Exposure to mixtures of Persistent Organic Pollutants (POPs) can inhibit the transactivation activities of the rat Aryl hydrocarbon Receptor (rAhR) in vitro


†Department of Food Science, Ulster, Ulster, Northern Ireland, UK.
‡Department of Production Animal Clinical Sciences, School of Experimental Biosciences, NMBU, Faculty of Veterinary Science, Oslo, Norway.
§Department of Basic Sciences and Aquatic Medicine, Section of Biochemistry and Physiology, NMBU, Faculty of Veterinary Science, Oslo, Norway.

1. Persistent organic pollutants (POPs) are defined as organic chemicals
2. resistant to degradation in the environment
3. bioaccumulate and biomagnify in living organisms
4. have potential harms on humans and wildlife
5. Humans are exposed to POP mixtures not as a simple compound, but few available scientific data have addressed the effect of POPs in mixture.

INTRODUCTION

Aims to determine, in vitro, how POPs act simultaneously in the mixture to produce an effect at the level of the rat Aryl hydrocarbon Receptor (rAhR) function

Materials and Methods

Dioxin Responsive luciferase gene transformed rat hepatoma DR-H4IE cells
Induced light production will be in proportion with the concentration of rAhR ligands

Test chemicals

29 POPs (Stockholm Convention 2001)

POPs and Early Menopause in U.S. Women http://t.co/ycXekUG2AA

RESULTS

Ahr mediated-activities POP Mixture and 6 sub-mixtures: Antagonism

Table 3: IC50 (b blood levels, µM) and efficiencies of POP and 6 sub-mixtures

Table 2: IC50 and efficiency values of 16 AHR antagonistic compounds.

Discussions and Conclusions

POPs mixture acts as rAhR antagonist, illustrating the principle of “something from nothing” (Thrupp et al. 2018)

Lower POP mixture effective concentration of 75 times the blood level plausibly reached in humans after a food contamination incident/highly exposed sub-populations

Perfluorinated compounds are probably non-specific rAhR antagonists

Additive effect seen for the sub Cl mixture but a possible synergistic effect seen for the POP mixture.

REFERENCES