A VIEW ON CURRENT CHALLENGES IN THE ENVIRONMENTAL RISK ASSESSMENT OF CHEMICALS

MONDAY, FEBRUARY 16, 2015
PRINCIPLES OF ENVIRONMENTAL RISK ASSESSMENT

Predicted Environmental Concentration (PEC) vs. Predicted No Effect Concentration (PNEC)
PRINCIPLES OF ENVIRONMENTAL RISK ASSESSMENT

- Tonnage
- Degradation properties of ingredient
- Disposal pathways
- Demographic information on markets e.g. Brazil

PEC

V

PNEC
PRINCIPLES OF ENVIRONMENTAL RISK ASSESSMENT

PEC

V

PNEC

nematodes

Sediment toxicity

Soil toxicity

Aquatic toxicity

Fish (if essential)

Daphnia

Unicellular algae

Unilever earthworms

PRINCIPLES OF ENVIRONMENTAL RISK ASSESSMENT
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PEC

V

PNEC

ACUTE TOXICITY ENDPOINTS

CHRONIC TOXICITY ENDPOINTS

AFs applied to most sensitive species
is safety margin acceptable (PEC<PNEC)?

Refine PEC and/or PNEC or risk manage

pec  v  p nec

yes

no

stop
WHERE COULD OMICS DATA HELP?

Acute

Natural

Omics?

Chronic

Mesocosm

R&D - SEAC
CHALLENGES THAT MIGHT BE INFORMED BY OMICS

• Increasing confidence in identification of sensitive species.

• A need for less reliance on in-vivo testing.
  » With an estimated 100,000 chemicals in regular commercial use and the available data for a relative small number of chemicals demands for additional data are high.

• Increased confidence in use in-silico approaches through increased ability to determine MoA with confidence.
CHALLENGES CONTINUED

• Increased robustness of extrapolation approaches across species/taxa through greater mechanistic understanding of pathways.

• The ability to better link understanding of individual (or sub-individual) effects to population level effects relevant to risk assessment.

• As biomarkers for exposure (need to be quantitative)
The adverse outcome pathway (AOP) or Source to Outcome framework provides a conceptual basis through which linkages can be explicitly assessed across biological levels of organization.
CHALLENGES WITH AOP / S2OP

• Limited AOPs currently with robust causal links between KE.

• Limited AOPs for population relevant chronic endpoints.

• There is a need to better link molecular responses to phenotypic endpoints.

• There is a need to better understand how we can use AOPs in risk assessment linked to exposure (the PEC); quantitative/ dose related
Thank you.