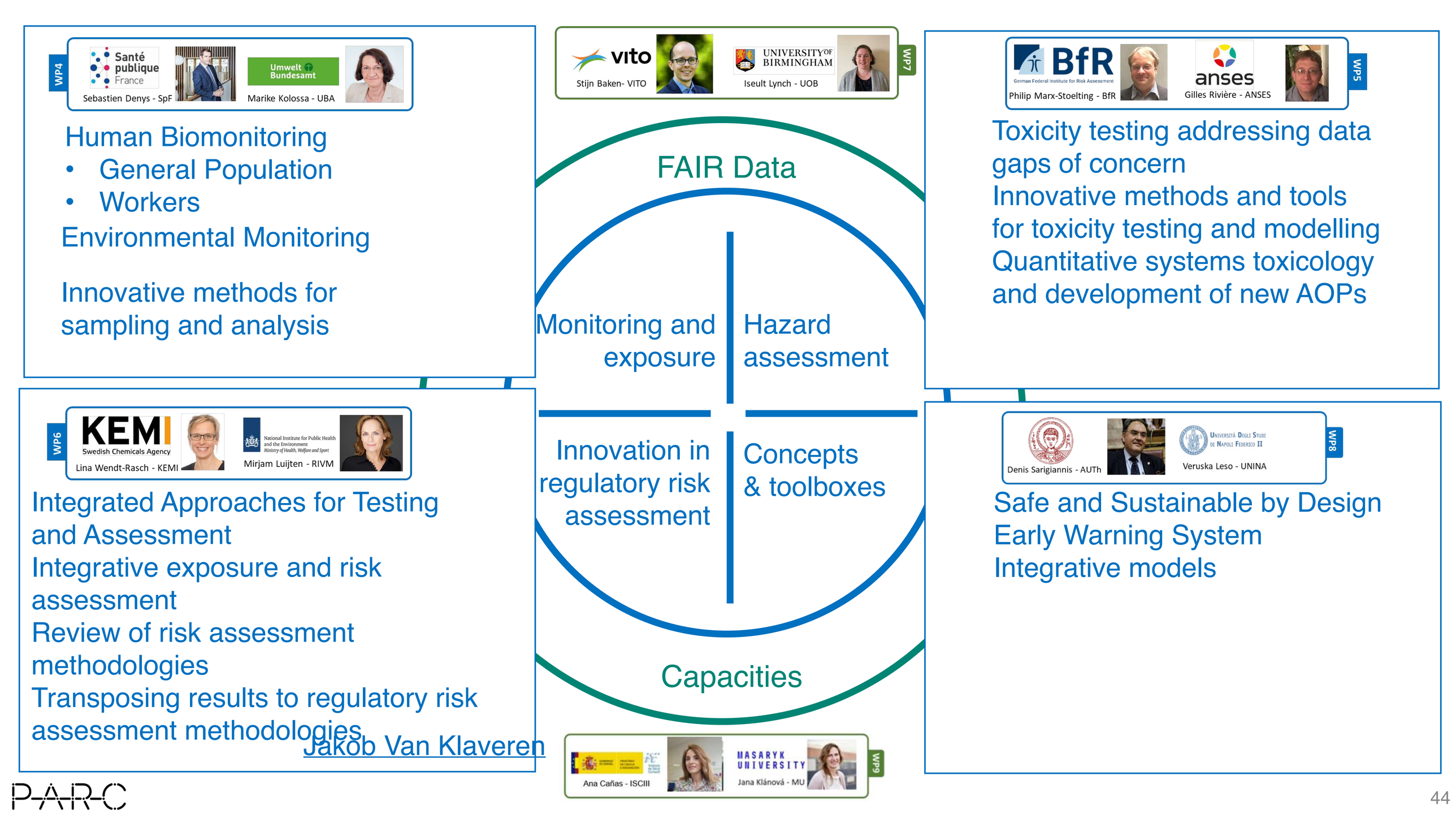
Iseult Lynch - UOB

WP5

Philip Marx-Stoelting - BfR

Gilles Rivière - ANSES

Toxicity testing addressing data gaps of concern
Innovative methods and tools for toxicity testing and modelling
Quantitative systems toxicology and development of new AOPs



WP6

Lina Wendt-Rasch - KEMI

Mirjam Luijten - RIVM

Integrated Approaches for Testing and Assessment
Integrative exposure and risk assessment
Review of risk assessment methodologies
Transposing results to regulatory risk assessment methodologies

WP8

Denis Sarigiannis - AUTh

Veruska Leso - UNINA

Safe and Sustainable by Design
Early Warning System
Integrative models

WP9

Ana Cañas - ISCIII

Jana Klánová - MU

Jakob Van Klaveren

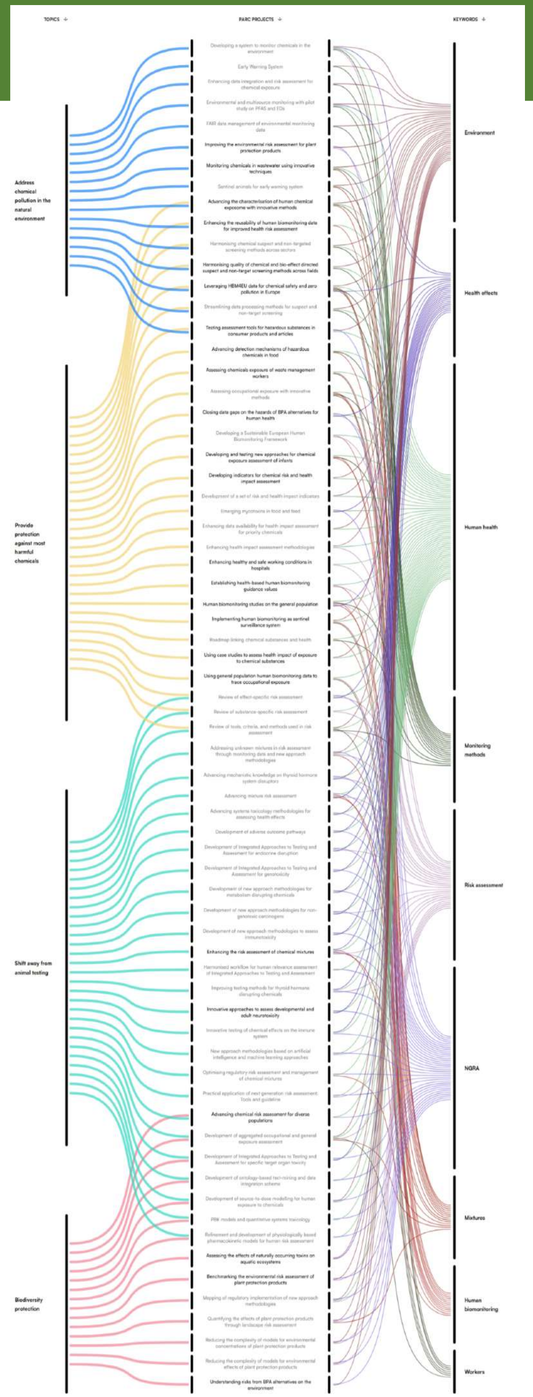
Scientific Impact

Address chemical pollution in the environment

Provide protection against most harmful chemicals

Shift away from animal testing

Biodiversity protection



Environment

Health effect

Human health

Monitoring methods

Risk assessment

Next Generation Risk Assessment

Mixtures

Human biomonitoring

Workers

PARC activities on Mercury

HBM Activities relay

HBM4EU science and policy for a healthy future

Aligned studies Human Biomonitoring in General Population (on going)

- Protocols
- Laboratory network (QA/QC)

EXPOSURE | TIME PATTERNS | HEALTH RISK

vito

PARC **EUROPEAN HUMAN BIOMONITORING DASHBOARD**

Population distribution of internal exposure levels

▶ EXTRA INFO ▶ DISCLAIMER ▶ ACKNOWLEDGEMENTS

▶ SELECT BIOMARKERS | PROJECT: All | STUDY: (Tout) | STRATIFICA...: No stratific... | STRATA: No strata | COUNTRY: (Tout) | AGE: (Tout) | POPULATION: (Tout) | SAMPLING PERIOD: 1991 2018 2005 2021

LEGEND: LOQ, P05 P10 P25 P50 P75 P90 P95 — only percentiles >LOD/LOQ are displayed. If only P90 and P95 are >LOD/LOQ the visualisation looks like this: LOQ, P90, P95

REGION: Northern EU, Eastern EU, Western EU, Southern EU

Distribution of substance: **Mercury and its organic compounds** / biomarker: **Tout** concentration in **Blood (µg/L)**

SELECT A PLOT: Distribution | sort data by: period

sampling period	country	data collection name	Biomarker + Age	No stratification	N
2016-2017	CZ	CzechHBM-CE_2016	Hg total - 3-5y; 6-11y	No strata	411
2015	CZ	CzechHBM-AE_2015	Hg total - 20-39y; 40-59..	No strata	302
2010	DE	ESB_2010	Hg total - 20-39y	No strata	457
2010-2012	SK	PRENATAL_Newborn	Hg total - <1y	No strata	294
			MeHg - <1y	No strata	144
2009	DE	ESB_2009	Hg total - 20-39y	No strata	424
2009-2010	ES	BIOAMBIENT.ES	Hg total - 20-39y; 40-59..	No strata	1880
2009	CZ	CzechHBM-AE_2009	Hg total - 20-39y; 40-59..	No strata	405
2008	DE	ESB_2008	Hg total - 20-39y	No strata	453
2008-2014	SI	SLO-HBM-I	Hg total - 20-39y; 40-59..	No strata	1083
2008	CZ	CzechHBM-CE_2008	Hg total - 6-11y	No strata	198
2007	DE	ESB_2007	Hg total - 20-39y	No strata	430
2007	CZ	CzechHBM-AE_2007	Hg total - 20-39y; 40-59..	No strata	411
2006	CZ	CzechHBM-CE_2006	Hg total - 6-11y; 12-19y	No strata	382
2005	CZ	CzechHBM-AE_2005	Hg total - 20-39y; 40-59..	No strata	405
2003-2006	DE	GerES IV (unweighted)	Hg total - 3-5y; 6-11y; 1..	No strata	1550
2002-2008	NO	MoBa	Hg total - 20-39y; 40-59..	No strata	2962

0.05 0.1 0.2 0.5 1 2 5 10 20

Participation in PARC general population aligned studies

The aim of the PARC aligned studies is to measure concentrations of environmental pollutants in the European population and to obtain comparable data across different EU countries

The study covers three age groups

Children 6—11 years	Adolescents 12—17 years	Adults 18—39 years

Targeting the following substances

Bisphenols Phthalates Pesticides Metals	Bisphenols Phthalates PFAS Pesticides Arsenic species	Bisphenols Phthalates PFAS Pesticides Metals

Studied in

14 countries	11 countries	20 countries

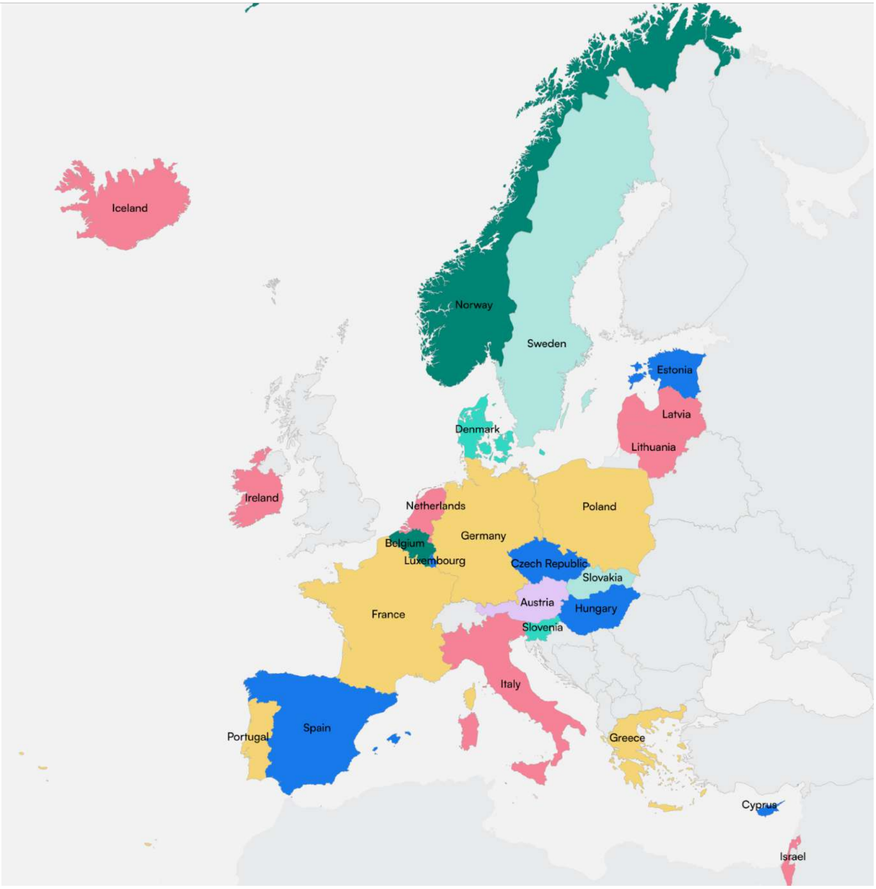
The (target) number of participants is

± 3250	± 2610	± 4750

Legend general population study

Countries involved in following studies

- Only children
- Children & adults
- Children & adolescent
- Only adolescent
- Adolescent & adults
- Only adult
- Children & adolescent & adults

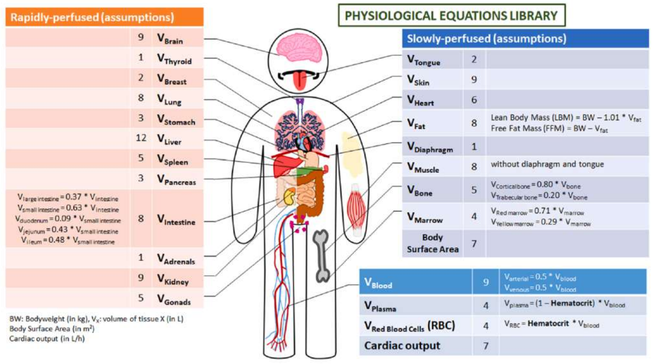


PARC

Co-funded by the European Union

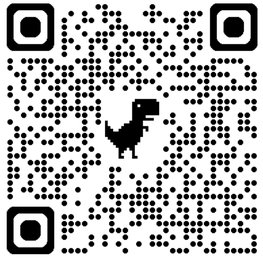
PARC activities on Mercury

Integrated methods for Risk and Health Impact Assessment



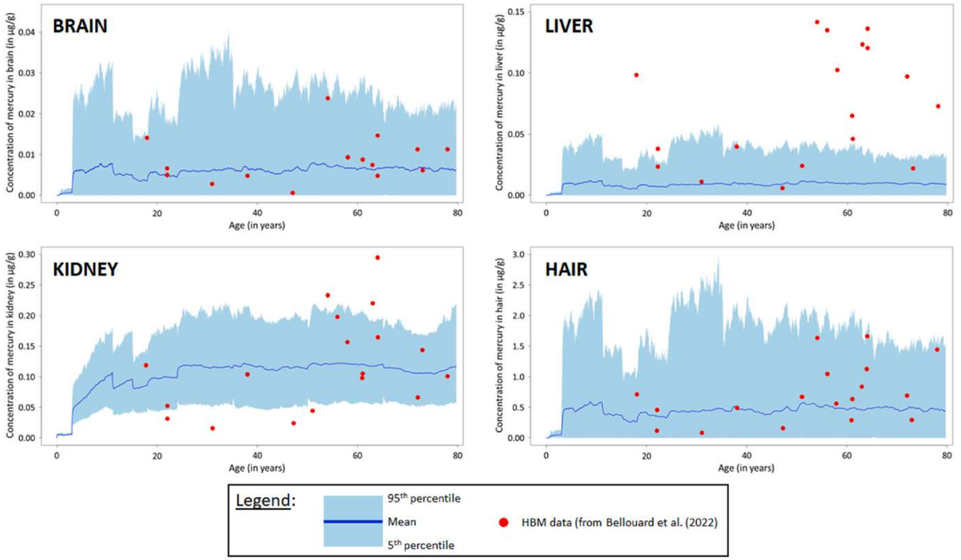
- Integrative PBPK modelling
- Simulation of entire life expos

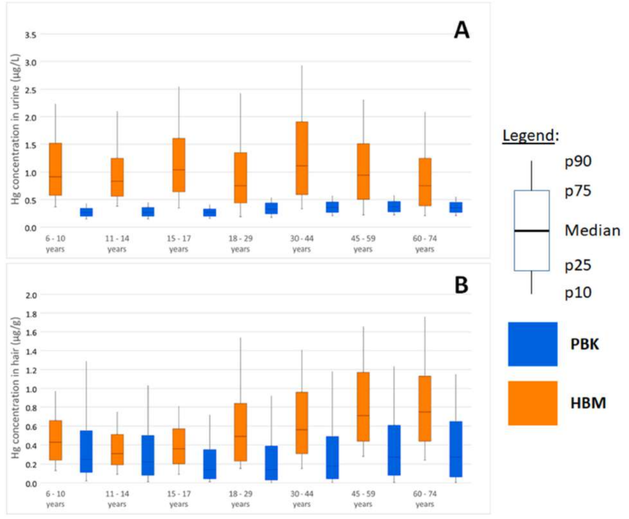
Compared with HBM Guidance values

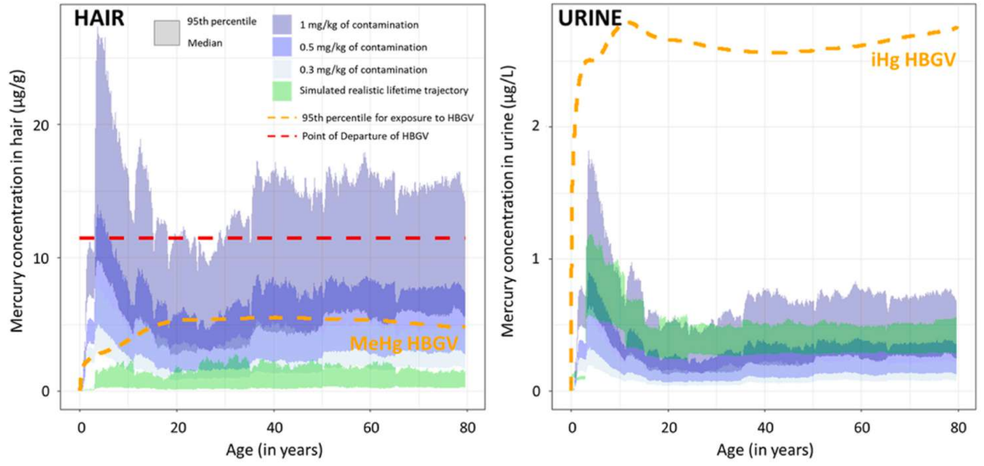


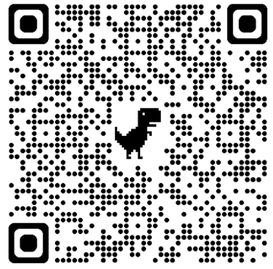
Gastellu et al, Environmental Research

Compared with Observed HBM data





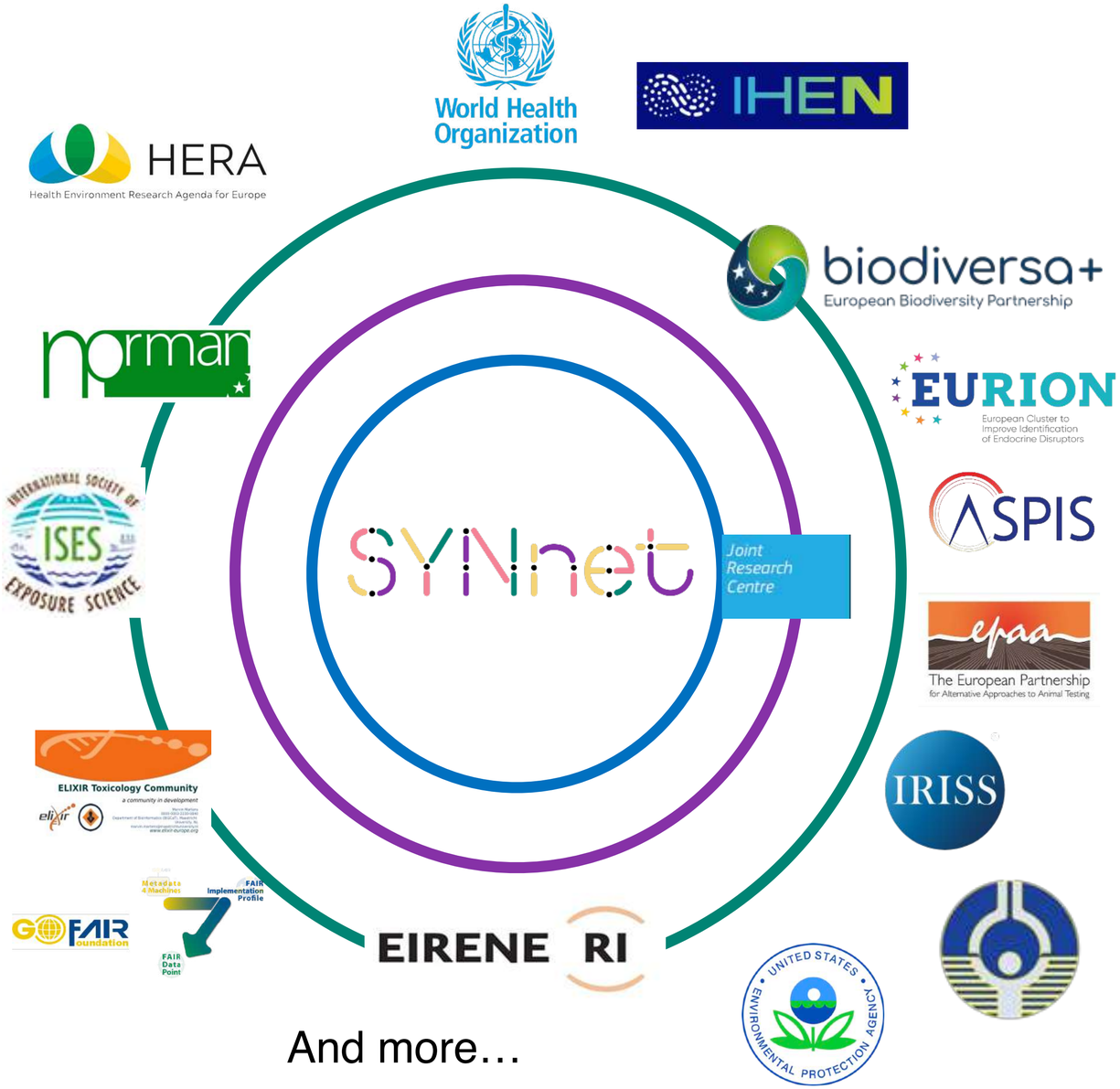




Gastellu et al, Food and Chemical Toxicology

Co-funded by the European Union

How do we support the global framework on chemicals



And more…

Strategic Objectives

A. Legal frameworks, institutional mechanisms and capacities are in place to support and achieve the safe and sustainable management of chemicals throughout their life cycle.

B. Comprehensive and sufficient knowledge, data and information are generated, available and accessible to all to enable informed decisions and actions.

C. Issues of concern are identified, prioritized and addressed.

D. Safer alternatives and innovative and sustainable solutions in product value chains are in place so that benefits to human health and the environment are maximized and risks are prevented or, where prevention is not feasible, minimized.

E. Enhanced implementation occurs through increased and effective resource mobilization, partnerships, cooperation, capacity-building, and integration into all relevant decision-making processes.

PARC Website
www.eu-parc.eu

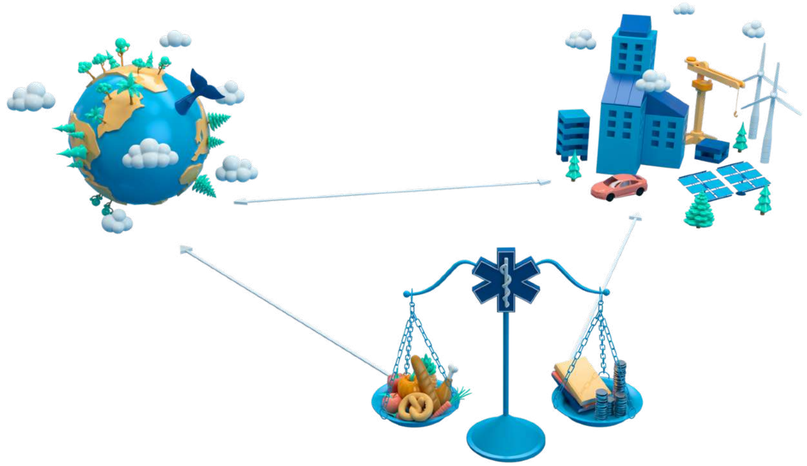
PARCopedia
www.parcopedia.eu

PARC SSbD
www.parc-ssbd.eu

- PARC Contact: PARC@anses.fr
- Coordinator: Pascal.Sanders@anses.fr
- Deputy Coordinator: Christophe.Rousselle@anses.fr

ESFRI infrastructure EIRENE

EIRENE RI



RESEARCH INFRASTRUCTURE FOR ENVIRONMENTAL EXPOSURE RISK ASSESSMENT IN EUROPE (EIRENE)

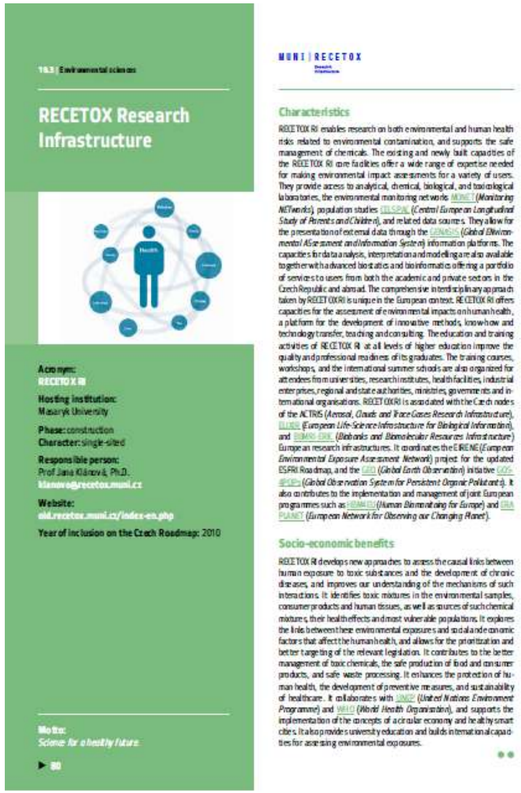
LINKING SCIENCE WITH POLICY MAKING

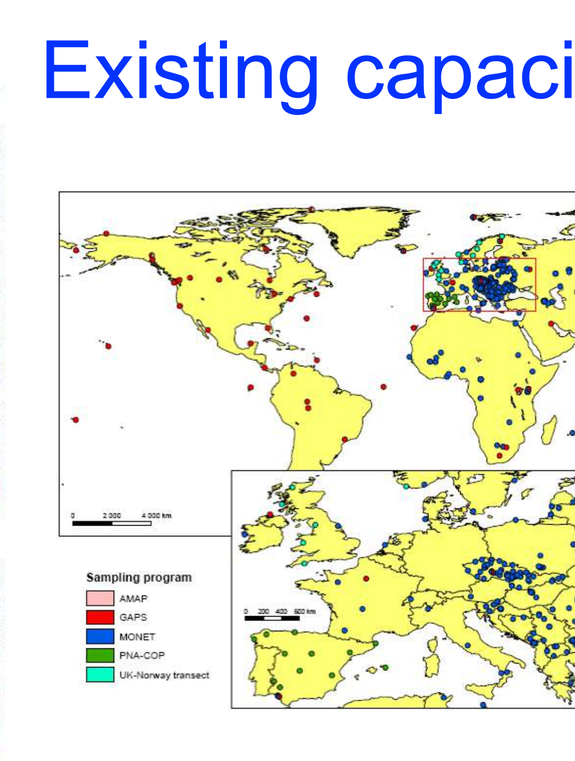
Jana Klánová on behalf of the EIRENE Consortium

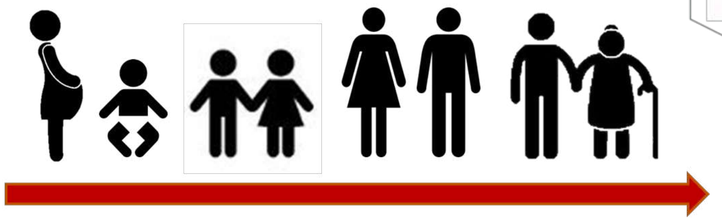
RECETOX Research Infrastructure

CETOCOEN
Excellence

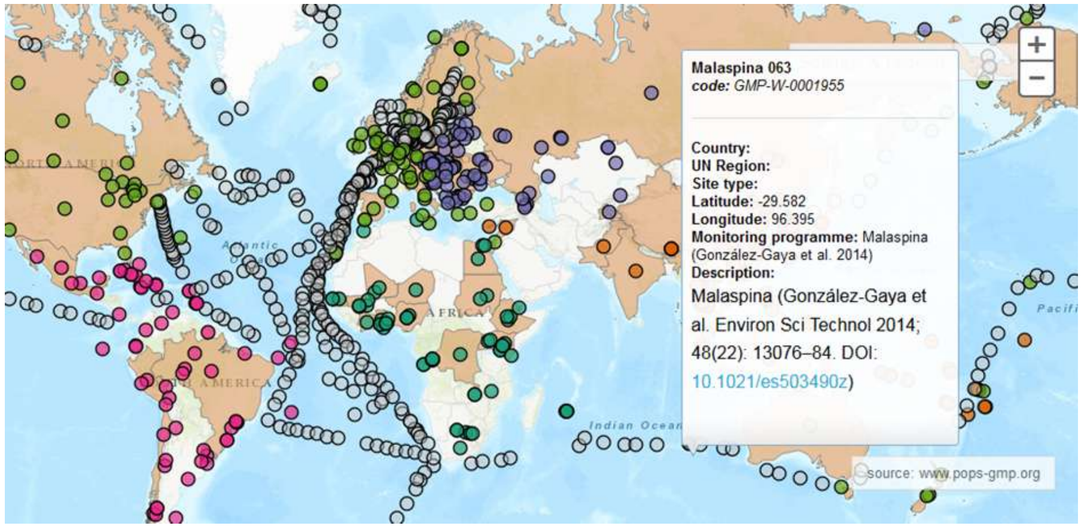
Existing capacities of the RECETOX RI







RECETOX accredited laboratories (TAL)
CELSPAC population cohorts
MONET environmental monitoring networks
GENASIS information platforms

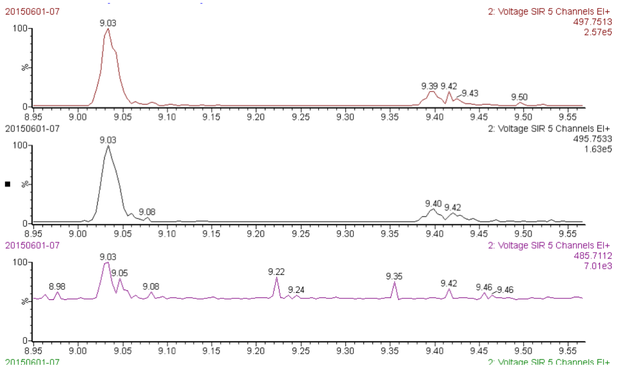


EIRENE RI

Analysis of organic pollutants, their metabolites, trace elements, metals, and species

Organic pollutants:

- Polychlorinated dibenzo-*p*-dioxins/furans (PCDDs/Fs)
- Polychlorinated biphenyls (PCBs) – indicator and dioxin-like
- Brominated and organophosphorus flame retardants
- Organochlorine, cyclodiene, and polar pesticides
- Polycyclic aromatic hydrocarbons (PAHs), NOx-, and oxy-PAHs
- hopanes
- Perfluorinated compounds (PFAS)
- Pharmaceuticals and cosmetic products
- Bisphenols
- Thyroid hormones

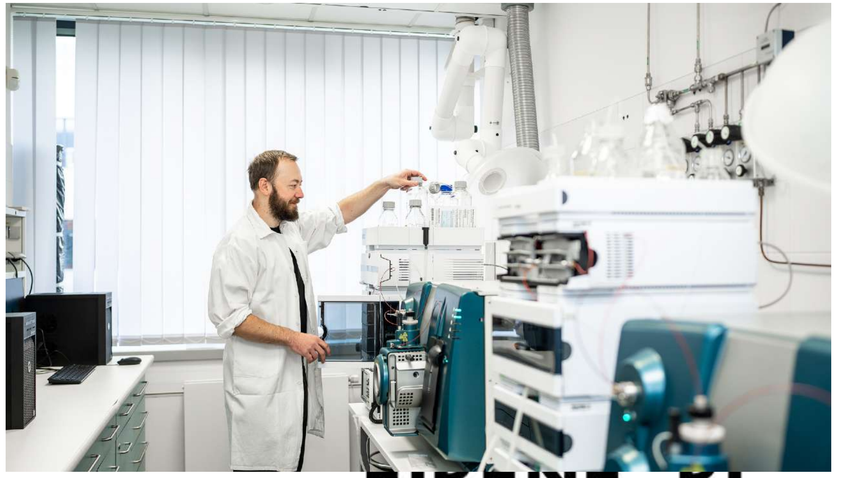


Metabolites:

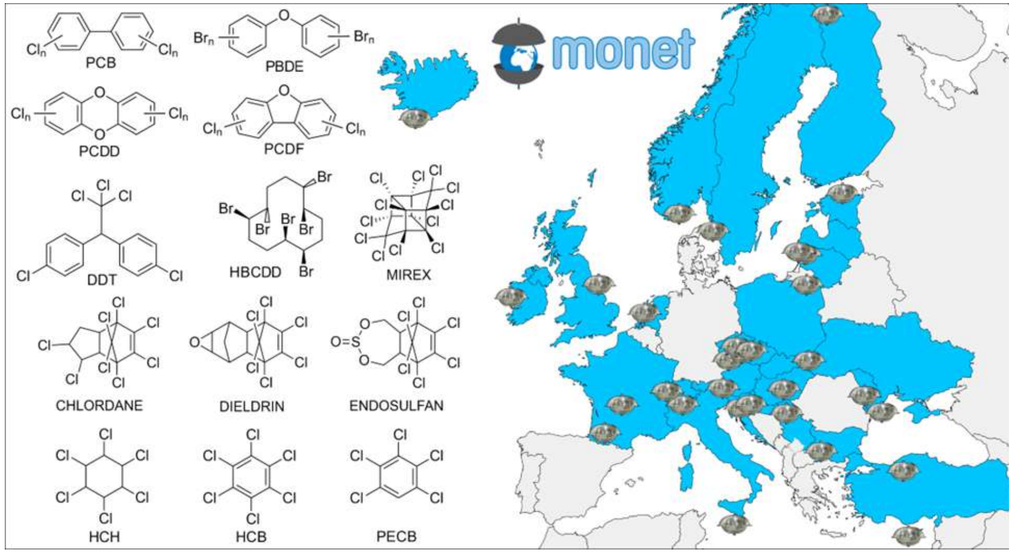
- OH-PAHs
- Phthalates metabolites + DINCH
- Pesticides metabolites + OP pesticides metabolites
- UV filters
- Mycotoxins

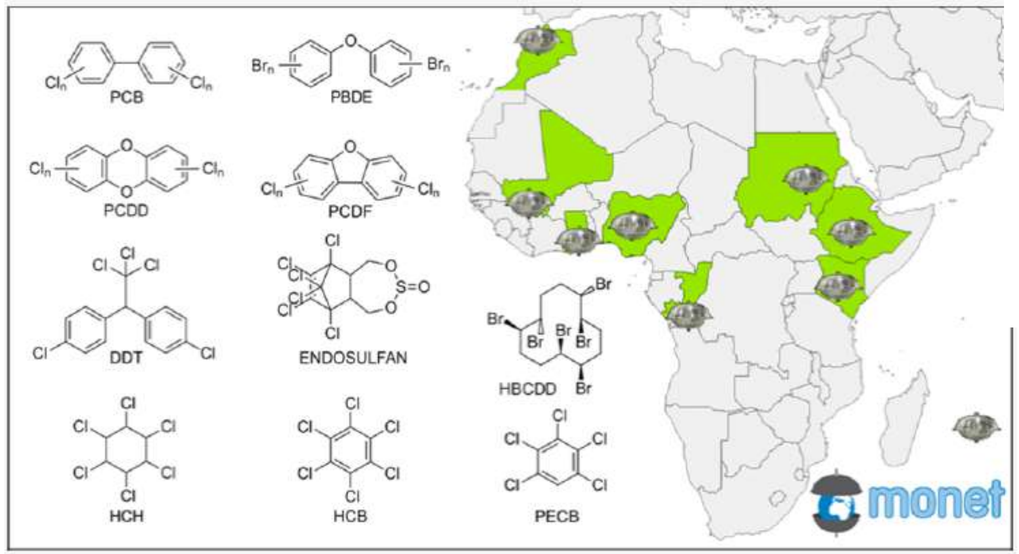
Toxic metals including mercury and their species, trace elements

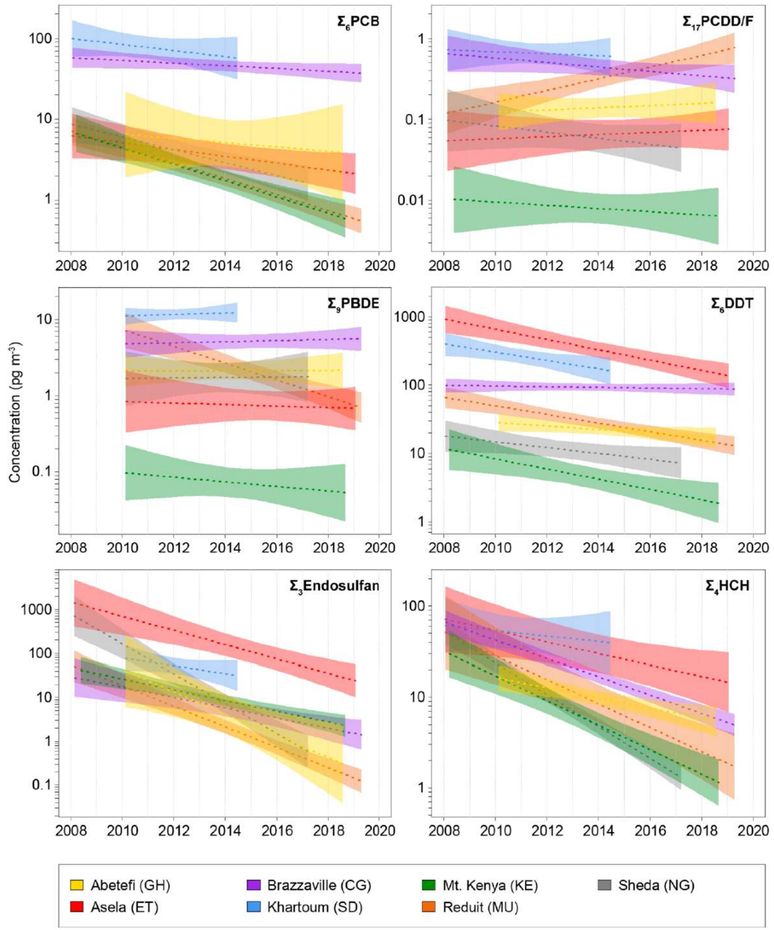
L 1666

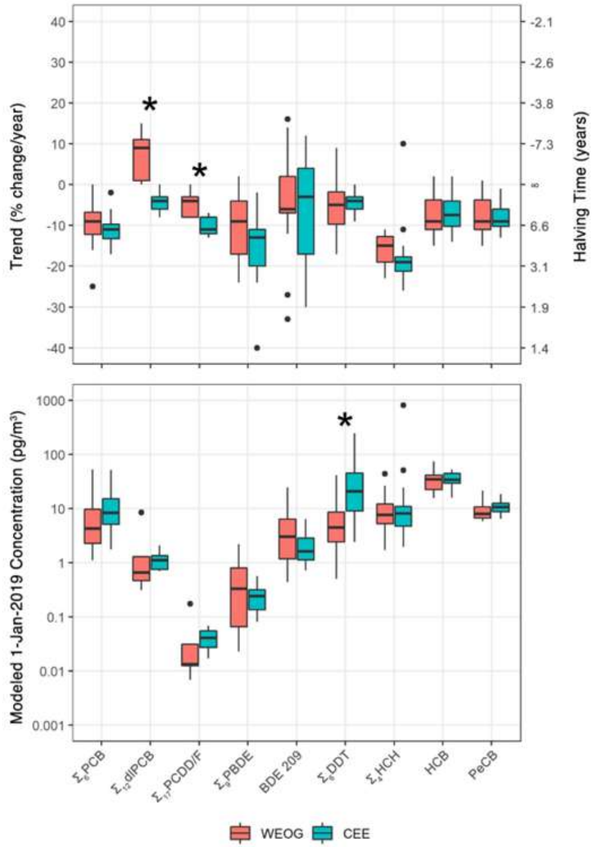


MONET: temporal trends in atmospheric and water levels of organic pollutants









- New sensors development (including personal)
- Setting monitoring studies
- Data provision

EIRENE RI
CETOCOEN Excellence

CELSPAC
for a healthy future

CELSPAC Population Studies

The Platform for Biomedical Research

CETOCOEN
Excellence

CELSPAC Population Studies

CELSPAC for a healthy future

1991–2 | 2015(7) | 2019 | 2020 | 2022 | 2024 | 2025 | 2026

ELSPAC N = 5,151

CELSPAC: **The Next Generation** N = 3,320

– **Children follow up** N = 150

CELSPAC: **The Next Generation – 4MI** N = 110

CELSPAC: **Young Adults** N = 1,056

CELSPAC: **Parents** N = 200

PROSECO (COVID-19 Imunita) N = 30,000

HAPIEE N = 2,302

SHARE N = ?

6,700+ of active participants plus 30,000 of PROSECO study´s participants

CETOCOEN Excellence

Biobanking & Laboratory Methods

CELSPAC
for a healthy future

- Fully automated processing (HAMILTON) and storing samples (ASKION)
- Automated DNA/RNA isolation and Quality control (Perkin Elmer Systems)
- Immunological analyses (ALEX – ELISA-based *in-vitro* multiplex allergy chip)
- Clinical chemistry and immunology analyses (ROCHE, Sysmex)
- Accreditation Swiss label BBMR-ERIC and ISO standard

  ČSN ISO 20387:2021 Biotechnology – Biobanking – General requirements for biobanking

BBMRI-ERIC®

BBMRI.cz
Biobanking and
BioMolecular resources
Research Infrastructure
Czech Republic

Services provided via OA online system

CELSPAC
for a healthy future

- Data & Biological material

  from the CELSPAC studies

- Realization of new epidemiological study

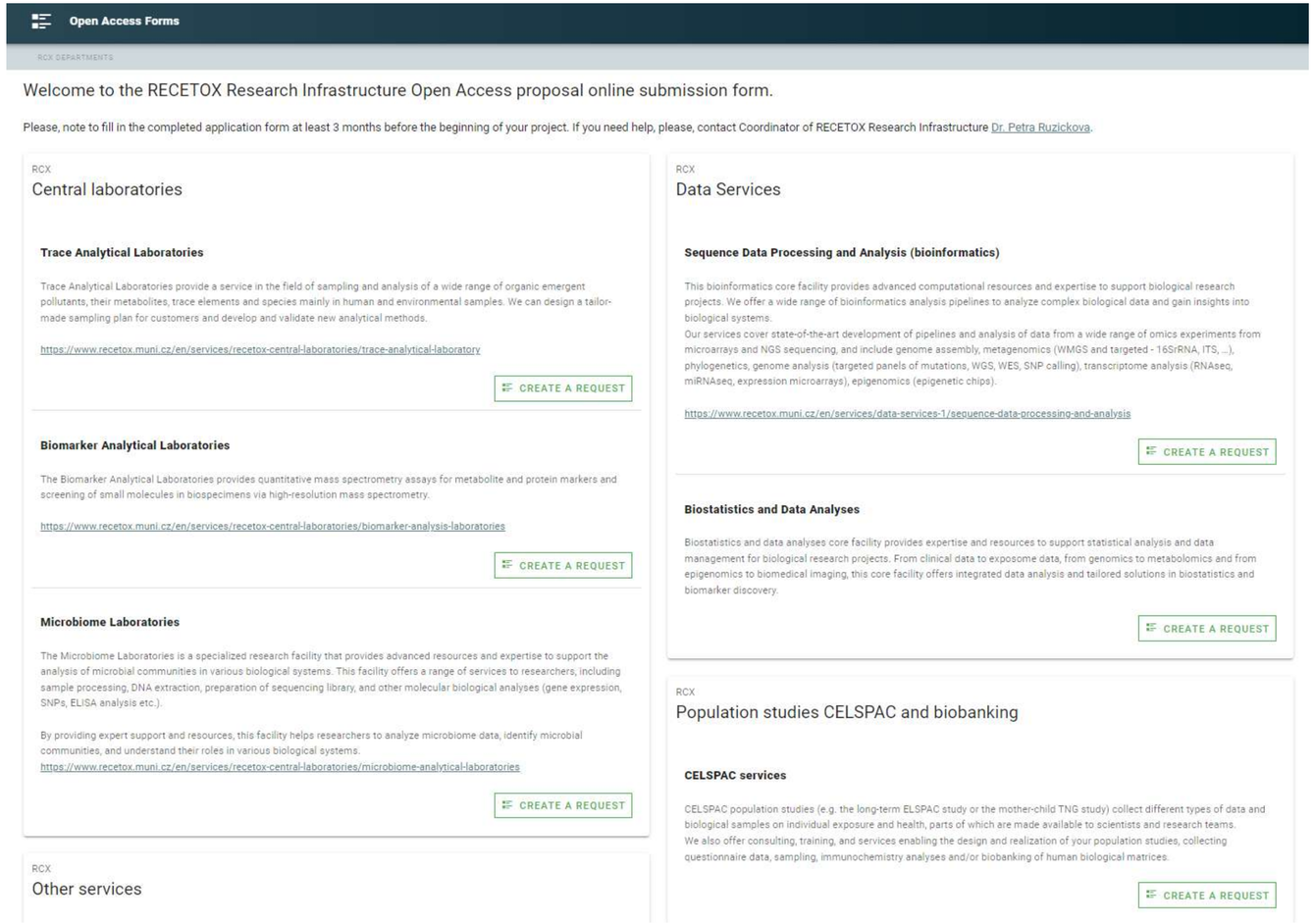
  Research protocol

  Questionnaire design New data collection and analysis

  New sample collection and analysis

  Storage of human biological samples

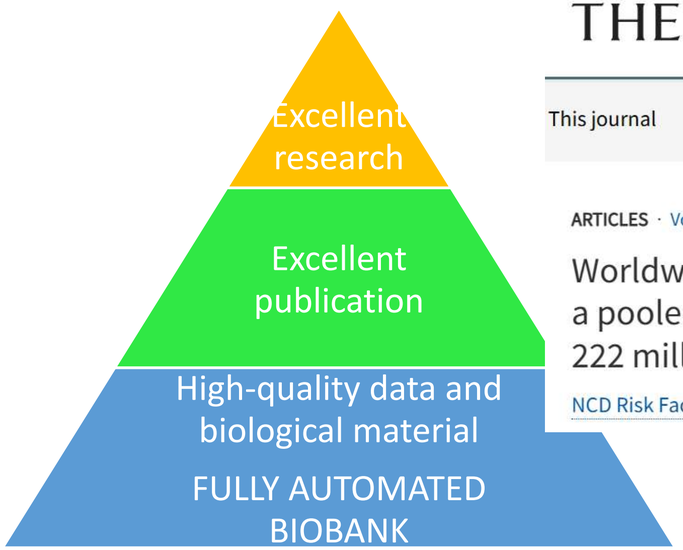
https://openaccess.recetox.cz/



CETOCOEN
Excellence

Population Studies as a platform for excellent research

	Totally	2024–Q2/2025
Study´s participants	48,600	2,500
Stored aliquots of biological samples	570,000	75,000
Realesed aliquots of biological samples	27,000	6,200
Data variables	560,000	16,000
Exported datasets	160 datasets with 210,000 variables	44 datasets with 60,000 variables
Open Access RI Applications	546	53
Publication based on PopStudies	147, Ø IF 7.9	21



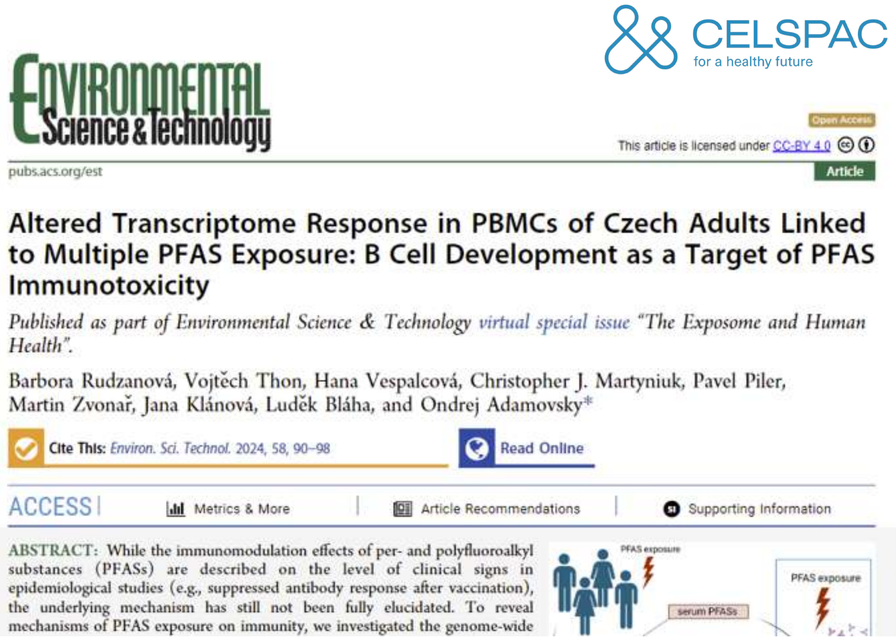

THE LANCET

This journal Journals Publish Clinical Global health Multimedia Events About

ARTICLES · Volume 403, Issue 10431, P1027-1050, March 16, 2024 · *Open Access* Download Full Issue

Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults

NCD Risk Factor Collaboration (NCD-RisC) †


CELSPAC for a healthy future

Environmental Science & Technology

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Article

Altered Transcriptome Response in PBMCs of Czech Adults Linked to Multiple PFAS Exposure: B Cell Development as a Target of PFAS Immunotoxicity

Published as part of Environmental Science & Technology virtual special issue "The Exposome and Human Health".

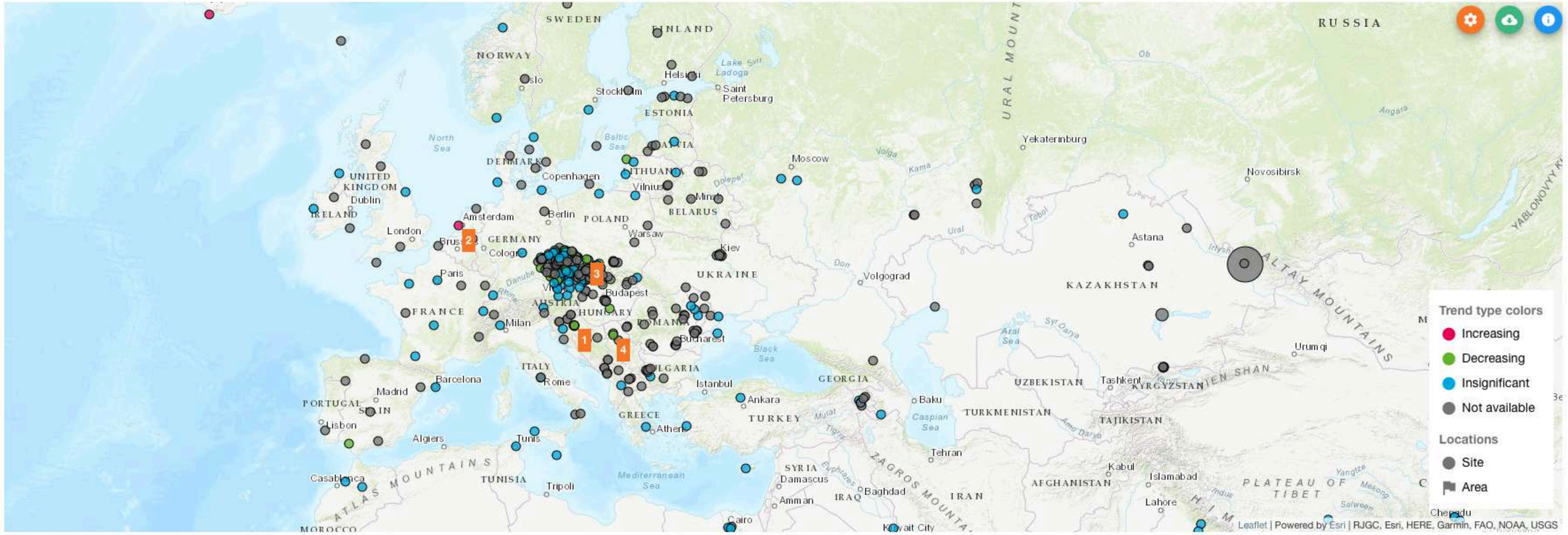
Barbora Rudzanová, Vojtěch Thon, Hana Vespalcová, Christopher J. Martyniuk, Pavel Piler, Martin Zvonař, Jana Klánová, Luděk Bláha, and Ondrej Adamovsky*

Cite This: *Environ. Sci. Technol.* 2024, 58, 90−98 Read Online

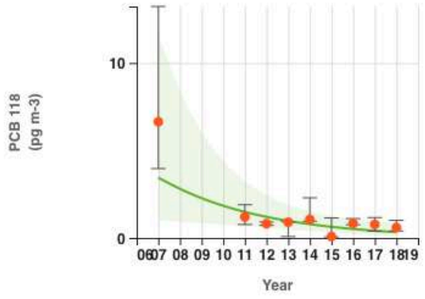
ACCESS | Metrics & More | Article Recommendations | Supporting Information

ABSTRACT: While the immunomodulation effects of per- and polyfluoroalkyl substances (PFASs) are described on the level of clinical signs in epidemiological studies (e.g., suppressed antibody response after vaccination), the underlying mechanism has still not been fully elucidated. To reveal mechanisms of PFAS exposure on immunity, we investigated the genome-wide

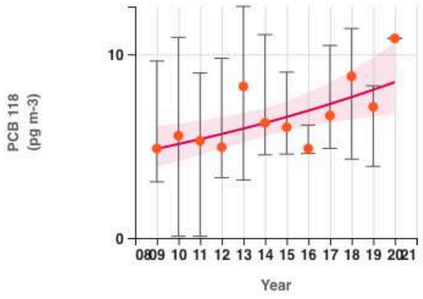
from environmental databases GENASIS and GMP DWH



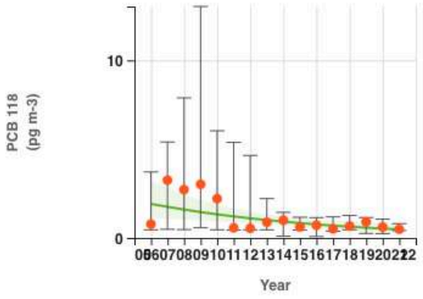
1 Zagreb, IMI, Croatia



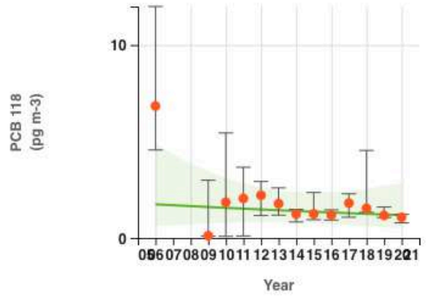
2 De Zilk, EMEP, Netherlands (the)



3 Jesenik, Jeseniky, Czechia

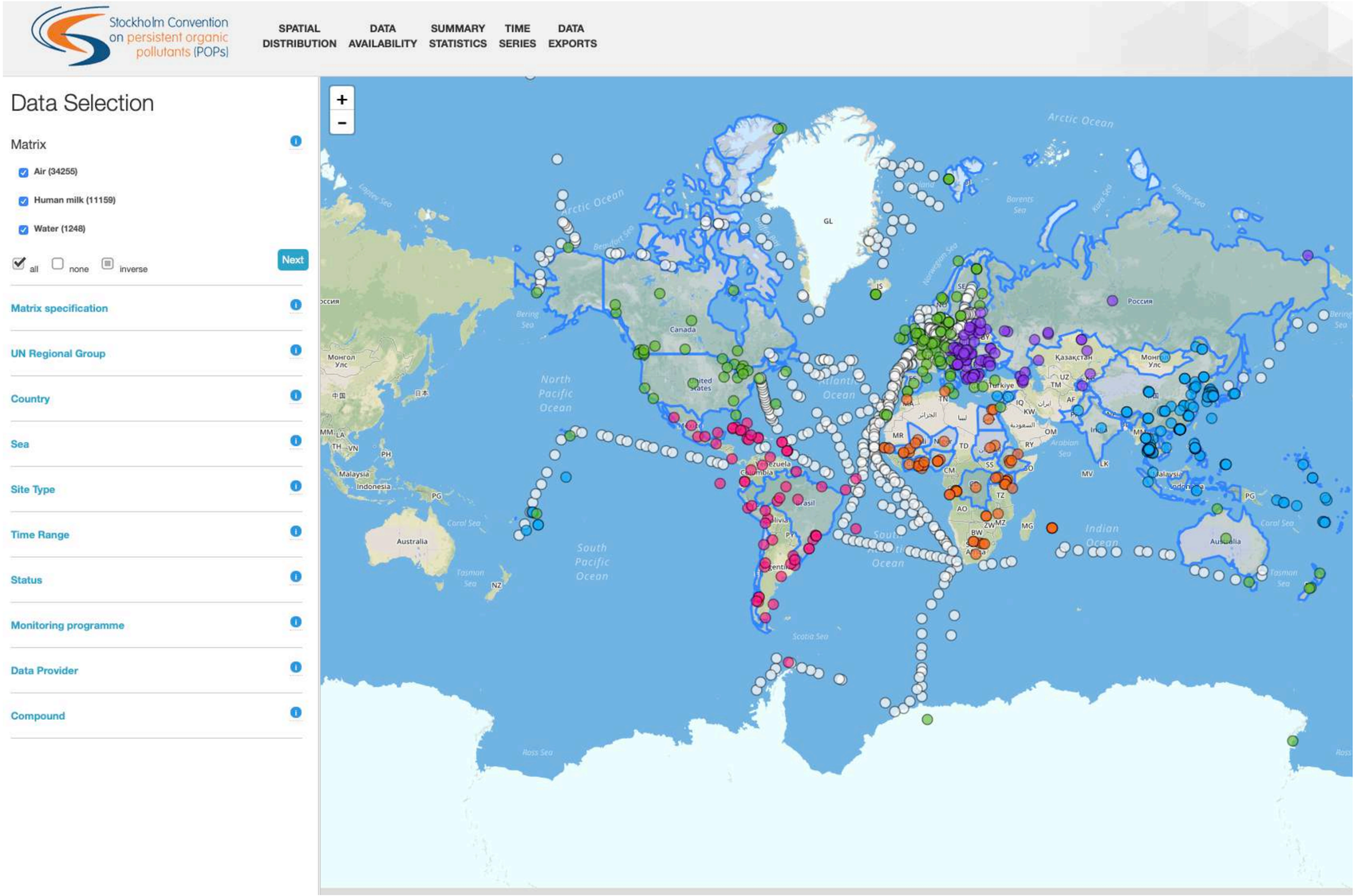


4 Fruska Gora, Serbia



EIRENE RI

GENASIS information system

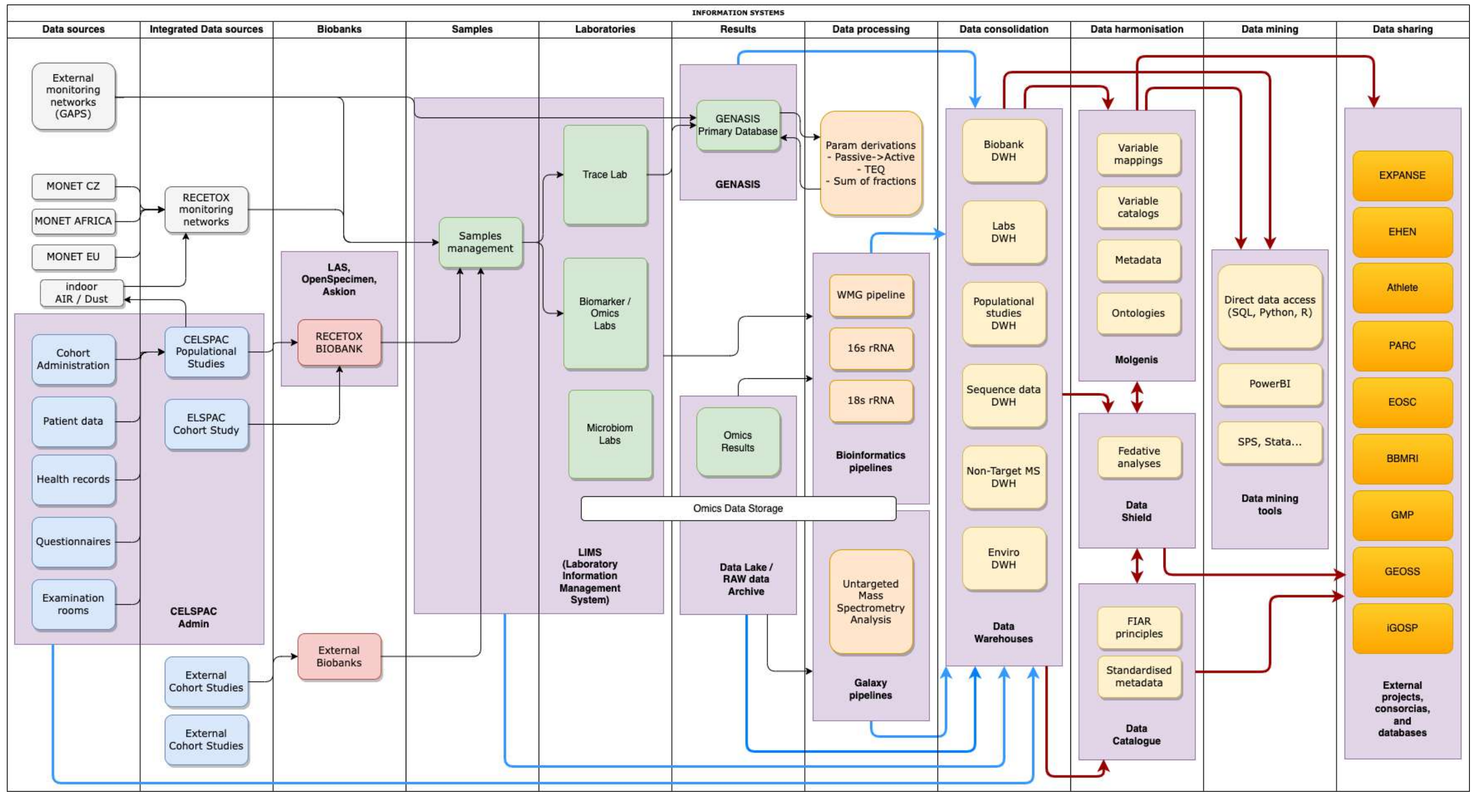


- Data collection and harmonisation
- Data hosting and visualisation
- Data integration and analysis
- Sevices to UNEP, WHO, government and authorities
- Support for the GMP

https://www.genasis.cz
https://www.pops-gmp.org

MUNI | RECETOX

…to complex data integrations



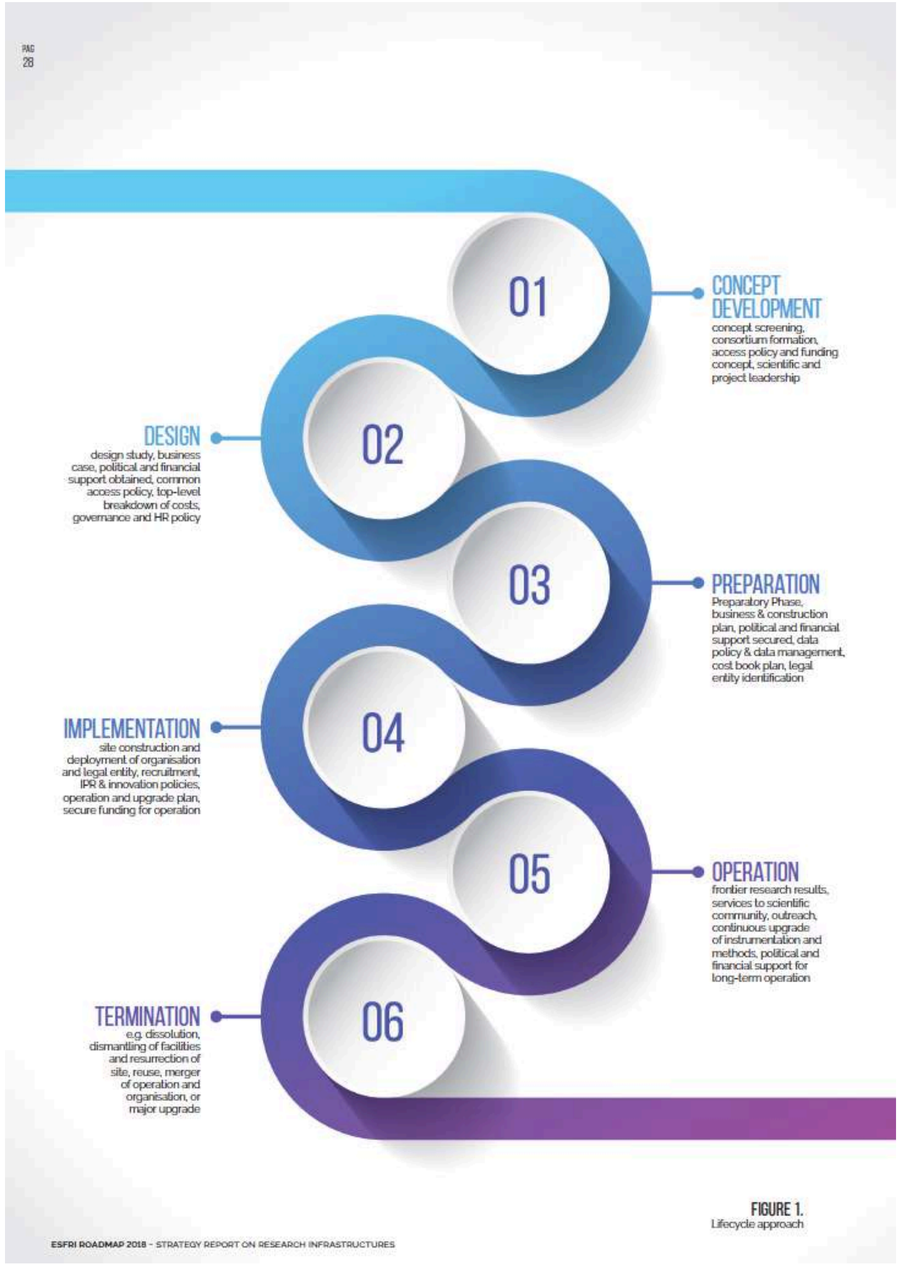
- CELSPAC Admin
- CELSPAC questionnaires
- Biobanking system
- Repositories for hi-res data
- Sensitive cloud

- FAIR Data management
- Building ontologies
- Co-leading PARC data activities
- Leading CZ-EOSC ENV

- High-res MS data processing
- Sequencing data
- Integrative omics
- Leading CZ-EOSC ENV

CETOCOEN Excellence

Gap in the 2018 ESFRI Roadmap



EIRENE RI

EIRENE RI: Prioritised in the 2021 ESFRI Roadmap

EIRENE RI

Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe

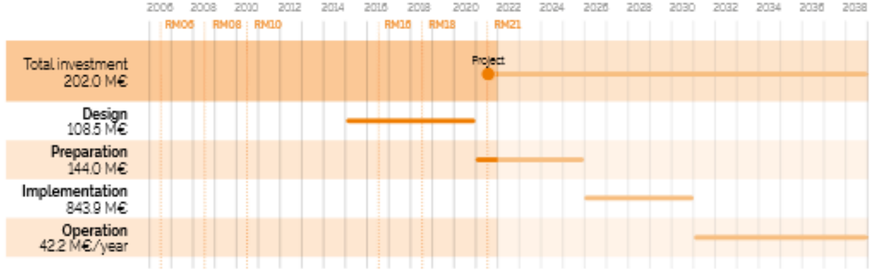
Website	Headquarters	Legal status	Type
pending	Masaryk University Brno, Czech Republic	pending	distributed

DESCRIPTION

The Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe (EIRENE RI) pioneers the first European Research Infrastructure on environmental determinants of human health, the Human Exposome. EIRENE RI intends to support large-scale research for the interdisciplinary assessment of environmental determinants of health, including indoor and outdoor environment factors, lifestyle, socioeconomics, and the individual's ability to cope with various stressors such as infection or disease. EIRENE RI will provide harmonised workflows and integrated services for data and sample collection, as well as knowledge and tools that will be made accessible to academic researchers, private companies, public authorities and citizens through the EIRENE open-access system and the EIRENE knowledge hub.

The concept of a pan-European Infrastructure supporting research on the effects of long-term exposures to various types of stressors on population health and the roles these exposures play in the development of chronic diseases is based on ten-year experience of Czech national RECETOX RI. Entered in the ESFRI Roadmap 2021, EIRENE RI already connects 50 research institutions from 17 countries. It builds on the legacy of the European environmental monitoring networks and their databases (EMEP, GMP, GMOS), GEO Initiatives (GOS4POP and GOS4M) and related H2020 projects (ERA PLANET, e-SHAPE), EU biomonitoring initiatives (DEMOCOPHES, HBM4EU), UNEP/WHO global biomonitoring efforts, EU exposome (HELIX, EXPOSOMICS, HEALS and EHEN cluster) and other related projects (HERA, EURION cluster).

TIMELINE & ESTIMATED COSTS



INTERCONNECTIONS

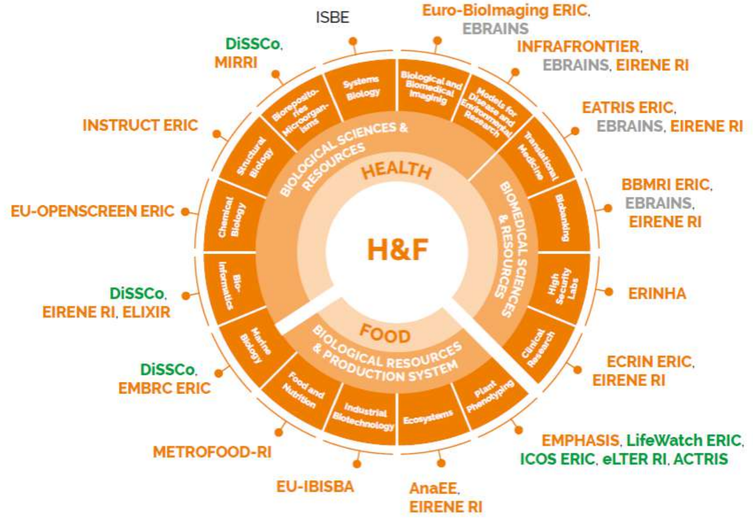
POLITICAL SUPPORT

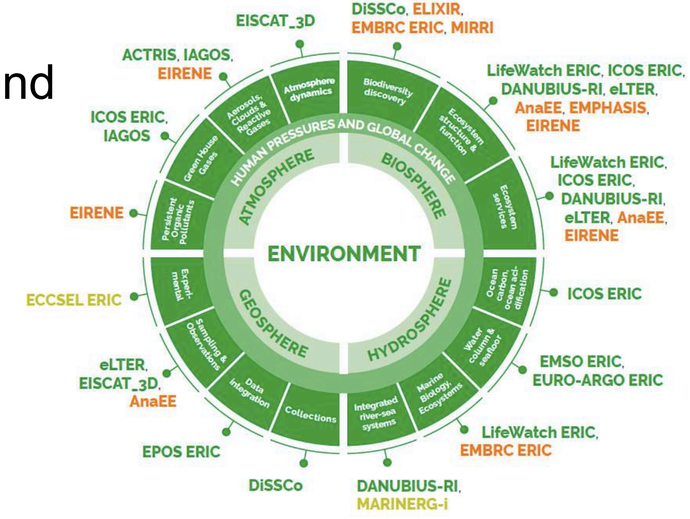
Lead
CZ

Prospective member
AT, BE, DE, EL, ES, IS, IT, NL, SK

Members

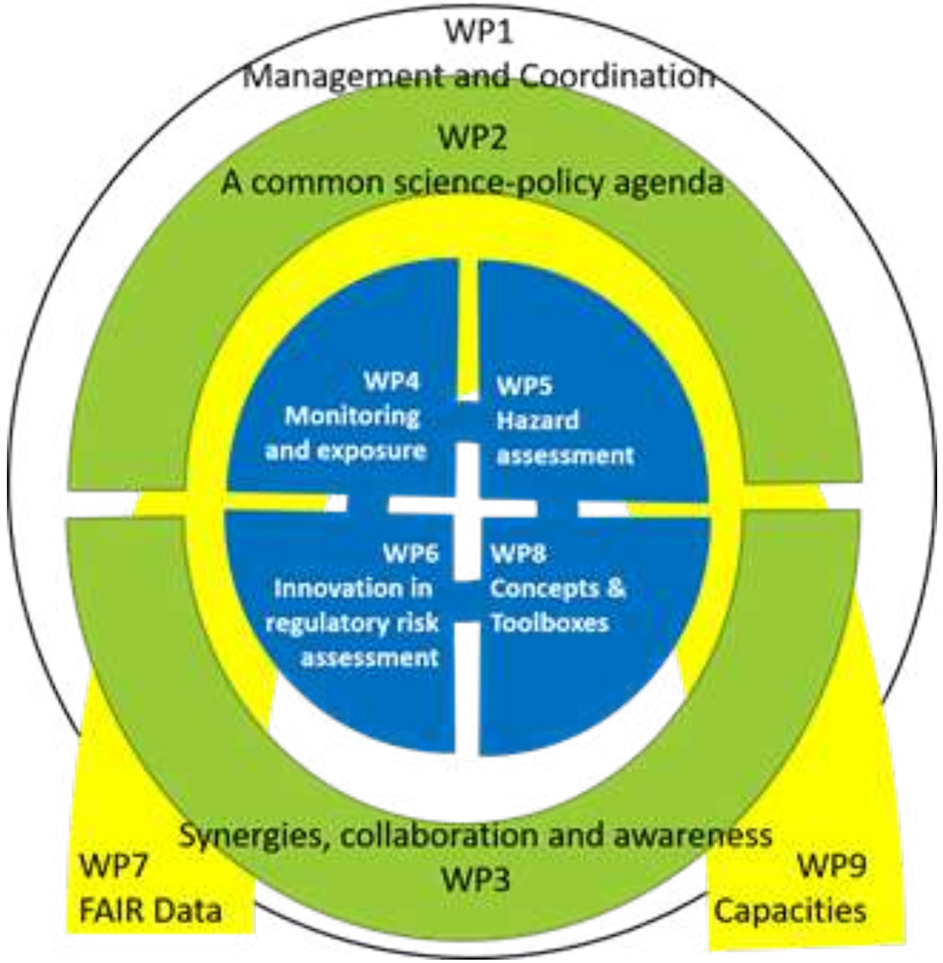
- **Austria, Belgium, Czechia, Italy, Netherlands**
- Germany, Greece, Island, Slovakia
- France, Norway, Sweden
- Finland, Slovenia, Spain, UK, US
- Cyprus, Denmark, LX, Portugal
- Australia, Canada, Japan, Switzerland
- EMBL/EBI

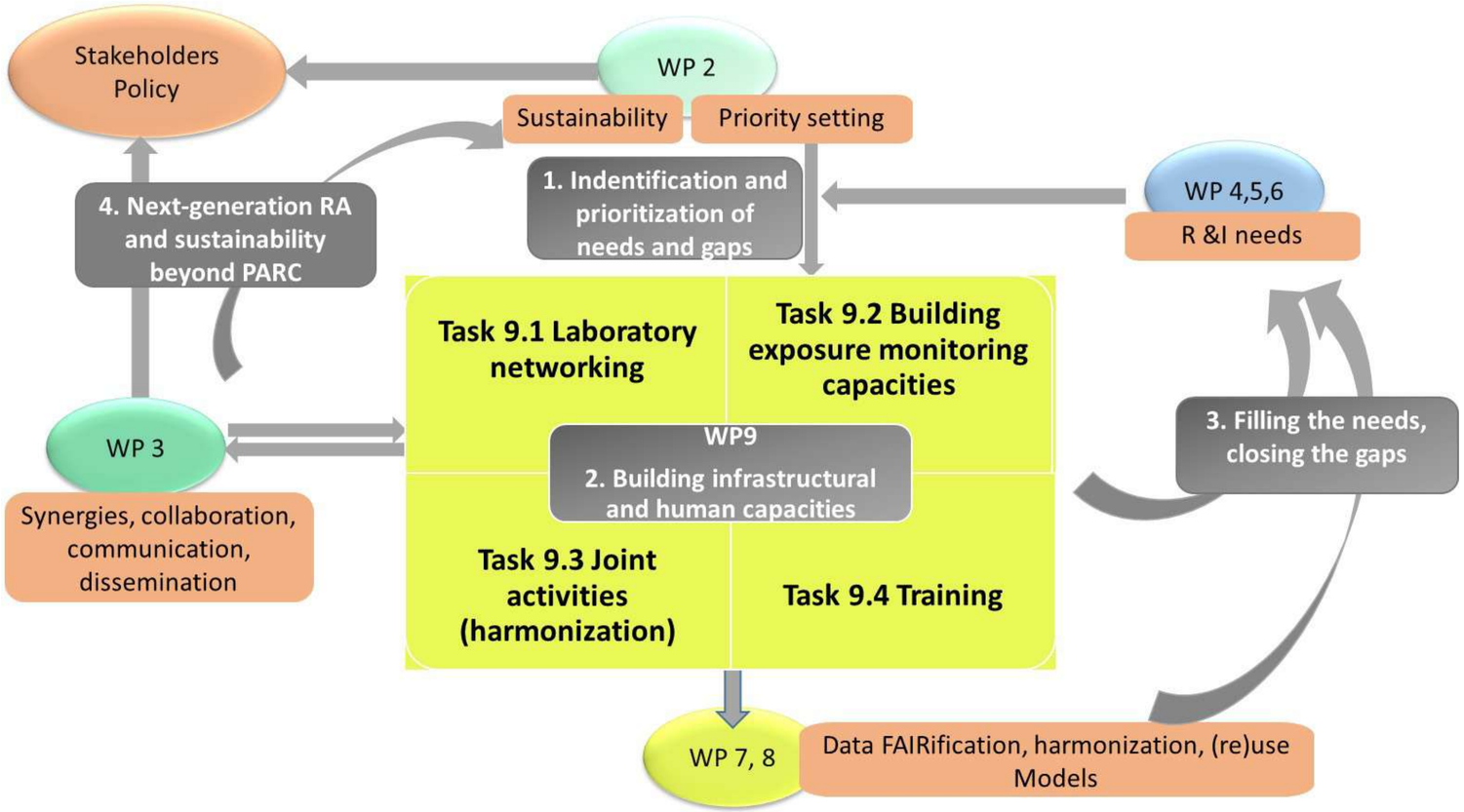




EIRENE RI

Building infrastructural and human capacities in PARC

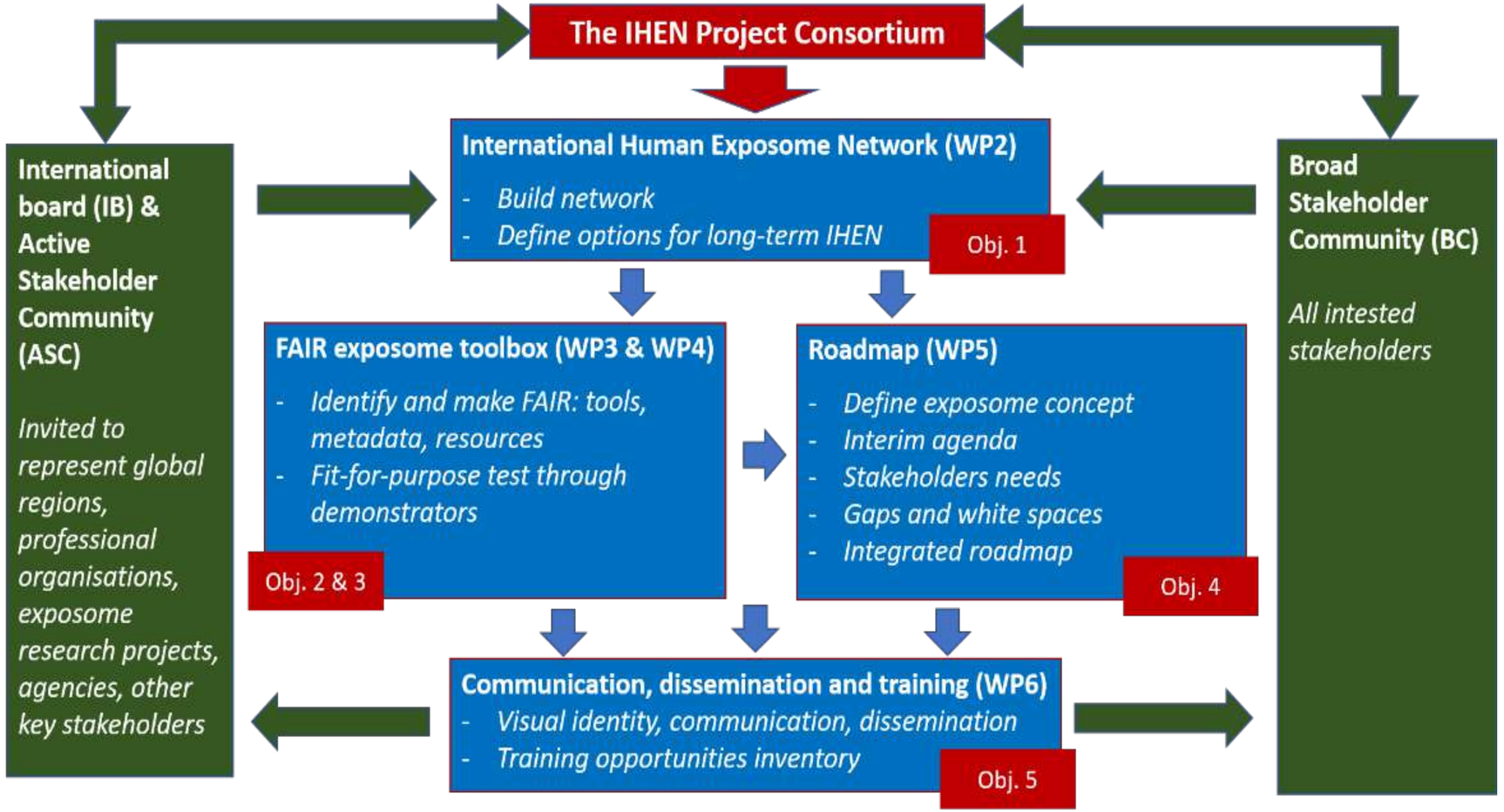




EIRENE RI

IHEN Vision

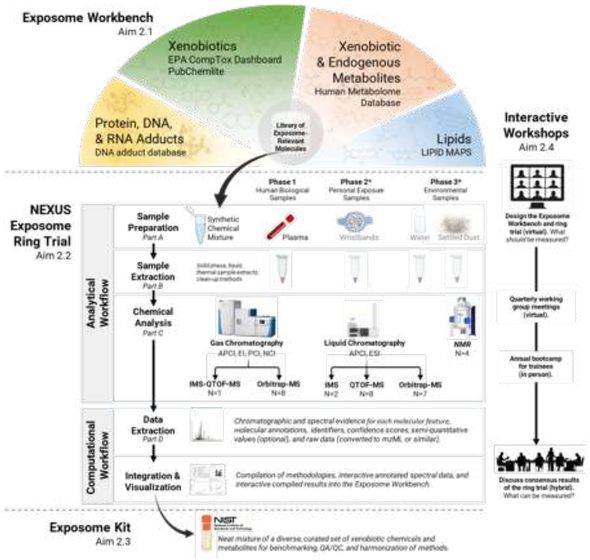
To establish an international network that will improve global research and cooperation on the exposome

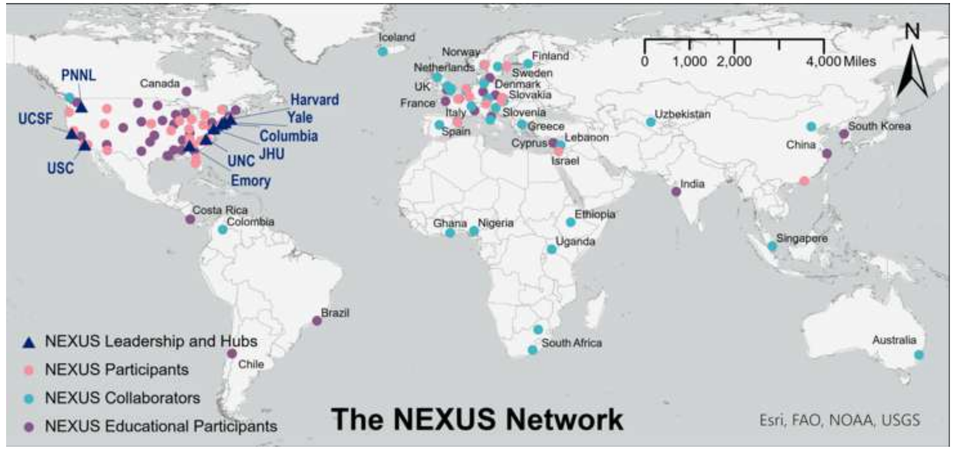


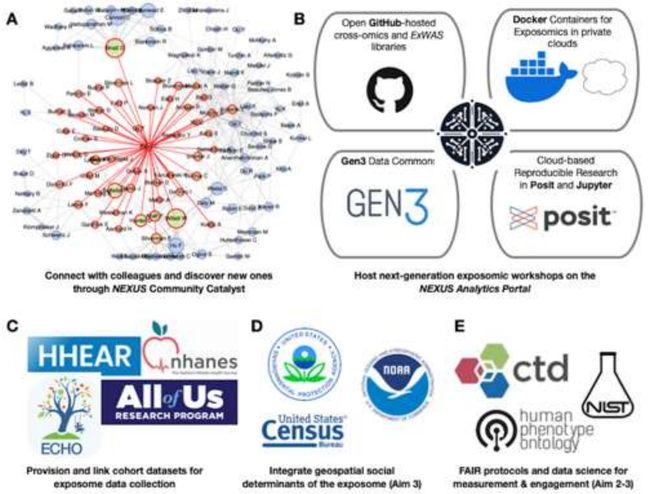
EIRENE RI

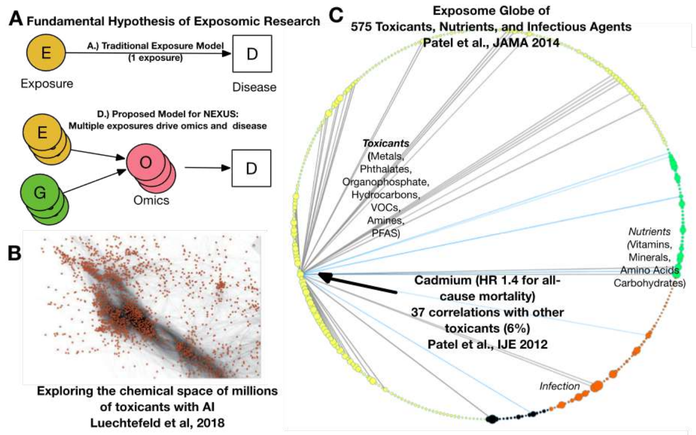
NEXUS: Network for Exposomics in US

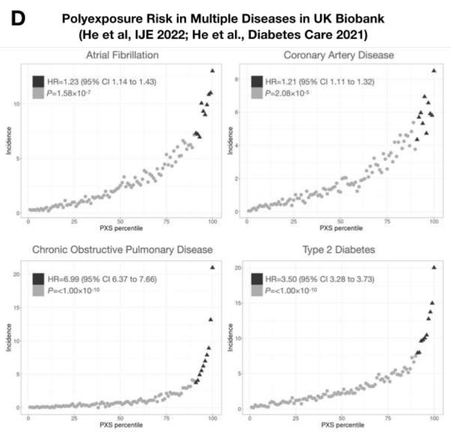
Hubs: Stakeholder Engagement, ChemBio Analysis, Geospatial Sciences, Data Sciences

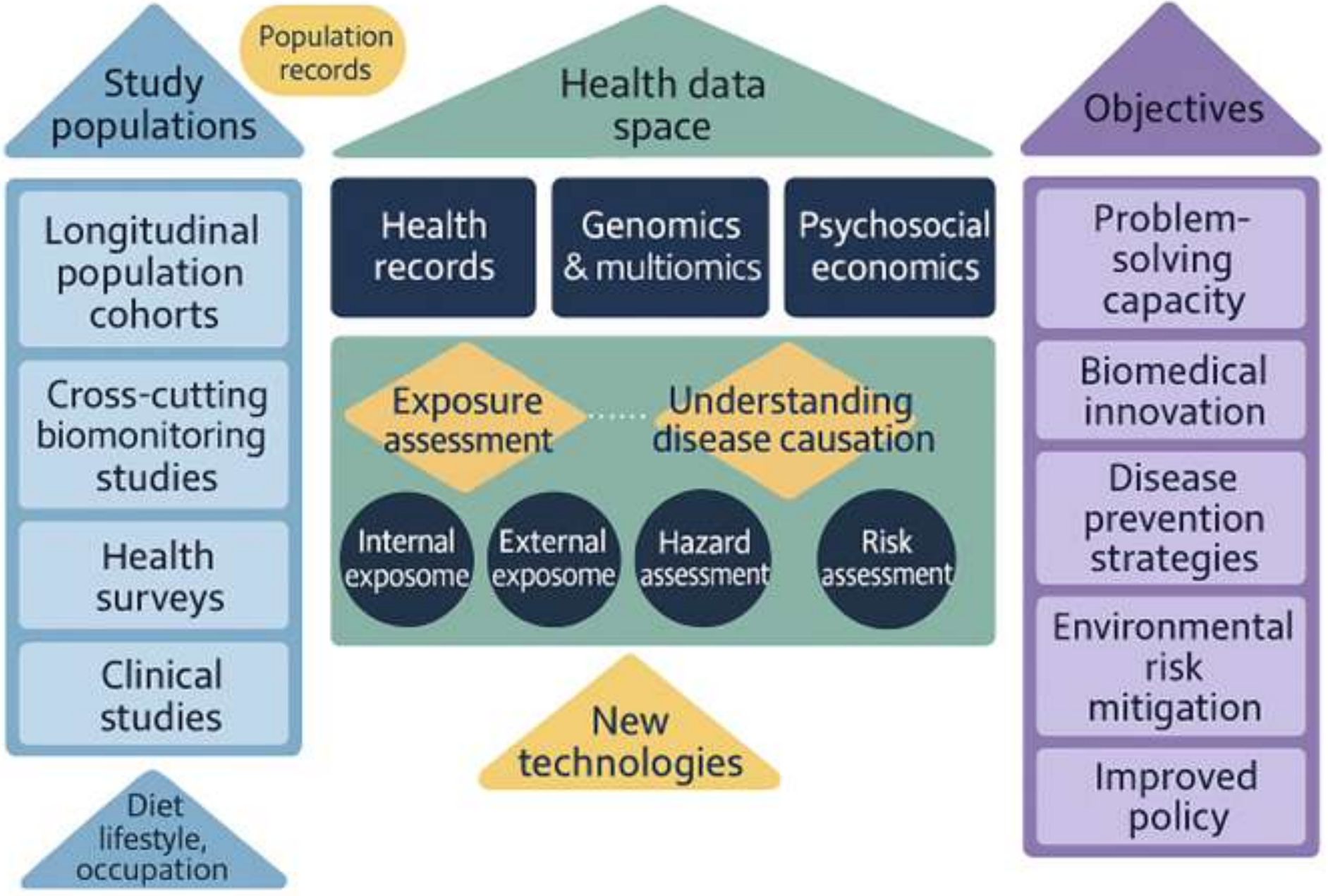






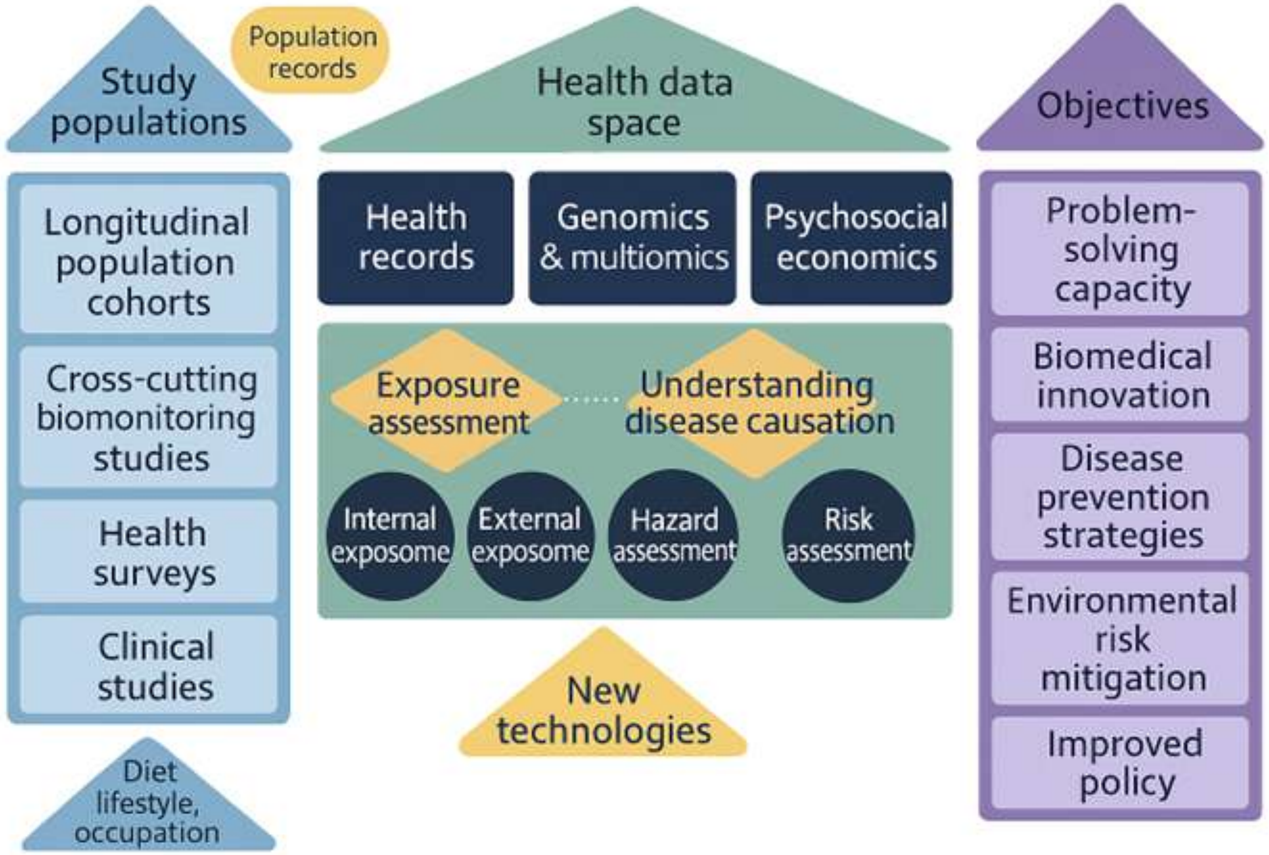


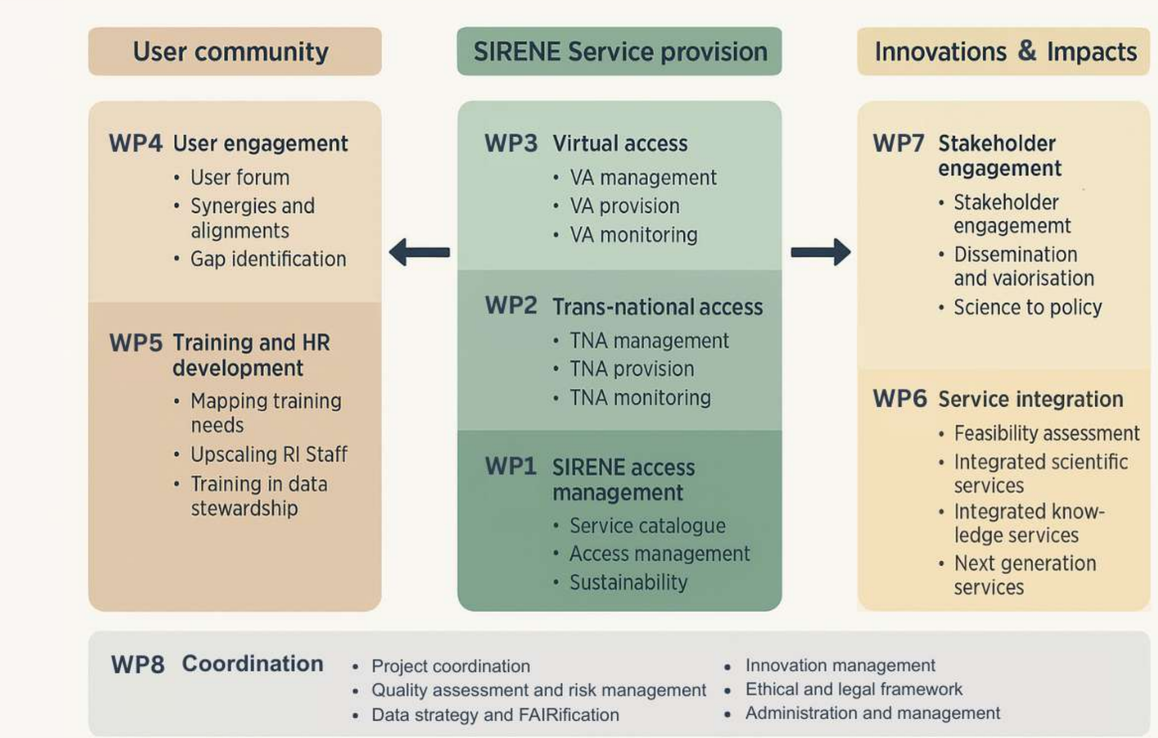


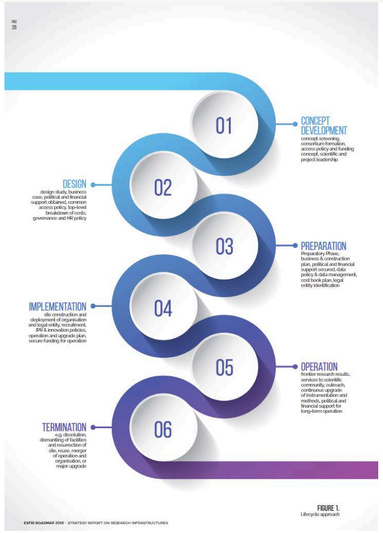

Study populations
Population records
Health data space
Objectives
Longitudinal population cohorts
Cross-cutting biomonitoring studies
Health surveys
Clinical studies
Diet lifestyle, occupation
Health records
Genomics & multiomics
Psychosocial economics
Exposure assessment
Understanding disease causation
Internal exposome
External exposome
Hazard assessment
Risk assessment
New technologies
Problem-solving capacity
Biomedical innovation
Disease prevention strategies
Environmental risk mitigation
Improved policy

EIRENE RI

SIRENE project







EIRENE ACTRIS
BBMRI AnaEE
ECRIN EMBRC
SHARE EuroBioImaging
EATRIS ELIXIR

EIRENE RI

EIRENE's and PARC's side event on COPs 2025

The RECETOX Centre has been operating at the science-to-policy interface at the national, European and global levels for two decades. As the Stockholm Convention Regional Centre (SCRC) for capacity building and technology transfer it supports the implementation of the global conventions protecting human health from the chemical risks and presents its activities at the Conferences of Parties of these conventions at the regular basis.

European Parliament

Human exposome research

Potential, limitations and public policy implications

STUDY

Panel for the Future of Science and Technology

EPRS | European Parliamentary Research Service

Scientific Foresight Unit (STOA)
PE 765.791 – April 2025

Global Forum of the Group of Earth Observations 2025

„The Earth Talks“ was a motto of the 2025 Global Forum of the Group of Earth Observations (GEO) held on May 5-9 in the Auditorium della Tecnica in Rome. GEO brought together all elements of our society – from ministers and global leaders to citizens – to harness Earth Intelligence to empower informed and ambitious actions to ensure food security, restore ecosystems, prevent disasters, and confront the triple planetary crisis, transforming the Sustainable Development Goals into an achievable reality.

Coordinating European Research Infrastructure on Human Exposome (EIRENE)

EIRENE RI

Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe

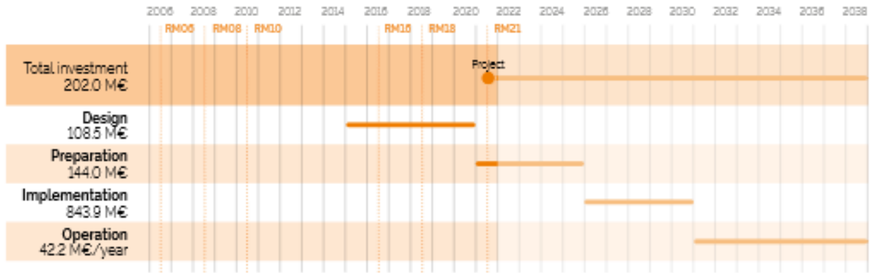
Website	Headquarters	Legal status	Type
pending	Masaryk University Brno, Czech Republic	pending	distributed

DESCRIPTION

The Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe (EIRENE RI) pioneers the first European Research Infrastructure on environmental determinants of human health, the Human Exposome. EIRENE RI intends to support large-scale research for the interdisciplinary assessment of environmental determinants of health, including indoor and outdoor environment factors, lifestyle, socioeconomics, and the individual's ability to cope with various stressors such as infection or disease. EIRENE RI will provide harmonised workflows and integrated services for data and sample collection, as well as knowledge and tools that will be made accessible to academic researchers, private companies, public authorities and citizens through the EIRENE open-access system and the EIRENE knowledge hub.

The concept of a pan-European Infrastructure supporting research on the effects of long-term exposures to various types of stressors on population health and the roles these exposures play in the development of chronic diseases is based on ten-year experience of Czech national RECETOX RI. Entered in the ESFRI Roadmap 2021, EIRENE RI already connects 50 research institutions from 17 countries. It builds on the legacy of the European environmental monitoring networks and their databases (EMEP, GMP, GMOS), GEO Initiatives (GOS4POP and GOS4M) and related H2020 projects (ERA PLANET, e-SHAPE), EU biomonitoring initiatives (DEMOCOPHES, HBM4EU), UNEP/WHO global biomonitoring efforts, EU exposome (HELIX, EXPOSOMICS, HEALS and EHEN cluster) and other related projects (HERA, EURION cluster).

TIMELINE & ESTIMATED COSTS



INTERCONNECTIONS

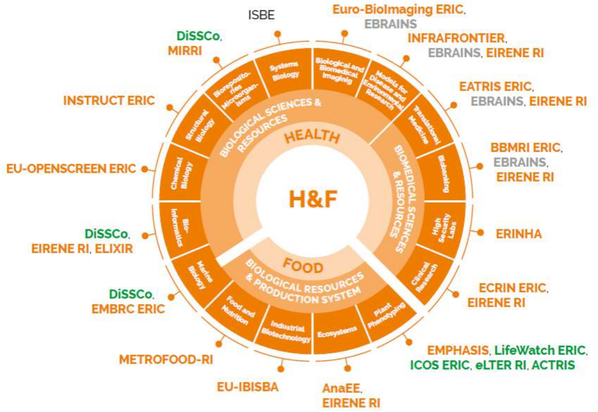
POLITICAL SUPPORT

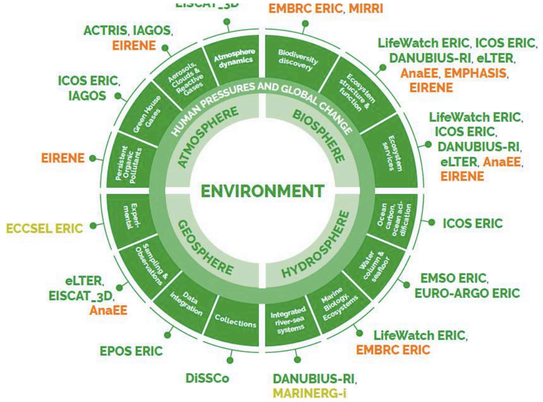
Lead
CZ

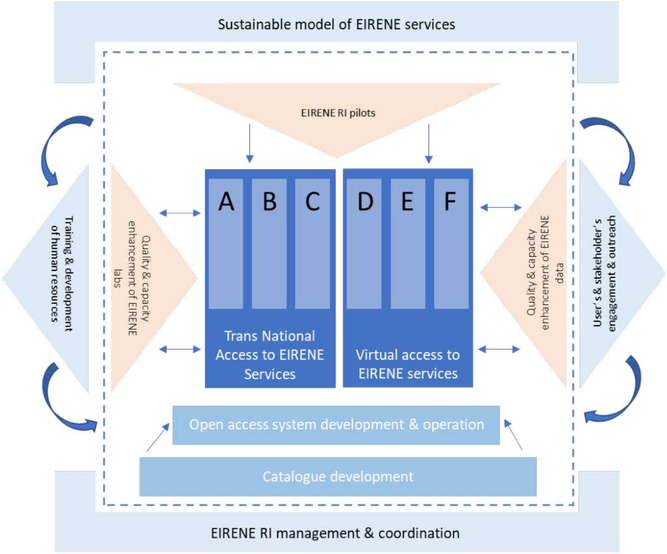
Prospective member
AT, BE, DE, EL, ES, IS, IT, NL, SK

Member states

- Austria, Belgium, Czech Republic, France, Italy, Netherlands
- Germany, Greece, Island, Slovakia, Slovenia
- Finland, Norway, Sweden, Spain
- UK, US, Australia, Canada, Japan
- Cyprus, Denmark, LX, Portugal







A – chemical (exposure) profiling

B – biological (response) profiling

C – hazard (risk) assessment

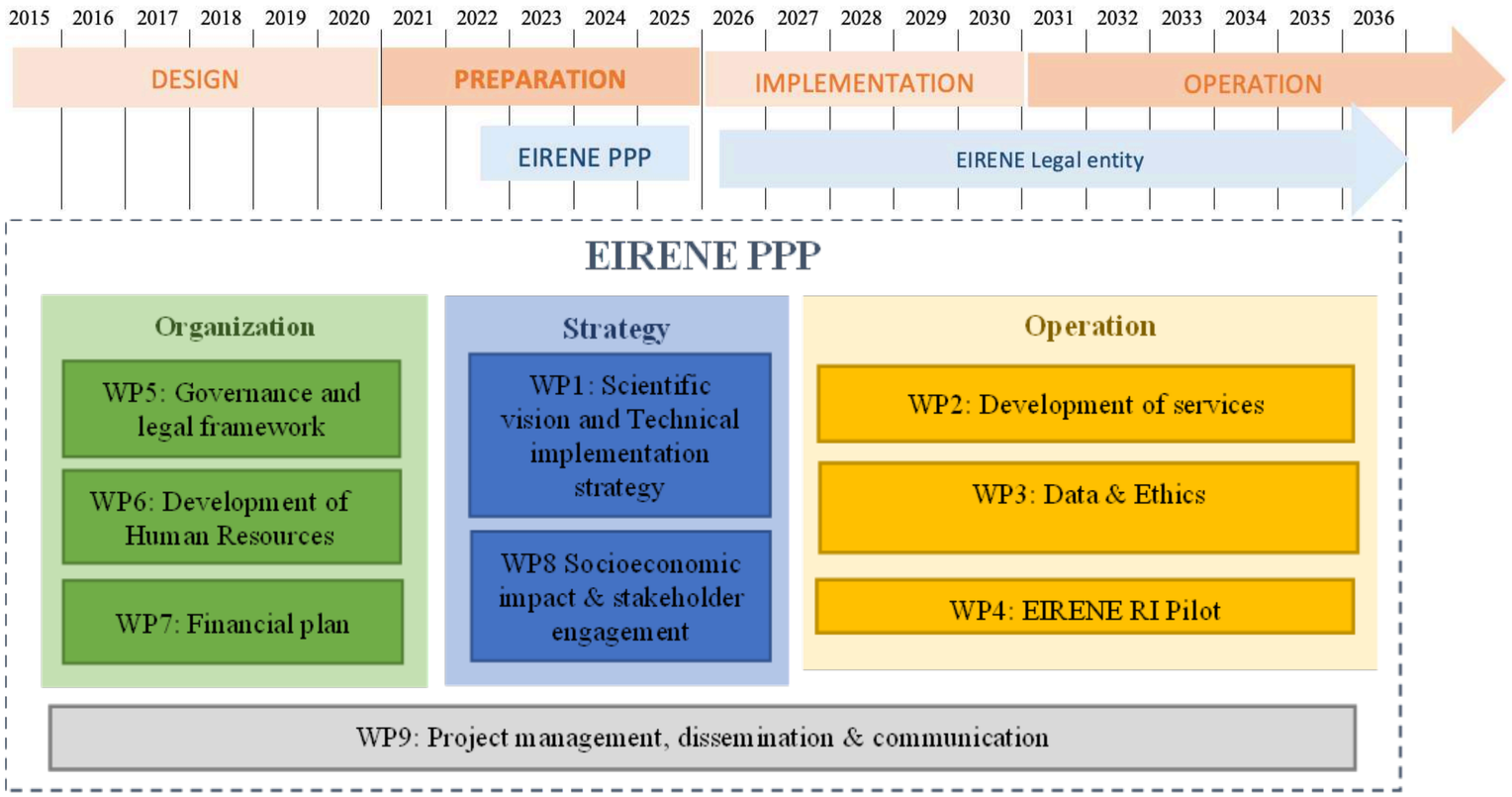
D – environmental data

E – human data

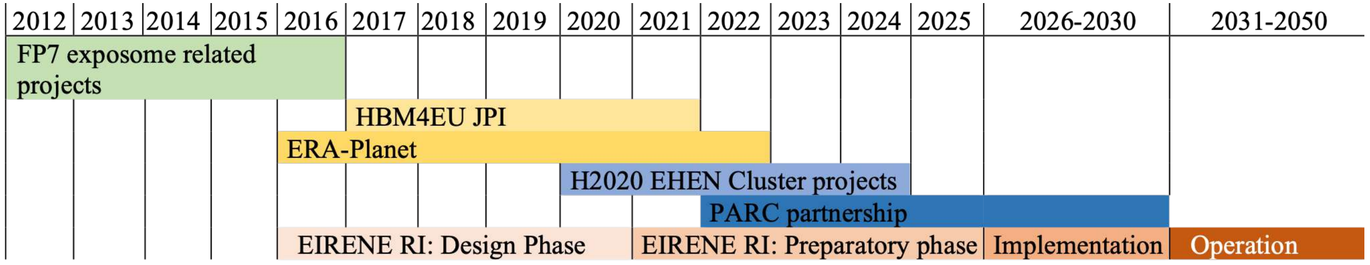
F – data processing tools & platforms

CETOCOEN Excellence

EIRENE PPP Horizon Europe project



ESFRI evaluation 2025
INFRA DEV EIRENE IMP
INFRA SERV SIRENE



CETOCOEN Excellence

EIRENE as an opinion leader

Human exposome research

Potential, limitations and public policy implications

Science

Current Issue

HOME > SCIENCE > VOL. 388, NO. 6745 > INTEGRATING EXPOSOMICS INTO BIOMEDICINE

PERSPECTIVE | BIOMEDICINE

Integrating exposomics into biomedicine

Assessing a full range of environmental exposures will improve human health

GARY W. MILLER AND BANBURY EXPOSOMICS CONSORTIUM Authors Info & Affiliations

SCIENCE · 24 Apr 2025 · Vol 388, Issue 6745 · pp. 356-358 · DOI: 10.1126/science.adr0544

STUDY

Panel for the Future of Science and Technology

EPRS | European Parliamentary Research Service

Scientific Foresight Unit (STOA)
PE 765.791 – April 2025

Want to know more?

- Brochures and leaflets or website www.recetox.muni.cz
- RECETOX Research infrastructure open access - https://www.recetox.muni.cz/en/services/for-users
- PARC materials and website www.eu-parc.eu

MUNI | RECETOX

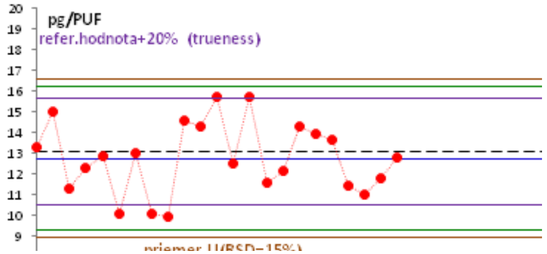
katerina.sebkova@recetox.muni.cz

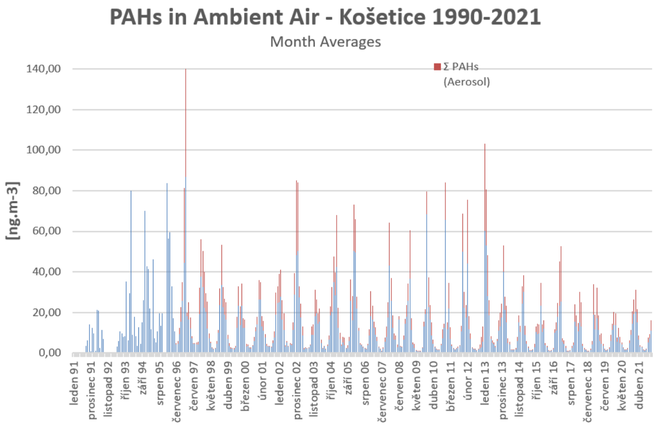
Should you have questions, do not hesitate to contact me!

Thank you for your kind attention!

Trace Analytical Laboratory offers

- Sampling
- Samples preparation
- Analysis and data evaluation
- QA/QC system
- Monitoring studies
- Monitoring Networks (MONET EU and Africa, A(



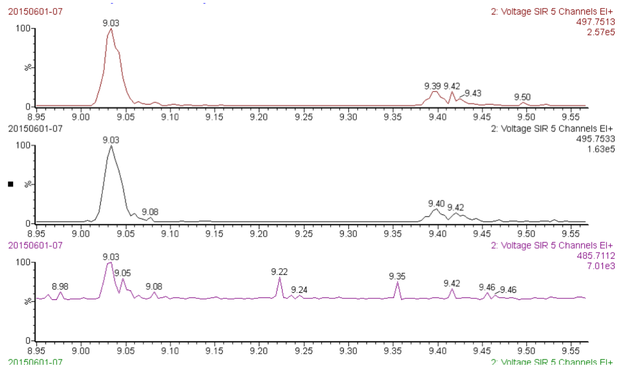


CETOCOEN Excellence

Analysis of organic pollutants, their metabolites, trace elements, metals, and species

Organic pollutants:

- Polychlorinated dibenzo-*p*-dioxins/furans (PCDDs/Fs)
- Polychlorinated biphenyls (PCBs) – indicator and dioxin-like
- Brominated and organophosphorus flame retardants
- Organochlorine, cyclodiene, and polar pesticides
- Polycyclic aromatic hydrocarbons (PAHs), NOx-, and oxy-PAHs
- hopanes
- Perfluorinated compounds (PFAS)
- Pharmaceuticals and cosmetic products
- Bisphenols
- Thyroid hormones



Metabolites:

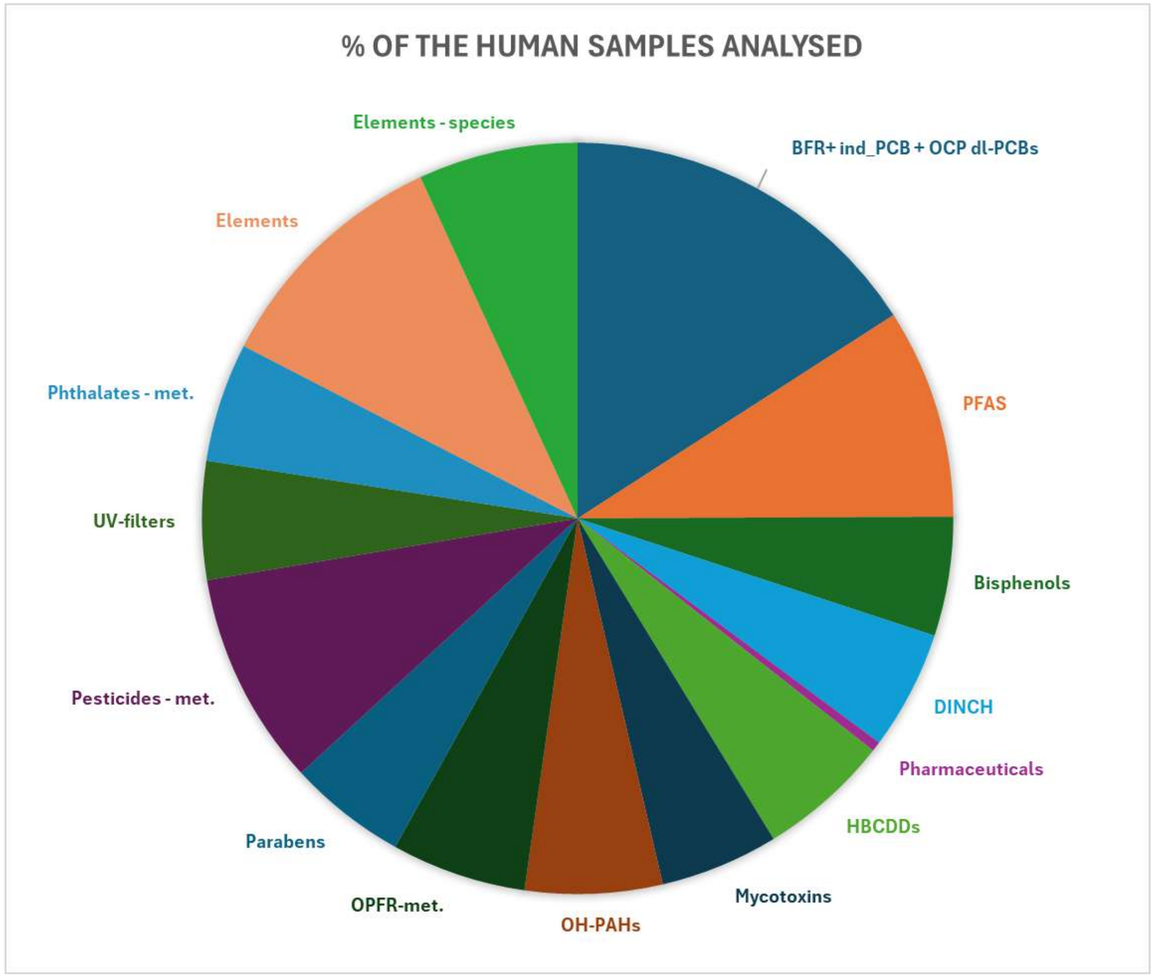
- OH-PAHs
- Phthalates metabolites + DINCH
- Pesticides metabolites + OP pesticides metabolites
- UV filters
- Mycotoxins

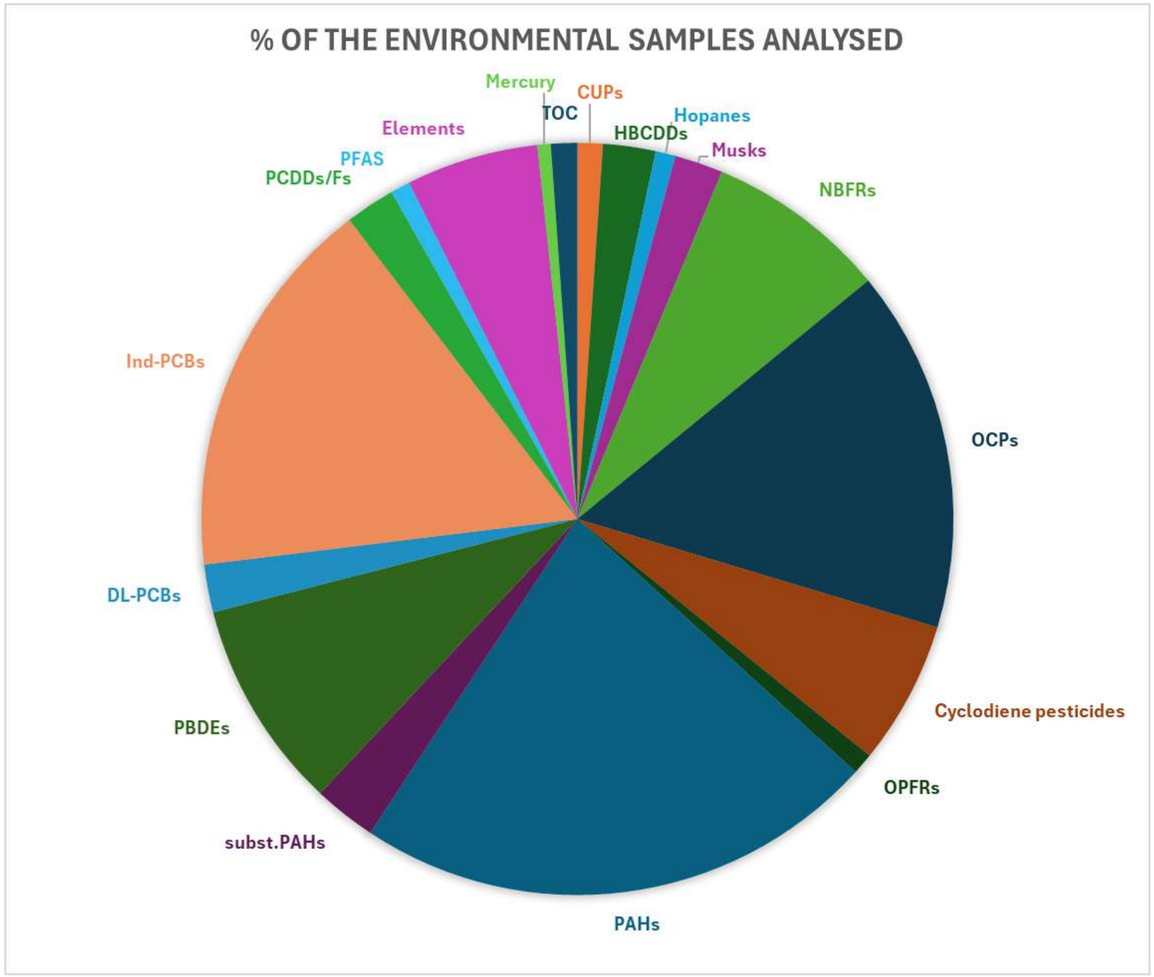
Trace elements, heavy metals, species, arsenic species in urine

L 1666

Excellence

35 000 analyses (70% human samples : 30% environmental samples)





Newly used methods in human samples:

- OP pesticides metabolites
- UV filters
- Mycotoxins
- Arsenic species in urine
- Titanium and nickel ions

Artificial samples:

- Bile acids and precursors
- Mycotoxins
- Arsenic species in urine
- Experimental, pharmaceuticals based on zinc nanomaterials

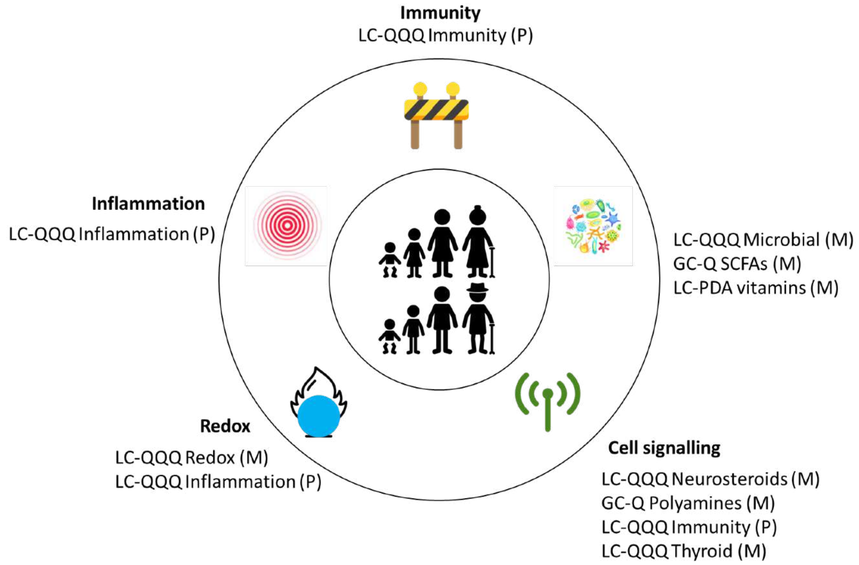
Newly used methods in environmental samples:

- Phthalates (GC-MS)
- Hopanes (GC-MS)
- Musks (GC-MS)
- New CUPs (LC-MS)
- OPFR (LC-MS)
- New PFAS (LC-MS)

CETOCOEN Excellence

Biomarker Analytical Laboratory

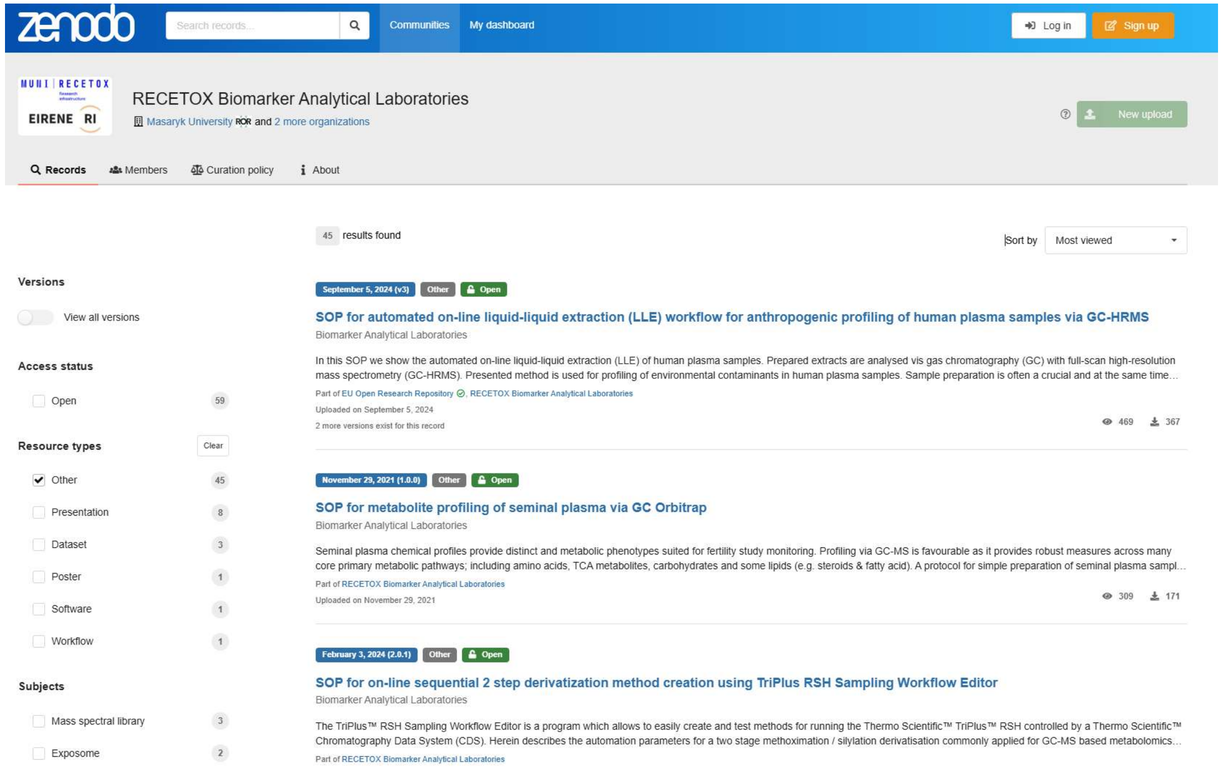
- Quantitative assays of clinically relevant proteins, including protein variants
- Quantitative multiplexed metabolite assays for molecular hallmarks
- Reproducible, scalable chemical exposure & metabolite screening assays



CETOCOEN Excellence

Open Science

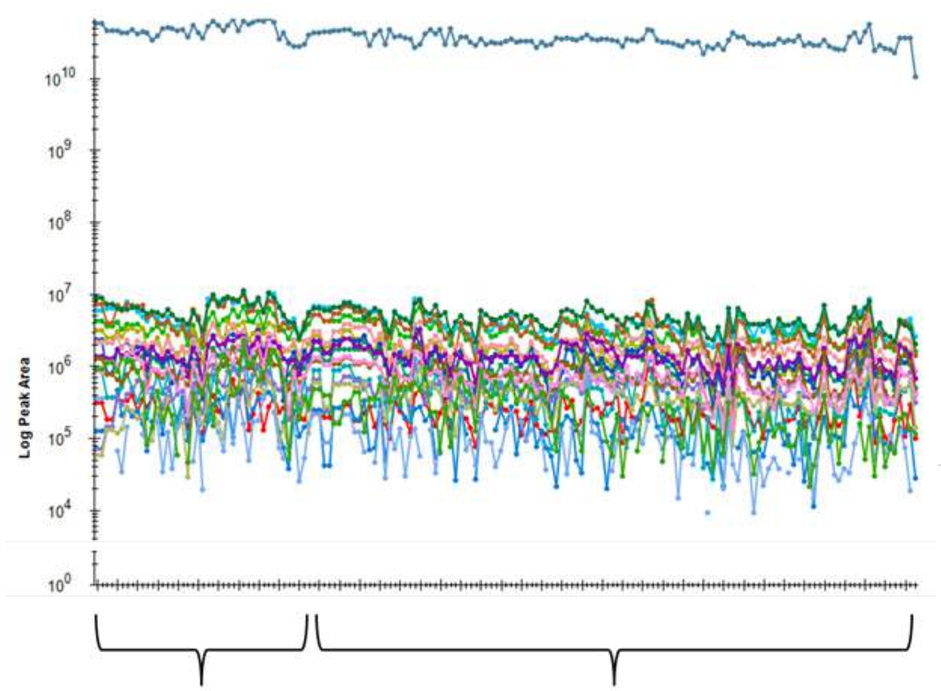
- All resources for reproduction are openly shared:
  - experimental & analytical SOPs
  - mass spectral library resources
  - data processing pipelines and workflows
  - QA/QC procedures and data – proof of measurement validity



- **45 methodological SOPs available**

CETOCOEN Excellence

Example QA/QC of population scale studies



study 1

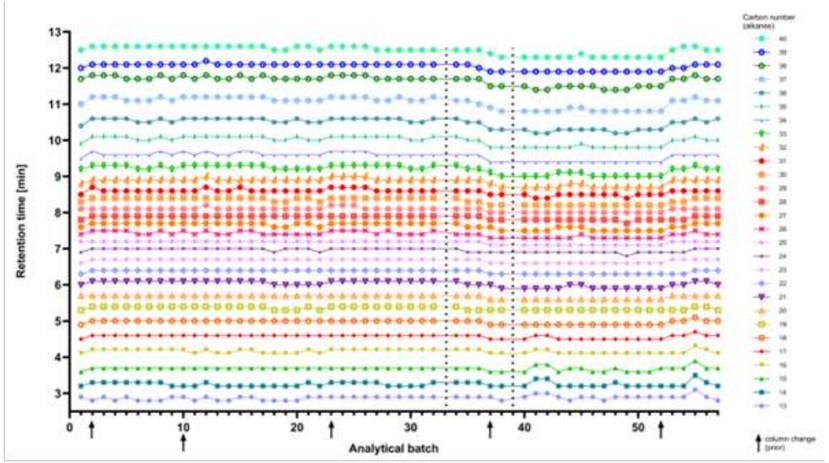
21 batches

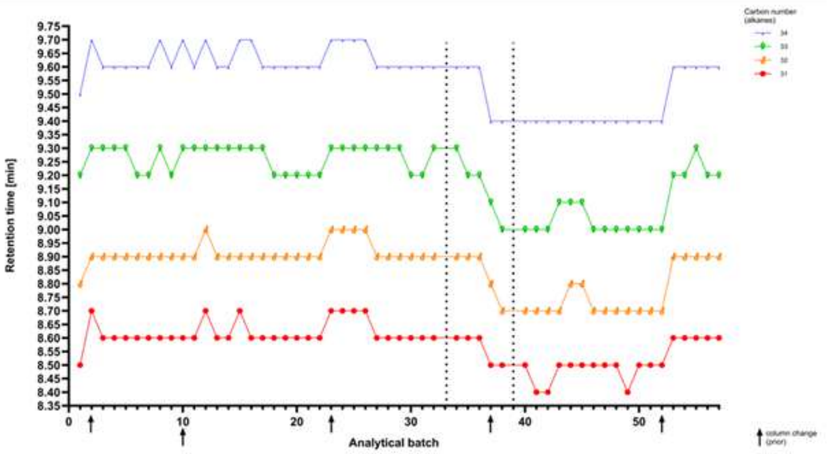
3 source exchanges
2 column exchanges
0 filament replacements
2 technical services
4.5% total error rate:
- 86.2% injection failure
- 12.3% autosampler collision
- 1.5% human error

study 2

57 batches

11 source exchanges
5 column replacements
3 filament replacements
2 technical services
3.7% total error rate:
- 89.0% injection failure
- 9.5% autosampler collision
- 1.5% human error

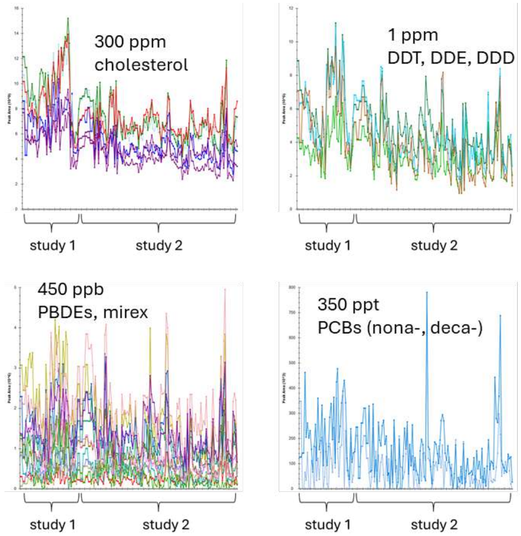




Errors tracked. Compliance procedures, aiming for future accreditation.

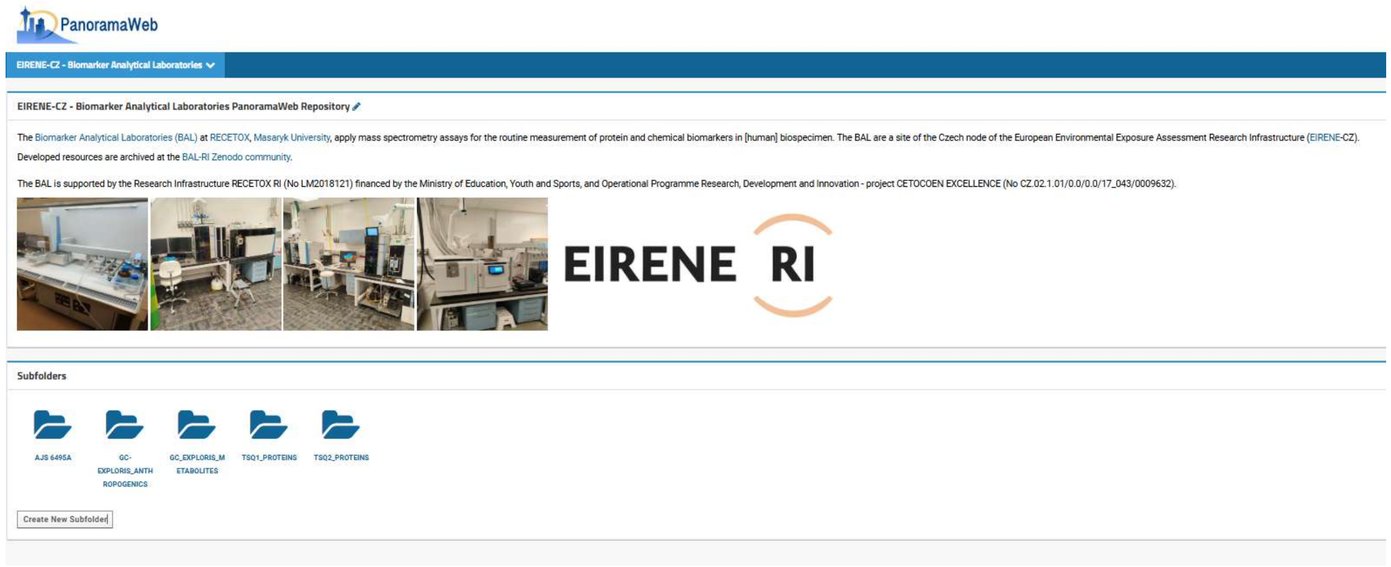
Study 1 = 850 samples
Study 2 = 3000 samples

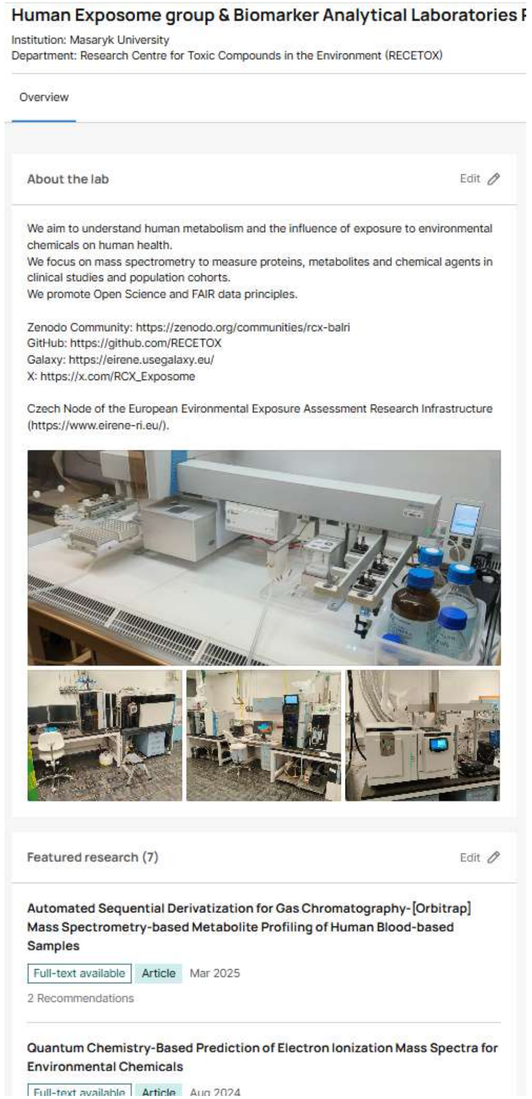
Currently measuring individual studies of ~10,000 samples



CETOCOEN Excellence

FAIR data & best practice reporting

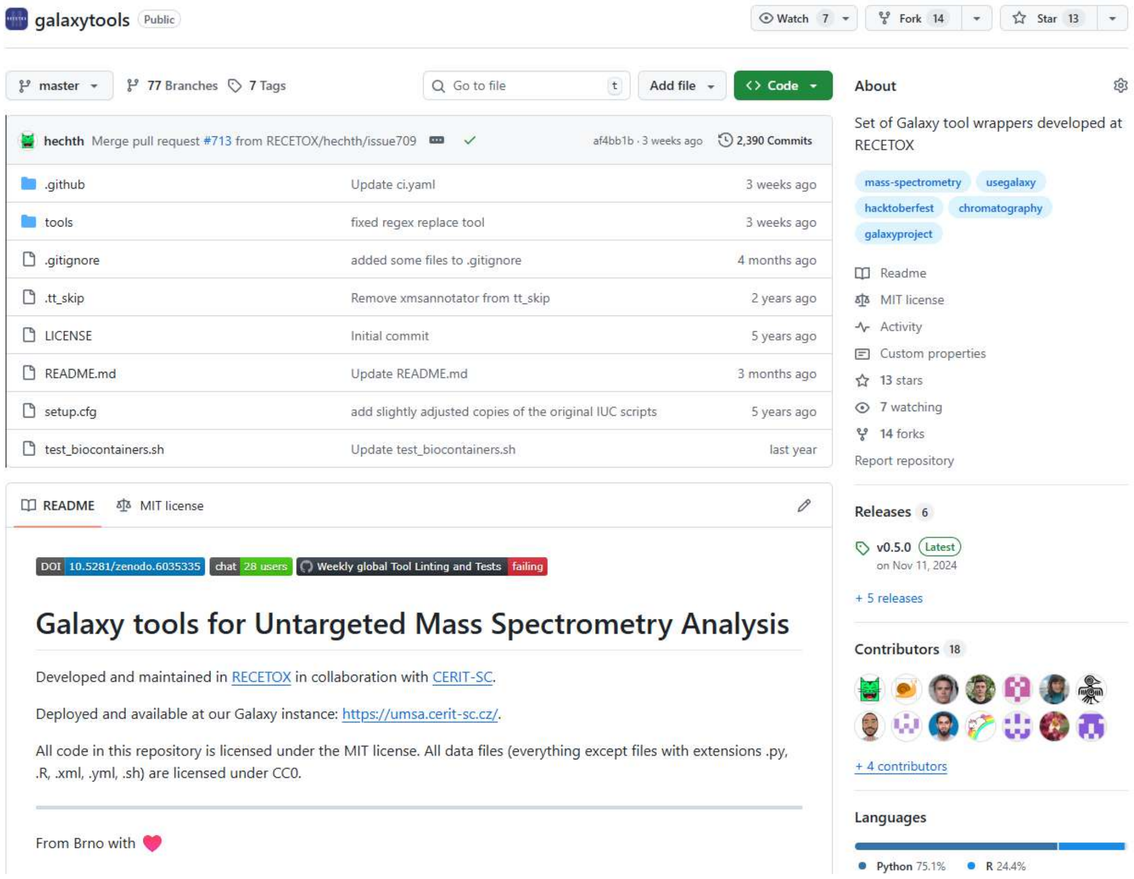




- Non-sensitive data is publicly deposited
- **All raw data is deposited under FAIR principles**, with access terms
- All open access publications and accompanying supplementary records are disseminated from the group

CETOCOEN Excellence

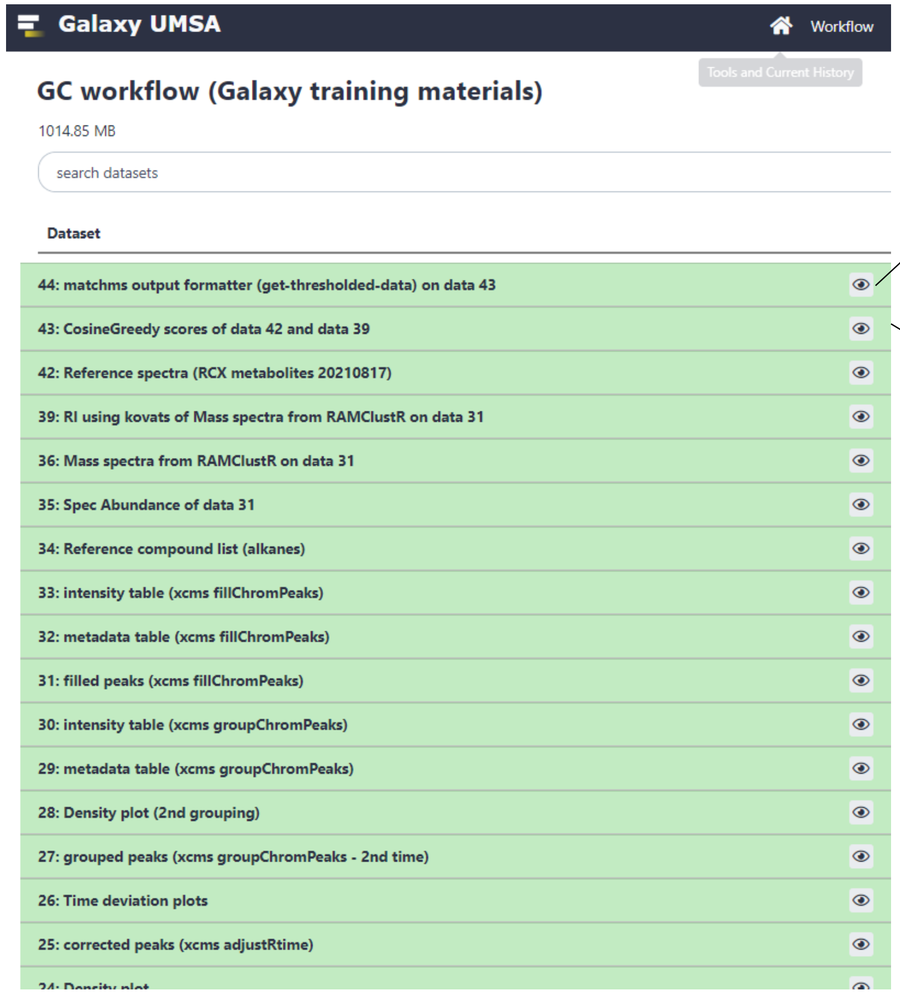
Data processing workflows

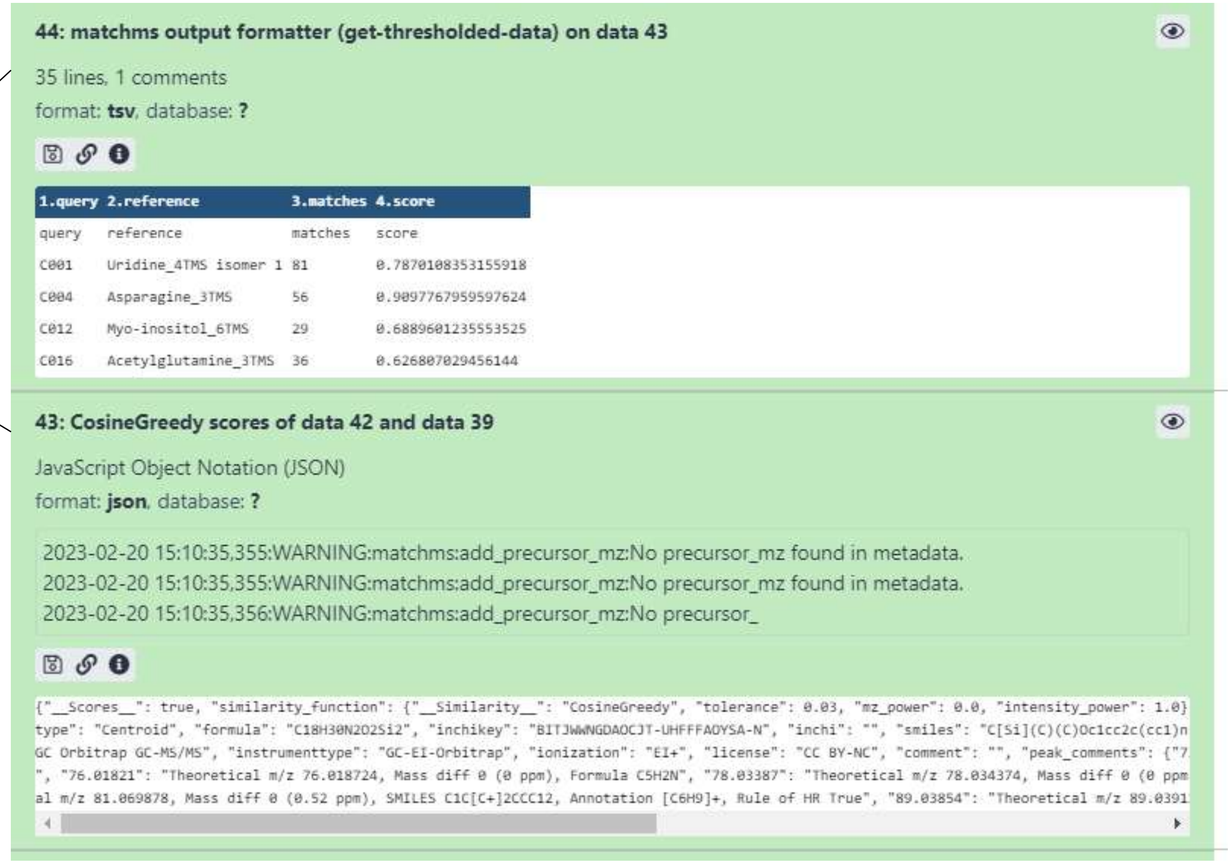


- Galaxy cloud infrastructure for **FAIR data processing**
- **Open code development**
- **Contribute towards 37 software resources**

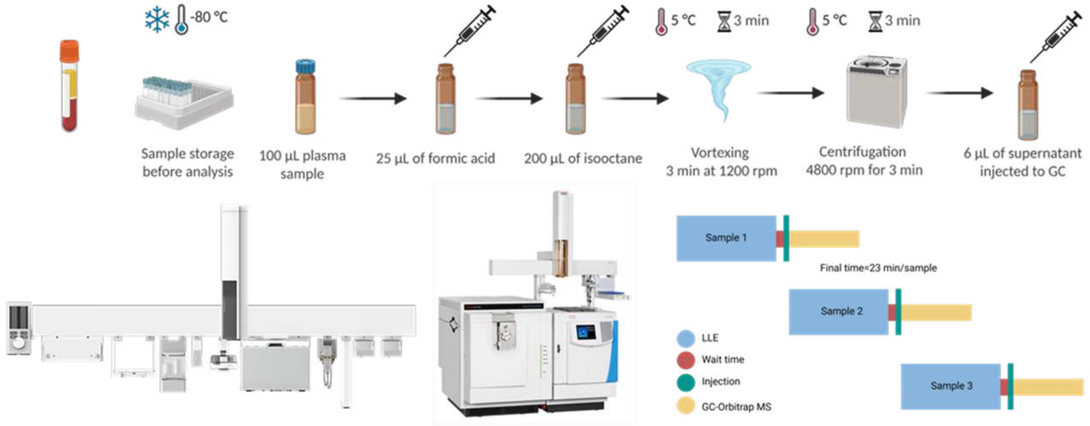
The Galaxy Community. The Galaxy platform for accessible, reproducible and collaborative biomedical analyses: 2022 update, *Nucleic Acids Research*, Volume 50, Issue W1, 5 July 2022, Pages W345–W351. https://doi.org/10.1093/nar/gkac247

Example - Galaxy ecosystem sharing





Automation of sample preparation workflows



- **Multi-site replication in 5 countries**
- **Application notes, webinars, posters and talks in collaboration with vendors**
- **Industry cooperations for workflow developments**

CTC Analytics

ThermoFisher SCIENTIFIC

LIVE from the LAB

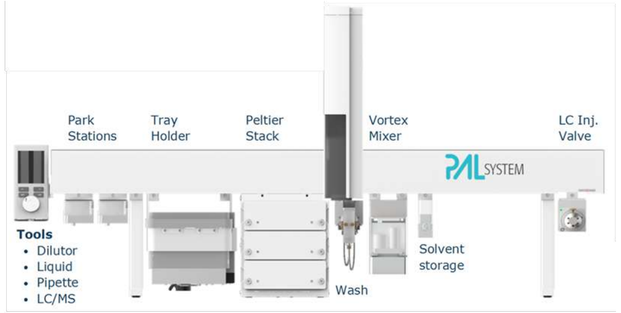
PAL SYSTEM Ingenious sample handling

GC/MS Application Note

Automated Direct Derivatization and GC/MS Analysis

A Robust Method for Comprehensive Metabolomic Profiling of Dried Blood Spots, Serum, and Plasma

biocrates The future of research and health



CETOCOEN Excellence