

Adoption of Non-Animal Methods

The Importance of: Innovation, Collaboration and Partnerships

Patrick Masscheleyn
Senior Vice President - Global Product Stewardship
Procter & Gamble

P&G Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

P&G product portfolio

In me

Personal health care









On me

Oral care
Feminine care





Skin care
Grooming





Hair Care
Baby care





Near me

Fabric care
Family care





Home care













More than
5 billion
exposures per day

Positive assurance of safety

Exposure

Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Responsible safety

Non-animal methods as the standard in safety



History

40 years and more than $450 million investment in animal testing alternatives



Research

First skin allergy animal testing alternative

Key innovator on Read Across

Today, using 50 animal testing alternatives

Partnership

P&G official member of HSI *#BeCrueltyFree* collaboration

Approx. 10 brands PETA certified as Cruelty Free

Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

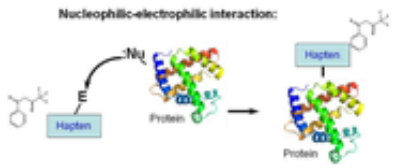
3R's how we innovate – skin sensitization

DISCOVER
Opportunity Areas

- Refine
- Reduce
- Replace

GENERATE
Ideas

- ***In Vivo*** **testing refinement**
- ***In Vitro*** **test development**
- ***In Chemico*** **test development**



- ***In Silico*** **Predictive modeling**

CREATE

Problem
SEED 1

MS
HP LC
T
H
K
C
Glu
Oxi

Solution
SEED 2

HP LC
K
C
Glu
Oxi

QSARs

Model
SEED 3

Adverse Outcome Pathways

C
K
Oxi

Peroxidase Peptide Reactivity Assay

Bayesian Network ITS

INCUBATE

Industry collaboration Ring trials

Cell based *in Vitro*

Defined Approaches

In Chemico approaches

SCALE

Buehler Test TG406

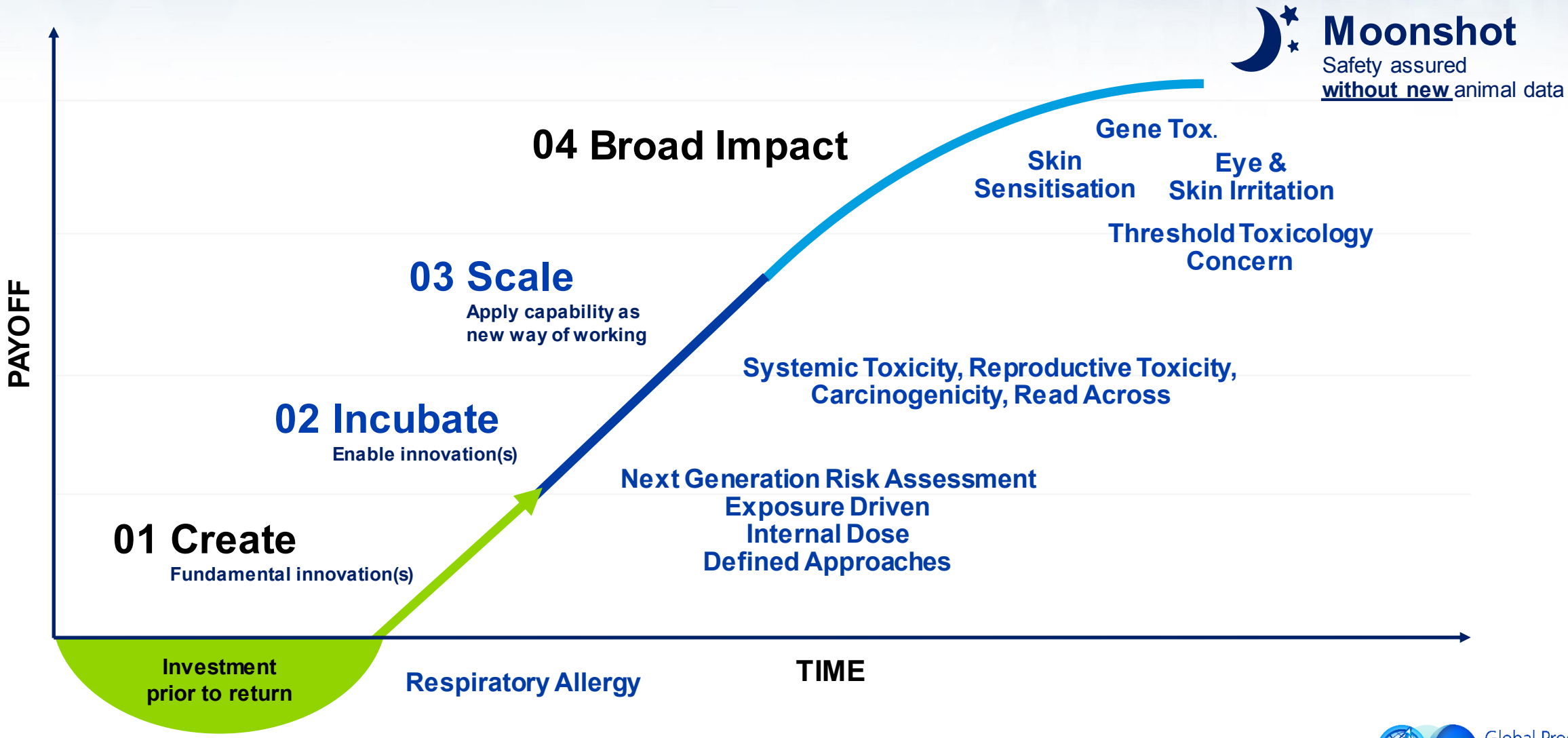
Local Lymph Node Assay

Direct Peptide Reactivity Assay TG442c

Next Generation Risk Assessment

Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

3R's innovation – the journey so far



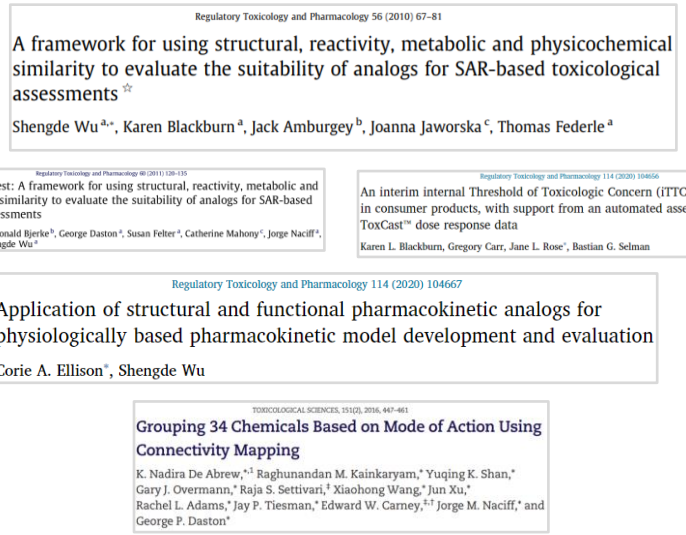
Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Read-across - stepping stone into the future

Leverages computational power to address safety questions on endpoints for which no full replacement models will be available in the foreseeable future

Advancing science

Expert-based RAX, uncertainty analysis, ontologies & frameworks, NAMs


Regulatory Toxicology and Pharmacology 56 (2010) 67–81

A framework for using structural, reactivity, metabolic and physicochemical similarity to evaluate the suitability of analogs for SAR-based toxicological assessments ☆

Shengde Wu [a,*], Karen Blackburn [a], Jack Amburgey [b], Joanna Jaworska [c], Thomas Federle [a]

Case studies to test: A framework for using structural, reactivity, metabolic and physicochemical similarity to evaluate the suitability of analogs for SAR-based toxicological assessments

Karen Blackburn [a,*], Donald Bjerke [b], George Daston [a], Susan Felter [a], Catherine Mahony [c], Jorge Naciff [a], Steven Robison [a], Shengde Wu [a]

An interim internal Threshold of Toxicologic Concern (iTTC) for chemicals in consumer products, with support from an automated assessment of ToxCast™ dose response data

Karen L. Blackburn, Gregory Carr, Jane L. Rose*, Bastian G. Selman

Regulatory Toxicology and Pharmacology 114 (2020) 104667

Application of structural and functional pharmacokinetic analogs for physiologically based pharmacokinetic model development and evaluation

Corie A. Ellison*, Shengde Wu

TOXICOLOGICAL SCIENCES, 151(2), 2016, 447–461

Grouping 34 Chemicals Based on Mode of Action Using Connectivity Mapping

K. Nadira De Abrew,*,1 Raghunandan M. Kainkaryam,* Yuqing K. Shan,* Gary J. Overmann,* Raja S. Settivari,† Xiaohong Wang,* Jun Xu,* Rachel L. Adams,* Jay P. Tiesman,* Edward W. Carney,†,‡ Jorge M. Naciff,* and George P. Daston*

Knowledge exchange

Outreach to ECHA, OECD Toolbox, Scientific Societies

ECHA EUROPEAN CHEMICALS AGENCY

QSAR TOOLBOX

Collaboration with regulators

CE-Seurat
LRSS

SEURAT-1

COSMETICS EUROPE LRSS

P&G Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Collaboration and partnership



50+
partners globally

1000+
publications

Training and presentations
in major scientific conferences and industry / NGO / regulatory workshops

P&G Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Defining the future:
Towards 4Rs “system biology revolution”

Regulatory Toxicology and Pharmacology 114 (2020) 104668

Contents lists available at ScienceDirect

Regulatory Toxicology and Pharmacology

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



New ideas for non-animal approaches to predict repeated-dose systemic toxicity: Report from an EPAA Blue Sky Workshop

Catherine Mahony[a], Randolph S. Ashton[b], Barbara Birk[c], Alan R. Boobis[d], Tom Cull[e], George P. Daston[f], Lorna Ewart[g,h], Thomas B. Knudsen[i], Irene Manou[j], Sebastian Maurer-Stroh[k,l], Luigi Margiotta-Casaluci[m], Boris P. Müller[n], Pär Nordlund[o,p], Ruth A. Roberts[q], Thomas Steger-Hartmann[r], Evita Vandenbossche[e], Mark R. Viant[s], Mathieu Vinken[t], Maurice Whelan[u], Zvonar Zvonimir[j], Mark T.D. Cronin[v,*]

Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Toward common goal

consumer / academia / regulator / NGO / industry

- **Safety assurance from fundamental understanding**
- **Assess more chemicals more quickly**
- **Generate and leverage new knowledge:**
  Next Generation Risk Assessment

  - ✓ Invest and build confidence to assess safety without new animal data
  - ✓ Consider exposure-based risk assessment vs. hazard-based C&L
  - ✓ Human relevance of high dose animal testing
  - ✓ Speed-up the uptake and implementation
  - ✓ Open source & case studies



P&G Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations

Closing thoughts: the third age of biology



Classification and Inference

01



Experimentation and reductionism

02



Synthesis, systems and prediction

03

Global Product Stewardship
Safety • Sustainability • Regulatory • Technical Relations



Improving everyday life.