Trusted science for safe food

International Symposium 'One substance – one assessment? The next 20 years'

Berlin

3-4 November 2022

Use of NAMs in the area of food safety

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Disclaimer: The views, thoughts and opinions presented are not necessarily those of EFSA

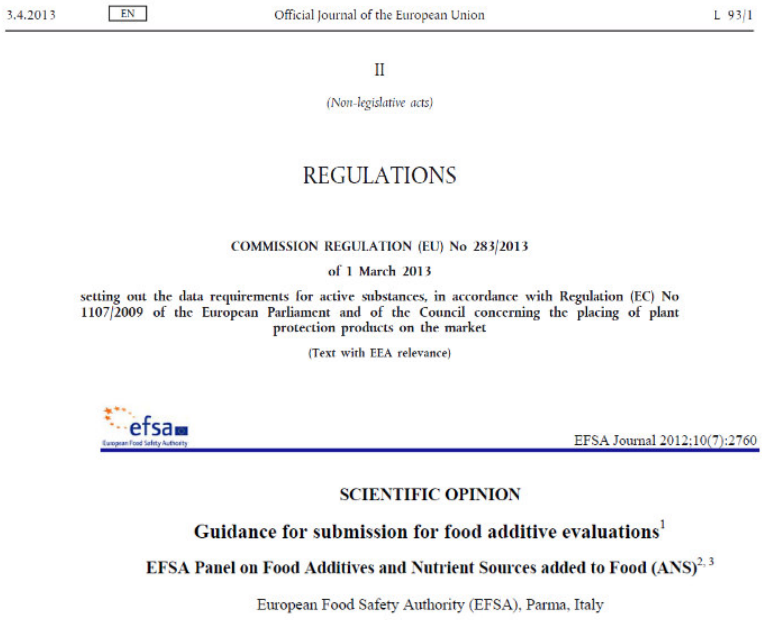
Regulated products

Contaminants

Applicants

No commercial producer

New chemicals or already on market



3.4.2013 EN Official Journal of the European Union L 93/1

II

(Non-legislative acts)

REGULATIONS

COMMISSION REGULATION (EU) No 283/2013

of 1 March 2013

setting out the data requirements for active substances, in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market

(Text with EEA relevance)

efsa European Food Safety Authority

EFSA Journal 2012;10(7):2760

SCIENTIFIC OPINION

Guidance for submission for food additive evaluations[1]

EFSA Panel on Food Additives and Nutrient Sources added to Food (ANS)[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

Main sources and types of data received by EFSA

In vivo biological studies	• ADME studies • Following OECD TG and GLP criteria • Traditional TK parameters (Tmax, t1/2, AUC, analytical data, etc...)
In vivo toxicological studies	• Sub-chronic, chronic, repro-dev studies • Following OECD TG and GLP criteria • Traditional Tox parameters (biochemistry, histopathology, weight, food consumption, etc...)
In vitro studies	• Mainly for genotoxicity and metabolism • Following OECD TG and GLP criteria • Traditional parameters (biochemistry, markers for mutagenesis and chromosomal aberrations, etc..)

Traditional chemical risk assessment relies mainly on animal bioassays

EFSA’s use of alternative approaches in chemical risk assessment: the past two decades

In vitro approaches for genotoxicity testing

- Established battery of in vitro tests
- When clear absence of genotoxicity there is no need for in vivo tests

TTC approach in chemical risk assessment

- Used by EFSA since 2004 for flavourings (EFSA Guidance from 2010 under review)
- For some impurities, metabolites and degradation products
- Pharmacologically active substances present in food of animal origin
- Combined exposure to multiple chemicals
- 2019 Guidance

Read-across in chemical risk assessment

- Flavourings
  - ✓ 1996-2006: Grouping of ~2650 existing flavourings into 34 groups of substances of structurally related compounds expected to show similar metabolic and biological behaviour
  - ✓ Flavouring Group Evaluations (FGEs)
  - ✓ Procedure for evaluation of new flavourings
- Combined exposure to multiple chemicals
  - ✓ Read-across from similar mixtures (sometimes referred to as sufficiently similar mixtures)
  - ✓ Grouping chemicals into assessment groups
- Food contact materials (ad-hoc)

Example: Pesticide metabolites

GUIDANCE

ADOPTED: 22 July 2016

doi: 10.2903/j.efsa.2016.4549

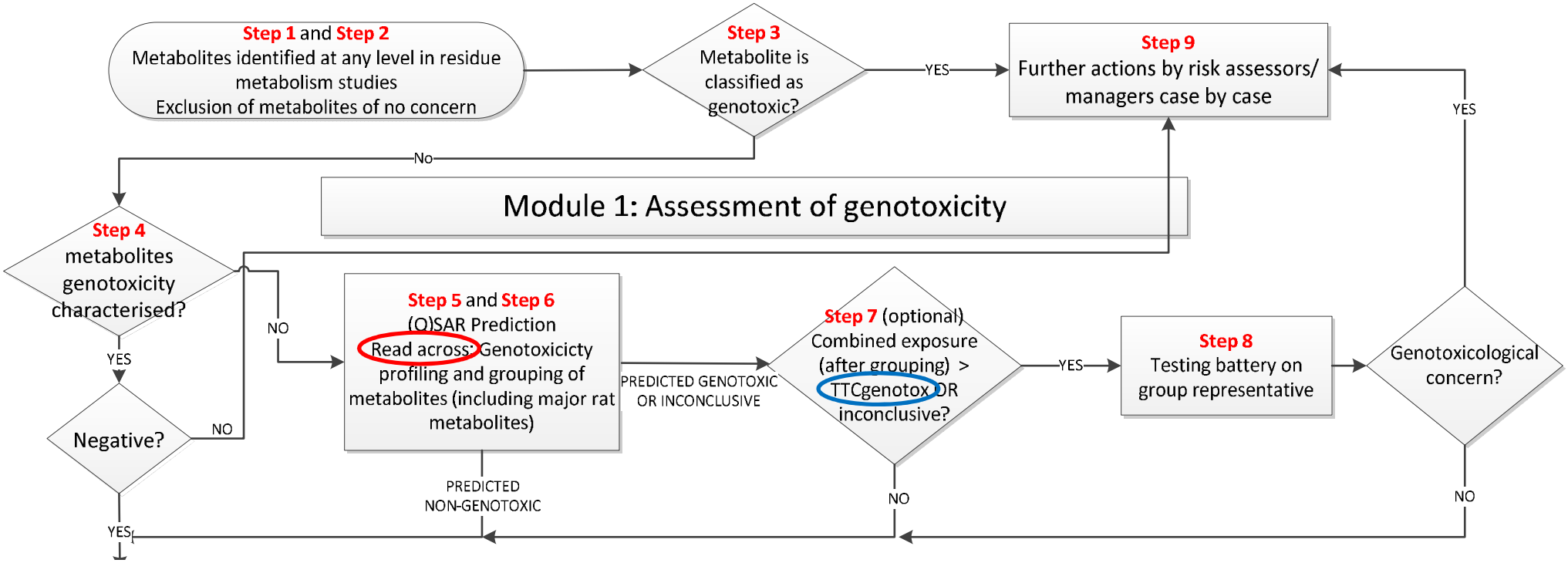
Guidance on the establishment of the residue definition for dietary risk assessment

EFSA Panel on Plant Protection Products and their Residues (PPR)

Abstract

EFSA has asked the Panel on Plant Protection Products and their Residues to prepare guidance on the establishment of the residue definition for dietary risk assessment. The residue definition for risk assessment is used by risk assessors to evaluate the potential risk of dietary intake of residues resulting from the application of a pesticide. This document guides the complex process of identifying

Module 1: Genotoxicity assessment



Recent Sectoral Guidance Documents: Opportunities for NAMs

GUIDANCE

EFSA Journal

ADOPTED: 30 June 2021

doi: 10.2903/j.efsa.2021.6768

Guidance on risk assessment of nanomaterials to be applied in the food and feed chain: human and animal health

EFSA Scientific Committee,

In vitro studies may provide mechanistic information on the **toxicokinetics and toxicodynamics** of the nanomaterials.

GUIDANCE

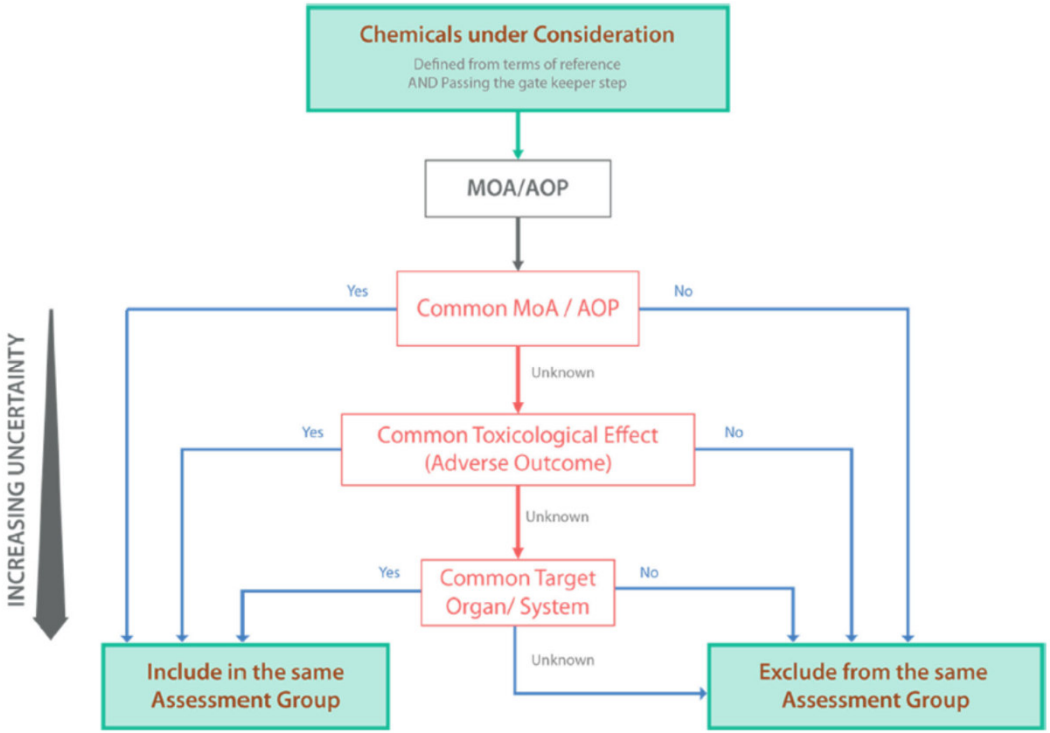
EFSA Journal

ADOPTED: 17 November 2021

doi: 10.2903/j.efsa.2021.7033

Guidance Document on Scientific criteria for grouping chemicals into assessment groups for human risk assessment of combined exposure to multiple chemicals

EFSA Scientific Committee,



Developmental Neurotoxicity Testing

SCIENTIFIC OPINION

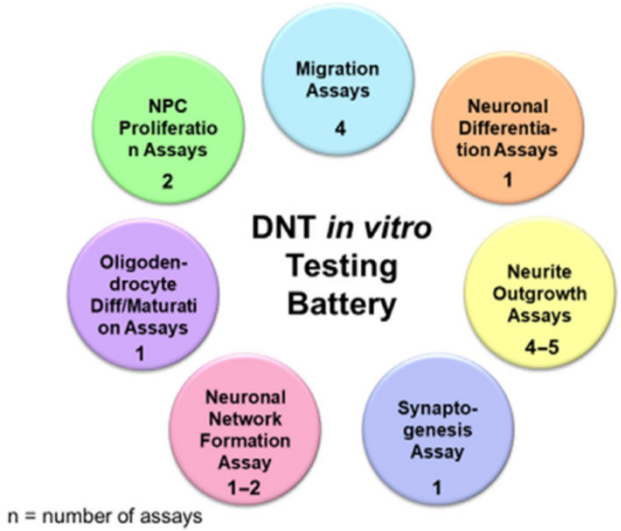
EFSA Journal

ADOPTED: 21 April 2021

doi: 10.2903/j.efsa.2021.6599

Development of Integrated Approaches to Testing and Assessment (IATA) case studies on developmental neurotoxicity (DNT) risk assessment

EFSA Panel on Plant Protection Products and their Residues (EFSA PPR Panel),



- The **IATA** was developed to assess the applicability of the **DNT in vitro testing battery** (IVB), designed to **explore fundamental neuro-developmental processes**, in the regulatory risk assessment of pesticides
- **Case studies** show the applicability of the DNT-IVB for hazard identification and characterisation and illustrate the usefulness of an AOP-informed IATA for regulatory decision making.

The future of chemical risk assessment in EFSA: New projects, new challenges and new ambitions

Changing the way to do Risk Assessment

SCIENCE-POLICY INTERFACE

The Commission will:

- foster multidisciplinary research and digital innovations for **advanced tools, methods and models, and data analysis capacities**[102] to also move away from animal testing;

EC policy

Safety testing and chemical risk assessment need to innovate in order to reduce dependency on animal testing but also to improve the quality, efficiency and speed of chemical hazard and risk assessments.

EFSA strategy 2027

STRATEGIC OBJECTIVE 2

Ensure preparedness for future risk analysis needs

KEY ACTIONS

- Develop and integrate new approach methodologies (NAMs) and omics for regulatory risk assessment

NAMs landscape

Landscape analysis

EXTERNAL SCIENTIFIC REPORT

APPROVED: 2 May 2022

doi:10.2903/sp.efsa.2022.EN-7341

Development of a Roadmap for Action on

New Approach Methodologies in Risk Assessment

Sylvia E. Escher[1], Falko Partosch[1], Sebastian Konzok[1], Paul Jennings[2], Mirjam Luijten[3], Anne Kienhuis[3], Victoria de Leeuw[3], Rosmarie Reuss[4], Katrina-Magdalena Lindemann[4], Susanne Hougaard Bennekou[5]

[1] Fraunhofer ITEM, [2] Vrije Universiteit Amsterdam, [3] National Institute for Public Health and the Environment, [4] Eura AG, [5] The National Food Institute Denmark

Identify **priorities** and **multiannual strategy** for the incorporation of NAMs in regulatory hazard and exposure assessment of chemicals in food and feed

Read-Across Approaches for Food Safety

3 Guidance on the Use of the Read-
4 across Approach in Food Safety
5 Assessment

Under development

6 EFSA Scientific Committee

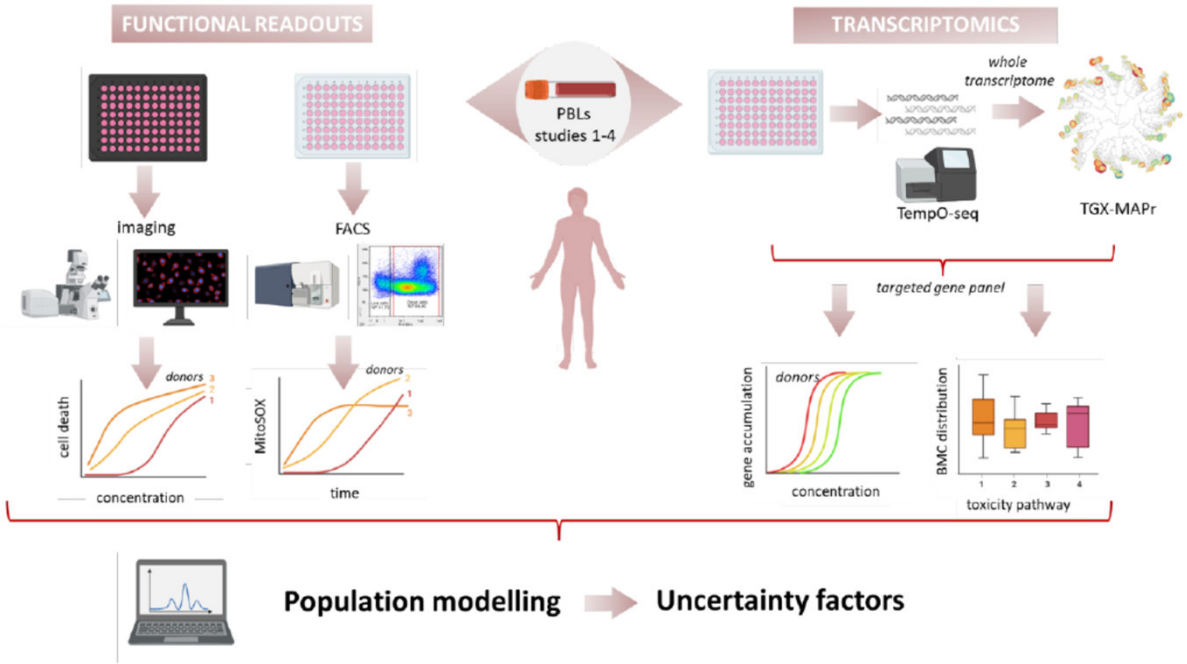
- Development for a **horizontal Guidance** on the use of RAx in EFSA and by its Scientific Panels
- Considerations
  - Testing the **regulatory applicability** of RAx to chemicals in remit of food safety
  - Testing opportunities for **biological RAx**
  - Testing opportunities to underpin RAx with **NAM**
- Procurement to test RAx using EFSA's database on plant protection products

Ongoing Collaborative NAM case studies

- Pesticides: neurodegenerative diseases
- Nanomaterials: GI uptake and genotoxicity
- Artificial intelligence for NAMs
- PFAS immunotoxicity
- TKplate 2.0 (Open-Source Platform integrating PBTK Models and Machine Learning Models)
- Human variability in toxicodynamics (qAOPs)

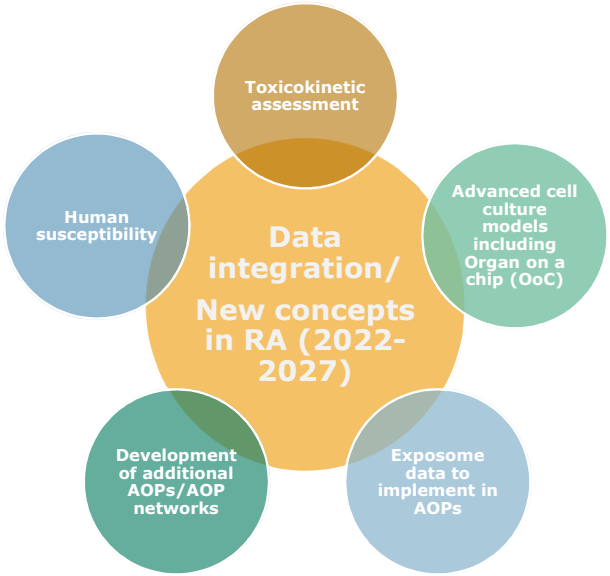
Human variability in toxicodynamics (qAOPs)

- Project starting November 2022
- Consortium: University of Leiden (lead) (NL), DTU-Food (DK), Centre for Human Drug Research (NL), Certara France (FR), BioClavis Ltd (UK)
- Modelling of cellular stress responses responsible for toxicity



NAM Project calls: 2022

Project call 2022
(NAMs4NANO):
Data integration: case studies nanomaterial, tools for reporting NAMs data in IUCLID

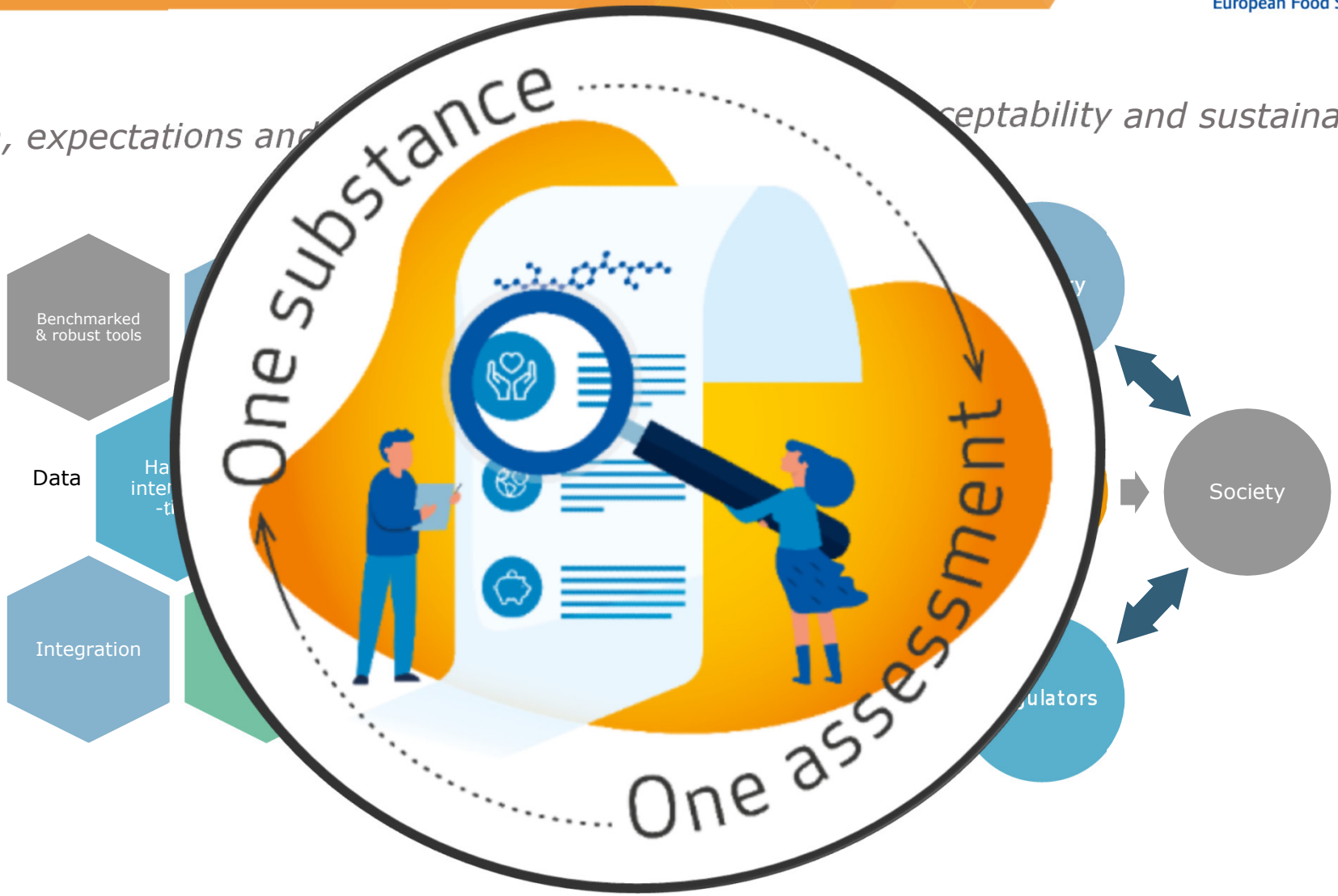


Project call 2022
(call for proposals):
Case studies: AOP and transcriptomics to predict target organ toxicity

Project call 2022
(ADME4NGRA):
Case studies to advance *in vitro* ADME models for use in IVIVE-PBK models, open access reference database

Some final thoughts – how to move to NGRA?

Vision, expectations and *ceptability and sustainability*



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