#environment #H2020projects #openscience #chemicalsafety #cluster #NAMs #riskassessment #strongertogether #humanscience

ASPIS

Animal-Free **S**afety Assessment of Chemicals:
Project Cluster for **I**mplementation of Novel **S**trategies

WHO WE ARE

ASPIS brings together the three consortia funded under the European Commission's call for projects advancing the safety assessment of chemicals without the use of animal testing.

Collectively, we represent more than 70 institutions across 16 European countries and the U.S. delivering on a €60 million investment in providing timely answers about chemicals' effects on human health.

PrecisionTox: Leveraging evolutionary diversity to reveal the molecular basis of toxicity

RISK HUNT3R: Human-centric chemical safety assessment utilizing systems toxicology

ONTOX: Synthesizing toxicology knowledge to support next-generation risk assessment

ASPIS - A shield used in ancient Greece; revolutionary defensive tool enabling advancing legions to join forces for better protection

OUR SHARED GOALS

We are committed to utilizing all available knowledge across disciplines to improve the accuracy, speed, and affordability of chemical safety testing without the use of laboratory animals. Building on advances in the omics fields including genomics, transcriptomics and metabolomics; robust in vitro and in silico methodologies; and artificial intelligence (AI) analysis strategies; we provide New Approach Methodologies (NAMs) to rapidly accelerate and improve chemical risk assessment in the EU.

OUR IMPACT

The safety of hundreds of thousands of chemicals in market products remains untested due to the high cost and slow pace of traditional animal testing. By demonstrating and validating NAMs, ASPIS introduces a new era of toxicology in which the biological effects of chemicals can be understood on a molecular level. This knowledge allows for precisely informed decisions that safeguard human and environmental health while facilitating the development of safe and sustainable products.

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreements numbers PrecisionTox: 965406, ONTOX: 963845 and RISK-HUNT3R.

OUR PROJECTS

Precision Toxicology *precisiontox.org*

PrecisionTox uncovers biomolecular toxicity pathways through simultaneous high-throughput testing across five biomedical model species and human cell lines, using multi-omics and artificial intelligence to identify molecular key events that initiate disease progression. The PrecisionTox approach leverages the shared genetic legacy of toxicity response observed throughout the animal kingdom, providing an alternative to traditional (mammalian) animal testing by deploying an evolutionarily diverse suite of organisms comprising fruit flies, nematodes, water fleas, and embryos of clawed frogs and zebrafish. In addition to this phylogenetic approach, PrecisionTox aims to quantify variation in risk within populations and corresponding exposure thresholds by addressing susceptibility as a heritable trait that varies with genetic diversity.

RISK-HUNT3R *risk-hunt3r.eu*

RISK-HUNT3R, short for RISK assessment of chemicals integrating HUman centric Next generation Testing strategies promoting the 3Rs, will develop, validate, and implement integrated approaches to lead the way towards next-generation risk assessment (NGRA). Innovative mechanism-based NAMs will exclusively be in vitro and in silico and relevant for human health. Through systematic and iterative evaluation of its NAM toolbox, the project will optimize a strategy to assess chemical exposure, toxicokinetics, and toxicodynamics. RISK-HUNT3R will provide a sustainable framework for NGRA that is human-relevant, fully based on non-animal approaches, and fit for implementation through engagement with chemical safety regulators.

ONTOX *ontox-project.eu*

ONTOX will deliver a generic strategy to create innovative NAMs in order to predict systemic repeated dose toxicity effects that, upon combination with tailored exposure assessment, will enable human risk assessment. For proof-of-concept purposes, focus will be put on 6 specific NAMs addressing adversities in the liver, kidneys, and developing brain induced by a variety of chemicals, including from the pharmaceutical, cosmetics, food, and biocide sectors. The 6 NAMs will each consist of a computational system based on cutting-edge AI and will be primarily fed by available biological/mechanistic, toxicological/epidemiological, physicochemical, and kinetic data. Data will be consecutively integrated in physiological maps, quantitative adverse outcome pathway networks, and ontology frameworks; data gaps, as identified by AI, will be filled by targeted state-of-the-art in vitro and in silico testing.

HOW WE WORK TOGETHER

We synergistically combine our efforts by organizing joint trainings and workshops, sharing data and tools, collaboratively mapping findings, disseminating results across our varied networks, and working together toward regulatory uptake of NAMs. Taking a bottom-up approach in which consortium members from all three projects directly collaborate within specific domains of activity, ASPIS is powered by seven Working Groups focusing on:

- Chemical Selection
- Kinetics and Exposure
- Omics
- Computational Approaches
- quantitative Adverse Outcome Pathway (qAOP)
- Risk Assessment
- Communication and Dissemination

The three projects will rotate responsibility for ASPIS coordination and administrative support.

get involved

Stay informed of progress and events by visiting the ASPIS website at aspis-cluster.com