Fakulta rybářství a ochrany vod
Faculty of Fisheries and Protection of Waters
Jihočeská univerzita v Českých Budějovicích
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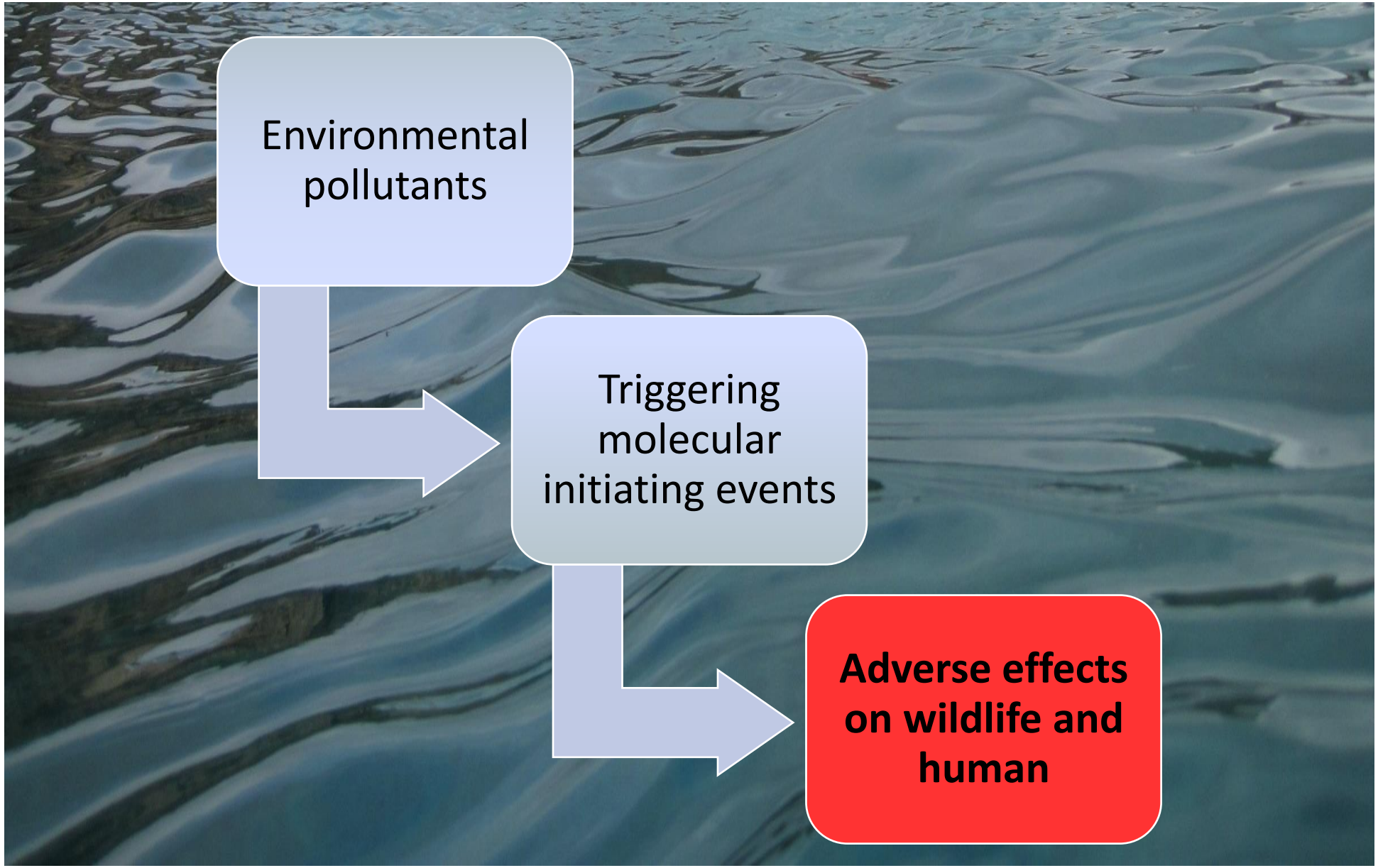
Syntéza bioanalytických a analytických metod ke zjišťování rizikových polutantů, identifikaci zdrojů znečištění a následné návrhy na jejich správu a regulaci

Ing. Pavel Šauer, Ph.D.

Potential of pollutants to cause adverse effects



Various sources of pollutants

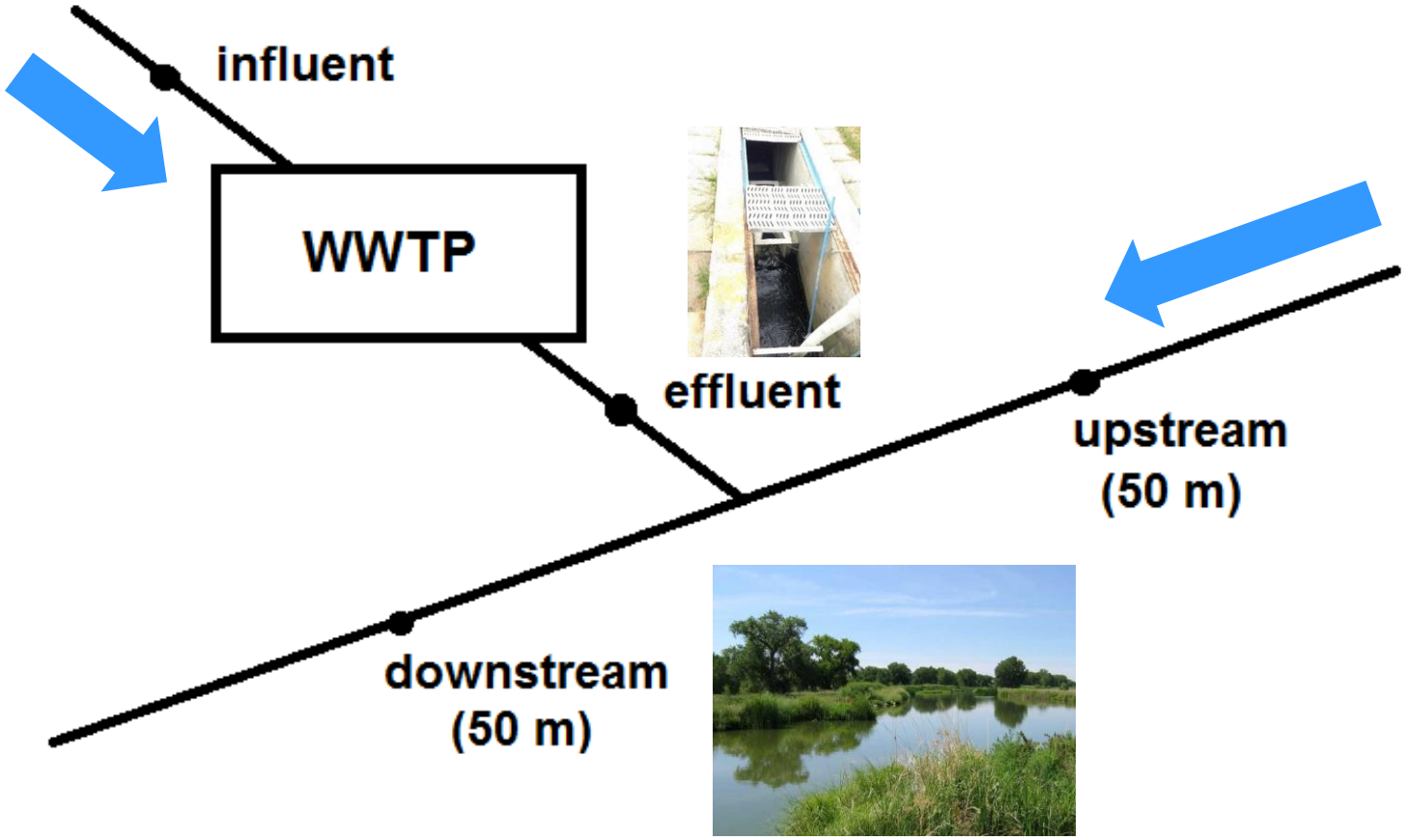
MUNICIPAL WASTEWATER TREATMENT PLANTS

INDUSTRIAL WASTEWATER TREATMENT PLANTS

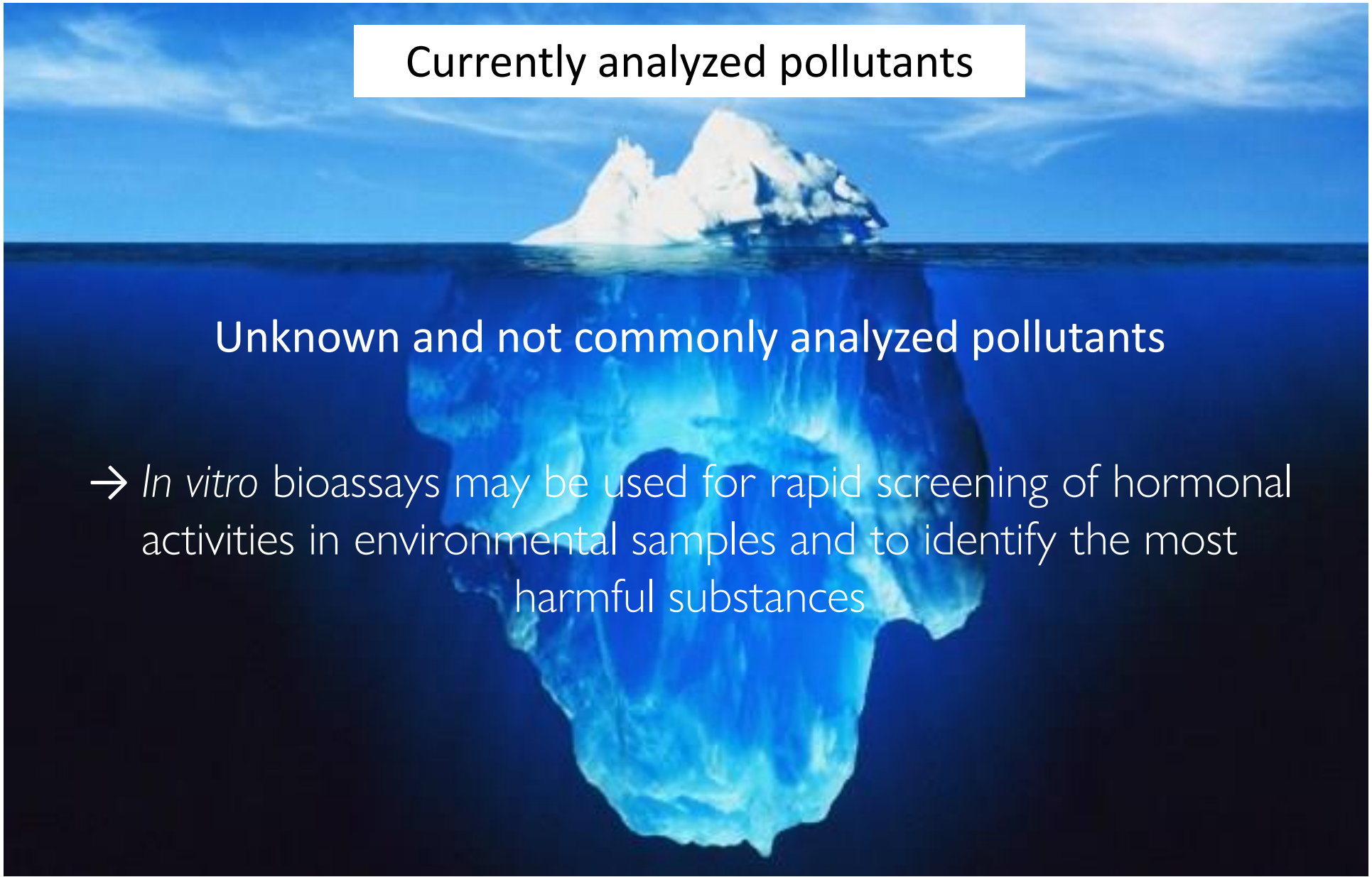
LIVESTOCK FARMING

Sampling points

- 1-L grab or 24-h composite samples in influent
- Passive sampling in effluent and surface water



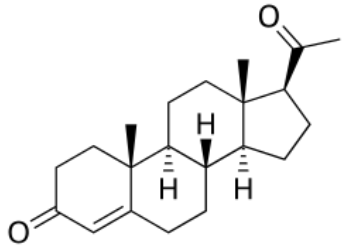
Pollutants in the aquatic environment



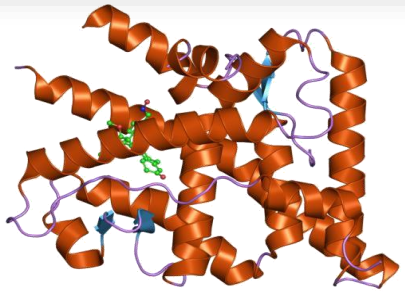
→ *In vitro* bioassays may be used for rapid screening of hormonal activities in environmental samples and to identify the most harmful substances

What are *in vitro* biological activities?

Ligand



Receptor



Agonistic activity

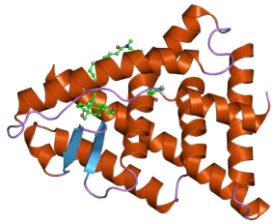
= ability of a compound to bind and activate a receptor

Antagonistic activity

= ability of a compound to bind and block a receptor

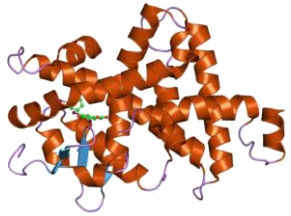
The activities indicate effects that could be manifested in organisms when exposed to such chemicals

Binding affinities



ER

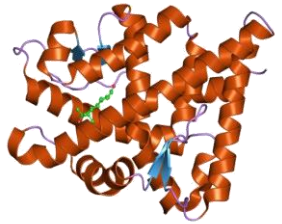
(estrogen receptor)



MR

(mineralocorticoid receptor)

AR

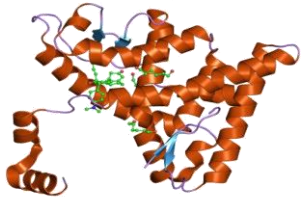


(androgen receptor)

Pollutants

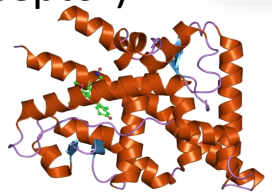
GR

(glucocorticoid receptor)



PR

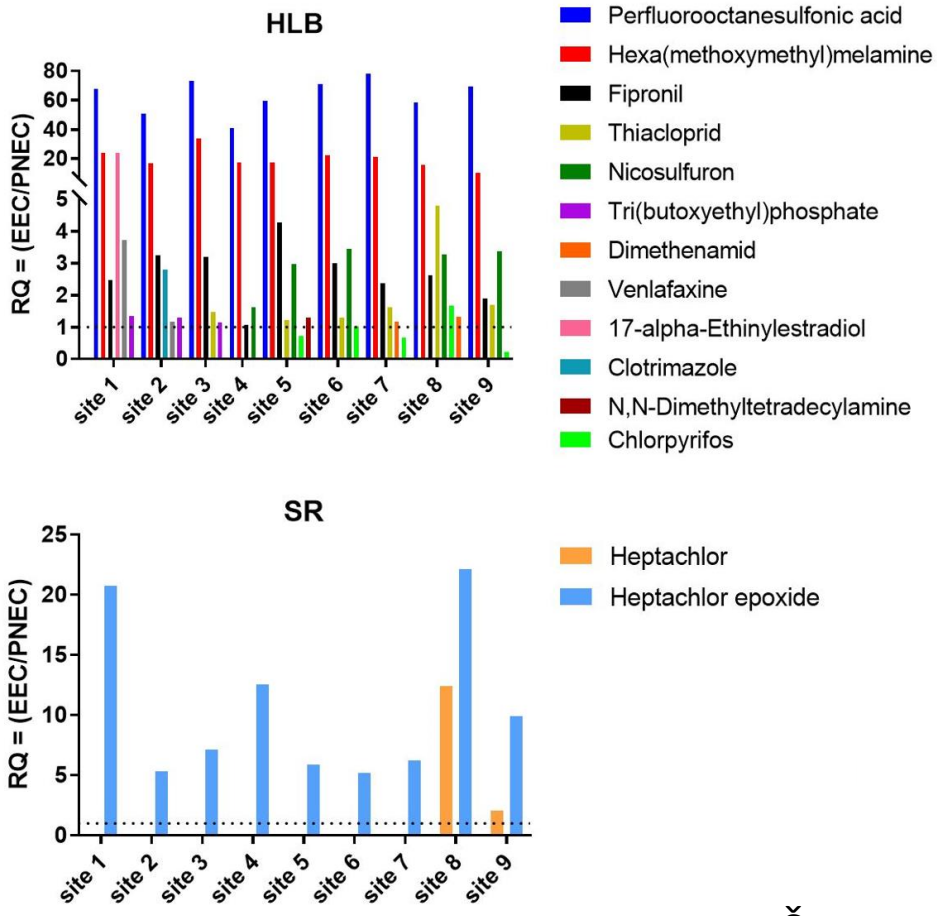
(progesterone receptor)



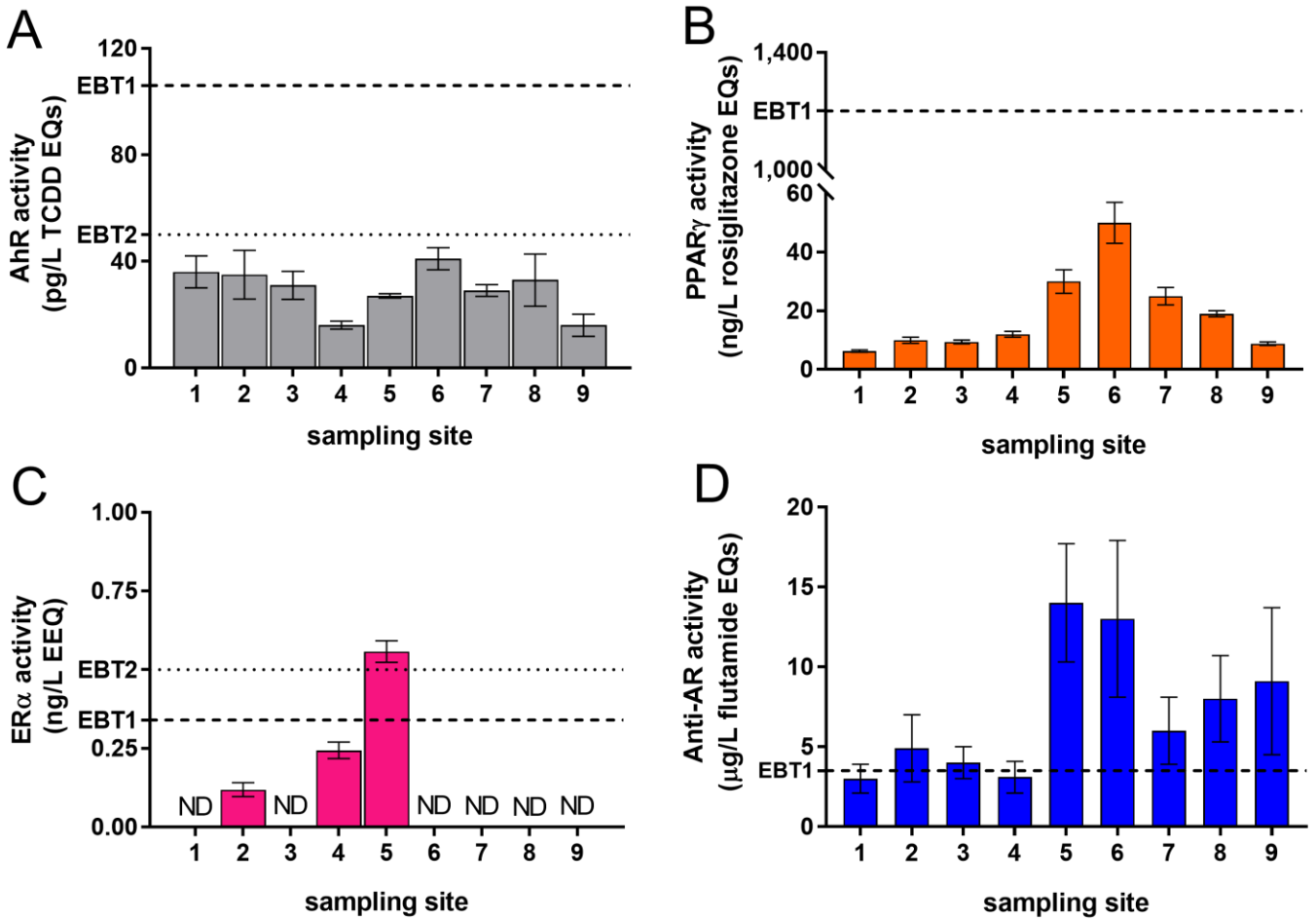
… and many other receptors and pathways can be affected

Environmental risk assessment

Risk quotients
(from chemical analysis)



Effect-based trigger values
(from *in vitro* bioassays)

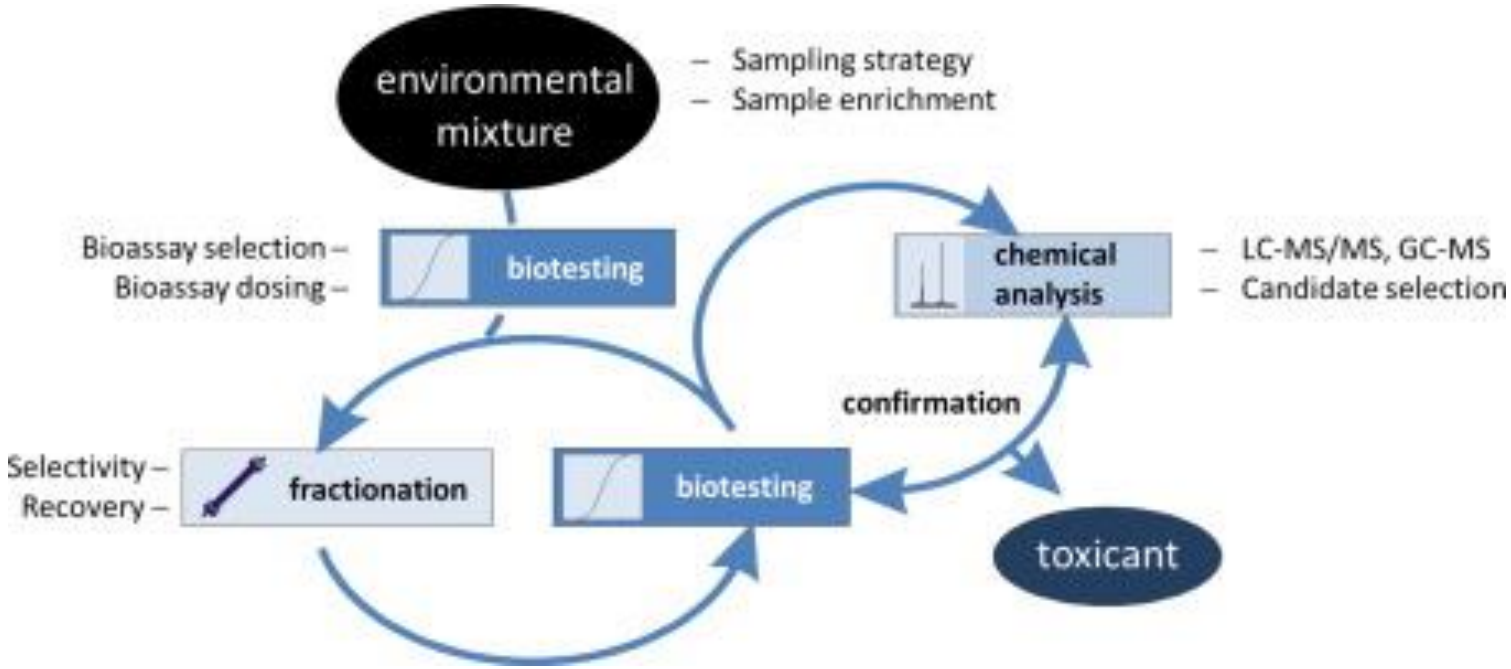


Šauer et al., 2023

Identification of effect drivers

Effect-directed analysis

(combination of chemical analysis and *in vitro* bioassays)



Brack et al., 2016

Identification of effect drivers

Effect-directed analysis

(combination of chemical analysis and *in vitro* bioassays)