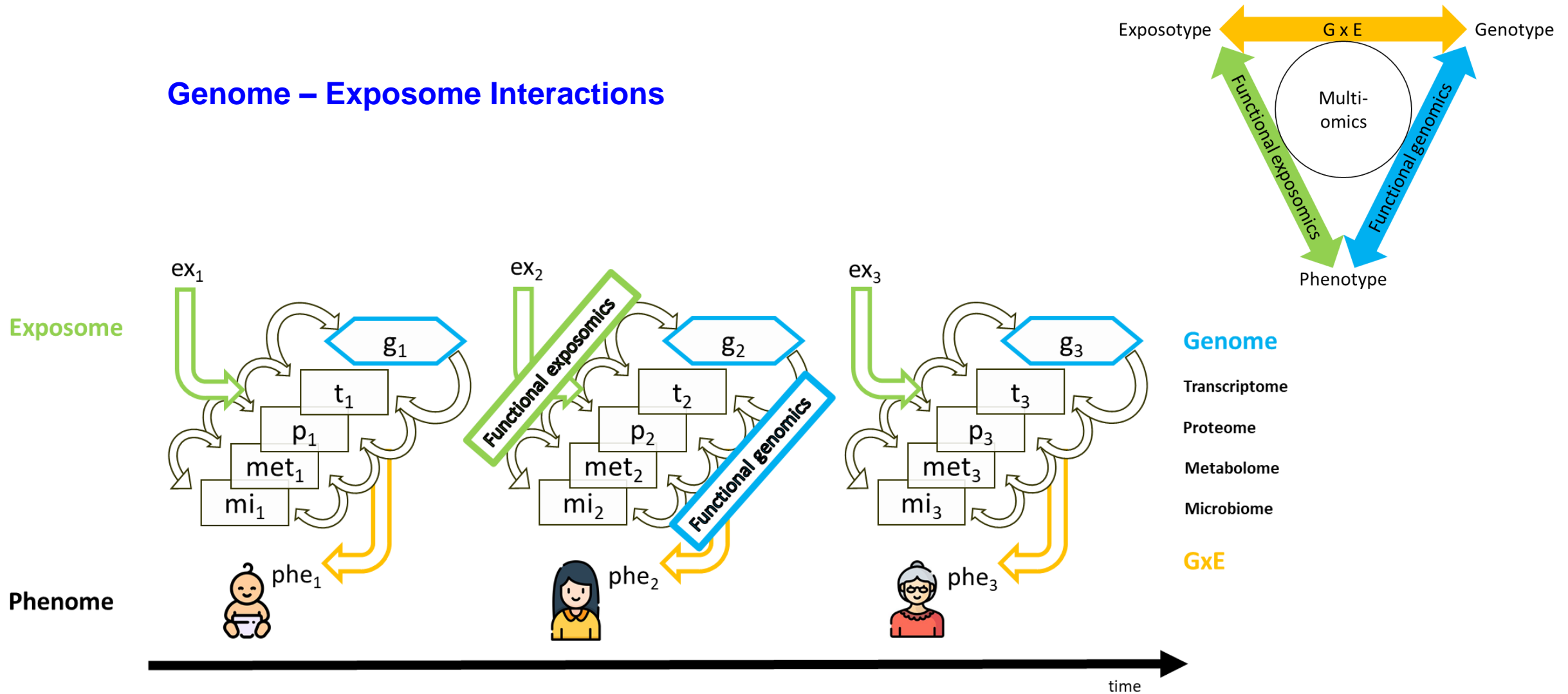


EIRENE - Research Infrastructure for EnvIRonmental Exposure assessment in Europe

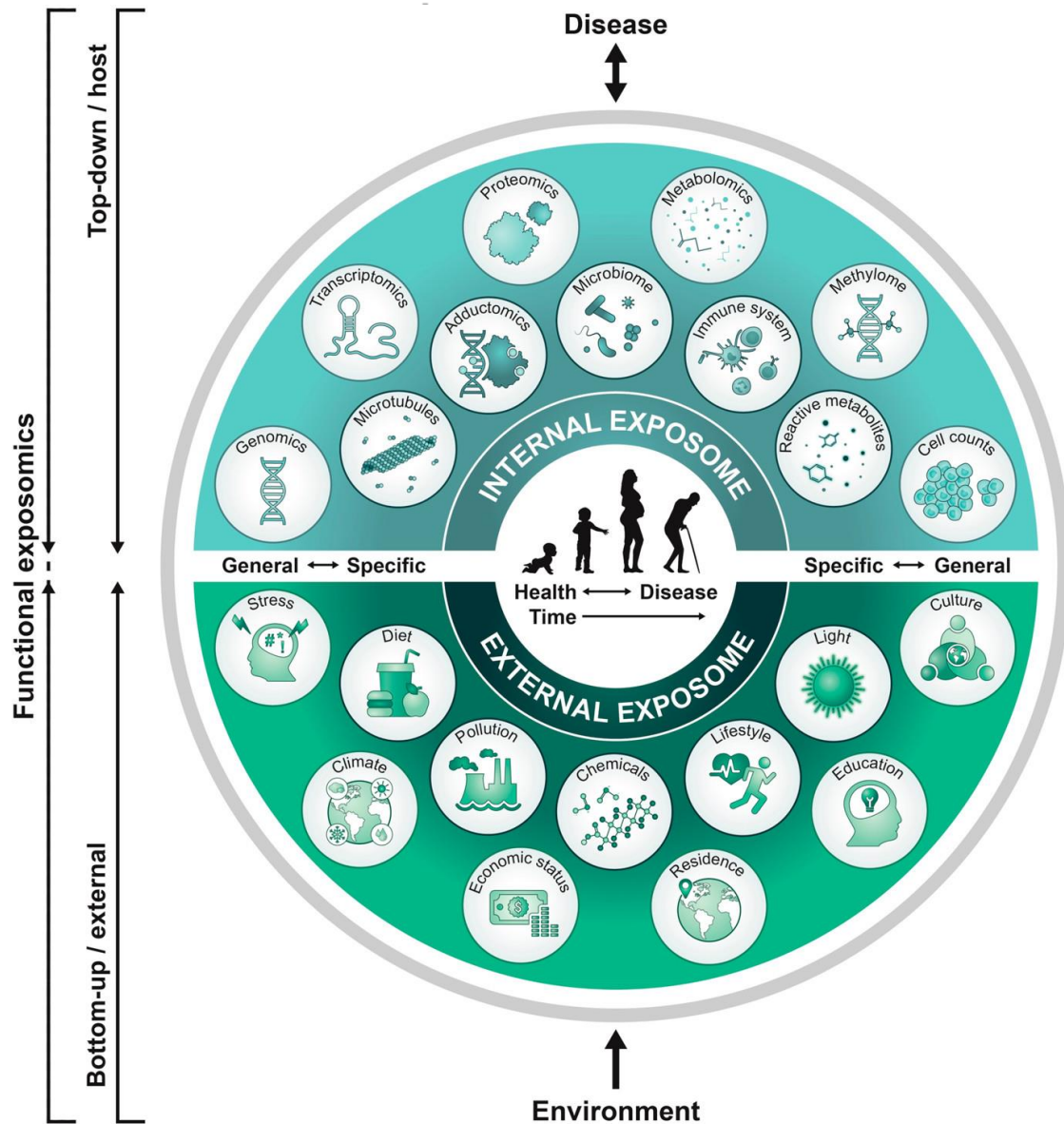
Jana Klánová

Masaryk University Brno

Genome – Exposome Interactions



<https://zenodo.org/record/5363305>



Defining the Scope of Exposome Studies and Research Needs from a Multidisciplinary Perspective

Pei Zhang, Christopher Carlsten, Romanas Chaleckis, Kati Hanhineva, Mengna Huang, Tomohiko Isobe, Ville M. Koistinen, Isabel Meister, Stefano Papazian, Kalliroi Sdougkou, Hongyu Xie, Jonathan W. Martin, Stephen M. Rappaport, Hiroshi Tsugawa, Douglas I. Walker, Tracey J. Woodruff, Robert O. Wright, and Craig E. Wheelock*



Cite This: <https://doi.org/10.1021/acs.estlett.1c00648>



Read Online

Recent works continue to exemplify the ‘exposome’ under the integrated functions of all processes which relate to disease.

Miller and Jones 2014:

(<https://doi.org/10.1093/toxsci/kft251>):

Exposome: The cumulative measure of environmental influences and associated biological responses throughout the lifespan, including exposures from the environment, diet, behavior, and endogenous processes

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Research and education for a healthy future

UPDATE 2019

Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022

Ministry of Education, Youth and Sports



1A.3 | Environmental sciences

RECETOX Research Infrastructure



Acronym:
RECETOX RI

Hosting Institution:
Masaryk University

Phase: construction
Character: single-site

Responsible person:
Prof. Jana Klánová, Ph.D.
klanova@recetox.muni.cz

Website:
old.recetox.muni.cz/index-en.php

Year of inclusion on the Czech Roadmap: 2010

Motto:
Science for a healthy future.

► 80

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Characteristics

RECETOX RI enables research on both environmental and human health risks related to environmental contamination, and supports the safe management of chemicals. The existing and newly built capacities of the RECETOX RI core facilities offer a wide range of expertise needed for making environmental impact assessments for a variety of users. They provide access to analytical, chemical, biological, and toxicological laboratories, the environmental monitoring network **MONET** (Monitoring Networks), population studies **ELSPAC** (Central European Longitudinal Study of Parents and Children), and related data sources. They allow for the presentation of external data through the **ENVISys** (Global Environmental Assessment and Information Systems) information platform. The capacities for data analysis, interpretation and modelling are also available together with advanced bioanalytics and bioinformatics offering a portfolio of services to users from both the academic and private sectors in the Czech Republic and abroad. The comprehensive interdisciplinary approach taken by RECETOX RI is unique in the European context. RECETOX RI offers capacities for the assessment of environmental impacts on human health, a platform for the development of innovative methods, know-how and technology transfer, teaching and consulting. The education and training activities of RECETOX RI at all levels of higher education improve the quality and professional readiness of its graduates. The training courses, workshops, and the international summer schools are also organized for attendees from universities, research institutes, health facilities, industrial enterprises, regional and state authorities, ministries, governments and international organisations. RECETOX RI is associated with the Czech nodes of the ACTRIS (Atmosol, Clouds and Trace Gases Research Infrastructure), **ELIXIR** (European Life-Science Infrastructure for Biological Information), and **BEMIS-ERIC** (Biobanks and Biomolecular Resources Infrastructure) European research infrastructures. It coordinates the ERENE (European Environmental Exposure Assessment Network) project for the updated **ESPA** Roadmap, and the **EU** (Global Earth Observation) initiative **ESPO** (Global Observation System for Persistent Organic Pollutants). It also contributes to the implementation and management of joint European programmes such as **HEMIS** (Human Monitoring for Europe) and **ERA PLANET** (European Network for Observing our Changing Planet).

Socio-economic benefits

RECETOX RI develops new approaches to assess the causal links between human exposure to toxic substances and the development of chronic diseases, and improves our understanding of the mechanisms of such interactions. It identifies toxic mixtures in the environmental samples, consumer products and human tissues, as well as sources of such chemical mixtures, their health effects and most vulnerable populations. It explores the links between these environmental exposures and social and economic factors that affect human health, and allows for the prioritization and better targeting of the relevant legislation. It contributes to the better management of toxic chemicals, the safe production of food and consumer products, and safe waste processing. It enhances the protection of human health, the development of preventive measures, and sustainability of healthcare. It collaborates with **WHO** (World Health Organization) and **WHO** (World Health Organization), and supports the implementation of the concepts of a circular economy and healthy smart cities. It also provides university education and builds international capacities for assessing environmental exposures.

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RECETOX RI

RECETOX accredited laboratories
MONET monitoring networks



<https://www.vyzkumne-infrastruktury.cz/en/2019/11/update-of-roadmap-of-large-research-infrastructures-of-the-czech-republic/>

MUNI | RECETOX

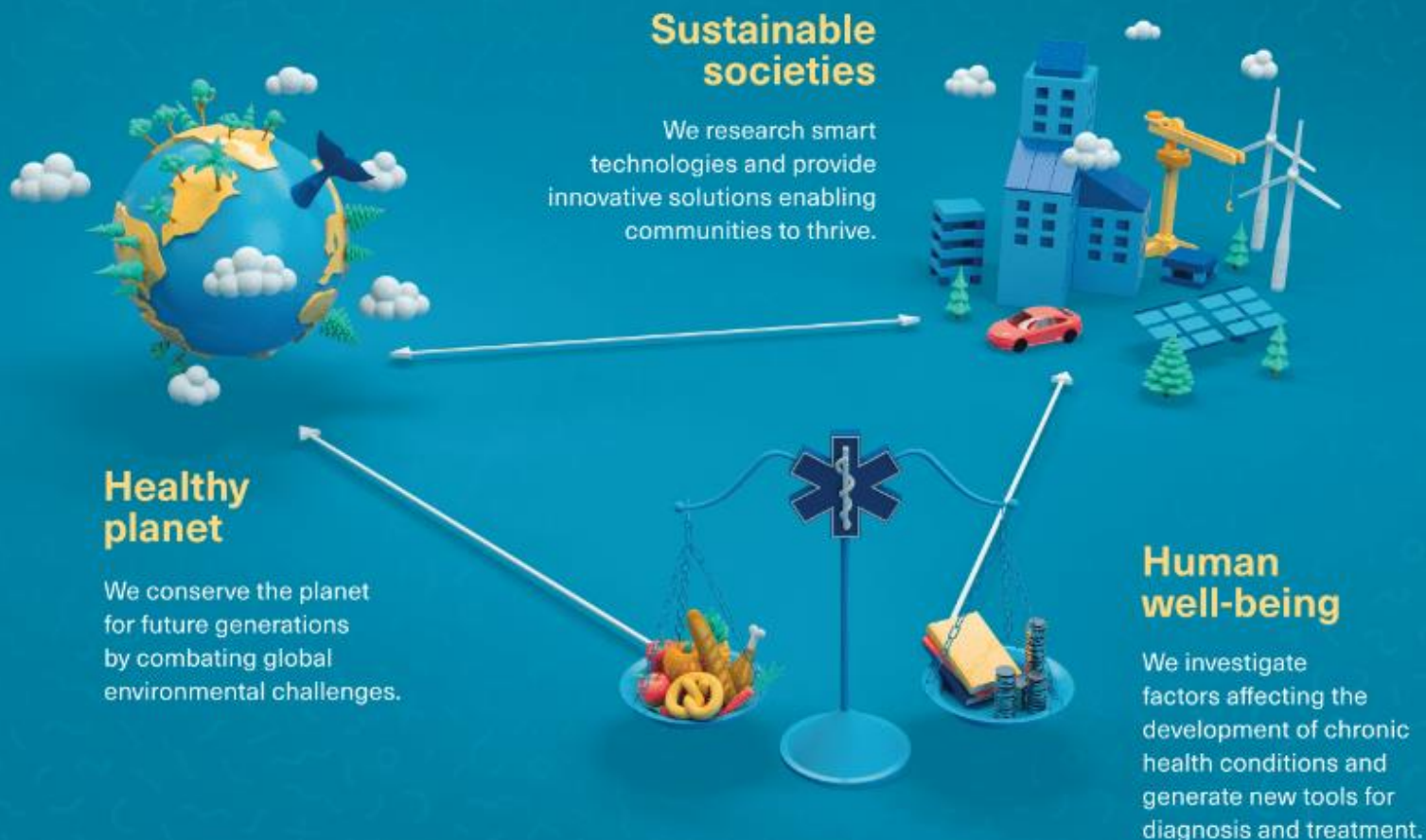
Teaming for a healthy future

Mission

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



This project has received funding
from the European Union's Horizon 2020
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Sustainable Development Goals 2030

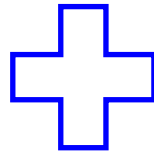


Legal frame



Partnership

Sustainable resources



Social and economic development



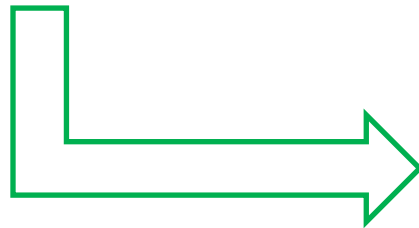
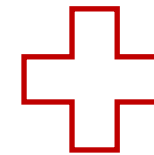
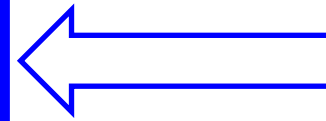
Basic human needs



Healthy planet



Universal values



Long-term sustainability

Sustainable society



Human health and wellbeing



Healthy planet



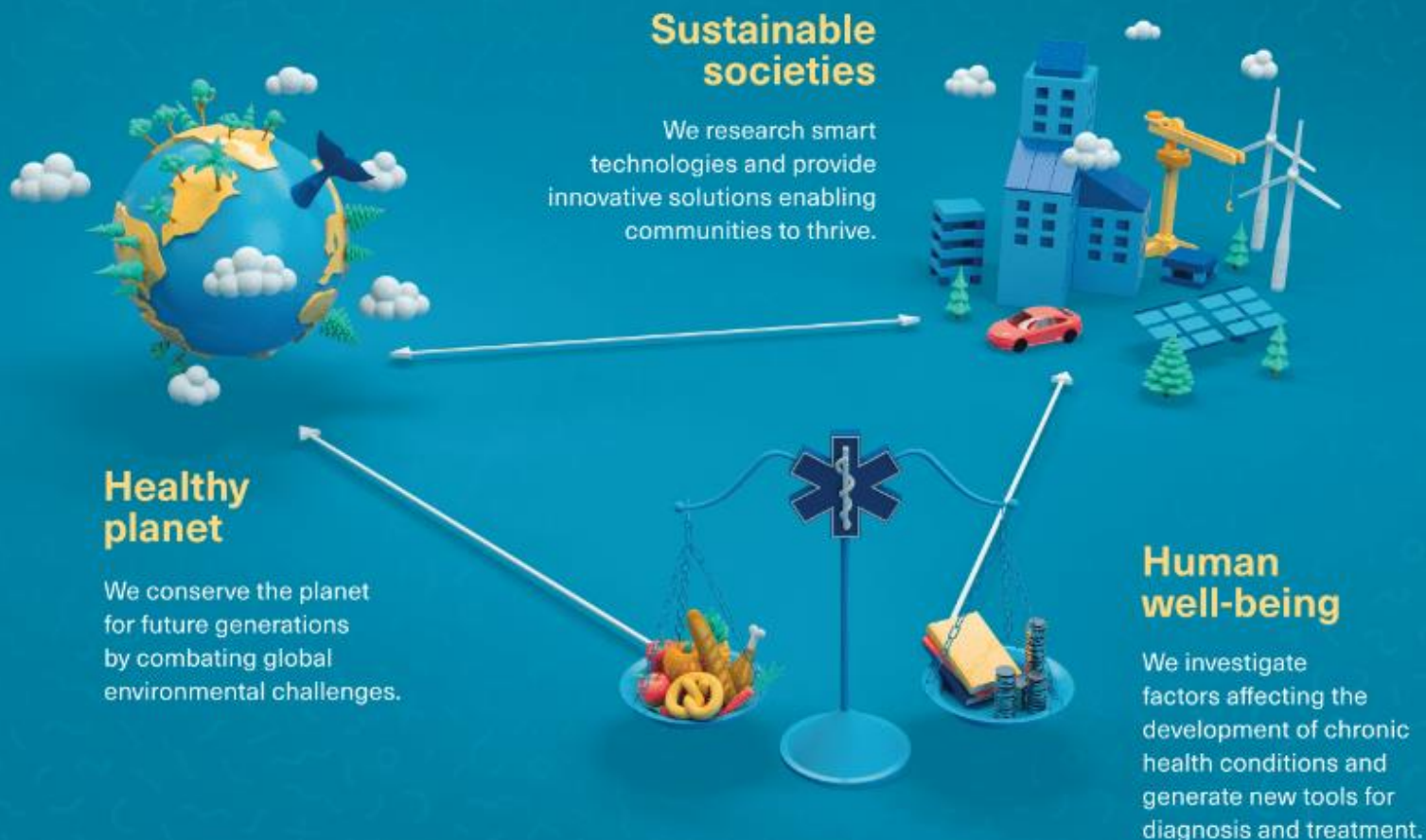
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14.3 | Environmental sciences

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RECETOX RI

RECETOX accredited laboratories
MONET monitoring networks
CELSPAC population studies
GENASIS information platforms

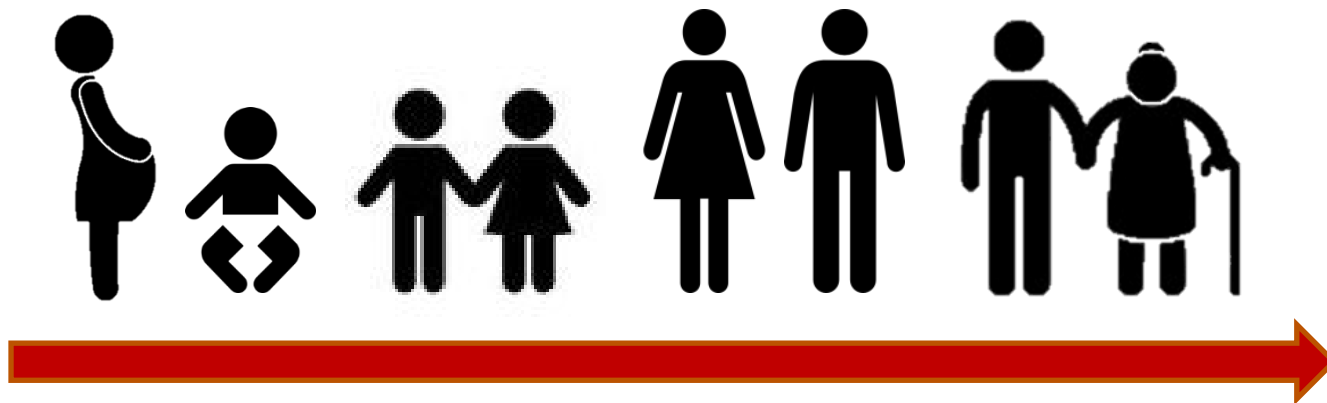


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Population cohorts and related biobanks in Central and Eastern Europe

- Large population-based cohorts are invaluable resources and important infrastructures supporting research in environmental health. [Geographic gap](#): longitudinal cohorts mostly available in Northern, Western and Southern Europe.
- Well-designed cohort studies improve our knowledge and understanding of disease aetiology and help identifying factors that affect health outcomes, but also contribute to insights on prediction models and effective risk management and prevention measures: [Selective focus of existing cohorts](#) (socio-economic, genetic, life-style, environmental etc).
- Biobanks and access to large numbers of samples and data are a key to enable studies on biomarkers of exposure and effects: [Mostly clinical biobanks](#) are organised in BBMRI.
- [Coordinated](#) infrastructures in cohort studies are needed spanning from parent-child cohorts to adult cohorts to capture general environment and occupation exposures throughout the lifetime up to old age.



CELSPAC: mother- child cohorts



- 1960s: > 500 mother-child pairs (two-decade follow-up)
- Anthropology, social-economic determinants



CELSPAC: birth cohorts



- 1960s: > 500 mother-child pairs



www.elspac.cz

- 1990s: ELSPAC, > 6000 families (two-decade follow up)
- DNA samples
- Pediatric records (including medication)
- School reports
- Physical and psychopological examinations
- Self-assessment questionnaires for mother, father and child
- Anthropometry, neurodevelopment, disorders, education and health outcomes can be linked to medical reports or self-reports (socio-economic status, lifestyle, diet, physical activity, stress, exposure, infections, drugs etc.)
- Geo-referenced data enable linking to external exposures
- Numerous papers published but no internal exposures



CELSPAC: mother- child cohorts



- 1960s: > 500 mother-child pairs



- 1990s: ELSPAC, > 6000 families



CELSPAC TNG

- 2020s: CELSPAC_ TNG, >1000 mother-child pairs
- Biobank established
- Laboratory capacities developed (incl. omics)
- Potential to link to national registers



Productive-age cohorts



- 1960s: > 500 mother-child pairs



- 1990s: ELSPAC, > 6000 families

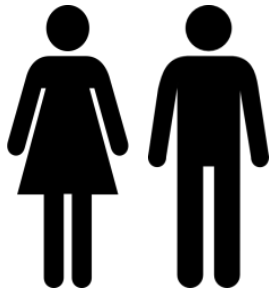


- 2020s: ELSPAC follow up, neuro spin-off



CELSPAC TNG

- 2020s: CELSPAC_ TNG, >1000 mother-child pairs



Productive-age cohorts



- 1960s: > 500 mother-child pairs



- 1990s: ELSPAC, > 6000 families



- 2020s: ELSPAC follow up, neuro spin-off



CELSPAC TNG

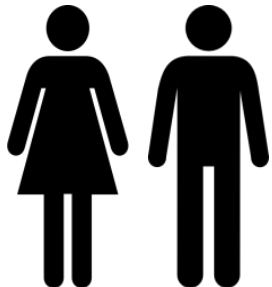
- 2020s: CELSPAC_TNG, >1000 mother-child pairs



Kardioviz Brno 2030
PROJEKT JE REALIZOVÁN FNUSA-ICRC



- 2010s: KARDIOVIZE, >2000 individuals, cardiometabolic focus



Ageing cohorts



- 1960s: > 500 mother-child pairs



- 1990s: ELSPAC parents



- 2020s: ELSPAC follow up



CELSPAC TNG

- 2020s: CELSPAC_ TNG, >1000 mother-child pairs



Kardiovize Brno 2030
PROJEKT JE REALIZOVAN FNUSA-ICRC



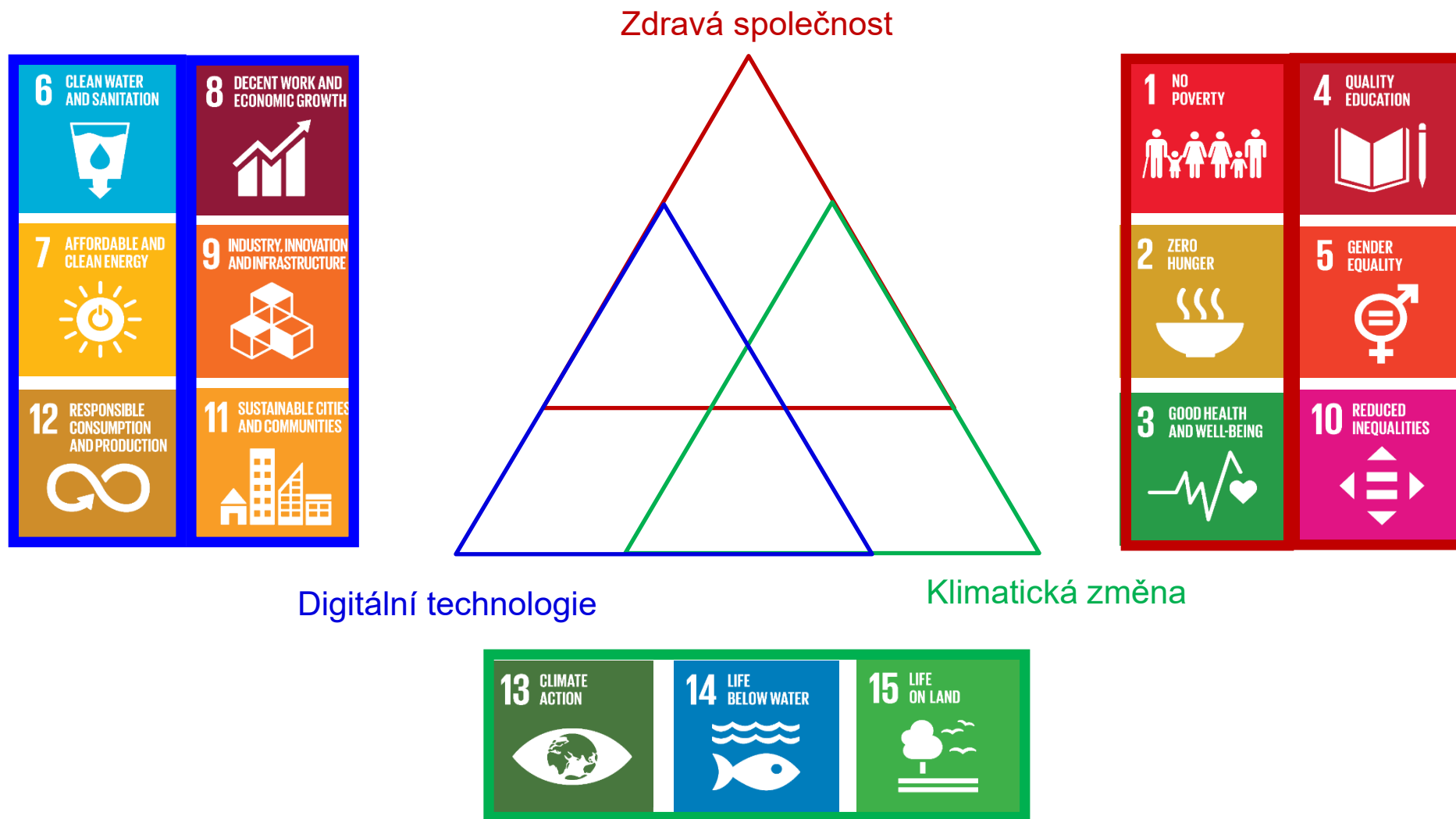
- 2010s: KARDIOVIZE, >2000 individuals



- 2000s: HAPIEE



RIS JMK 2021-2027: Globální výzvy



Strategický cíl 7: #brnoregion jako laboratoř budoucnosti

Brno Living Lab

MUNI

FAKULTNÍ
NEMOCNICE
BRNO

FNUSA
ICRC

B | R | N | O

jiho~~mo~~ravský 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.



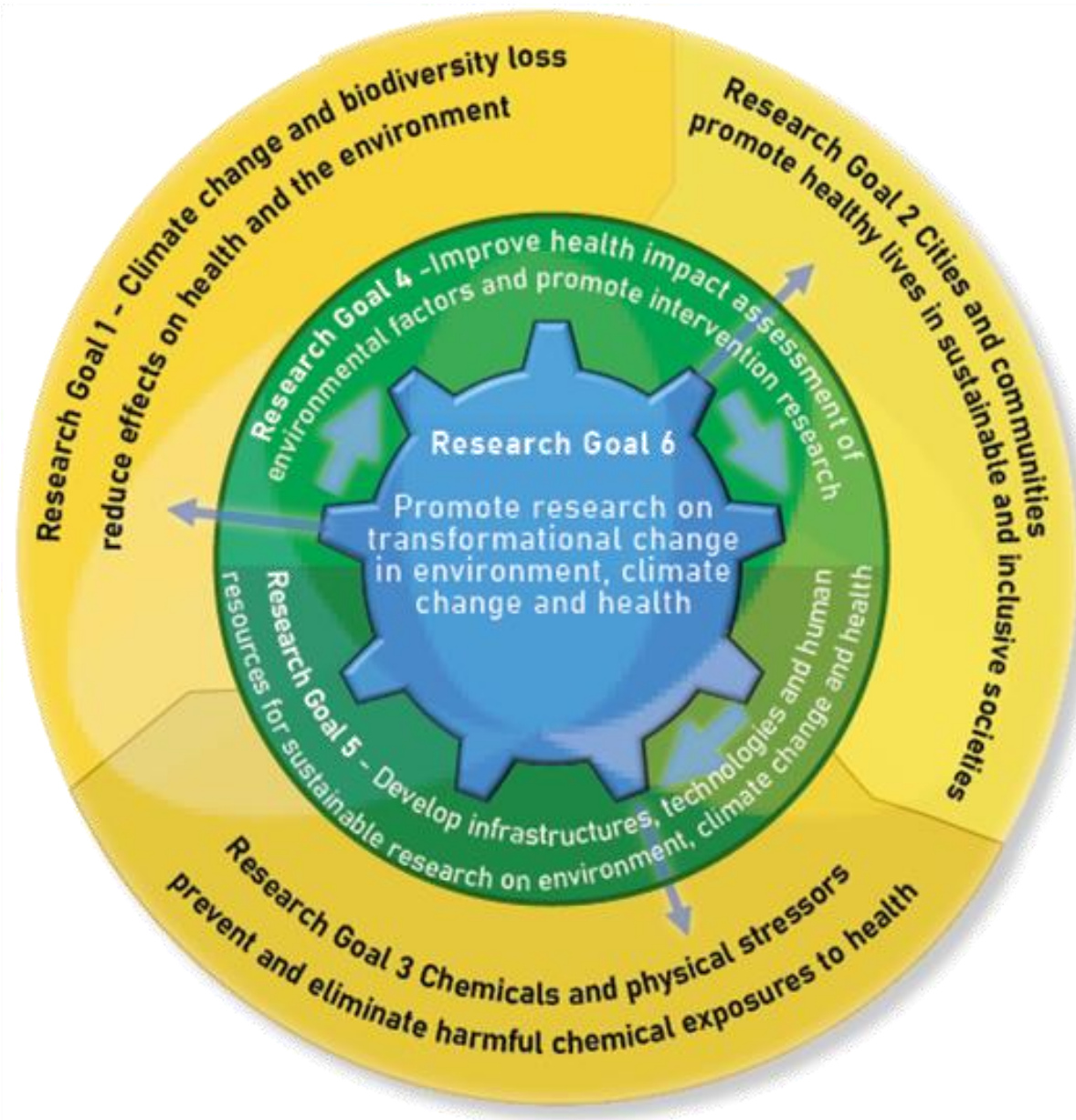
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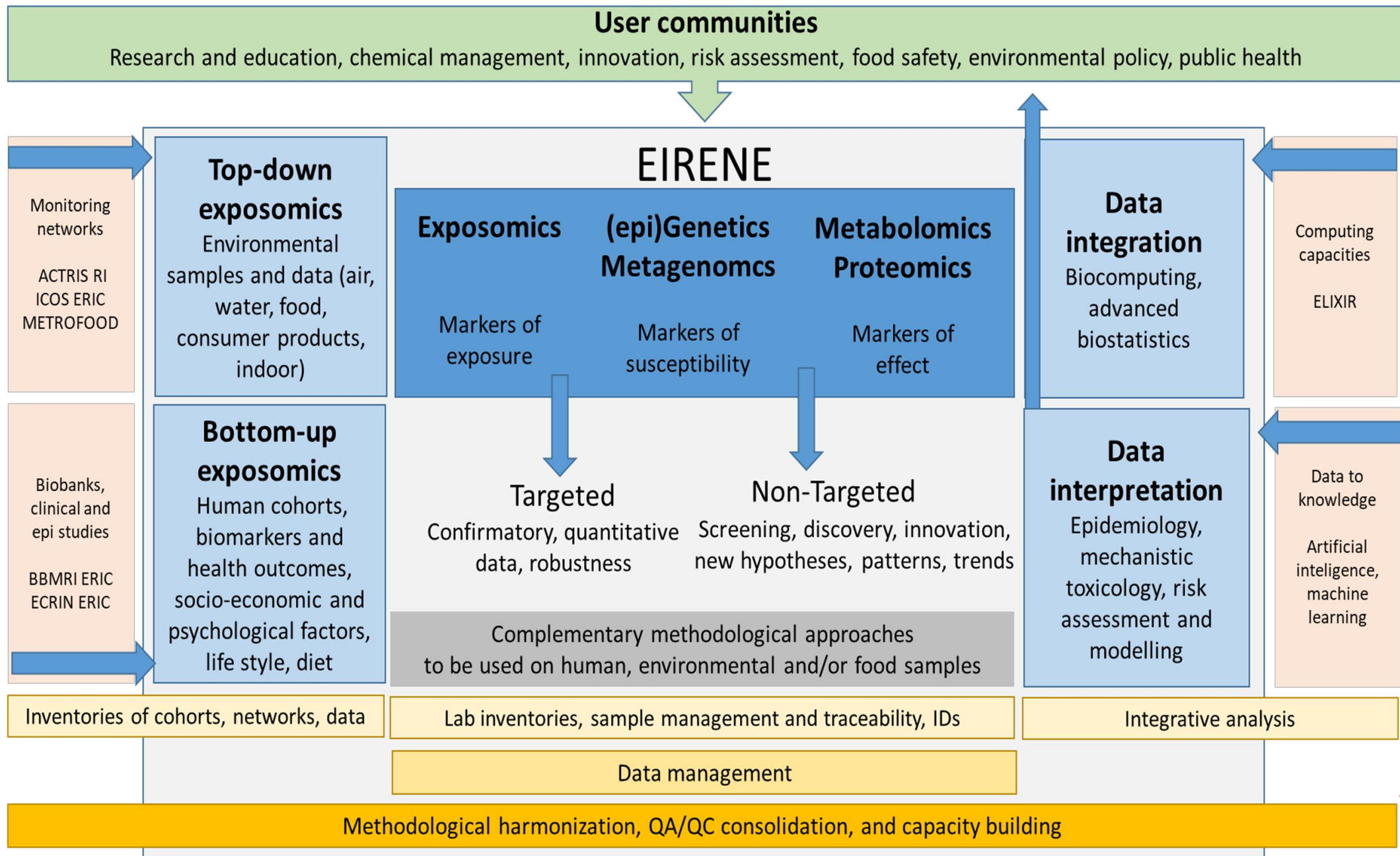
muni.recetox.cz

A gap identified in the Health&Food domain of 2018 ESFRI Roadmap

*„There is a need to enable a research infrastructure that will facilitate research on the human health and wellbeing at all stages in development, including ageing, nutrition and behavioural studies, and their connections to the social sciences and humanities. There are **geographic, economic and environmental drivers affecting human health and wellbeing. Climate change, extreme weather, dramatic changes in ecosystem services, environmental pollution and exposure to harmful chemicals** represent a new combination of issues that **require an integrated approach at pan-European level.***

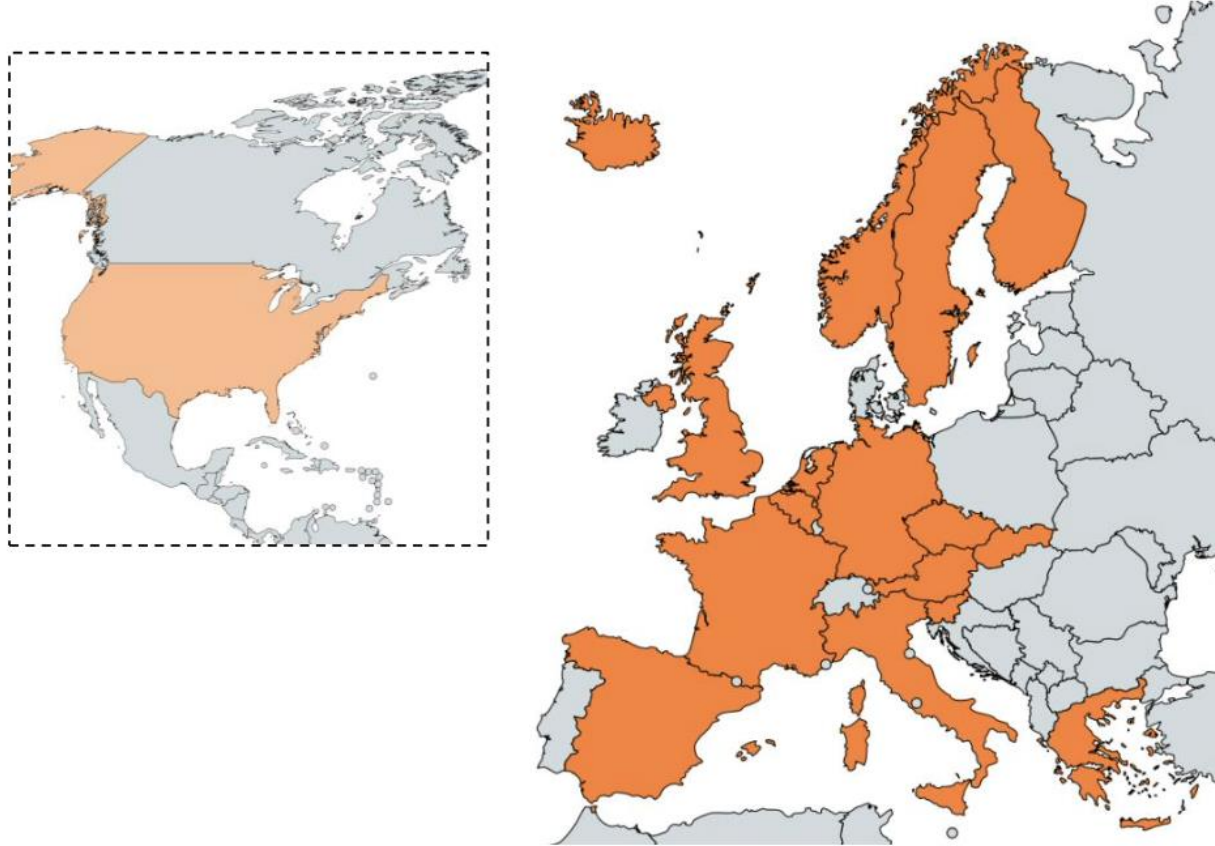
*At the heart of this approach is the **EXPOSOME**, taking a holistic view throughout the human lifetime on the effect of exposures to diet, lifestyle, and the environment on human health and disease. The EXPOSOME coupled with advanced genetic and medical approaches represents an opportunity to tackle this complex issue by connecting to the landscape of Health & Food RIs and other domains. Ongoing EU projects and networks on human biomonitoring (HBM4EU and EMEP) are important steps to bring together relevant parties.”*

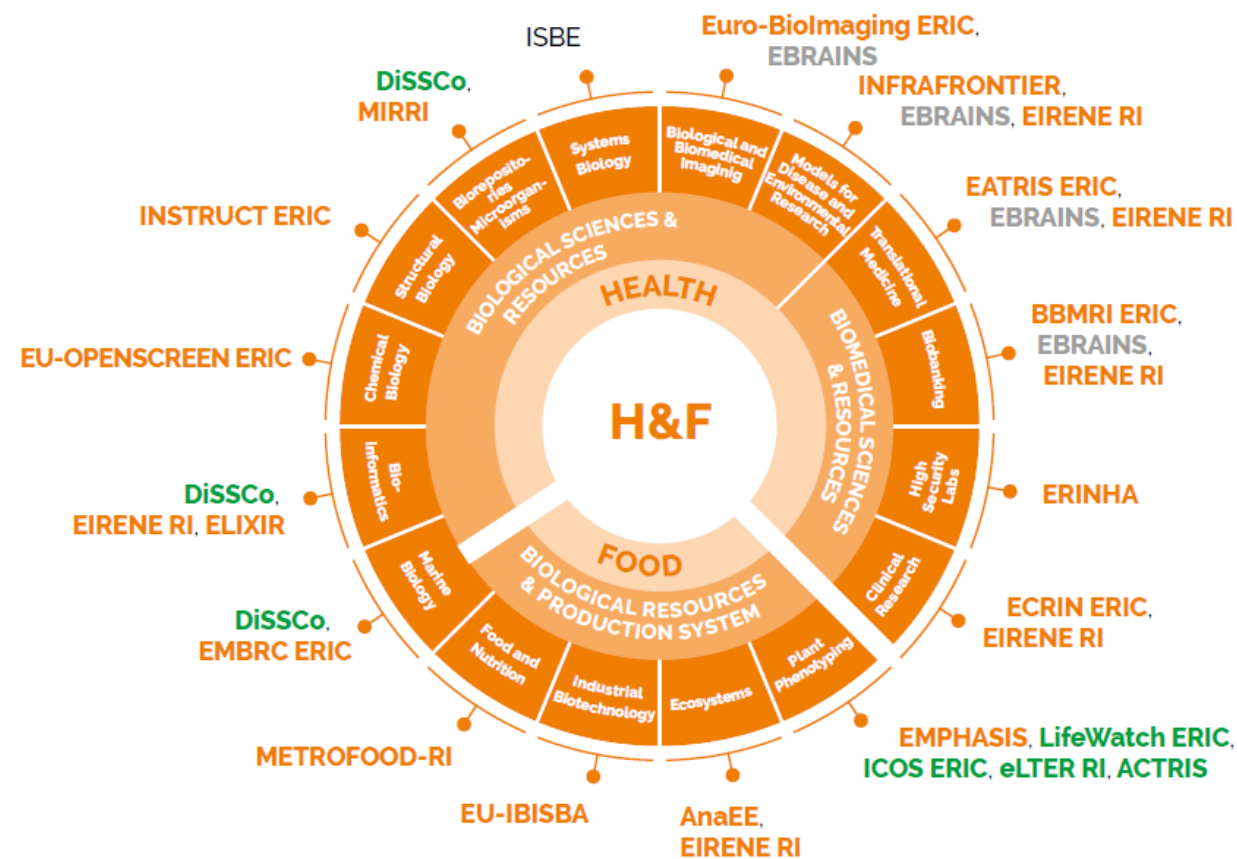
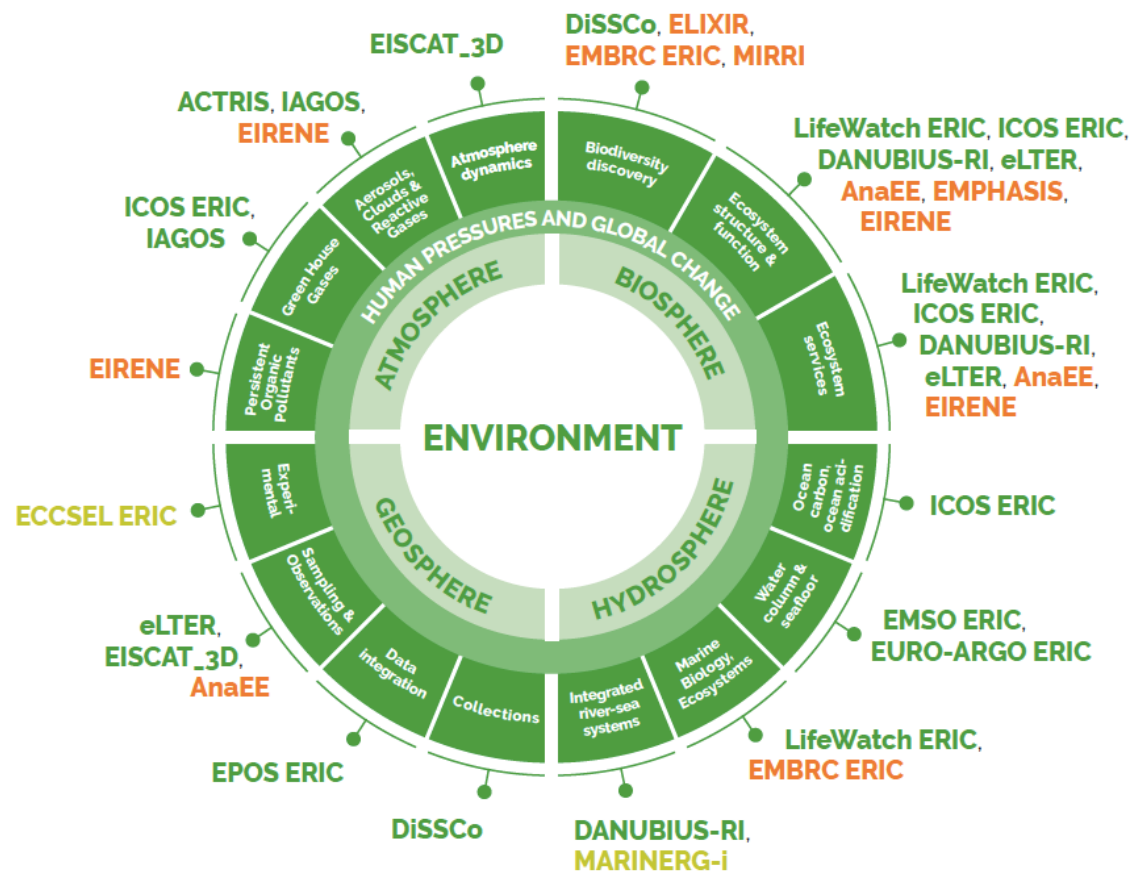




EIRENE RI consortium 2020

17 national Nodes, 50 individual partners





Thank you for your kind attention