

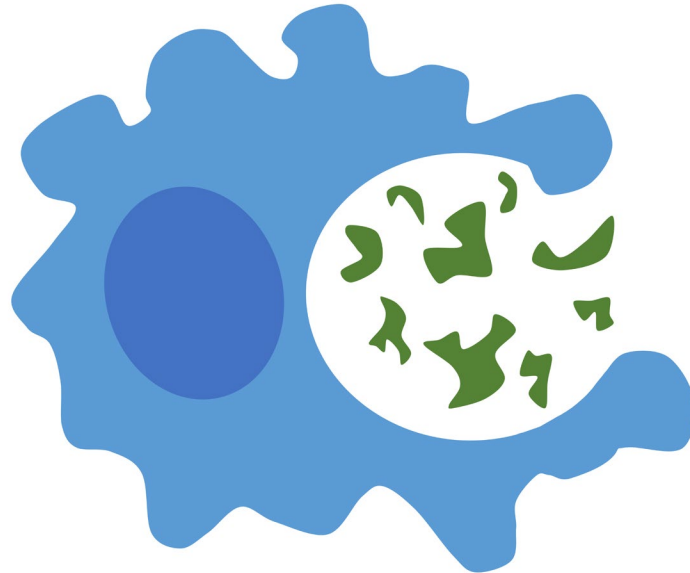
FISHH: First Immunotox Screening of microplastics on Human Health

Sponsor



Presenter

M. Mengelers (RIVM)



Participants



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport



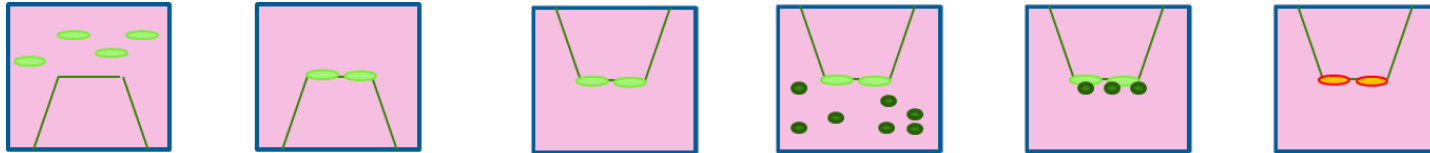
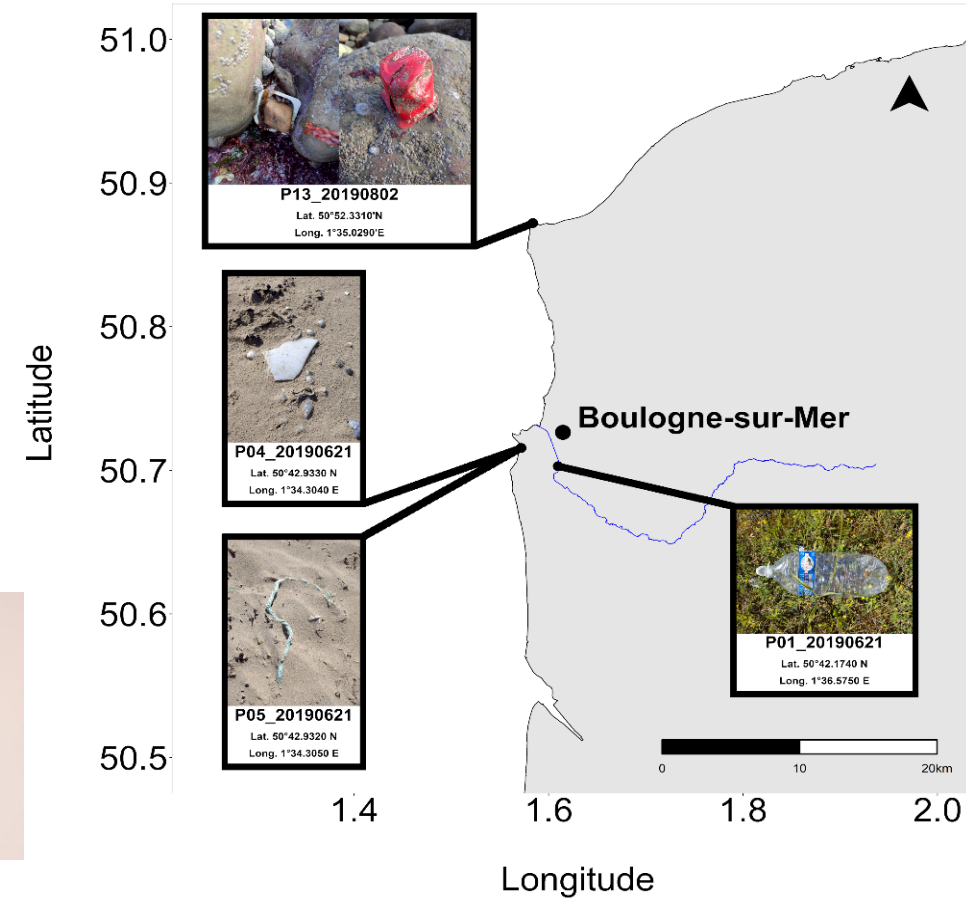
SyMO-Chem

Research questions

1. Is there a correlation between material properties and immunological activity of macrophages upon exposure to plastic microparticles ?
2. How can dose-response modelling contribute to the improvement of an experimental study design ?

Plastic particles and *in vitro* exposure

1. **Environmentally sourced** small plastic particles (smaller than 200 micrometers) were collected from the South Atlantic Subtropical Gyre (by NIOZ)
2. Particles generated from **weathered macroplastics** collected on the French coast (by ANSES).

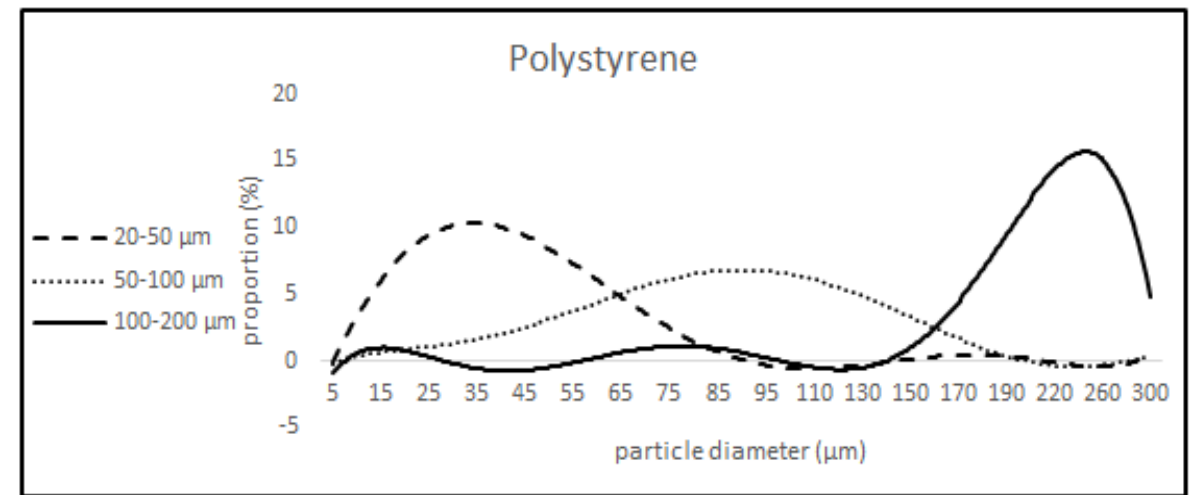
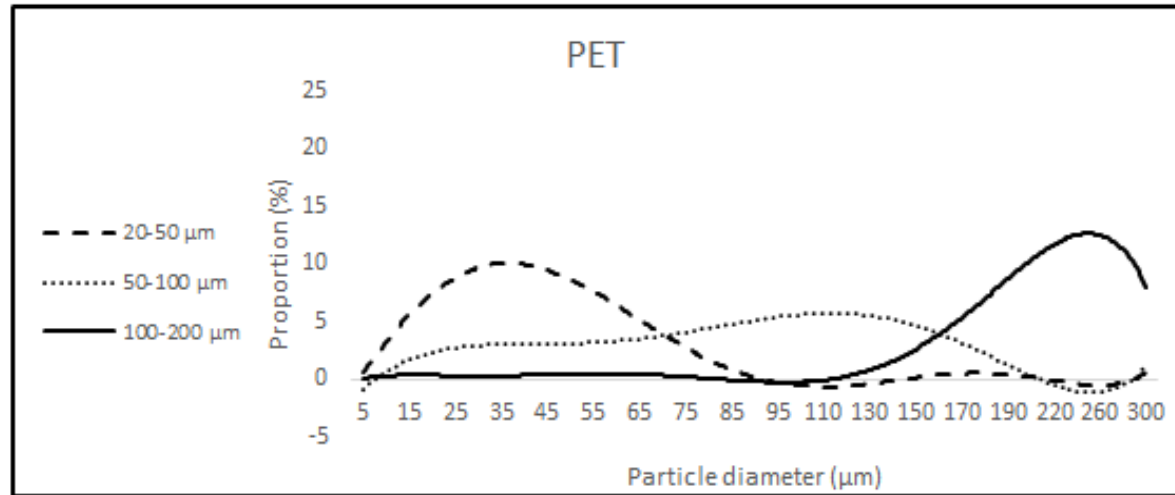
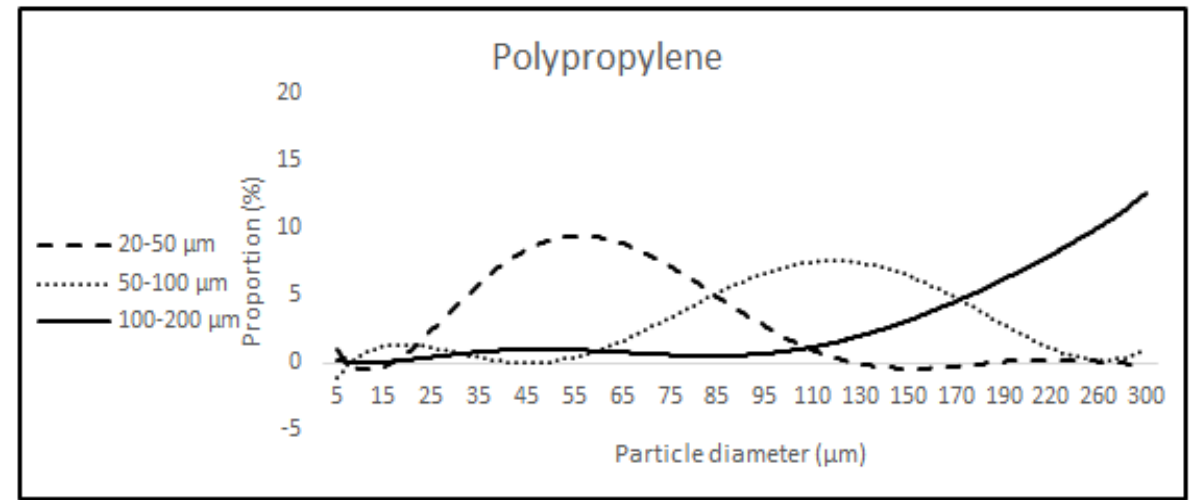
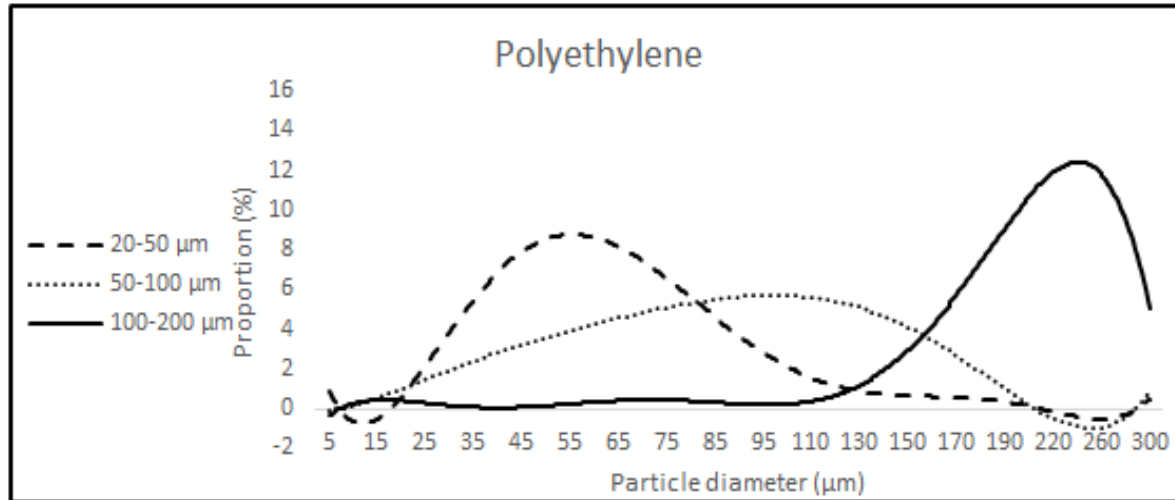


Samples	Description	Identification ^a		
		Py-GC/MS	μ-Raman	FT-IR
P_01_20190621	Water plastic bottle	PET (76 %) ^b	PET (97 %)	PET (648)
P_04_20190621	Cordage	PP (95 %)	PP (91 %)	PP (284)
P_05_20190621	White piece of plastic	PE (99 %)	PE (87 %)	PE (951)
P_13_20190802	Yogurt pot	PS (93 %)	PS (94 %)	PS (431)

^a: Values presented in *italic* between brackets correspond to the identification scores obtained with the different techniques.

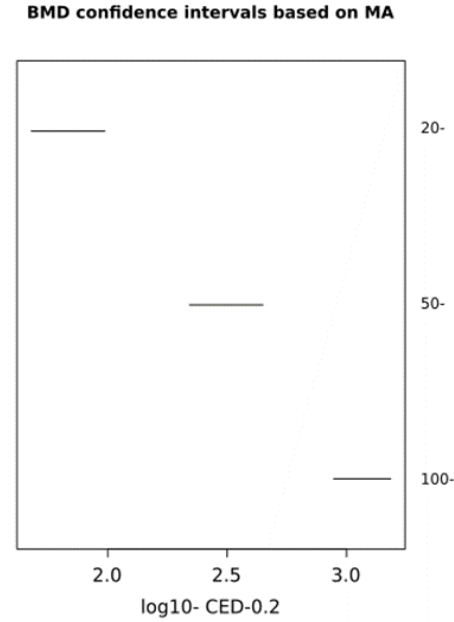
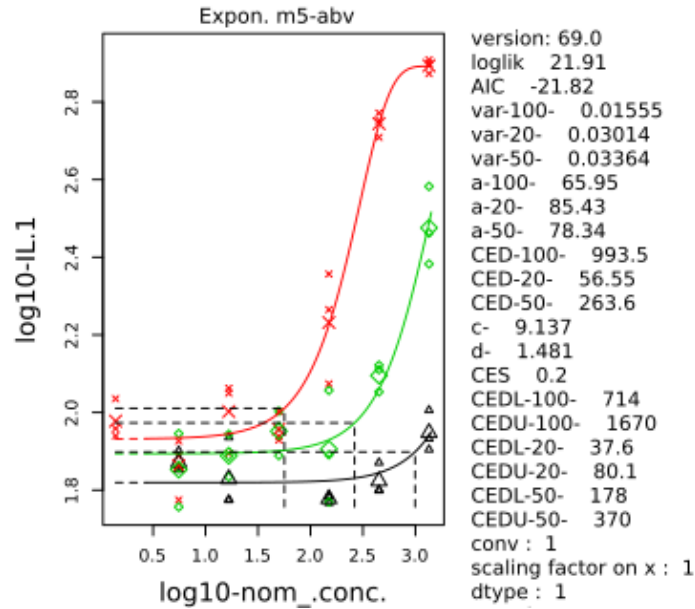
^b: Although inferior to 80%, the identification as PET has been validated, controlling specific peaks as presented in (Hermabessiere et al. 2018)

Particle size distribution

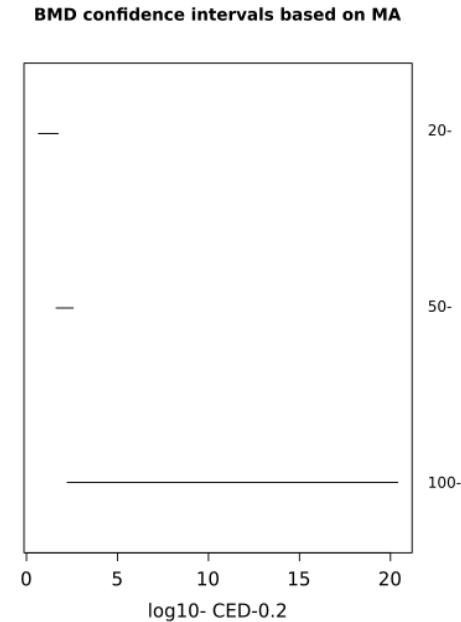
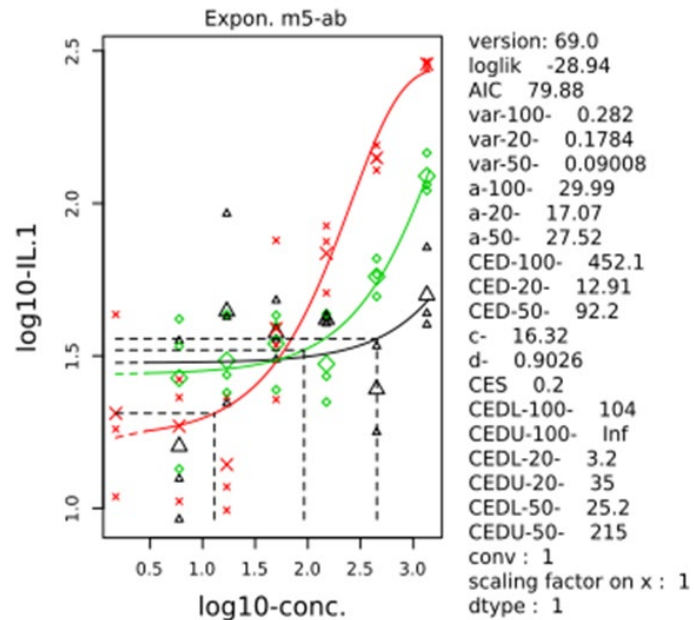


Dose-response curves for IL-1 secretion in relationship to particle size

Polyethylene terephthalate



Polystyrene



Conclusions regarding dose-response analyses

- Dose range was adjusted (expanded to lower concentrations)
- Critical effect size was adjusted (increased from 5 to 20%)
- Number of negative controls needs to be increased in the future
- Dose-response analyses could be performed for three particles sizes of sinking microplastic particles (PET, PS and nylon)
 - for the floating particles (PE and PP) dose-response analyses could only be performed for the smaller/smallest particle sizes
- A lower particle size results in lower BMDLs for IL-1, IL-8, TNF
 - this may also be due to the increased migration of additives present in the microplastics