history

culture

architecture

science

BRNO
city for life

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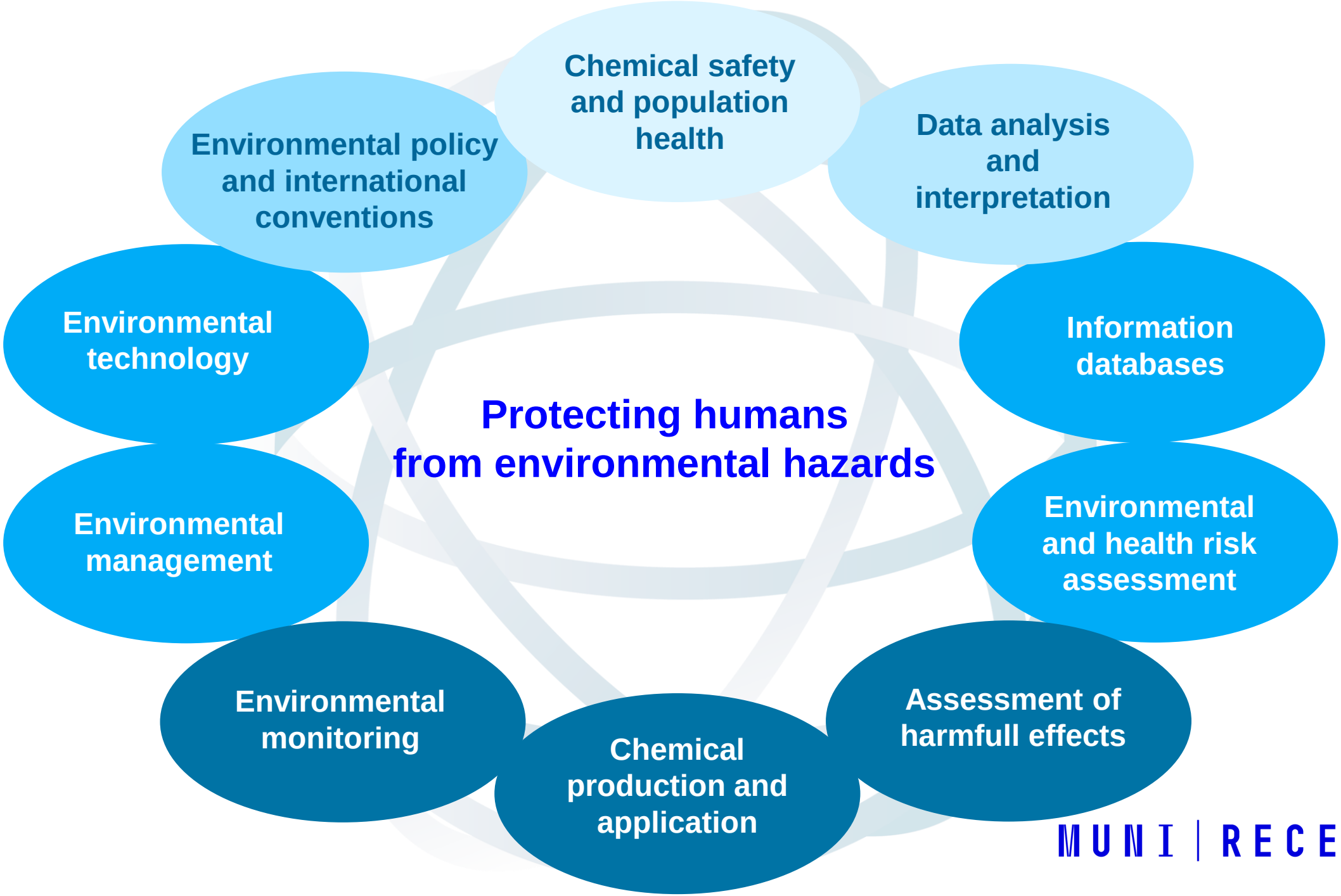
Research and Education of a Healthy Future

Jana Klánová
Masaryk University Brno
RECETOX Centre



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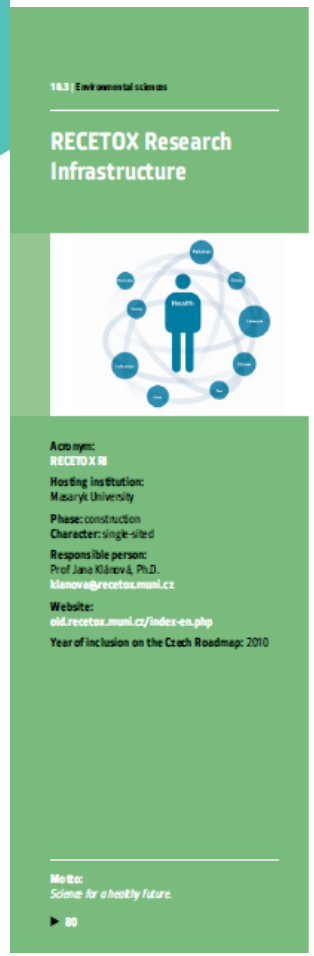

RECETOX RI

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

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

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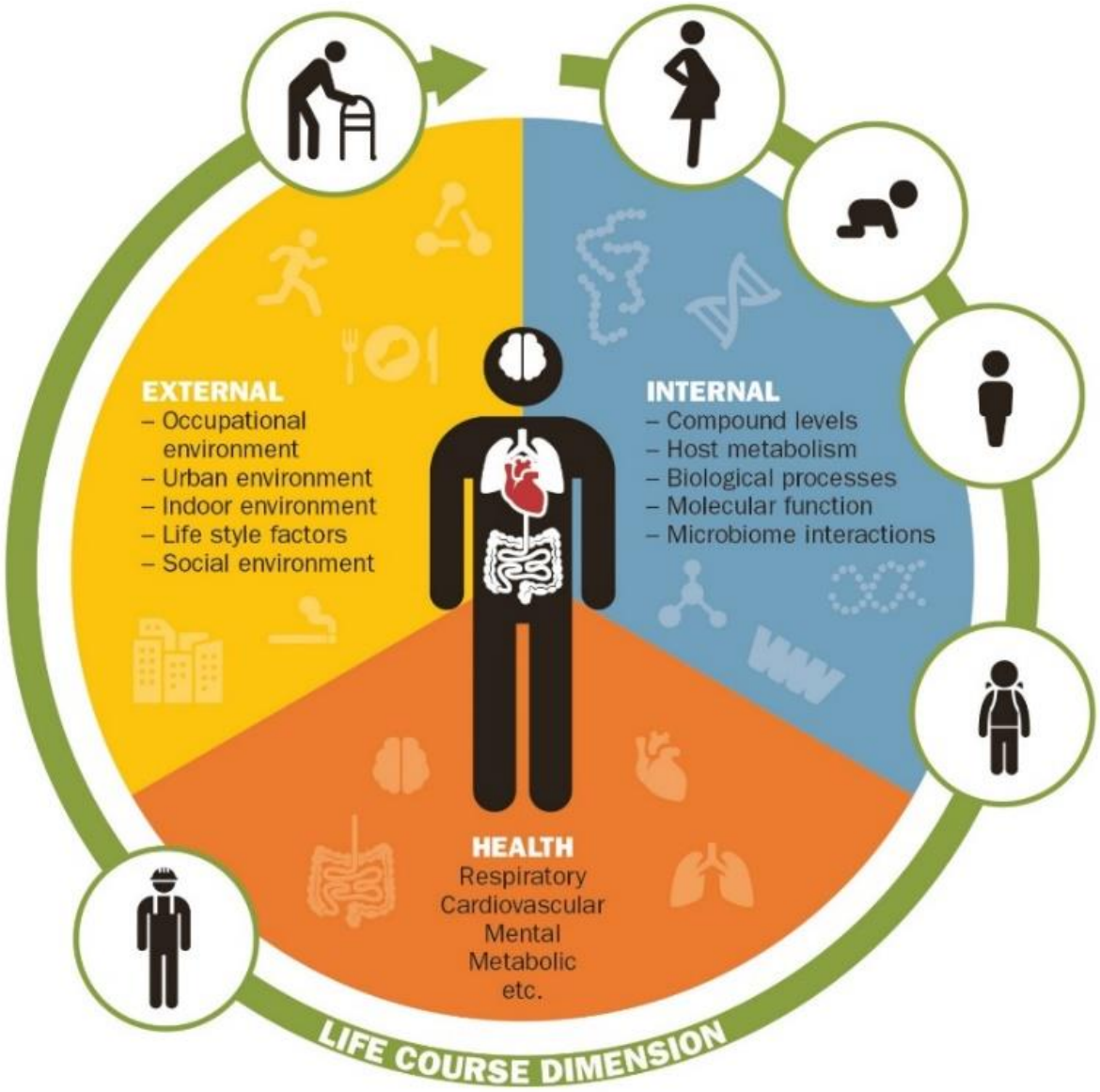
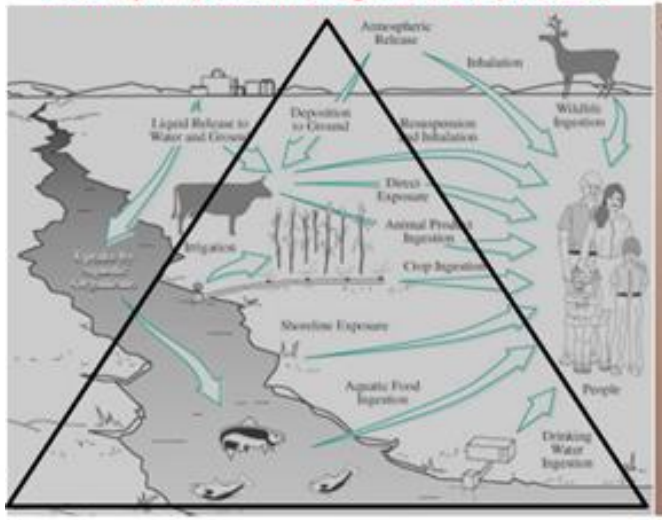
HUMAN EXPOSOME



Bottom-up Exposomics

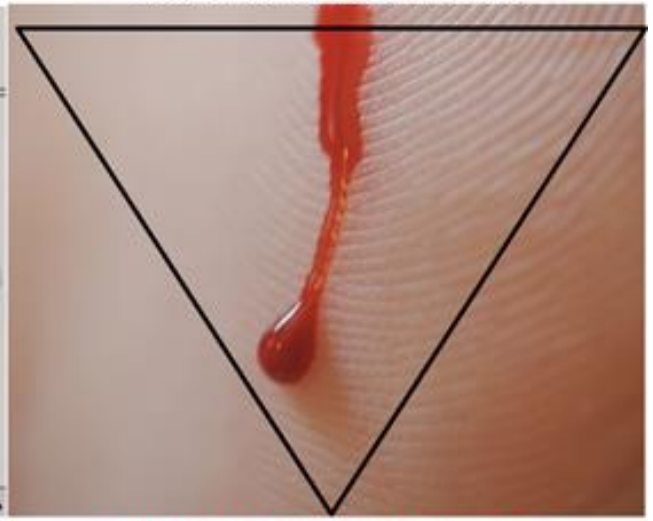
Identify important exogenous exposures



Measure chemicals in air, water & food

Top-down Exposomics

Measure chemicals in blood



Identify all important exposures

Bottom-up vs. Top-down Exposomics

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

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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.

Sustainable societies

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

Healthy planet

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

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

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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.

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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

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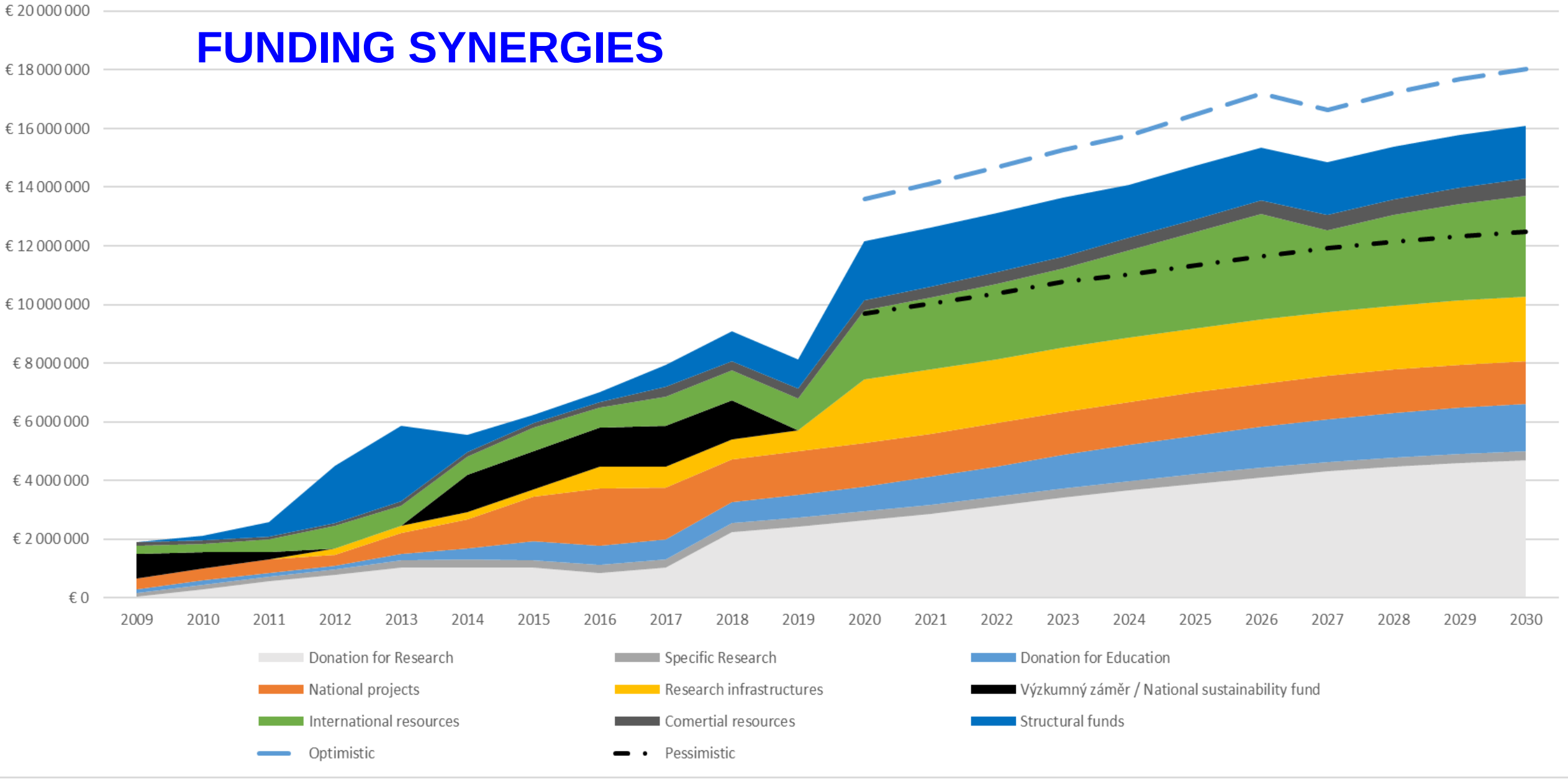
FUNDING SYNERGIES



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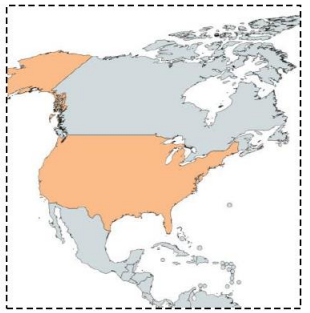
EIRENE RI



User communities
Research and education, chemical management, innovation, risk assessment, food safety, environmental policy, public health

EIRENE

Monitoring networks

ACTRIS RI
ICOS ERIC
METROFOOD

Top-down exposomics
Environmental samples and data (air, water, food, consumer products, indoor)

Exposomics
Markers of exposure

(epi)Genetics Metagenomcs
Markers of susceptibility

Metabolomics Proteomics
Markers of effect

Data integration
Biocomputing, advanced biostatistics

Computing capacities

ELIXIR

Biobanks, clinical and epi studies

BBMRI ERIC
ECRIN ERIC

Bottom-up exposomics
Human cohorts, biomarkers and health outcomes, socio-economic and psychological factors, life style, diet

Targeted
Confirmatory, quantitative data, robustness

Non-Targeted
Screening, discovery, innovation, new hypotheses, patterns, trends

Data interpretation
Epidemiology, mechanistic toxicology, risk assessment and modelling

Data to knowledge

Artificial inteligence, machine learning

Complementary methodological approaches
to be used on human, environmental and/or food samples

Inventories of cohorts, networks, data

Lab inventories, sample management and traceability, IDs

Integrative analysis

Data management

Methodological harmonization, QA/QC consolidation, and capacity building

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Thank you for your kind attention

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https://www.recetox.muni.cz/en

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University College London (UK)

Collaborative activities in Cetocoen Excellence

- **Education and training**
  - Research methods
  - Epidemiology
  - Medical and health statistics
- **Joint research activities**
  - Work on population cohorts
  - Environmental health
  - Participation in international projects

- **Integration** of education / training / research / capacity building

Benefits for UCL (1): Access to unique data

- ELSPAC cohorts of newborns (1991-)
  - Prospective analyses
- TNG cohort of newborns (2019-)
  - Jointly developed protocol
- HAPIEE cohort of ageing population sample (2002-)
  - Planed re-examination
- Urban environment
  - Population exposures
- Other data
  - E.g. COVID-19 seroprevalence survey

Benefits for UCL (2): Access to laboratory expertise

- Recetox to analyse environmental exposure in biological samples of cohort participants
  - E.g. HAPIEE cohort: nested case-control study of MI and stroke (~600 cases and 600 control)
  - Wide range of biomarkers to study potential novel risk factors

  - KARDIOVIZE population study: lab analyses of a subsample of the study
  - Estimates of environmental exposures

Benefits for UCL (3): Access to expertise

- Biomarkers and pollutants
  - Important for design of studies
  - Protocol development
  - Interpretation of findings
- GIS and geospatial modelling
  - Members of cohorts geo-coded
  - Individuals can be linked with estimates of environmental exposures (air pollution, noise, proximity to traffic etc)
  - Allows analyses of the association between environmental exposures and health outcomes
  - Research visits to UCL planned to work / train jointly on projects

Thank you

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https://www.ucl.ac.uk/epidemiology-health-care/research/ucl-research-department-epidemiology-public-health