Food packaging and chemical safety today

Overview of scientific challenges for tomorrow

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Zurich, 8 October 2015

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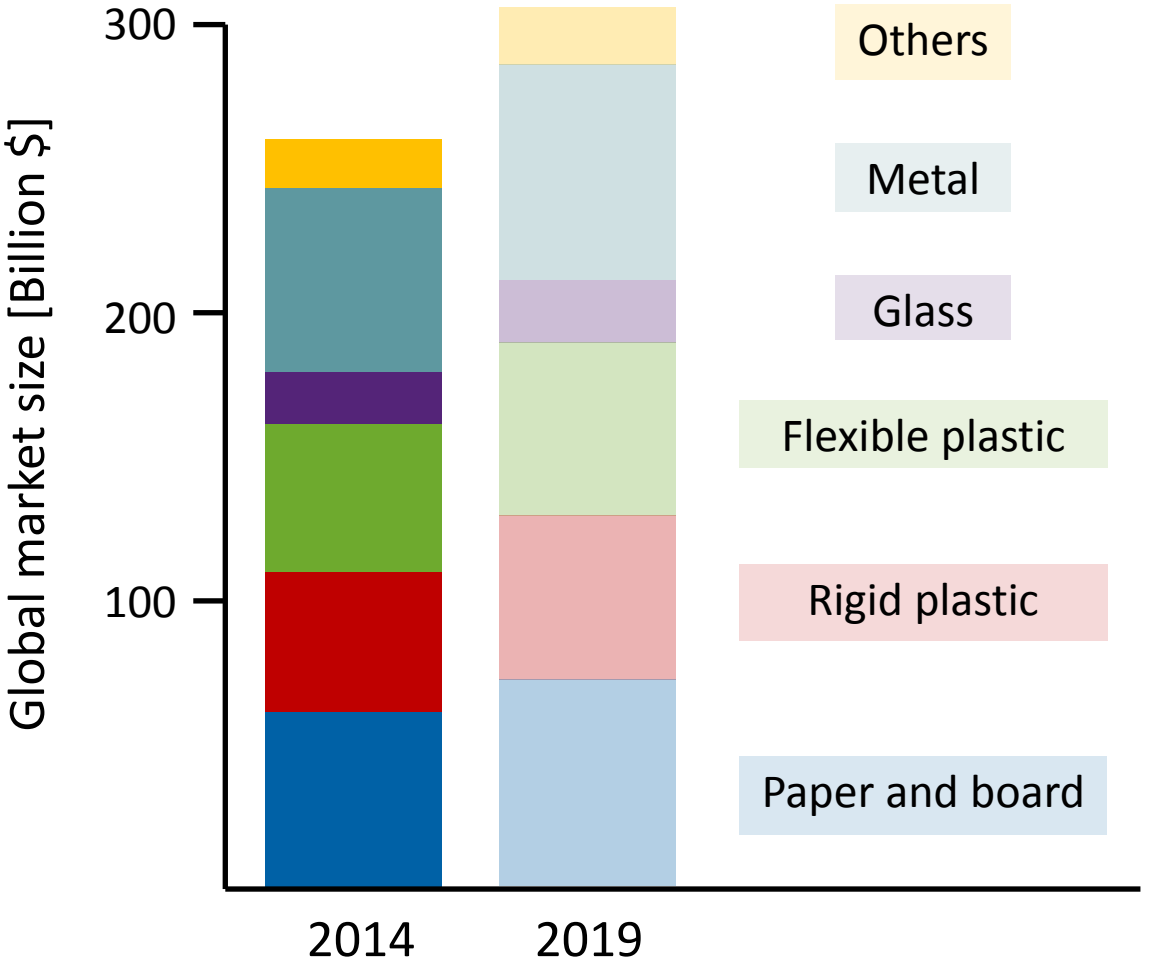
Food packaging and chemical safety today:

Food packaging market



Source: MarketsandMarkets Analysis

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Food packaging and chemical safety today:

Public awareness

JRC, EC (2007): Consumer perception studies on the safety of food packaging, 700 participants		Friends of Glass (2014): Exploring consumer attitudes to packaging and food and drink safety, 8135 participants	
«Food packaging contamination»		«Worry about food contamination of harmful chemicals from the packaging»	
Serious concern	>50%	A lot of worry	27%
Some concern	>30%	To some extent	39%
No concern	≈10%	A little bit	28%
No opinion	≈5%	Not at all	6%

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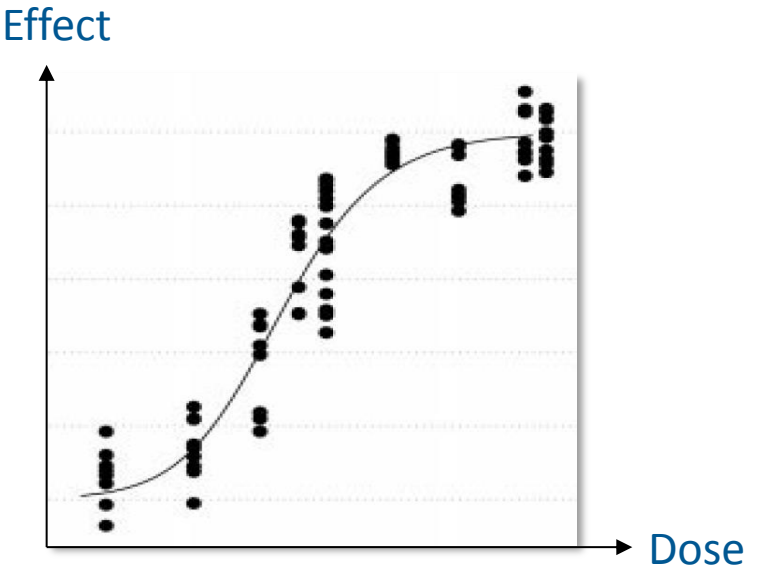
Food packaging and chemical safety today:

The dose makes the poison

exposure x hazard = risk ?



Paracelsus' birth place
1493

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Scientific challenges for tomorrow:

Number of substances

Intentionally added substances

- **900-1000** entries on the Union list
- **6475** entries in the FACET database
- **7201** direct or indirect food additives (PEW list)
- **>5000** substances for packaging inks

Non-intentionally added substances (NIAS)

- Side products
- Impurities
- Break-down products
- Contaminations from recycling processes
- 95-98% of the migrate from can coatings
- 60-90% for polypropylene (PP)

Sources:
Neltner T et al. 2013 Reprod Toxicol
Oldring P et al. 2014 Food Addit Contam A
Ordinance of the FDHA on Materials and Articles 2005 Annex 6
Grob K 2014 Food Control

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Scientific challenges for tomorrow:

A simple equation…

exposure x hazard = risk

Data availability?

- < 2000 starting substances: authorized toxicological evaluation
- NIAS may be
  - known & tested/evaluated
  - known, but not tested
  - detected, but not identified
  - not detected

Source:
Grob K 2014 Food Control

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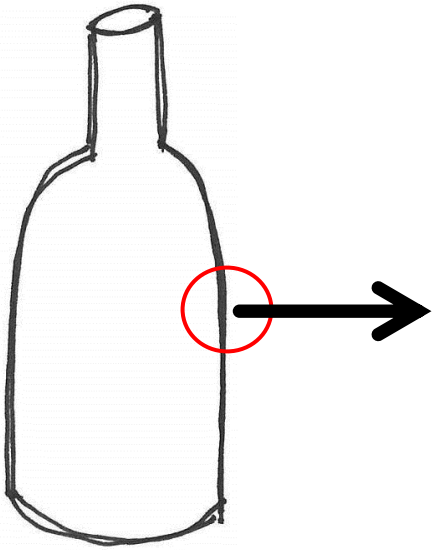
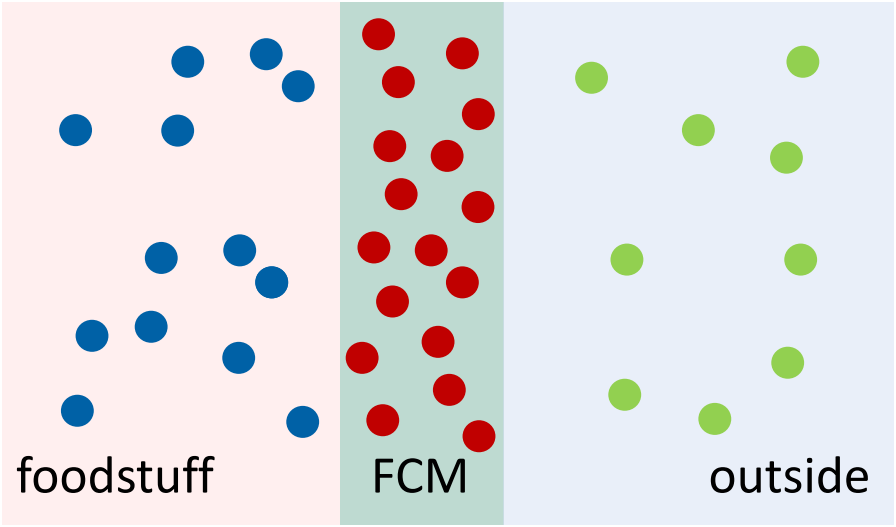
Migration from FCMs





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Scientific challenges for tomorrow: Exposure

Cumulative exposure

oral exposure

oral, dermal and respiratory exposure

Fotos courtesy of Kim Seng, LukedaDuke, UGA College of Ag & Environmental Sciences – OCCS; flickr

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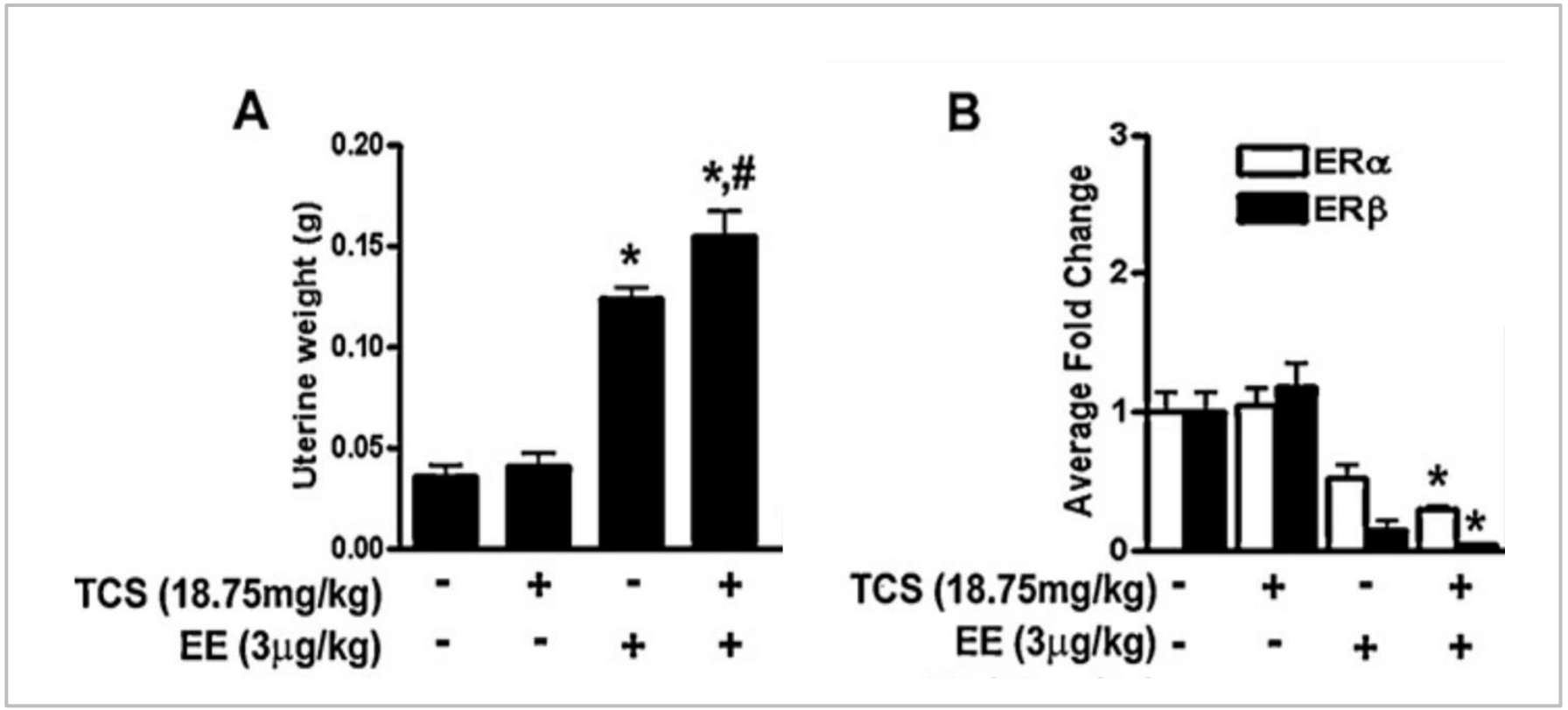
Mixture toxicity

triclosan (TCS) and ethinyl estradiol (EE)



Source: **Louis GW** et al. 2013 Reproductive Toxicology

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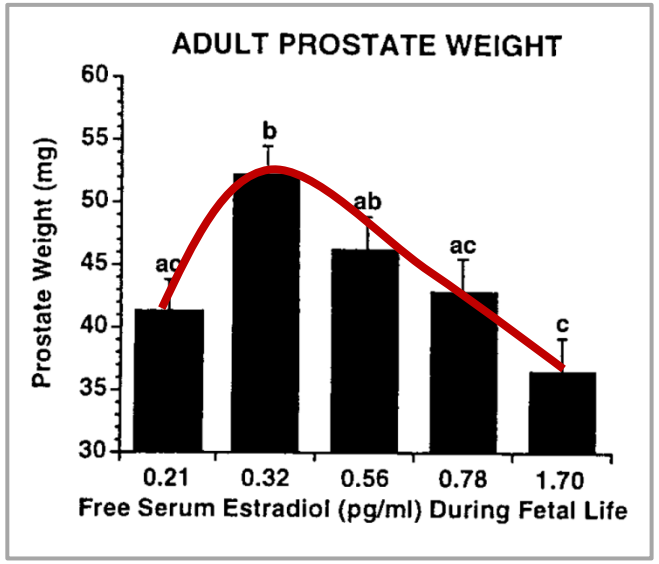
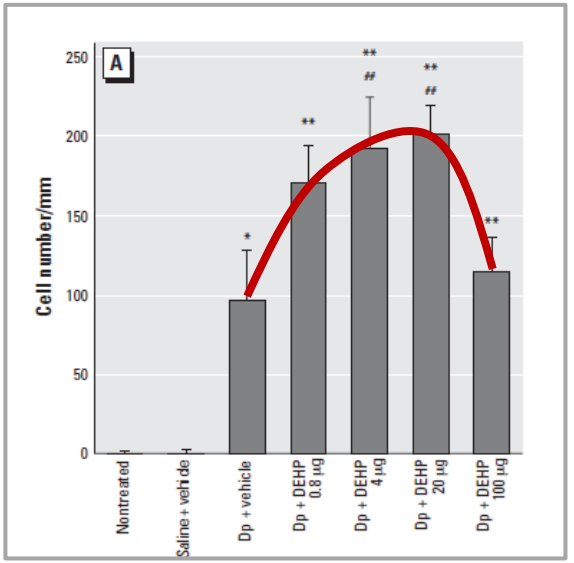
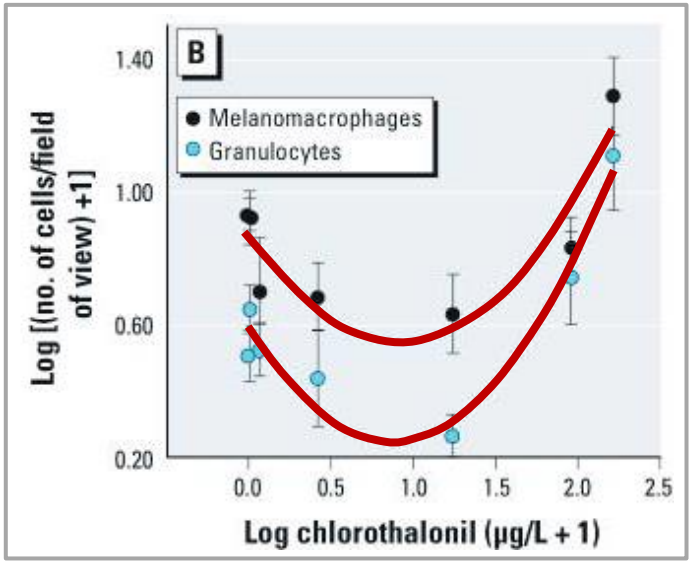
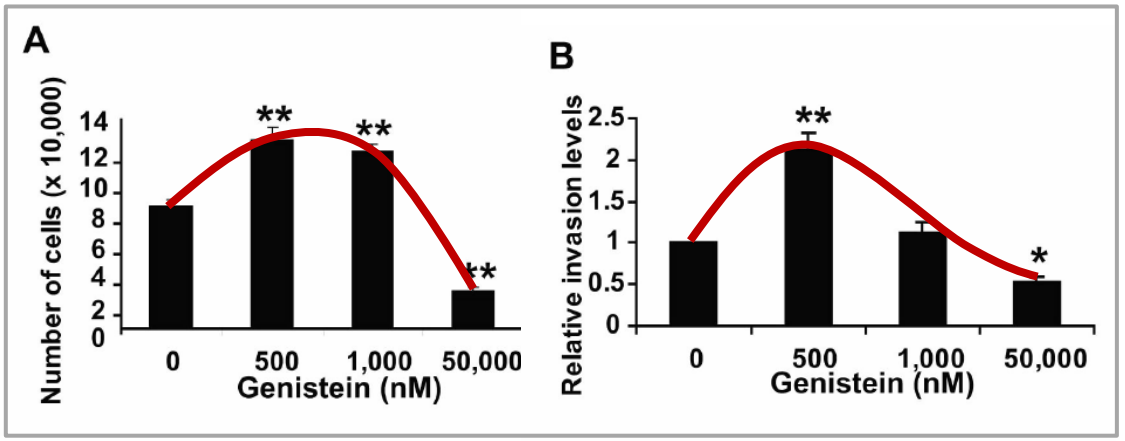
Non-monotonic dose responses









Sources:
Vandenberg L et al. 2012 Endocrine Reviews
Vom Saal F et al. 1997 PNAS
Takano H et al. 2006 EHP
McMahon TA et al. 2011 EHP
El Touny LH et al. 2009 Cancer Research

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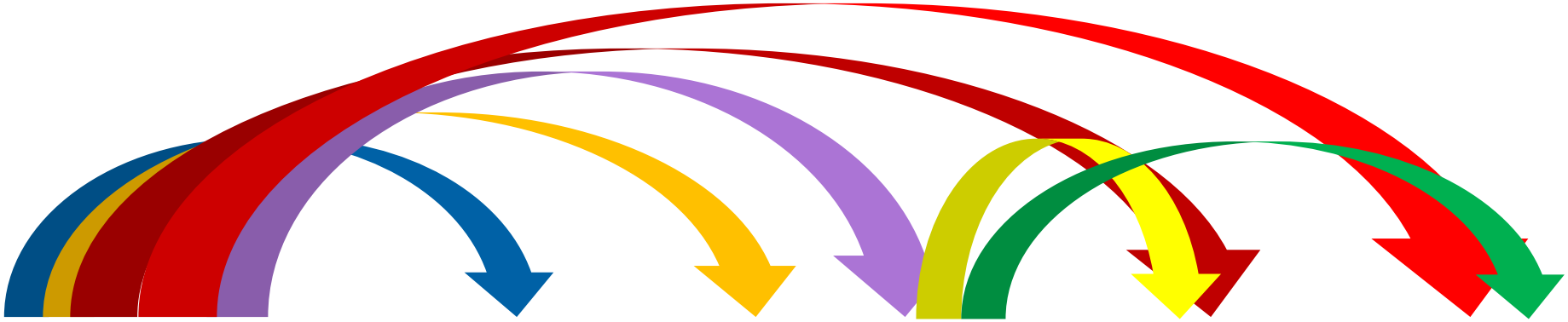
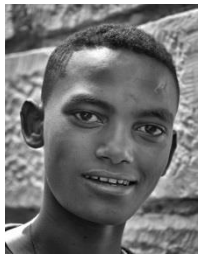
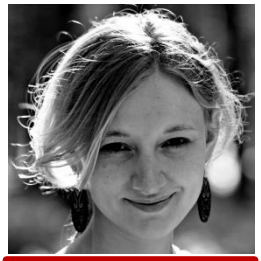
Sensitive windows of development

Time of exposure





gestation, infancy, early childhood	childhood	puberty	reproduc-tive life	middle life	later life

Sources:
Heindel J NIEHS; adapted
Alonso-Magdalena P et al. 2015 Endocrinology

Fotos courtesy of Peter Dahlgren, Rafal Zych, Rod Waddington, Leon Lopez Cuervo, Artform Canada, Ben Smith; flickr

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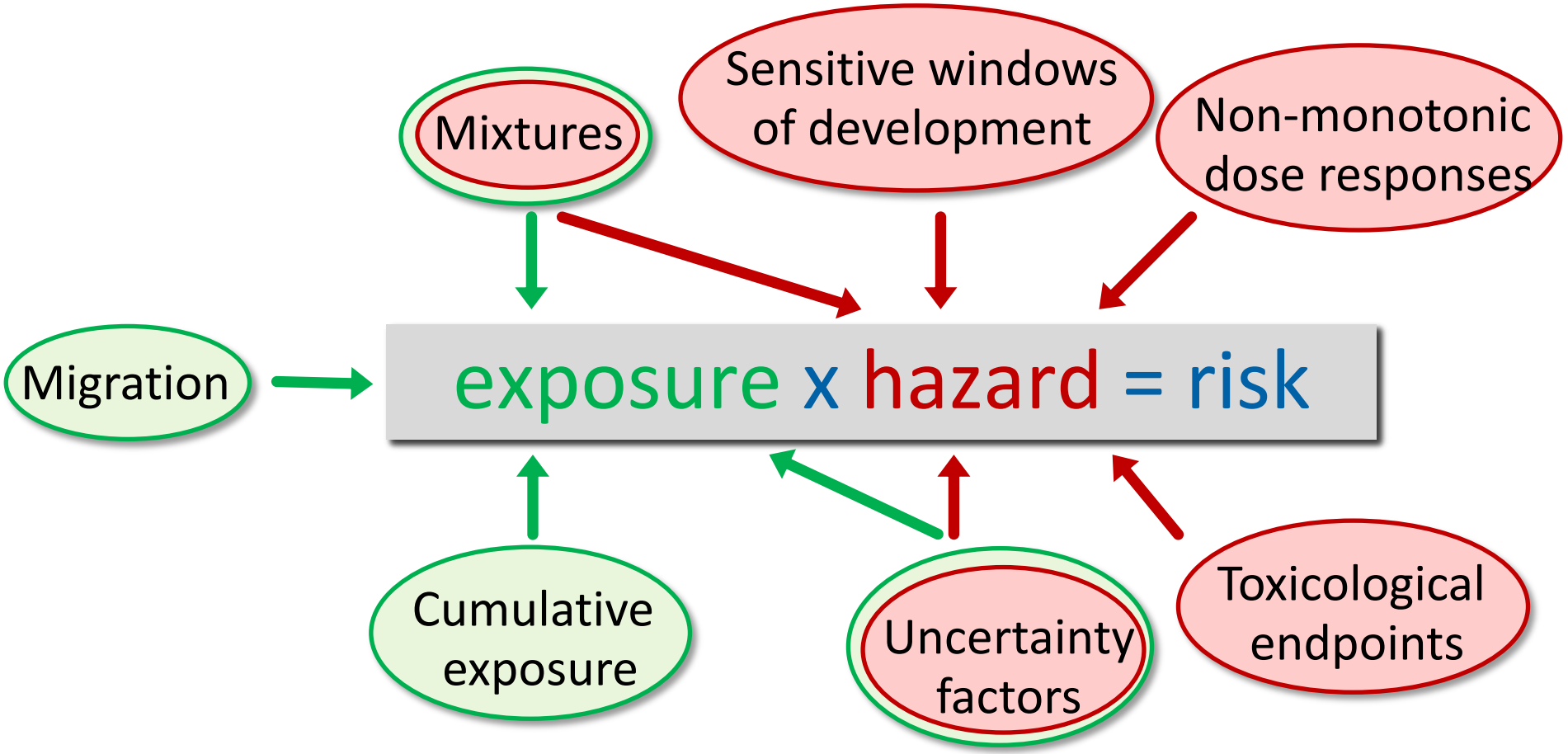
Scientific challenges for tomorrow:

A simple equation…



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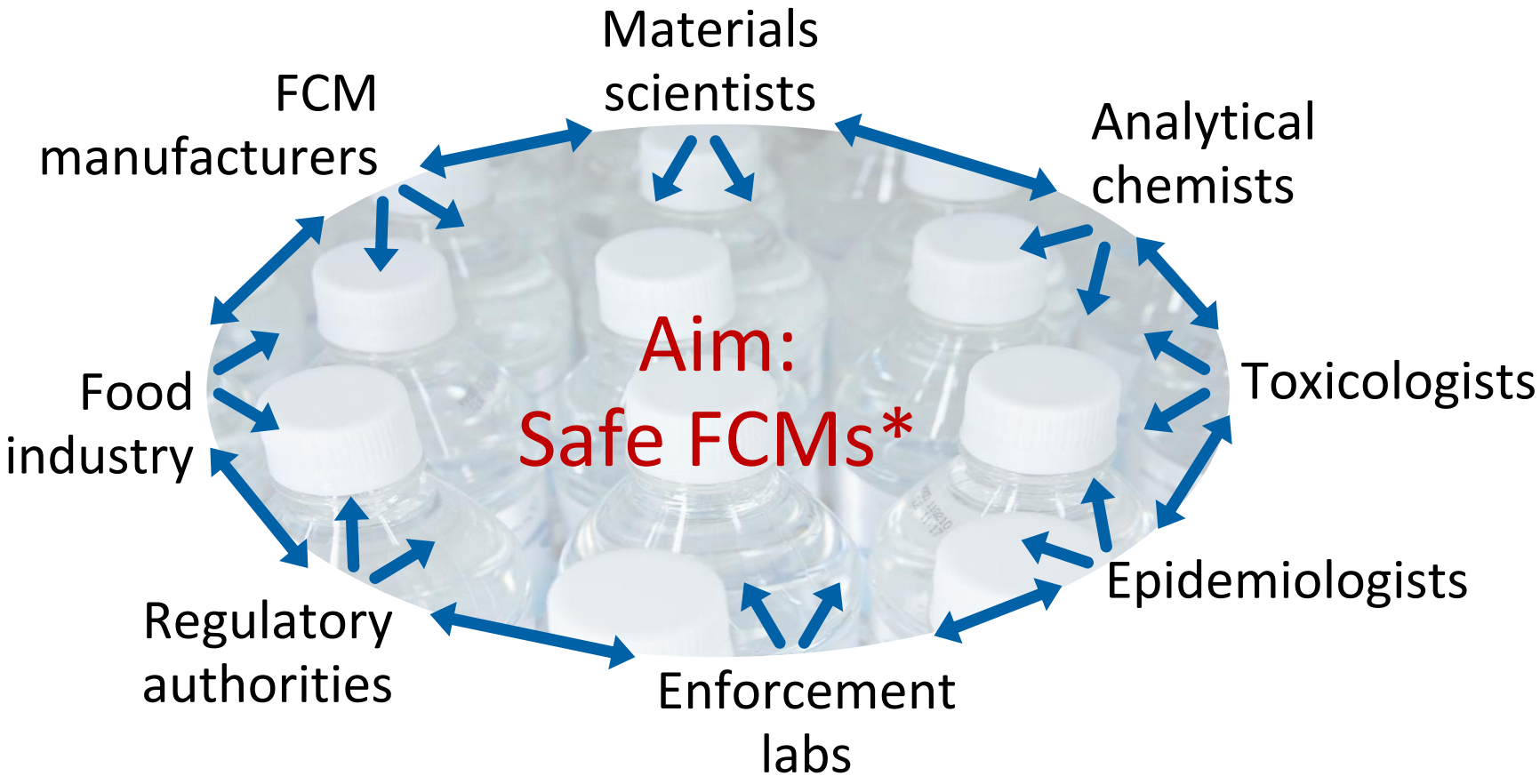
Scientific challenges for tomorrow:

Who?



FPF provides information & enables communication

*based on most current scientific understanding

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Conclusions

- Data availability not sufficient to guarantee safety.
- New scientific understanding questions the classical chemical risk assessment approach.
- Testing methods for e.g. hormonal activity exist and go beyond the present legal requirements.
- Strategies and open-minded discussions needed to integrate current knowledge and to further increase the safety of FCMs.

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Thank you!

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