

# Next Gen Tools for Chemical Safety Assessment

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Unilever

**Safety &  
Environmental  
Assurance  
Centre**

Protecting People & Planet  
Trusted Impactful Innovations  
designed for Safety & Sustainability

## Acknowledgements:

Carl Westmoreland, Gavin Maxwell, Maria Baltazar, Paul Carmichael, Matt Dent, Steve Gutsell, Sarah Hatherell, Predrag Kukic, Hequn Li, Alistair Middleton, Iris Müller, Ramya Rajagopal, Georgia Reynolds, Andrew White & SEAC colleagues + collaborators



HUMANE SOCIETY  
INTERNATIONAL

ZOOM WEBINAR

## Regulatory Acceptance and Use of Next-Generation Approaches for Chemical Safety Assessment



July 13, 2022



9:00 EDT / 15:00 CET

Join us for a webinar to learn how state-of-the-art science is being used by corporate and government stakeholders in risk assessment and prioritisation to ensure protection.

# Collaborating to modernise the scientific data & tools we use for making safety decisions – 15+ years of research & evaluation

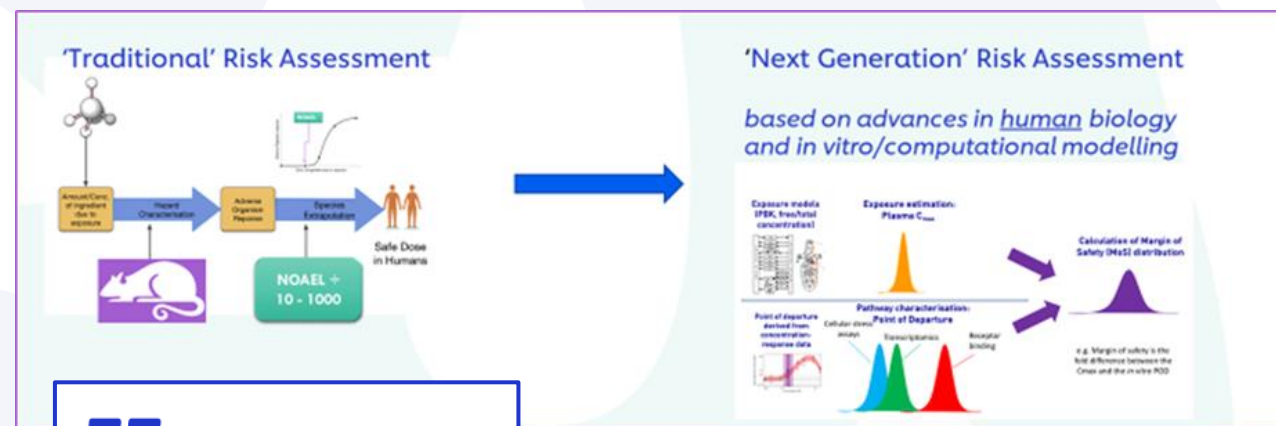


# Overview & Background Context

## Next Generation Risk Assessment (NGRA) using New Approach Methods (NAMs)

Data are needed for decisions on:

1. safety of consumers exposed to chemicals in products
2. safety of workers exposed to chemicals during product manufacture
3. safety of people & non-human species if exposed to chemicals in the environment



Advances in science and technology mean that we can generate much more relevant safety data to protect people and the environment using modern non-animal approaches.



**Unilever : U.S. EPA and Unilever Announce Major New Research Collaboration to Advance Non-Animal Approaches for Chemical Risk Assessment**

09/08/2015 | 09:01am EDT



Research collaboration will develop ground-breaking scientific approaches to better assess the safety of chemicals found in some consumer products without using animal data

# Assessing Consumer Safety of cosmetics ingredients without new animal testing (required by EU Cosmetic Products Regulation, 10+ years experience)

Is the consumer exposure safe? A tiered approach is routine:

- Use all available safety data on the ingredient
  - clinical, epidemiological, animal (if dates permit), *in vitro*, etc.
- Exposure-based waiving (e.g. TTC – toxicological threshold of concern)

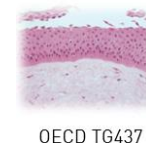
- *In silico* predictions

- History of safe use

- Read across from comparable ingredients

- Use of existing OECD *in vitro* approaches

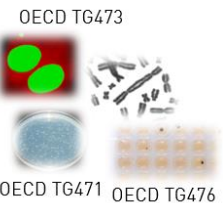
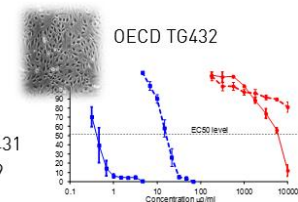
- Next Generation Risk Assessment (NGRA)



OECD TG437



OECD TG430/431  
OECD TG439



OECD TG473

OECD TG471 OECD TG476

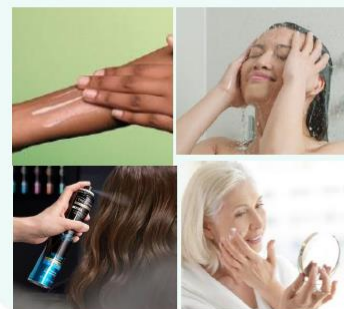
# Next Generation Risk Assessment (NGRA)

NGRA is defined as an exposure-led, hypothesis-driven risk assessment approach that integrates New Approach Methodologies (NAMs) to assure safety without the use of animal testing

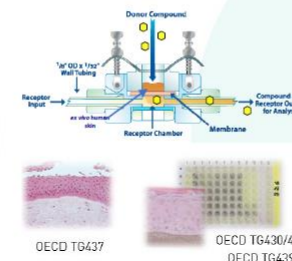


[Safety Homepage « Safety Science in the 21st Century \(tt21c.org\)](http://tt21c.org)

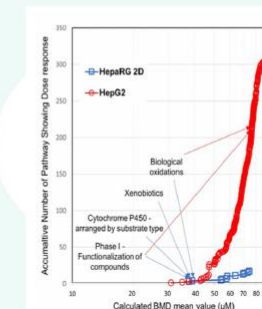
## Next Generation Risk Assessment is highly interdisciplinary



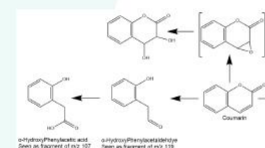
Risk assessment



Biology



Bioinformatics



Chemistry

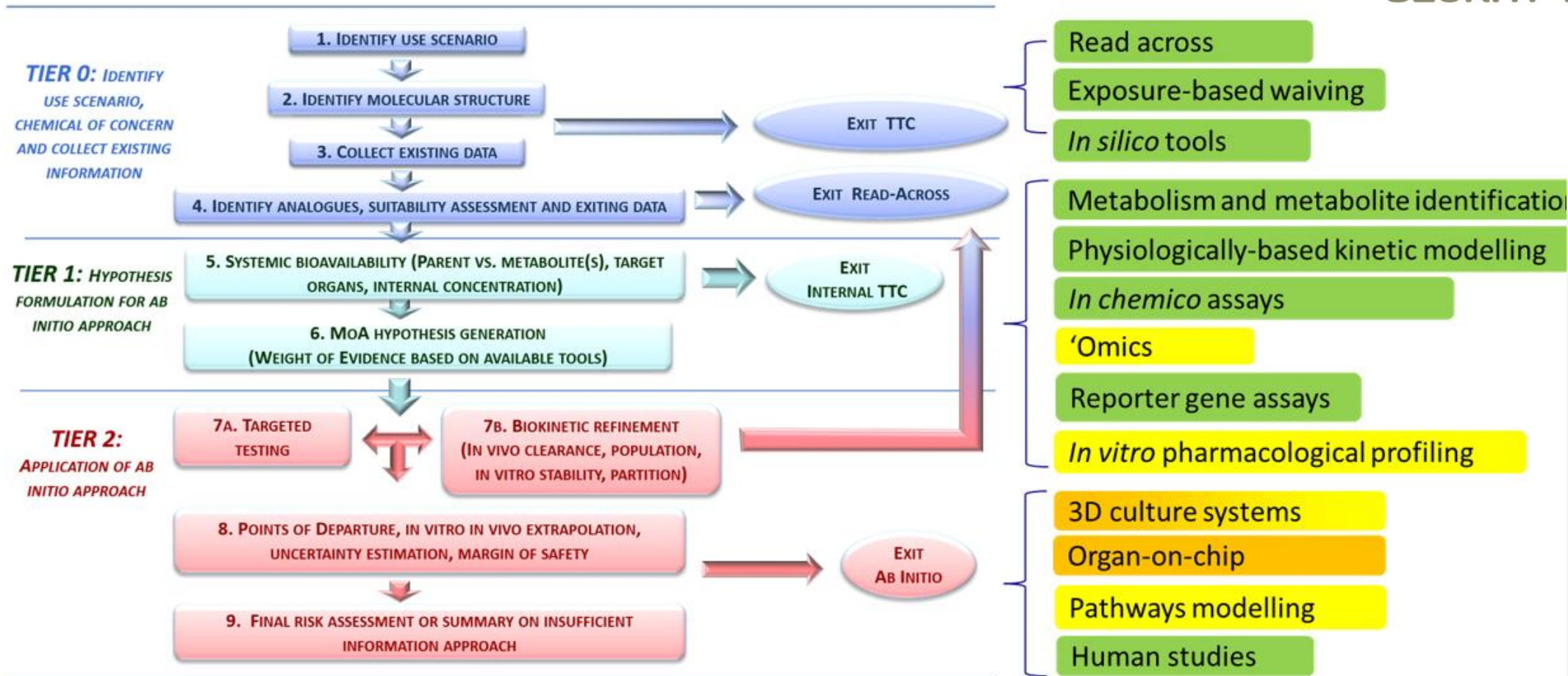
$$y_t = \underbrace{\begin{bmatrix} w_{g,1}^{(1)} & \dots & w_{g,1}^{(m)} \\ \vdots & & \vdots \\ w_{g,n_y}^{(1)} & \dots & w_{g,n_y}^{(m)} \end{bmatrix}}_C \underbrace{\begin{bmatrix} \phi_g^{(1)}(x_t, u_t) \\ \vdots \\ \phi_g^{(m)}(x_t, u_t) \end{bmatrix}}_{\varphi_g(x_t, u_t)} + e_t$$

Mathematical and statistical modelling

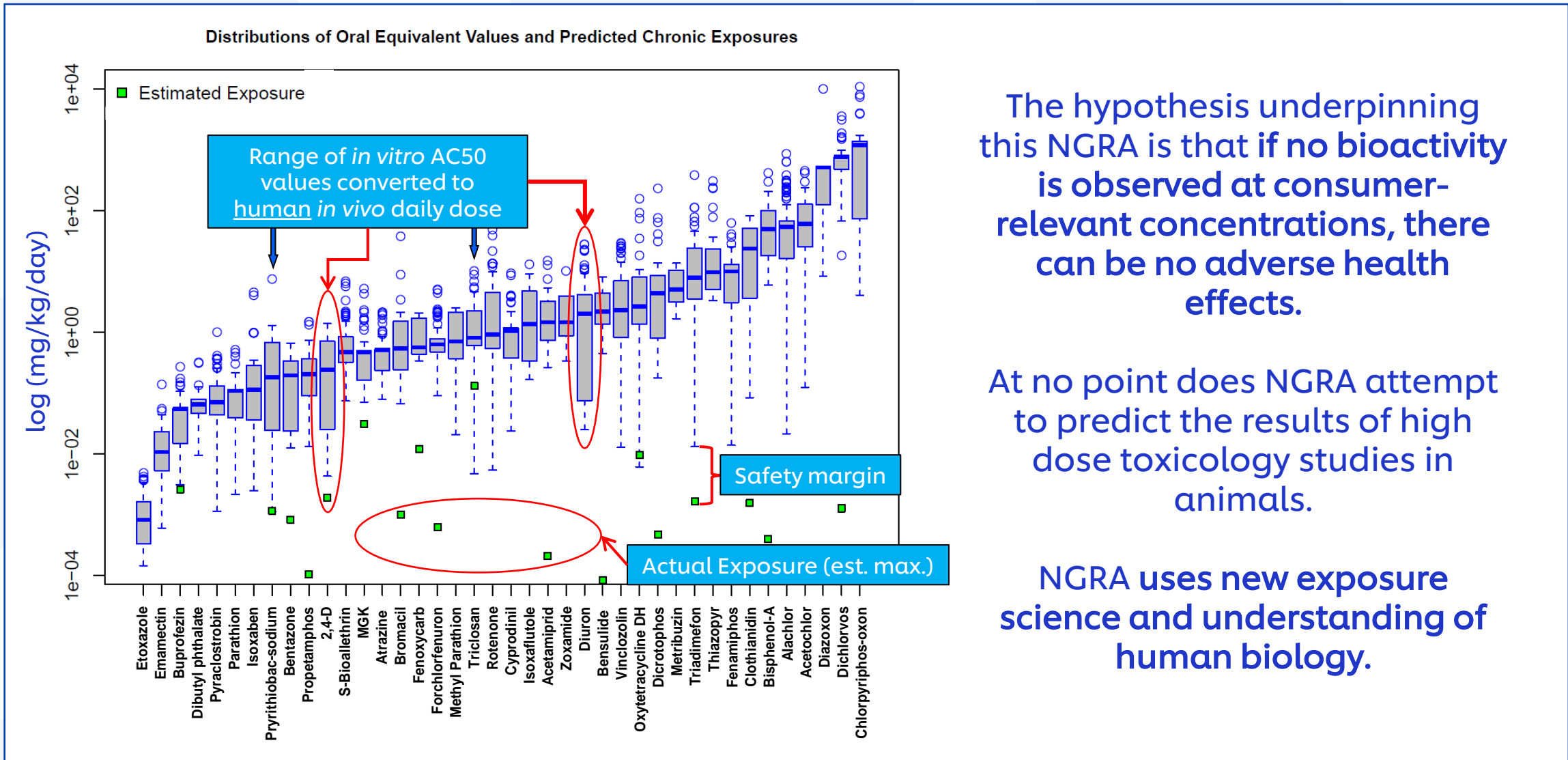
[Unilever, Safety & Environmental Assurance Centre \(SEAC\) – YouTube](#) US SoT March 2020 – NGRA concept & approach

[Unilever - Safety & Environmental Assurance Centre at Unilever Global IP Limited – YouTube](#) US SoT March 2022 – integrating NAMs in NGRA for consumer safety decisions

# NGRA: tiered testing and human health assessment approach



# NGRA: aim is protection of health, not prediction of animal data



The hypothesis underpinning this NGRA is that if no bioactivity is observed at consumer-relevant concentrations, there can be no adverse health effects.

At no point does NGRA attempt to predict the results of high dose toxicology studies in animals.

NGRA uses new exposure science and understanding of human biology.

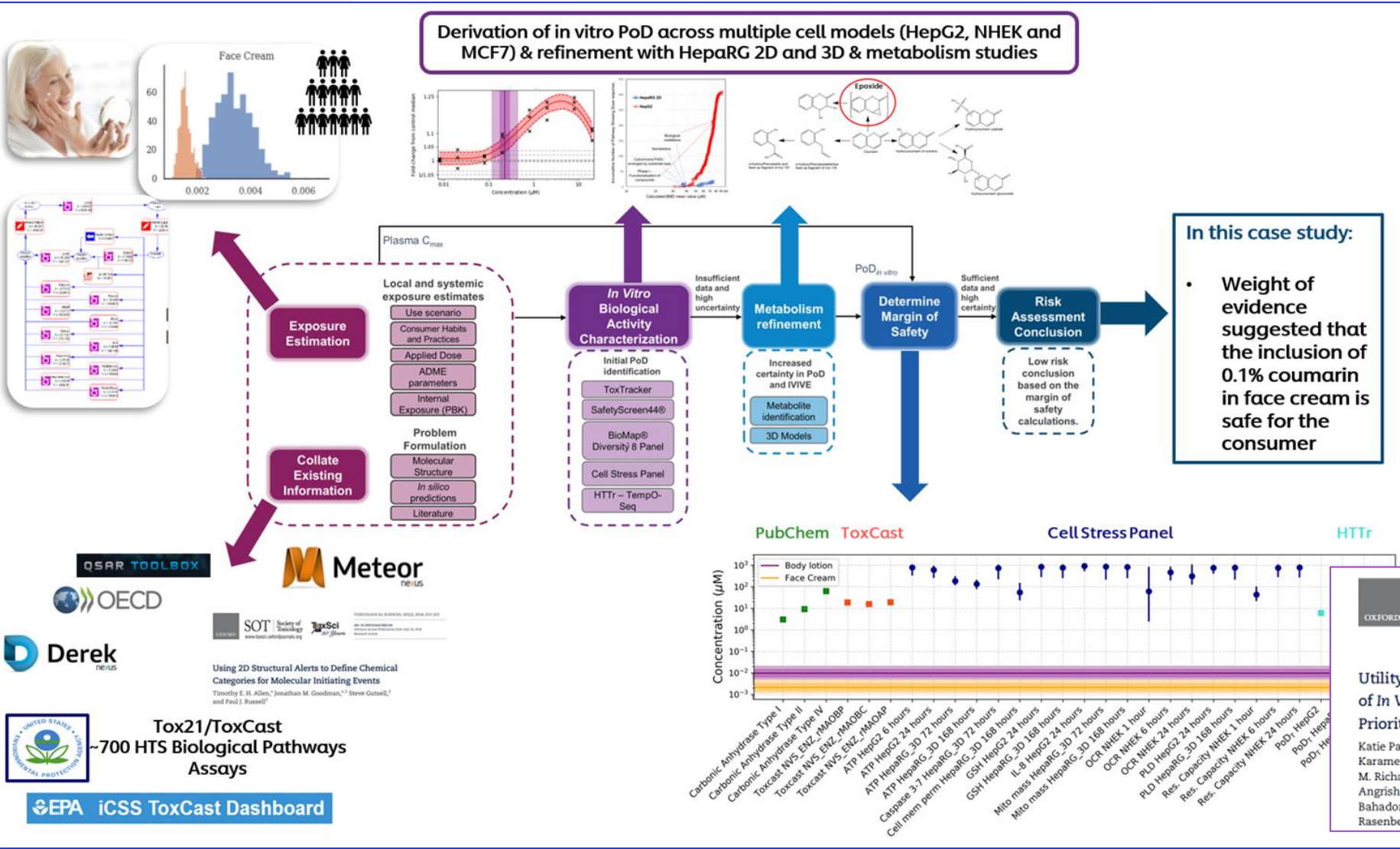


# A large toolbox of modern scientific methods (NAMs) is used

Not a prescriptive set of tools, but driven by the safety assessment

Exposure tools to inform level of Systemic Exposure

Bioactivity tools to provide Points of Departure: *Bioactivity - Exposure Ratio*



Hatherell et al (2020) Toxicological Sciences, **176**, 11-33

Moxon et al (2020) Toxicology in Vitro, **63** 104746  
Li et al (2022) Toxicol. Appl. Pharmacol., **442** 115992

OXFORD SOT Society of Toxicology academic.oup.com/toxsci Tr-X Spotlight

TOXICOLOGICAL SCIENCES, 173(1), 2020, 202-225  
doi: 10.1093/toxsci/kfz011  
Advance Access Publication Date: September 18, 2021  
Research Article

**Utility of In Vitro Bioactivity as a Lower Bound Estimate of In Vivo Adverse Effect Levels and in Risk-Based Prioritization**

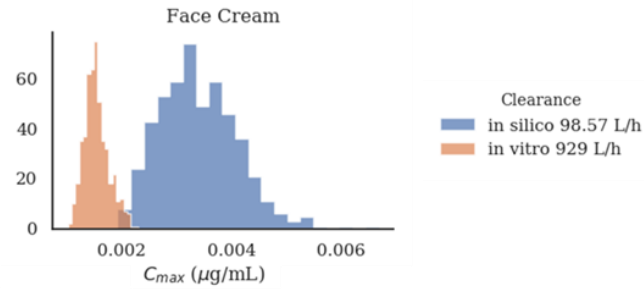
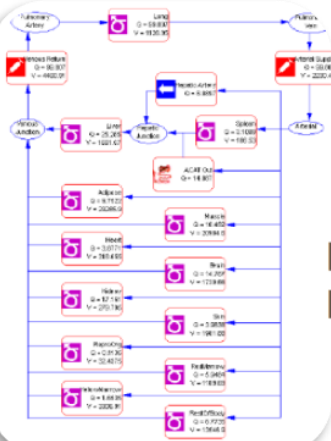
Katie Paul Friedman, Matthew Gagne, Lit-Hsin Loo, Panagiotis Karamertzanis, Tatiana Netzeva, Tomasz Sobanski, Jill A. Franzosa, Ann M. Richard, Ryan R. Lougee, Andrea Gissi, Jia-Ying Joey Lee, Michelle Angrish, Jean Lou Dorne, Steven Foster, Kathleen Raffaele, Tina Bahadori, Maureen R. Gwinn, Jason Lambert, Maurice Whelan, Mike Rasenberg, Tara Barton-Maclaren, and Russell S. Thomas





# Key tools in our NGRA approach for systemic effects (NAMs Toolbox)

## PBK Modelling



Toxicology in Vitro (2020), 63, 104746

## In vitro pharmacological profiling

**PERSPECTIVES**

**A GUIDE TO DRUG DISCOVERY – OPINION**

**Reducing safety-related drug attrition: the use of *in vitro* pharmacological profiling**

Joanne Bower, Andrew J. Brown, Jacques Homan, Wolfgang Juratnik, Arun Sridhar, Gareth Waldron and Steven Whitbread

Abstract In vitro pharmacological profiling is increasingly being used earlier in the drug discovery process to identify undesirable off-target activity profiles that could hinder or halt the development of candidate drugs or even lead to market withdrawal if discovered after a drug is approved. Here, for the first time, the rationale, strategies and methodologies for *in vitro* pharmacological profiling at four major pharmaceutical companies (AstraZeneca, GlaxoSmithKline, Novartis and Pfizer) are presented and illustrated with examples of their impact on the drug discovery process. We hope that this will enable other companies and academic institutions to benefit from this knowledge and consider joining us in our collaborative knowledge sharing.

Decreasing the high attrition rate in the drug discovery and development process is a primary goal of the pharmaceutical industry. One of the main challenges in achieving this goal is creating an appropriate balance between drug efficacy and potential adverse effects as early as possible in order to reduce safety-related attrition, particularly in the more expensive late stages of clinical development. Gaining a better understanding of the safety profile of drug candidates early in the process is also crucial for reducing the likelihood of safety issues limiting the use of approved drugs, or even leading to their market withdrawal, having to incur the associated substantial and expensive costs.

target (or targets), whose secondary effects are due to interactions with targets other than the primary target (or targets) that is off-target interactions. Off-target interactions are often the cause of ADRs in animal models or clinical studies, and careful characterization and identification of secondary pharmacology profiles of drug candidates early in the drug discovery process might help to reduce the incidence of type A ADRs.

In vitro pharmacological profiling involves the screening of compounds against a broad range of targets (receptors, enzymes, ion channels, transporters, etc.) that are chosen from the scientific

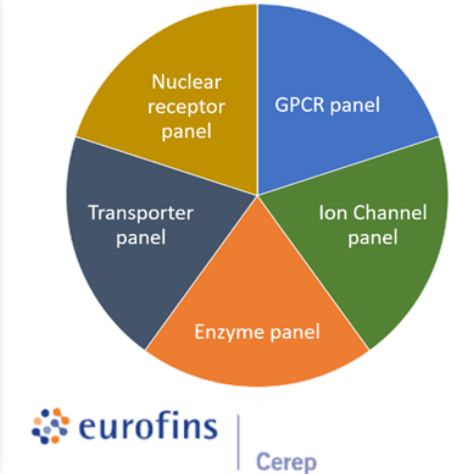
safety testing of drug candidates and are designed to prevent serious ADRs from occurring in clinical studies.

The *in vitro* pharmacology assay that is absolutely required by regulatory authorities is that measures the effects of new chemical entities on the ion channels of nature ( $I_{Ca}$ ) or heterologously expressed human voltage-gated potassium channel subfamily 11 member 2 (hKCNH2), also known as hERG7. The mechanism by which blockade of hERG can affect potentially fatal cardiac arrhythmias (torsades de pointes) following a prolongation of the QT interval is well characterized<sup>1,2</sup>, and the assessment of this ADR is one reason why this assay is a mandatory regulatory requirement. Receptor binding studies are also recommended as the first tier approach for the assessment of the dependence potential of novel chemical entities<sup>3</sup>.

However, current regulatory guidance does not describe which targets should constitute an *in vitro* pharmacological profiling panel and does not indicate at what stage of the discovery process such *in vitro* pharmacological profiling should occur. Nevertheless, the general need for most pharmaceutical companies to perform this testing early in drug discovery to reduce attrition and to facilitate better prediction of ADRs in the later stages of drug discovery and development.

Here, for the first time, four major pharmaceutical companies (AstraZeneca, GlaxoSmithKline, Novartis and Pfizer) share their knowledge and experience of the innovative application of existing screening technologies to detect off-target interactions of compounds. The objective of this article is to describe the rationale and main strategies for the use of an *in vitro* pharmacological profiling panel to reduce the incidence of type A ADRs.

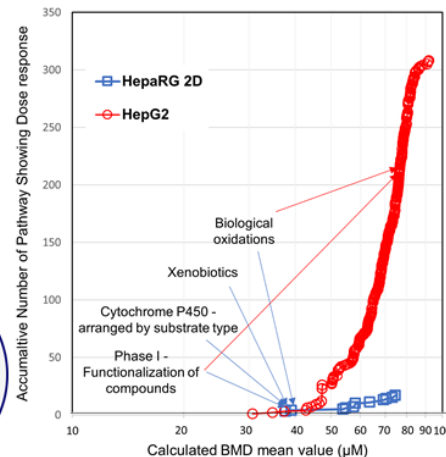
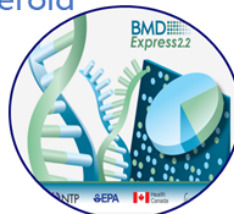
that are chosen from the scientific



## Transcriptomics

- Use of full human gene panel ~ 21k
- 24 hrs exposure
- 7 concentrations
- 3 cell lines HepG2/ HepaRG/ MCF7
- 3D HepaRG spheroid

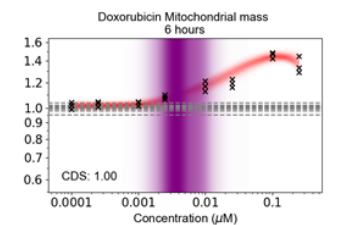
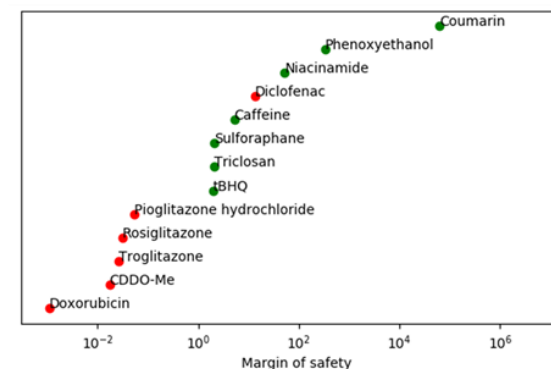
## BMDexpress 2



## Cellular Stress Pathways

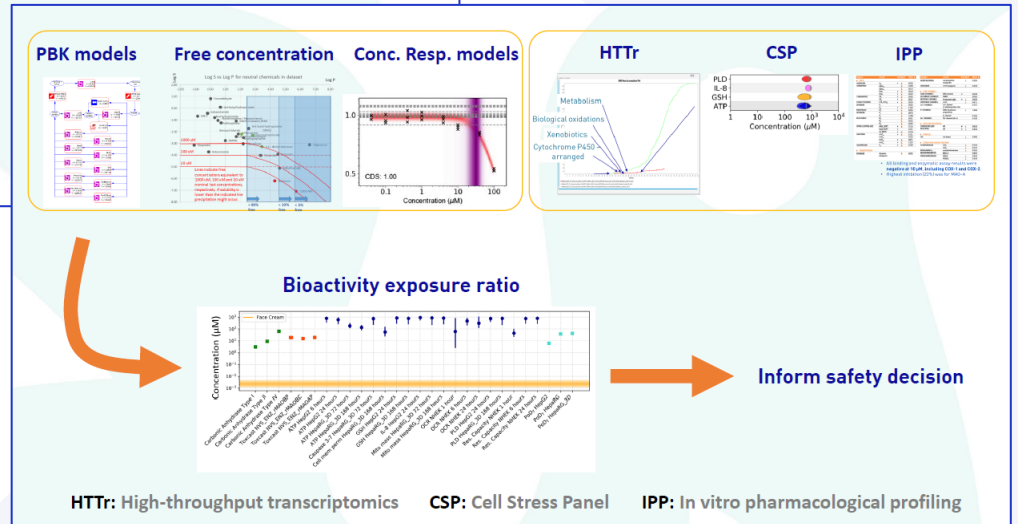
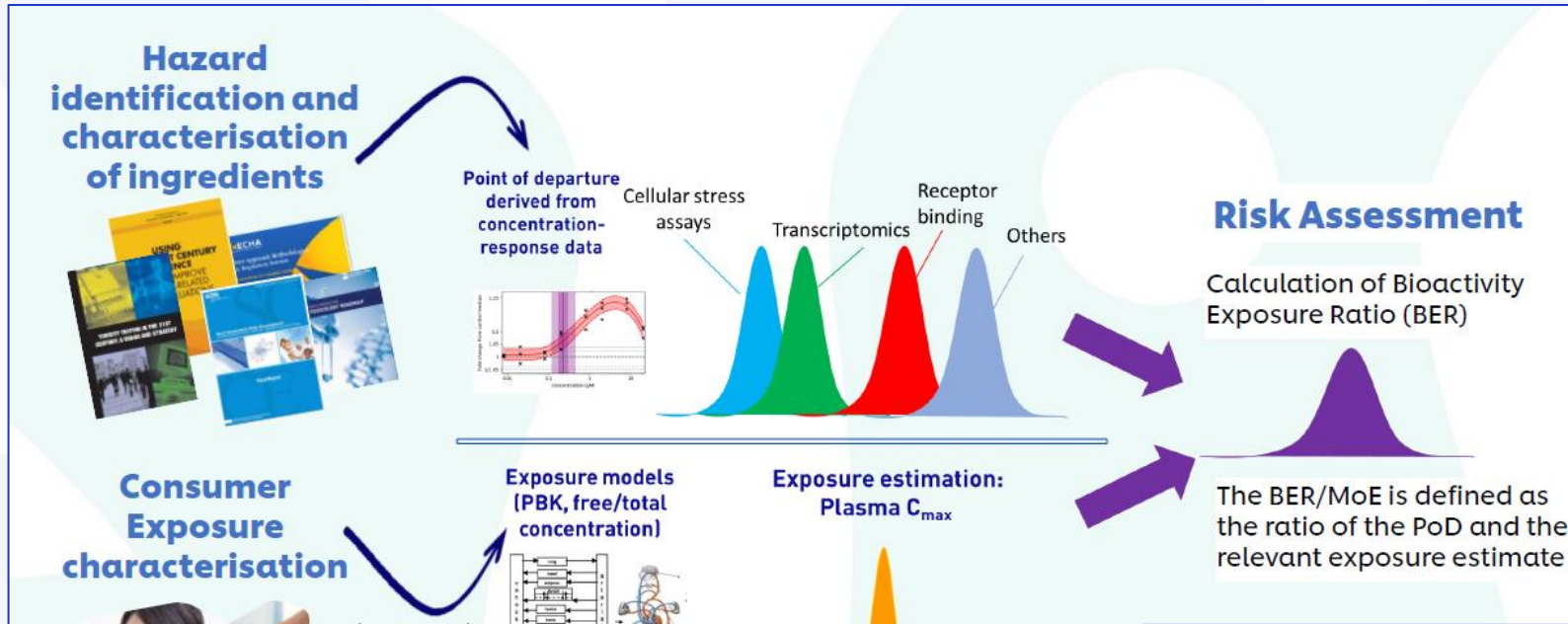
13 chemicals, 36 Biomarkers; 3 Timepoints; 8 Concentrations; ~10 Stress Pathways

- Exposure scenario adopted for chemical is 'low risk'** (from consumer goods perspective)
- Nicotinamide (food, cosmetics)
  - Caffeine (beverages, cosmetics)
  - Phenoxyethanol (cosmetics)
  - Sulfuraphane (food)
  - tBHQ (antioxidant)
  - Triclosan (antimicrobial)
- Exposure scenario adopted for chemical is 'high risk'** (from consumer goods perspective)
- CDDO-Me (drug)
  - DEM (industrial chemical)
  - Doxorubicin (drug)
  - Diclofenac (drug)
  - Troglitazone (drug)
  - Pioglitazone (drug)
  - Rosiglitazone (drug)



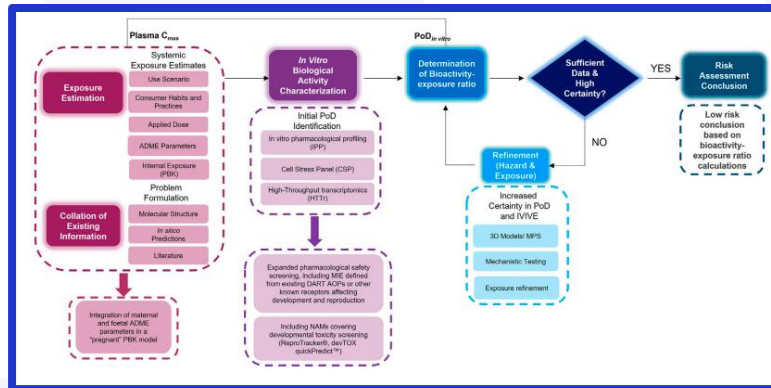
Toxicol Sci (2020), 176, 11-33

# Integrating these approaches to make safety decisions



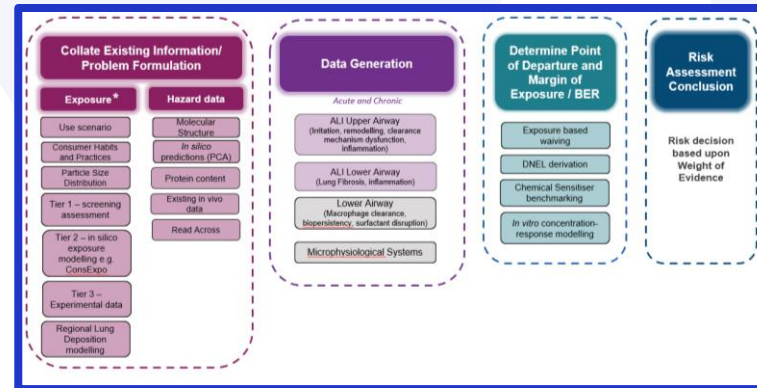
# Unilever frameworks for using NAMs for Consumer Safety decisions

## Developmental & Reproductive



Rajagopal et al (2022) *Frontiers in Toxicology*, doi: 10.3389/tox.2022.838466

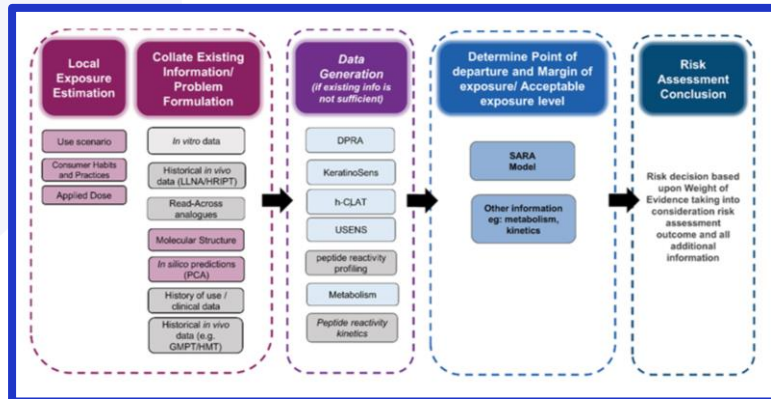
## Inhalation



## Ongoing Evaluations - Unilever working with government agencies

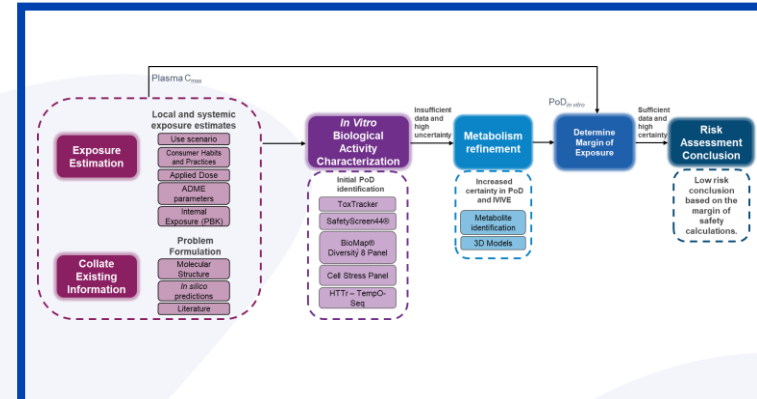


## Skin Sensitisation



Reynolds et al (2021) *Reg Tox Pharmacol*, 127, 105075

## Systemic



Baltazar et al (2020) *Toxicol Sci*, 176, 236-252

**NICEATM News - 2021 Issue 25; May 27**

**In this Newsletter:**

**NICEATM to Collaborate with Unilever on Development of Predictive Model for Skin Sensitization**

**NICEATM to Collaborate with Unilever on Development of Predictive Model for Skin Sensitization**

NICEATM has entered into an agreement with consumer products company Unilever to collaboratively test and further develop their Skin Allergy Risk Assessment (SARA) predictive model. SARA is a computational model that uses a variety of input data to estimate a probability that a chemical will cause an allergic skin reaction in humans. NICEATM will test the SARA model using a variety of chemical data sets, including chemicals of interest to U.S. and international regulatory agencies. NICEATM and Unilever will also work together to expand the SARA model to include data generated by NICEATM. The intent is to make the SARA model openly available for public use along with other NICEATM predictive models. Availability of the SARA model will help further reduce animal use for the endpoint of skin sensitization, and will improve upon existing efforts by providing points of departure for quantitative human risk assessment.

Information about other NICEATM projects to evaluate alternatives to animal use for skin sensitization is available at <https://ntp.niehs.nih.gov/go/ACDtest>.

Reference: Reynolds et al. Probabilistic prediction of human skin sensitizer potency for use in next generation risk assessment. *Comput Toxicol* 9:36-49. <https://doi.org/10.1016/j.comtox.2018.10.004>



# Evaluating the NAMs Toolbox

## Are non-animal systemic safety assessments protective? A toolbox and workflow

Alistair M. Middleton<sup>1\*</sup>, Joe Reynolds<sup>1</sup>, Sophie Cable<sup>1</sup>, Maria Teresa Baltazar<sup>1</sup>, Hequn Li<sup>1</sup>, Samantha Beven<sup>2</sup>, Paul L. Carmichael<sup>1</sup>, Matthew Philip Dent<sup>1</sup>, Sarah Hatherell<sup>1</sup>, Jade Houghton<sup>1</sup>, Predrag Kukic<sup>1</sup>, Mark Liddell<sup>1</sup>, Sophie Malcomber<sup>1</sup>, Beate Nicol<sup>1</sup>, Benjamin Park<sup>2</sup>, Hiral Patel<sup>3</sup>, Sharon Scott<sup>1</sup>, Chris Sparham<sup>1</sup>, Paul Walker<sup>1</sup>, Andrew White<sup>1</sup>

<sup>1</sup>Unilever Safety and Environmental Assurance Centre, Colworth Science Park, Sharnbrook, Bedfordshire, MK44 1LQ, United Kingdom

<sup>2</sup>Discovery Services, Charles River, Chesterford Research Park, CB10 1XL, United Kingdom

<sup>3</sup>Cyprotex Discovery Ltd, No. 24 Mereside, Alderley Park, Macclesfield, Cheshire, SK10 4TG, United Kingdom.

*Toxicological Sciences* - accepted for publication

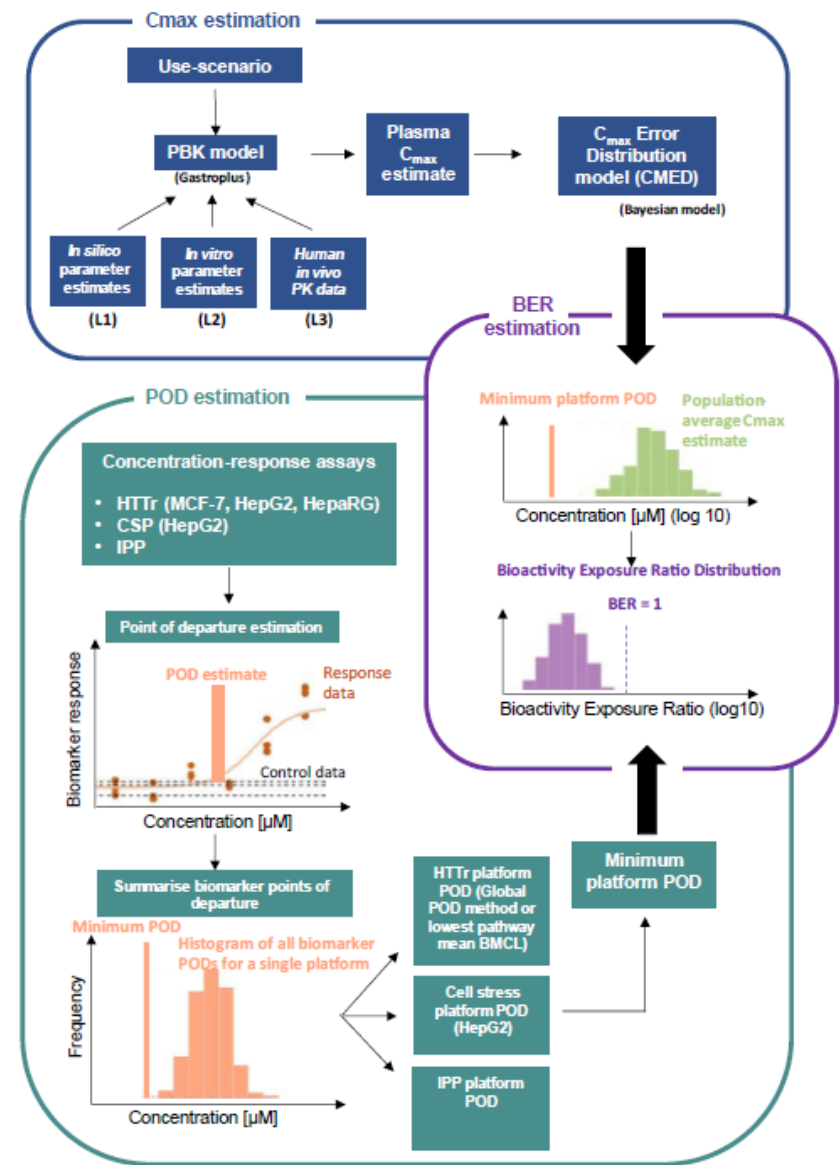
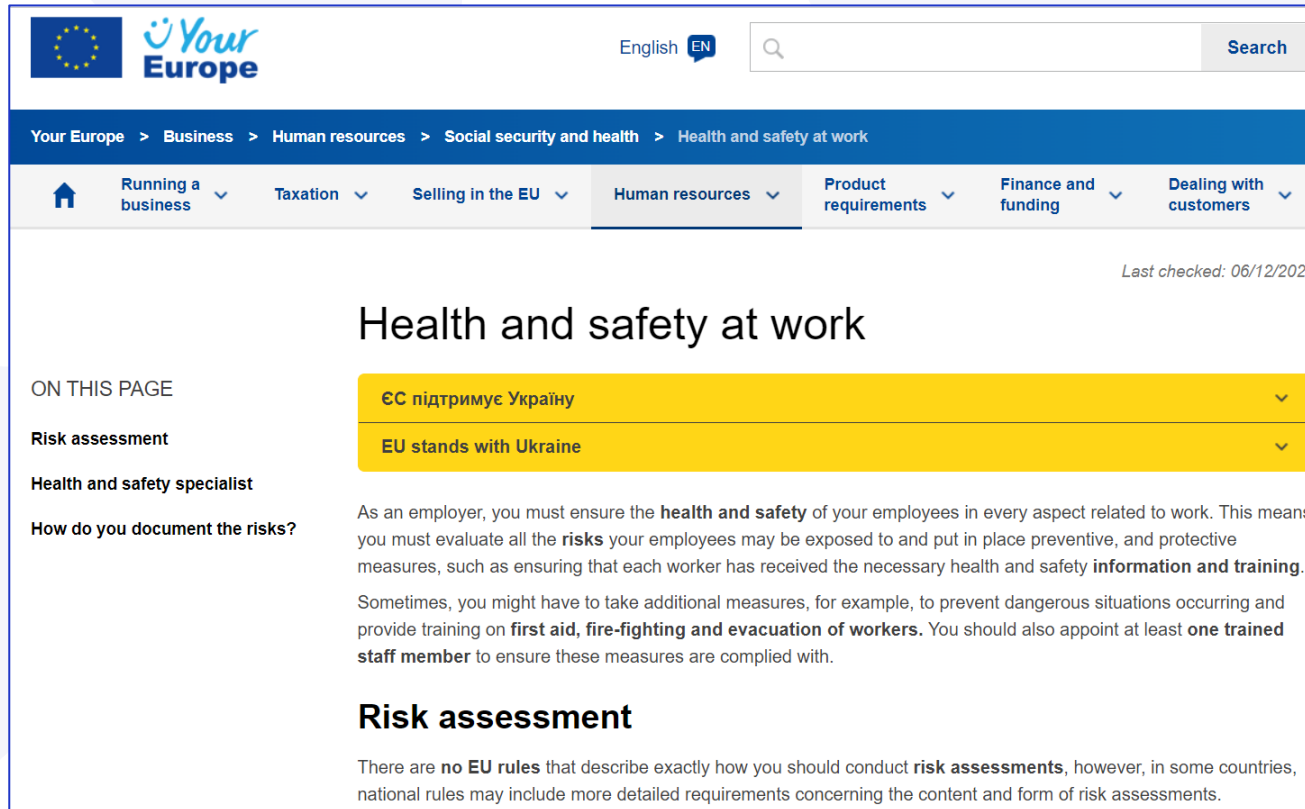


Figure 1: Schematic of the systemic safety toolbox and associated workflow, which comprises three modules: one to estimate the exposure using Physiologically Based Kinetic (PBK) models, another to estimate the point of departure (POD) based on the cell stress panel (CSP), High Throughput Transcriptomics (HTTr) and *in vitro* Pharmacological Profiling (IPP) bioactivity data. The workflow involves combining the outputs from these two modules into the third module to estimate the Bioactivity Exposure Ratio (BER).

# Worker Safety is ensured via prevention & protection

– exposure-based risk assessments specific for the activity / local operating set-up



The screenshot shows the 'Your Europe' website interface. At the top, there is a search bar and a language selector set to 'English EN'. The breadcrumb navigation path is: Your Europe > Business > Human resources > Social security and health > Health and safety at work. Below this is a horizontal menu with categories: Running a business, Taxation, Selling in the EU, Human resources (selected), Product requirements, Finance and funding, and Dealing with customers. The main content area is titled 'Health and safety at work' and includes a date 'Last checked: 06/12/2021'. On the left, there is a sidebar with 'ON THIS PAGE' containing links for 'Risk assessment', 'Health and safety specialist', and 'How do you document the risks?'. The main text area contains two yellow boxes: 'ЄС підтримує Україну' and 'EU stands with Ukraine'. Below these, there is a section for 'Risk assessment' with introductory text.

## Health and safety at work

Last checked: 06/12/2021

ON THIS PAGE

- Risk assessment
- Health and safety specialist
- How do you document the risks?

ЄС підтримує Україну

EU stands with Ukraine

### Risk assessment

As an employer, you must ensure the **health and safety** of your employees in every aspect related to work. This means you must evaluate all the **risks** your employees may be exposed to and put in place preventive, and protective measures, such as ensuring that each worker has received the necessary health and safety **information and training**.

Sometimes, you might have to take additional measures, for example, to prevent dangerous situations occurring and provide training on **first aid, fire-fighting and evacuation of workers**. You should also appoint at least **one trained staff member** to ensure these measures are complied with.

There are **no EU rules** that describe exactly how you should conduct **risk assessments**, however, in some countries, national rules may include more detailed requirements concerning the content and form of risk assessments.

Under workplace legislation, it is the **employer's duty to carry out a risk assessment and ensure that the workers are protected and provided with information, guidance and training** on the safe use of chemicals in the workplace, based on information derived from the labels and the safety data sheet. The employer also has the right to demand further information from the supplier.

**REACH continuously accumulates data on health and safety risks** from the use of chemical substances. The **registrant** (the manufacturer or the importer), who has to provide this data to the ECHA, also has to **communicate** this information to the downstream user, by providing an extended safety data sheet with exposure scenarios containing operational conditions and risk management measures for safe use, meant to facilitate the training of workers and the risk assessment procedure. At the same time, the registrant has the right to be informed by the downstream users on the relevance of the proposed risk management measures, in particular if they are inappropriate.

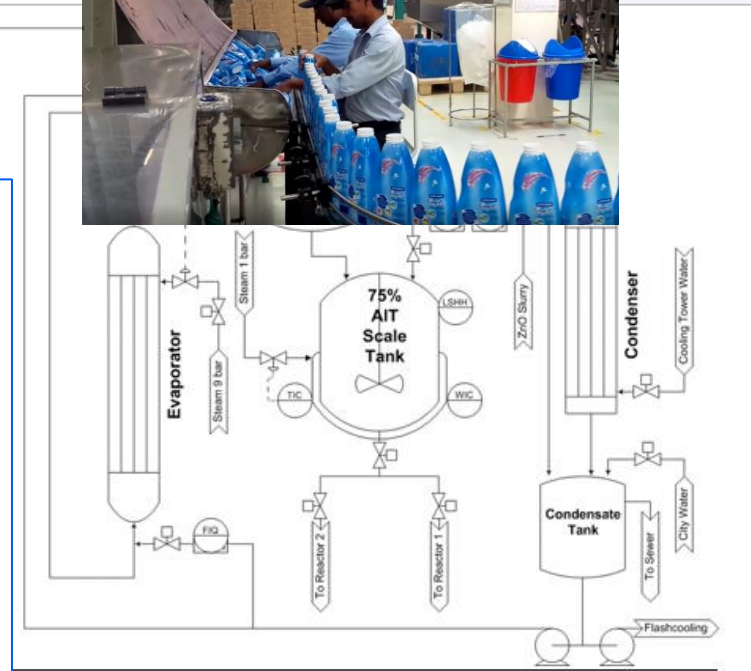
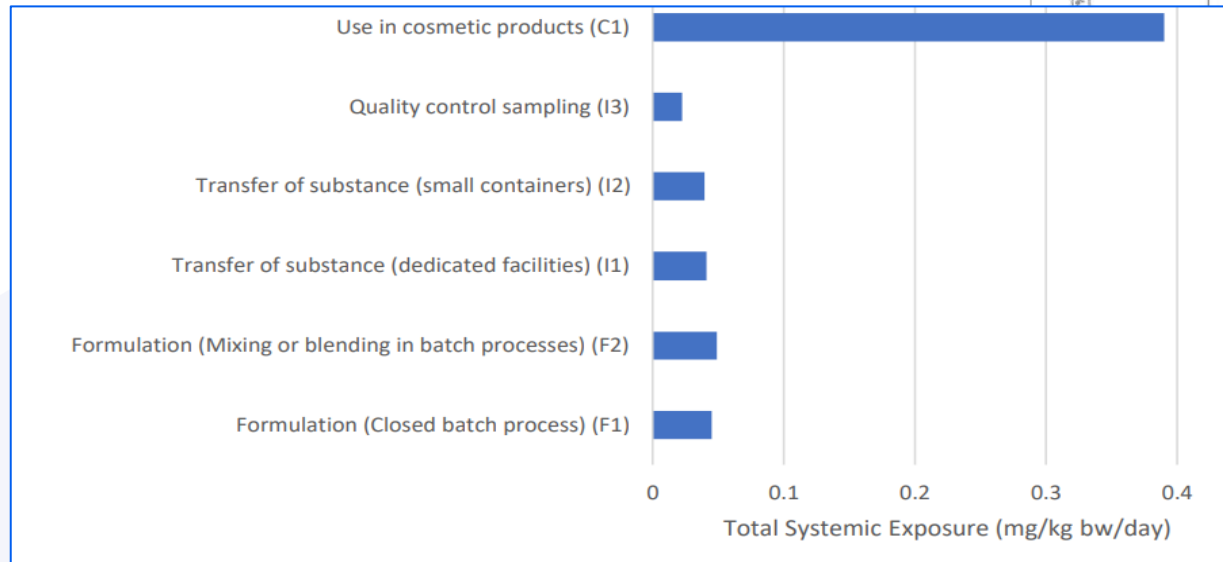
Can we change the types of data generated under REACH so they are based on advanced human-relevant science in place of animal testing?

# NGRA approaches for Worker Safety decisions

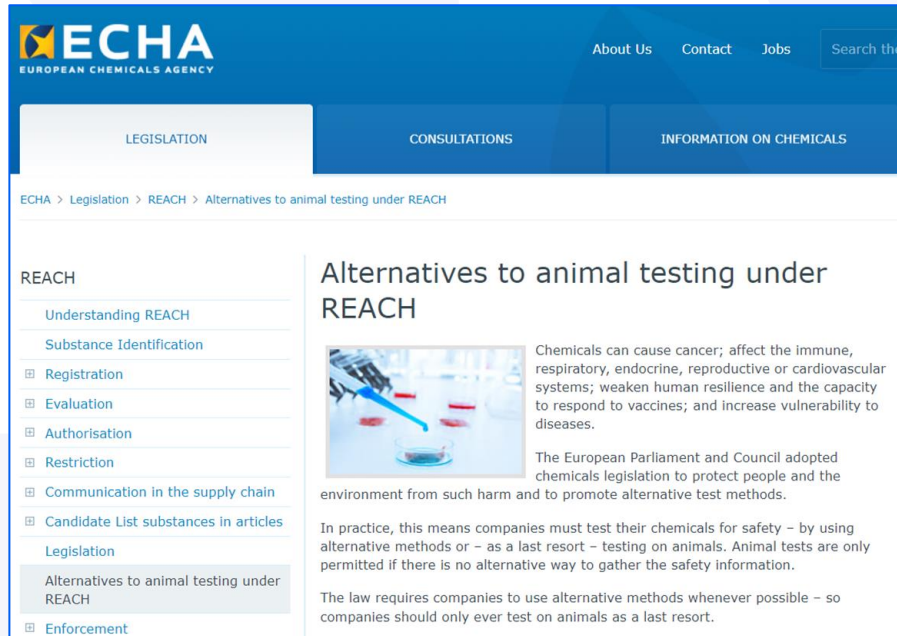
- Understanding worker exposure
  - Routes
  - Levels
  - PPE\*, engineering controls, ventilation, etc.
  - *PBK models for worker exposure*
- NGRA
  - *Bioactivity – Exposure Ratio (BER) approach for worker exposure*



\* PPE = Personal Protective Equipment



# Chemical Safety following environmental exposures – EU regulatory approach: protection from harm & use of non-animal tests



The screenshot shows the ECHA (European Chemicals Agency) website. The main navigation bar includes 'About Us', 'Contact', 'Jobs', and a search bar. Below this, there are three tabs: 'LEGISLATION', 'CONSULTATIONS', and 'INFORMATION ON CHEMICALS'. The 'LEGISLATION' tab is active, and the page title is 'ECHA > Legislation > REACH > Alternatives to animal testing under REACH'. On the left, there is a sidebar with a 'REACH' menu containing links for 'Understanding REACH', 'Substance Identification', 'Registration', 'Evaluation', 'Authorisation', 'Restriction', 'Communication in the supply chain', 'Candidate List substances in articles', 'Legislation', 'Alternatives to animal testing under REACH', and 'Enforcement'. The main content area is titled 'Alternatives to animal testing under REACH' and features an image of laboratory glassware. The text explains that chemicals can cause various health effects and that the European Parliament and Council have adopted legislation to protect people and the environment. It states that in practice, companies must test their chemicals for safety by using alternative methods or, as a last resort, testing on animals. The law requires companies to use alternative methods whenever possible.

EU REACH legislation has been in place for 15 years. It was introduced to protect people & the environment from harm and to promote alternative test methods.

Science & technology have advanced hugely since June 2007. Chemicals regulations need to catch up → framework for using best scientific data for safety decisions.

- Closing the Gap between Modern Safety Science & Regulatory Use of Next Gen Tools
- Building Confidence in the use of NAMs being Protective

## Safety scientists are calling for paradigm shift & regulatory change - safe & sustainable ingredients without animal testing



This article snippet is from the journal 'Alternatives to Laboratory Animals'. The title is 'Upholding the EU's Commitment to 'Animal Testing as a Last Resort' Under REACH Requires a Paradigm Shift in How We Assess Chemical Safety to Close the Gap Between Regulatory Testing and Modern Safety Science'. The authors are Julia Fentem, Ian Malcomber, Gavin Maxwell and Carl Westmoreland. The article was published in 2021, Volume 49(6), pages 123-132. It is available on SAGE publishing. The snippet also includes the journal's ISSN (1363-2475) and a link to the article's DOI (10.1177/02611929211040824).



This article snippet is from the journal 'Archives of Toxicology'. The title is 'A framework for chemical safety assessment incorporating new approach methodologies within REACH'. The authors are Nicholas Ball<sup>1</sup>, Remi Bars<sup>2</sup>, Philip A. Botham<sup>3</sup>, Andreea Cuciureanu<sup>4</sup>, Mark T. D. Cronin<sup>5</sup>, John E. Doe<sup>6</sup>, Tatsiana Dudzina<sup>6</sup>, Timothy W. Gant<sup>7</sup>, Marcel Leist<sup>8</sup>, and Bennard van Ravenzwaay<sup>9</sup>. The article was received on 11 October 2021 and accepted on 21 December 2021. It is available on SAGE publishing.



This article snippet is from the journal 'Cosmetics'. The title is 'Unilever: EU needs 'paradigm shift' in chemical safety assessment methods'. The author is Kacey Culliney. The article was published on 23 Sep 2021 and last updated on 23 Sep 2021 at 14:58 GMT. The snippet also includes the journal's ISSN (2673-7115) and a link to the article's DOI (10.3390/cosmetics9090165).



This article snippet is from the journal 'Cosmetics'. The title is 'The future of animal-free chemical testing? There's a 'big frustration' in the scientific community, say Unilever execs'. The author is Kacey Culliney. The article was published on 20 Oct 2021 and last updated on 20 Oct 2021 at 09:54 GMT. The snippet also includes the journal's ISSN (2673-7115) and a link to the article's DOI (10.3390/cosmetics9100165).

# Adoption of NGRA in cosmetic ingredient safety assessment ...



... use of similar approaches for chemicals registration purposes?

Computational Toxicology 7 (2018) 20–26

Contents lists available at ScienceDirect

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Computational Toxicology

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

Principles underpinning the use of new methodologies in the risk assessment of cosmetic ingredients

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REGULATORY TOXICOLOGY

**A framework for chemical safety assessment incorporating new approach methodologies within REACH**

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Scientific Committee on Consumer Safety  
 SCCS

THE SCCS NOTES OF GUIDANCE FOR THE TESTING OF  
 COSMETIC INGREDIENTS AND THEIR SAFETY  
 EVALUATION  
 11<sup>TH</sup> REVISION

Scientific Committees  
 on Consumer Safety  
 on Health, Environmental and Emerging Risks

The SCCS adopted this guidance document at its plenary meeting on 30-31 March 2021

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**EPA New Approach Methods Work Plan: Reducing Use of Vertebrate Animals in Chemical Testing**

CONTACT US

International Cooperation on Cosmetics Regulation (2018)

EPA United States Environmental Protection Agency

EPA 600/X-21/2099 | December 2021 | www.epa.gov/research

**New Approach Methods Work Plan**

U.S. Environmental Protection Agency  
 Office of Research and Development  
 Office of Chemical Safety and Pollution Prevention  
 December 2021



Scientific Committee on Consumer Safety (2021)



# Stakeholders engaging on use of NAMs for EU chemicals regulations

Comment

## Upholding the EU's Commitment to 'Animal Testing as a Last Resort' Under REACH Requires a Paradigm Shift in How We Assess Chemical Safety to Close the Gap Between Regulatory Testing and Modern Safety Science

Alternatives to Laboratory Animals  
2021, Vol. 49(4) 122-132  
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Julia Fentem, Ian Malcomber, Gavin Maxwell and Carl Westmoreland

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## Food for Thought ... Ready for Regulatory Use: NAMs and NGRA for Chemical Safety Assurance

Paul L. Carmichael<sup>1,2</sup>, Maria T. Baltazar<sup>1</sup>, Sophie Cable<sup>1</sup>, Stella Cochrane<sup>1</sup>, Matthew Dent<sup>1</sup>, Hequn Li<sup>1</sup>, Alistair Middleton<sup>1</sup>, Iris Muller<sup>1</sup>, Georgia Reynolds<sup>1</sup>, Carl Westmoreland<sup>1</sup> and Andrew White<sup>1</sup>

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flash

## EPAA Workshop

23 - 24 November 2021, virtual event



The European Partnership  
for Alternative Approaches to Animal Testing

Deep-Dive Workshop on «Use of New Approach Methodologies (NAMs) in Regulatory Decisions for Chemical Safety»

## How to accelerate the replacement of animal toxicity testing

Helsinki Chemicals  
Forum 2022

8-9 June 2022  
Stakeholder views on hot topics in chemicals safety

### Context

It is agreed that we need to replace animal toxicity testing and many regulations encourage avoiding it. But the tests are still widely used. They can be time-consuming, costly and are not always accurate in predicting chemical effects in humans. While new approach methods (NAMs) are becoming available, implementing them has been a relatively slow process. Regulatory authorities are looking for assurance that these alternative test methods protect human health as efficiently/effectively as the animal models they replace. But how can confidence be achieved and how can we speed up their adoption by decision makers?

**Moderator: Patience Browne**, principal administrator, Hazard Assessment and Pesticides Programmes, Environmental Directorate, OECD

### Panelists:

**Gavin Maxwell**, EPAA industry co-chair and safety science leader, Unilever Safety & Environmental Assurance Centre (SEAC)

**Marina Pereira**, senior strategist – regulatory policy, research and toxicology, Humane Society International

**Ofelia Bercaru**, director – prioritisation and integration, Echa

**Maurice Whelan**, head of Chemical Safety and Alternative Methods Unit, European Commission

**Tara Barton-Maclaren**, research manager, Healthy Environments and Consumer Safety Branch, Health Canada/ Government of Canada



Maisons-Alfort, 11 May 2022  
PRESS RELEASE

Launch of the European research and innovation PARC programme to improve chemical risk assessment