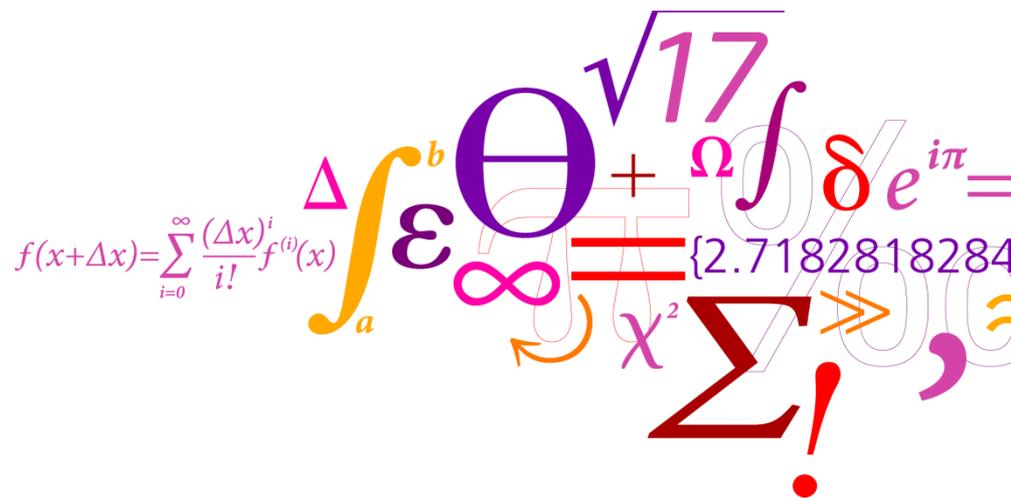
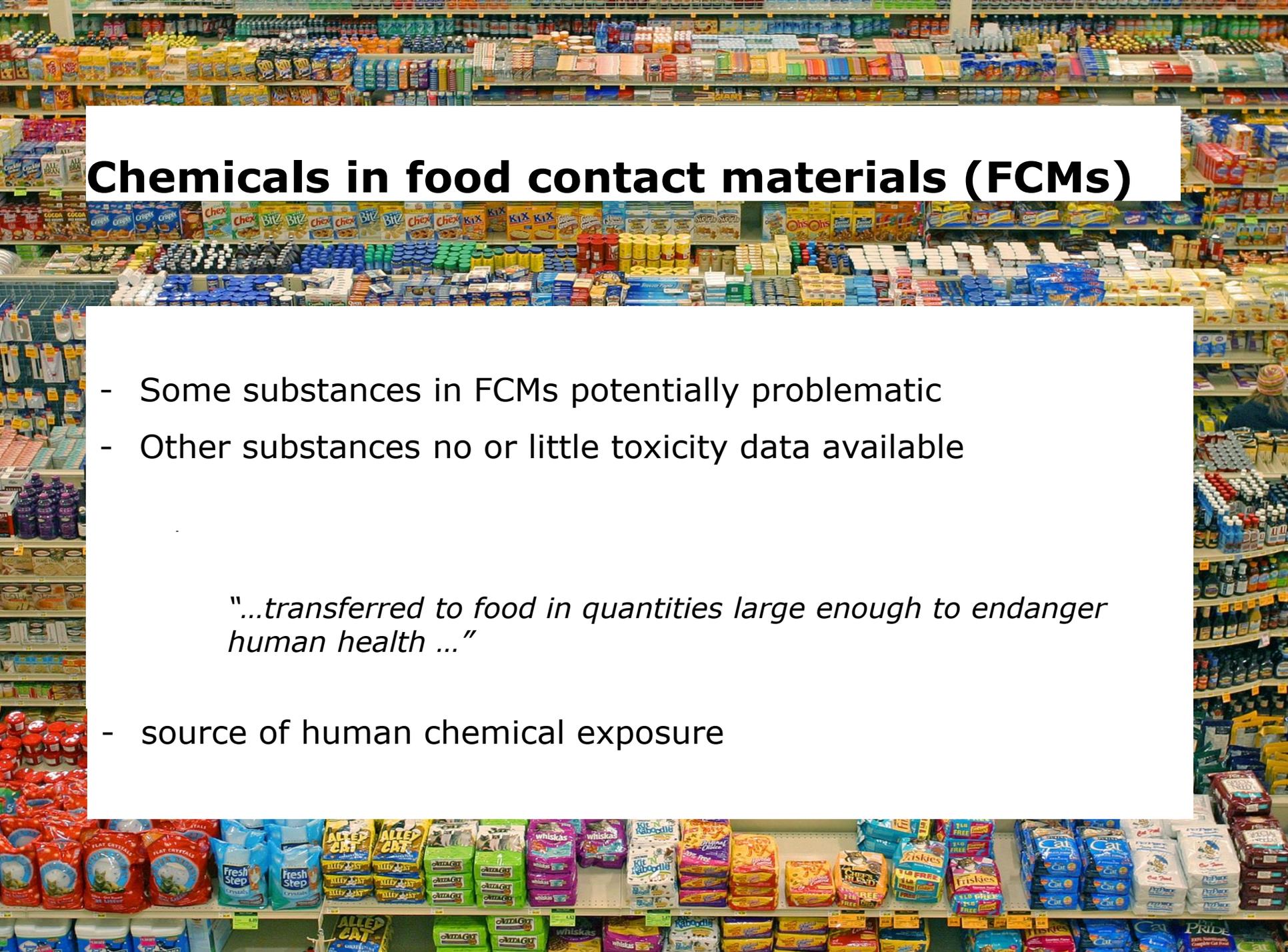


# Are chemicals in food packaging a problem?

Anna Kjerstine Rosenmai

19th of March 2015





## Chemicals in food contact materials (FCMs)

- Some substances in FCMs potentially problematic
- Other substances no or little toxicity data available

*"...transferred to food in quantities large enough to endanger human health ..."*

- source of human chemical exposure

# Two approaches and effect measures

1

Test toxicology of compounds with known identity or use

2

Test FCMs of paper and board of unknown chemical composition and toxicological potential

TOX

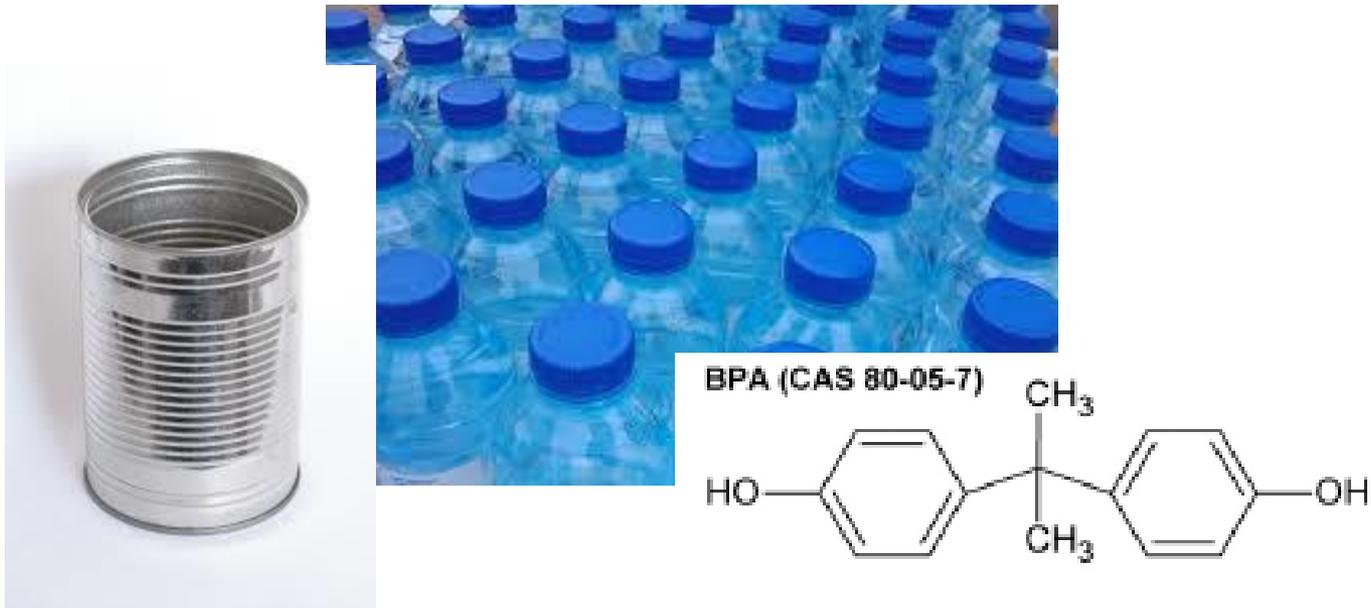
Cell-based tests

- Genotoxicity
- Mutagenicity
- ....
- Endocrine disruptive potential

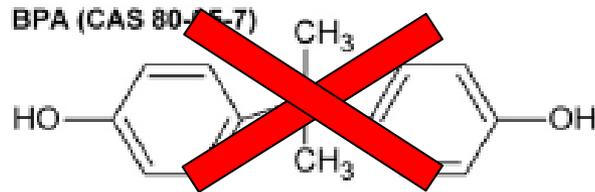


# Bisphenol A (BPA) analogues

- BPA used mainly in cans and plastics
- BPA prohibited in Canada and EU for baby feeding bottles
- BPA is a known endocrine disruptor

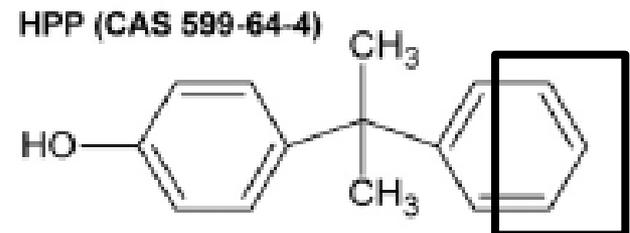
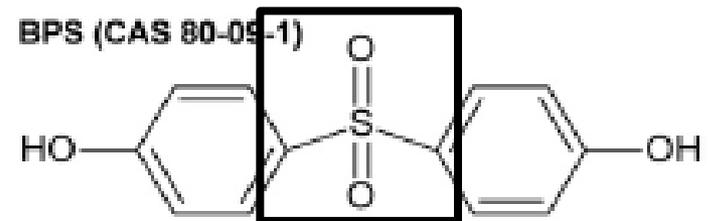
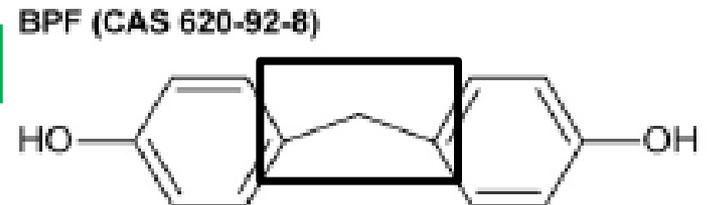
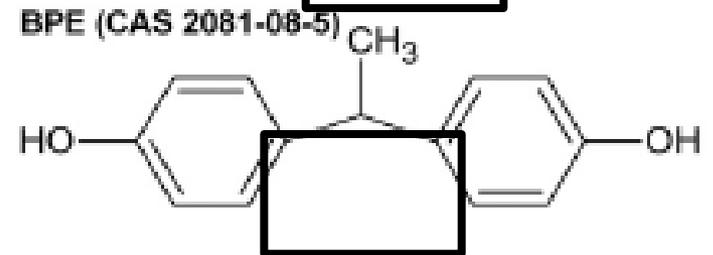
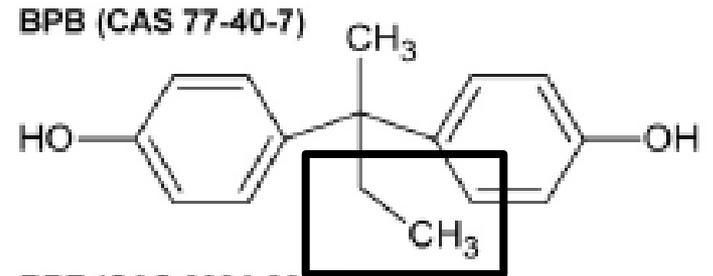
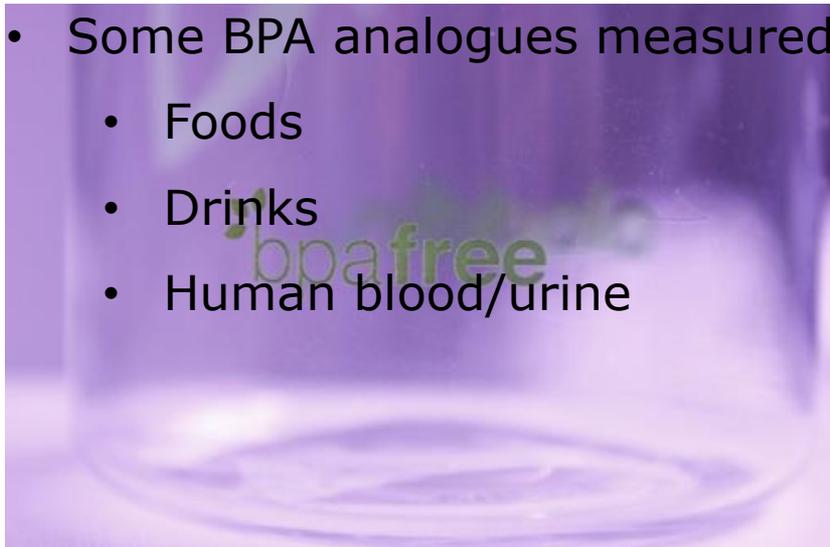


# Bisphenol A analogues



What is used instead and is it less problematic?

- Some BPA analogues measured in,
  - Foods
  - Drinks
  - Human blood/urine



# BPA analogues – Major findings

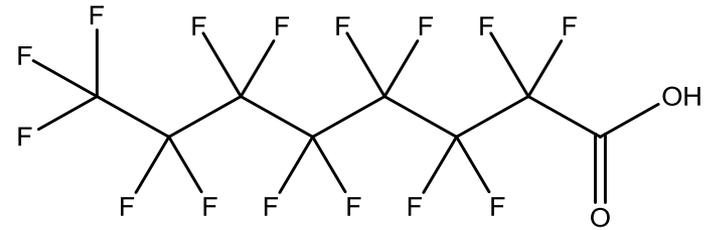


- All tested BPA analogues had endocrine disruptive potential
  - Generally the endocrine targets were similar to BPA
- ⇒ The tested BPA analogues are not good alternatives to BPA based on our results

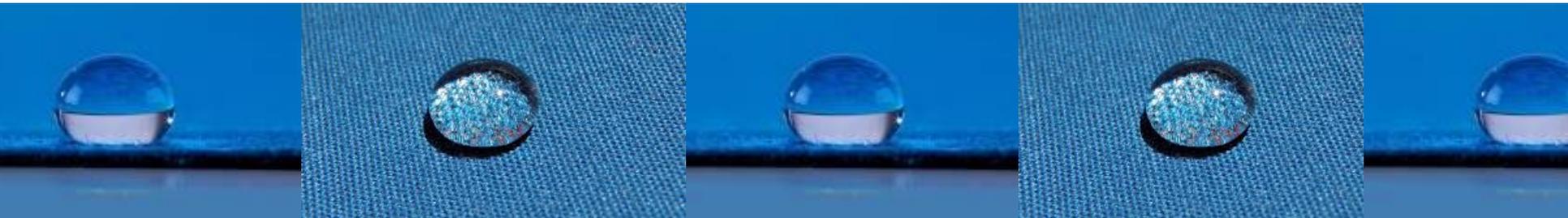
Fluorochemical

# Fluorochemicals

- Used in FCMs of paper and board to give repellency properties

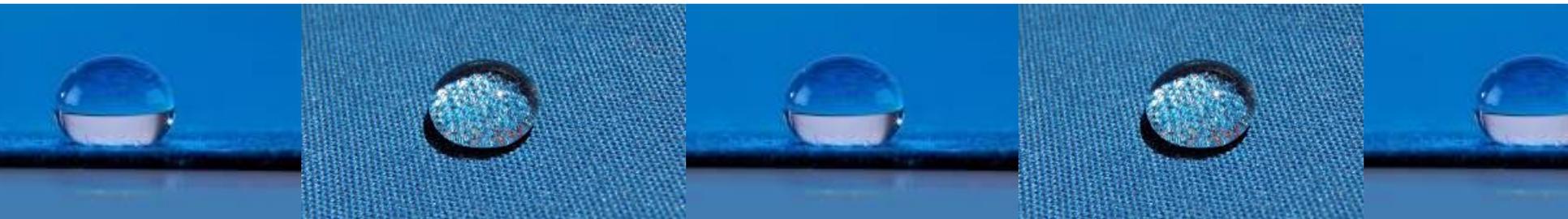
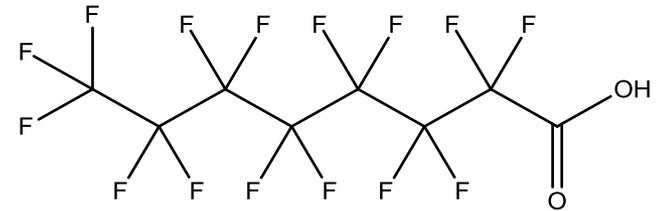


- Measured in different human body compartments
- Some fluorochemicals have among other effects endocrine disruptive potential



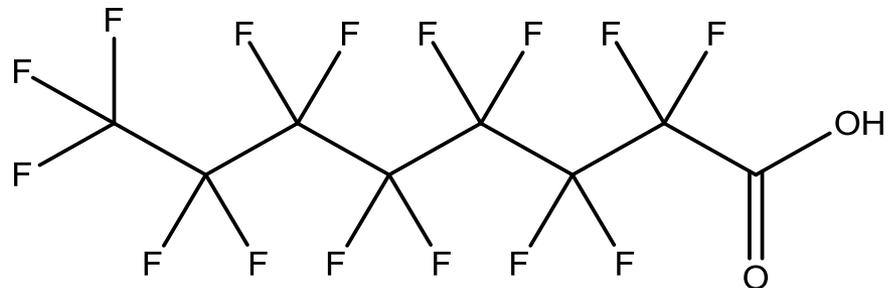
# Fluorochemicals

- Change to short-chained chemistry
- Chemical structure and concentration of fluorochemicals used in FCM is often unknown
- Toxicity data for some fluorochemicals often not sufficient or publically available



# Fluorochemicals tested

- Four fluorochemicals used as coating in FCM of paper and board
- Twelve fluorochemicals which occur as impurities in FCMs of paper and board or metabolic products of other fluorochemicals
- Three fluorochemical containing mixtures for FCMs of unknown composition and concentration



# Fluorochemicals – Major findings



Fluorochemicals used in/on FCMs of paper and board should be further investigated as short chained fluorochemicals should be investigated further, as some caused no effect, whereas others were estrogenic. More information on chemical structures and concentrations still needed to fully elaborate on whether problematic



## FCM test strategy

- to assess if problematic compounds are present in FCMs of paper and board when we know little to nothing about chemical composition and toxicity

# FCM test strategy



Jens Højslev Petersen

Linda Bengtström

Anne Marie Vinggaard

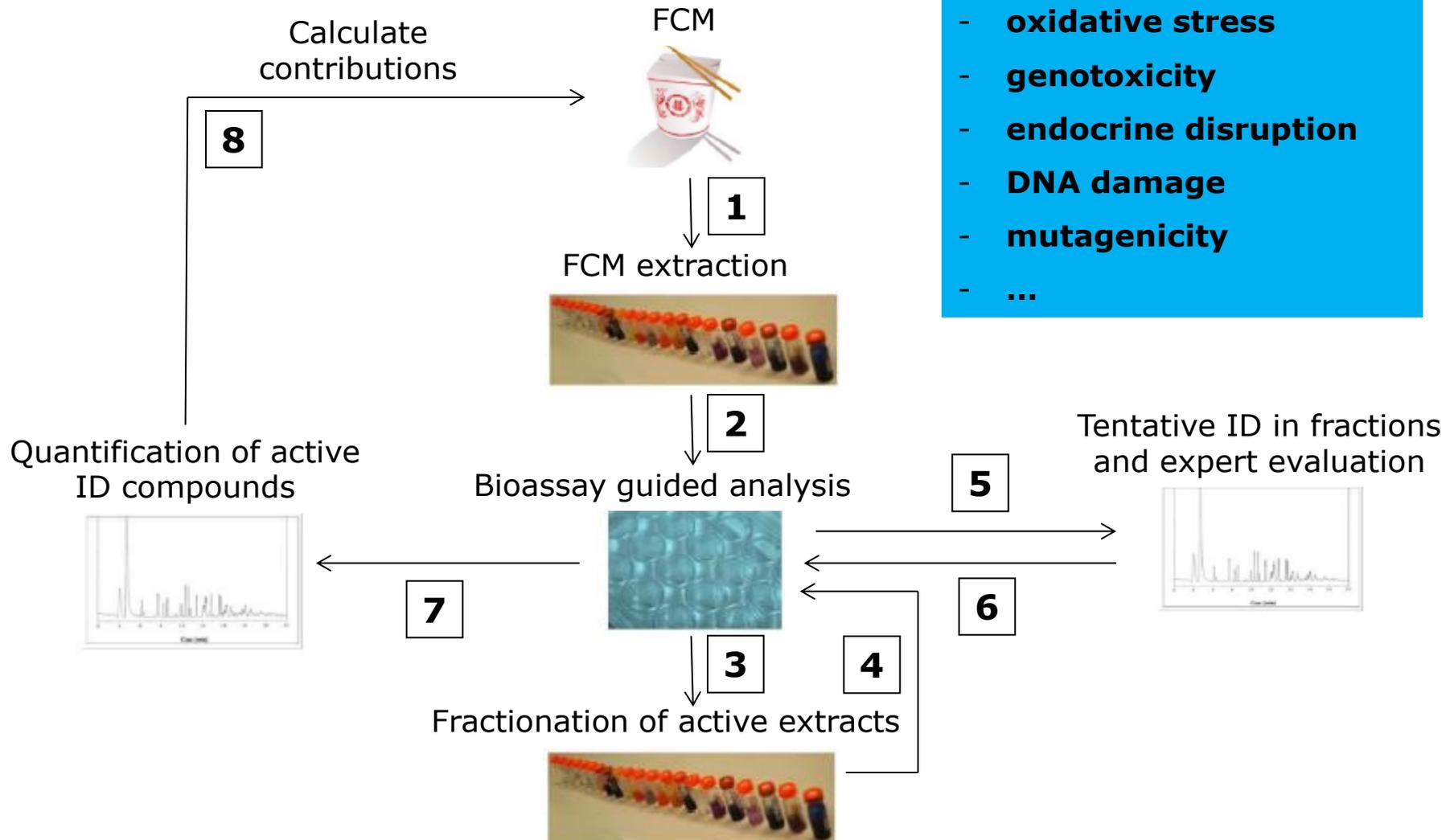
Kit Granby

Xenia Trier

Mona-Lise Binderup

Camilla Taxvig

# FCM test strategy

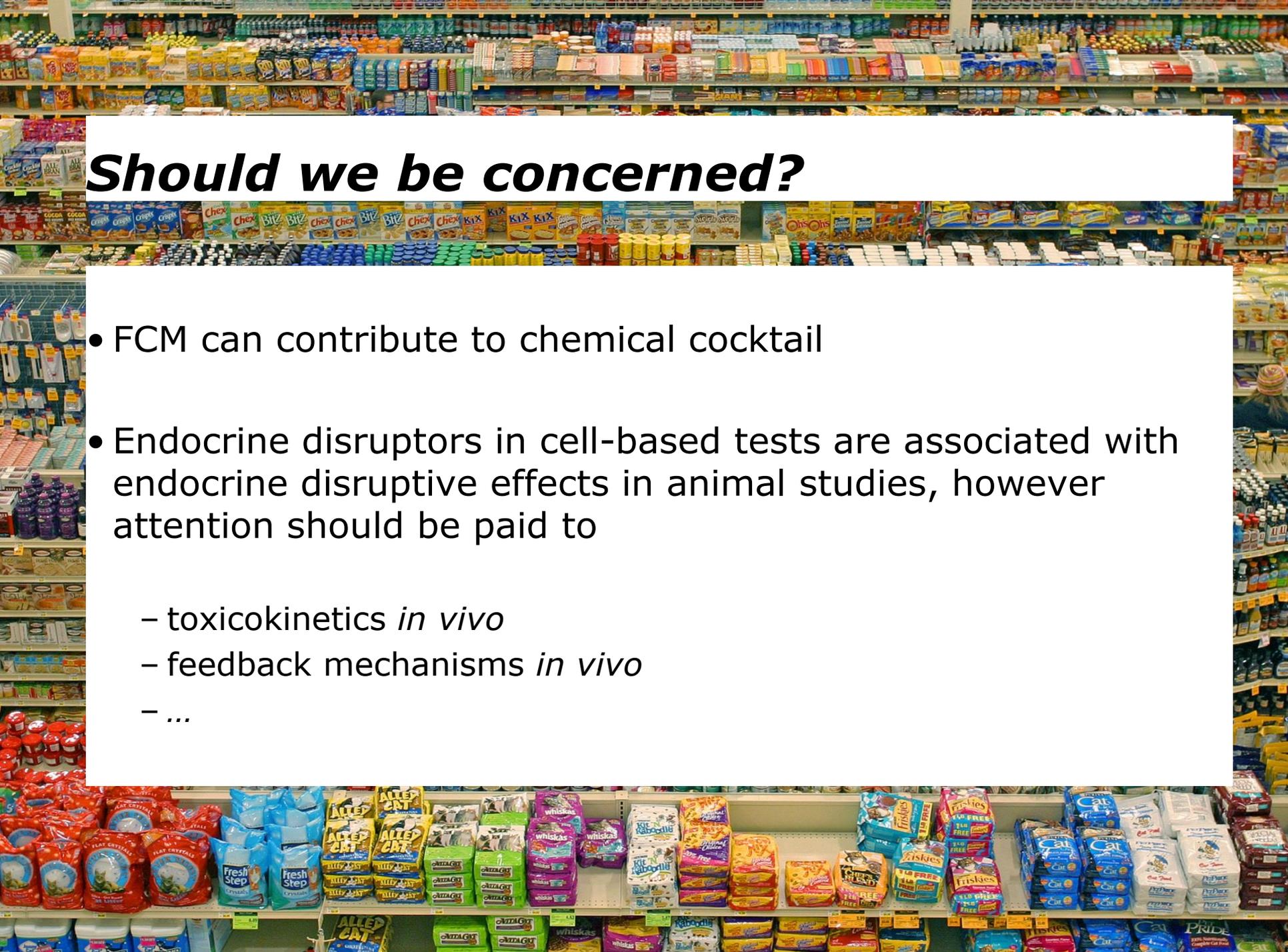


- Assays included cover,**
- oxidative stress
  - genotoxicity
  - endocrine disruption
  - DNA damage
  - mutagenicity
  - ...

# FCM test strategy – Major findings

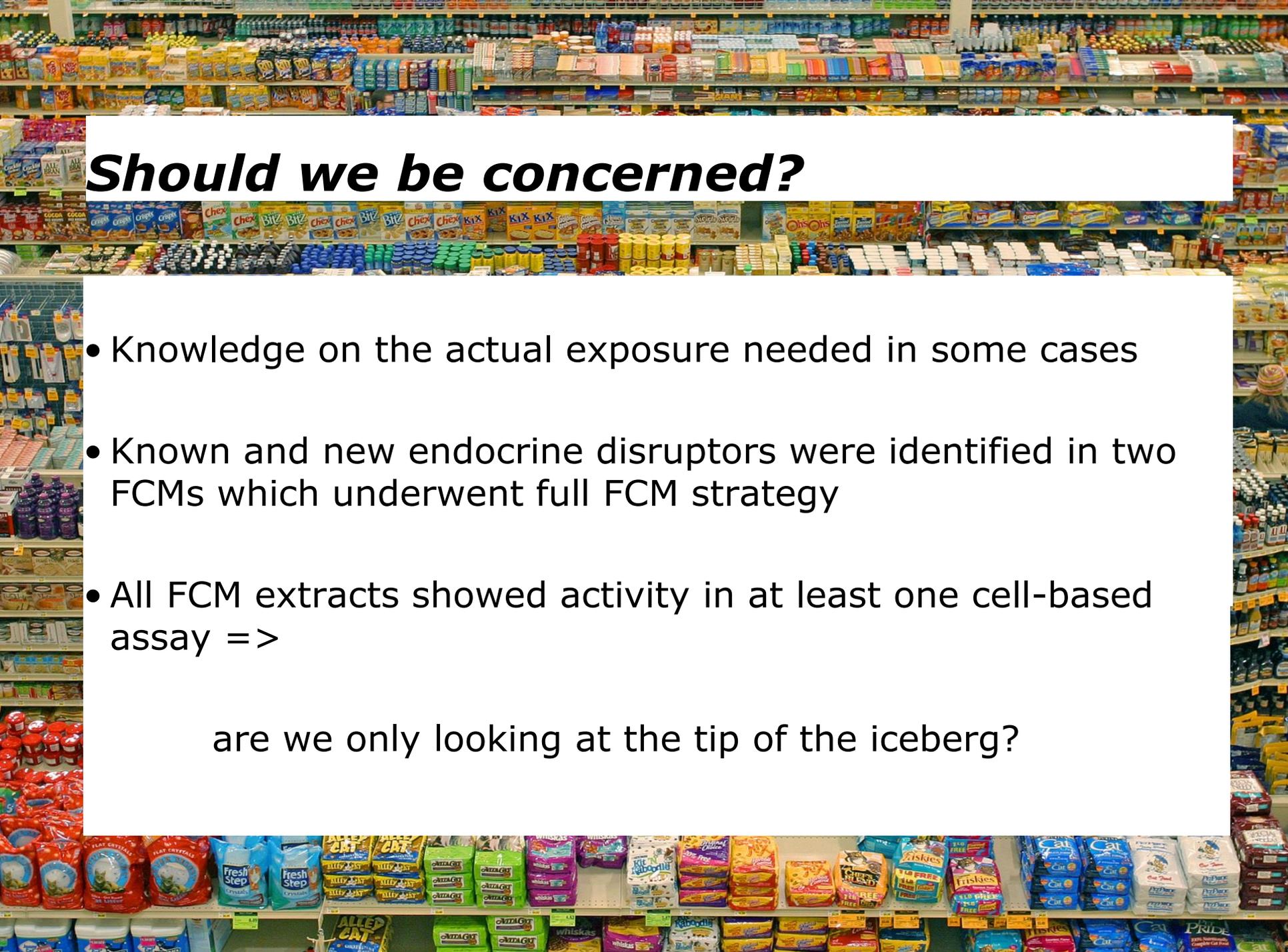


- All FCM extracts led to effects in at least one cell-based test
- Known endocrine disruptors were identified by use of the strategy (bisphenol A, phthalates)
- Previously unknown endocrine disruptors were identified



# ***Should we be concerned?***

- FCM can contribute to chemical cocktail
- Endocrine disruptors in cell-based tests are associated with endocrine disruptive effects in animal studies, however attention should be paid to
  - toxicokinetics *in vivo*
  - feedback mechanisms *in vivo*
  - ...



# ***Should we be concerned?***

- Knowledge on the actual exposure needed in some cases
- Known and new endocrine disruptors were identified in two FCMs which underwent full FCM strategy
- All FCM extracts showed activity in at least one cell-based assay =>

are we only looking at the tip of the iceberg?

# Thank you for your attention!



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