Home
Happening Now
Search
Live Program
On Demand
My Schedule
My Favorites
My Contacts
Exhibitors
Sponsors
Presenters
Attendees
PhotoBooth
SocialMedia
Just for Fun
Help Desk
Program Committee
Sign out
Technical Support

Meeting Time - *America/Chicago*
My Time - *Europe/Belgrade*

Live Session Discussions

# 1.19.10 - Toxicity Profiling of Neuroactive Compounds in the Aquatic Environment: Scientific Concept Integrating Mechanistic Data Into Adverse Outcome Pathway Framework

## Abstract

Neuroactive compounds (NCs) such as pharmaceuticals, illicit drugs and neuroactive pesticides are recognized as an emerging problem in the aquatic environment posing a risk for wildlife and humans. Descriptions of Adverse Outcome Pathways (AOPs) for NCs, centralized within the AOP Knowledge Base (AOP-KB) including publicly available electronic repository AOP-Wiki, are mostly focused on human health, with most of them being still under review or in a less advanced stage of development. Concerns regarding the presence of NCs in the environment and lack of knowledge on their AOPs and adverse effects on aquatic non-target species, represent a newly opened field of investigation, which can successfully combine fundamental scientific research with computational and data mining approach. We present a scientific concept relying on integration of mechanistic data on (neuro)toxic potency of NCs frequently occurring in the aquatic environment into existing AOP frameworks to provide new lines of evidence for Key Events Relationship (KERs) between NCs exposure and Adverse Outcomes (AOs). Experimentally derived mechanistic data are deriving from: (1) biomarkers of neurotoxicity in brain tissue from fish caged at the pollution hot spot in the Danube and Sava Rivers (*in situ* study - conducted in the frame of the FP7 SOLUTIONS project) and (2) biomarkers of neurotoxicity in human neuroblastoma cells treated with environmentally relevant NCs with various primary modes of action and their mixtures (*in vitro* study). **We have chosen an approach to transfer** experimental data to specific biomarker response patterns, link them to Molecular Initiating Events (MIEs) and/or Key Events (KEs) reported in the AOP frameworks extracted by data mining from the AOP-KB and relevant literature, suggest KERs and imply to AO of tested NCs. Such an approach in toxicity profiling provides indication of neurotoxic potential of (mixtures of) emerging compounds and present the initial line of evidence in prioritization of chemicals for additional testing. The concept supports and facilitates further integration of AOP framework into environmental risk assessment. *Acknowledgements:* This research was supported by the Science Fund of the Republic of Serbia, PROMIS, Grant No. 6061817, BIANCO. The abstract content is the responsibility of the Faculty of Sciences University of Novi Sad, and it does not reflect the opinion of the Science Fund of the Republic of Serbia.

## Authors

Sonja Kaisarevic
University of Novi Sad Faculty of Sciences

Dina Tenji

Tanja Tomic

Ivana Teodorovic

## Resources

View Poster

# TOXICITY PROFILING OF NEUROACTIVE COMPOUNDS IN THE AQUATIC ENVIRONMENT: SCIENTIFIC CONCEPT INTEGRATING MECHANISTIC DATA INTO ADVERSE OUTCOME PATHWAY FRAMEWORK

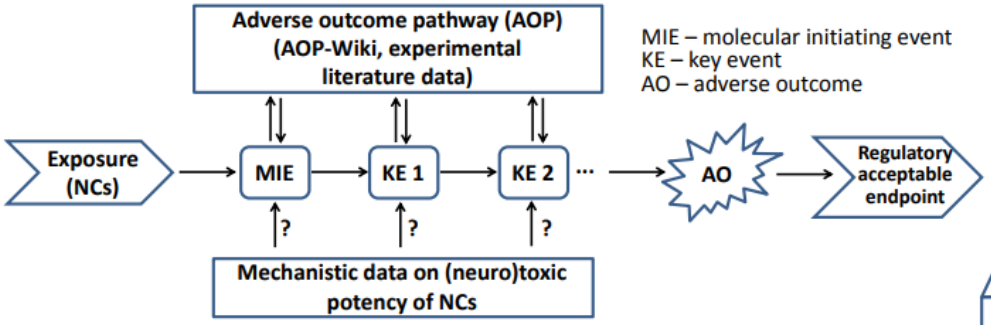
Sonja Kaisarevic, Dina Tenji, Tanja Tomic, Ivana Teodorovic
*University of Novi Sad, Faculty of Sciences, Department of Biology and Ecology, Laboratory for Ecophysiology and Ecotoxicology - LECOTOX, Novi Sad, Serbia*
sonja.kaisarevic@dbe.uns.ac.rs

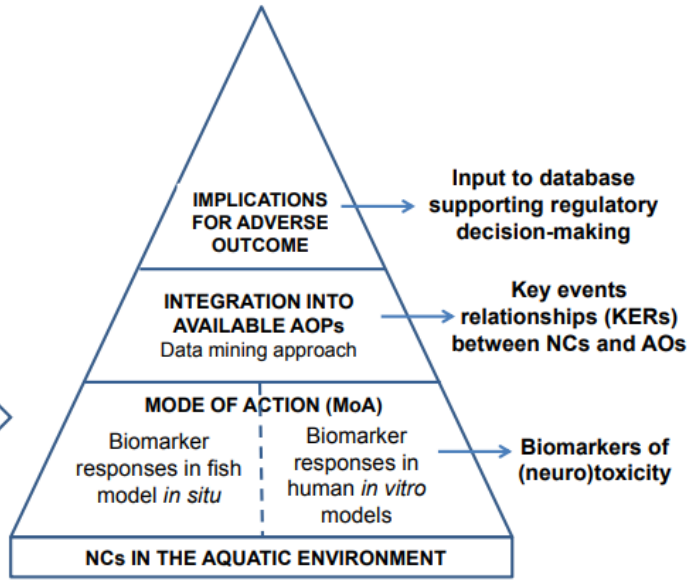
**Neuroactive compounds (NCs) - pharmaceuticals, illicit drugs, neuroactive pesticides: emerging environmental problem in European surface waters posing a great risk for wildlife and human!**

**Experimentally derived mechanistic data are deriving from:**

(1) biomarkers of neurotoxicity in brain tissue from fish caged at the pollution hot spot in the Danube and Sava Rivers (*in situ* study - conducted in the frame of the FP7 SOLUTIONS project) and

(2) biomarkers of neurotoxicity in human neuroblastoma cells treated with environmentally relevant NCs with various primary modes of action and their mixtures (*in vitro* study).




**Key neurotransmitter pathways and measurement of corresponding enzyme inhibition or receptor activity (i.e. neurochemical biomarkers):**

- AChE activity, nicotinic and muscarinic receptors;
- MAO activity, dopamine and serotonin receptors;
- GABA-T activity, GABA receptors

**Disturbance of exocytosis of neurotransmitters:** synaptotagmin 10

**Myelination of axones and neuroprotection:** myelin basic protein

**Neuroendocrine regulation of reproduction:** tachykinin

**Disturbance of membrane resting potential:** $Na^+/K^+$ ATPase activity

**Such an approach in toxicity profiling provides indication of neurotoxic potential of (mixtures of) emerging compounds and present the initial line of evidence in prioritization of chemicals for additional testing. The concept supports and facilitates further integration of AO framework into environmental risk assessment.**

*Acknowledgements:* This research was supported by the Science Fund of the Republic of Serbia, PROMIS, Grant No. 6061817, BIANCO.

The abstract and poster content are the responsibility of the Faculty of Sciences University of Novi Sad, and it does not reflect the opinion of the Science Fund of the Republic of Serbia.