**CEFIC Long-range Research Initiative**

**Request for Proposals (RfP)**

***Title and Code Number:***

**Development of human exposure probabilistic modelling framework for microplastics / LRI-B24**

***Background***

Microplastics have received increased attention in scientific, regulatory, and social forums in recent year. As a result, human health risk of microplastics has been recognized as a global issue. Although recent assessment conclusions from authorities indicated that current scientific literature does not identify a concern for human health, it is well recognized that there are insufficient data to allow for a robust evaluation of the potential human health risks of microplastics (SAPEA, 2019; WHO, 2019). One of the key knowledge gaps is the human exposure to microplastics. Recent publication from Nor et al. (2021) has shown a promising route to probabilistically model human exposure to microplastics, and predict microplastics concentrations in the gut, body tissue, and stool.

Therefore, proposals are requested to expand on Nor et al.’s work, and develop a human exposure probabilistic modelling framework for microplastics.

***Objectives***

This project is looking to expand on recently developed model by Nor et al. (2021) to develop a human exposure probabilistic modelling framework for microplastics, that will provide direction to planned and ongoing research, and to provide qualitative and quantitative risk context to those study data. The project will need to be coordinated with the Cefic LRI XX project on inhalation of MP and the PlasticEurope project on ingestion.

1. The model must cover microplastics with size ranges 1 nm – 5 mm, primary focus should on 100 nm – 5 mm, but reaching a 1 nm lower limit would be of interest. Gap analysis to achieve such limit should be included.
2. The model must have modules to cover the entire food basket and inhalation (including dust for both routes).
3. The model needs to be user-friendly, which allows non-model experts to perform modelling analyses. Uncertainty analysis should be included, with guidance of reporting and interpreting model output.
4. It is desirable that the model could simulate concentrations of microplastics in human organs and systemic circulation. For example, particle concentrations in lungs, lymphatics, blood, and liver.
5. The sensitivity analyses should provide a list of recommendation for experimental work to refine processes and model parameters
6. The conclusions of the project should clearly state which parts of the base model have been validated with empirical data (e.g. 14C-MP toxicokinetic study and/or stool data, or prevalence in human lung) and where further validation is needed. It is expected that additional preliminary validation data will be generated.

***Scope***

Develop user-friendly human exposure probabilistic model to support risk-based decision making related to microplastics for human health. User-friendly means the model should allow non-model experts to perform modelling analyses using default, or user-defined parameters. The specific choice of modelling platform is left to the research team but it should be accessible to the research community, and should allow for updates as key processes are further characterized in the future.

* All types of microplastics are in scope. The RfP is not restricted to a certain type of microplastics, e.g. polyolefin origin.
* Particle sizes 100 nm – 5 mm are in scope
* Entire food basket is in scope (100% of the dietary intake, including food and beverages/drinks)
* Inhalation and ingestion exposure pathways are in scope

***Out of scope*** *(May be included in future RfP)*

* Particle sizes < 100 nm are out of scope
* Dermal exposure pathway is out of scope
* Chemical exposure through microplastics is out of scope

***Deliverables***

Working model with user-friendly interface, accompanied with User’s Manual/Guidance Document. The model code needs to be open source.

The final report shall contain an executive summary (2 pages max), a main part (max. 50 pages) and a detailed bibliography. It is expected that the findings will be developed into at least one peer reviewed publication, following poster(s) and presentation(s) at suitable scientific conference(s).

***Cost and Timing***

Start in Q4 2021, duration 24 months

Budget in the order of €200K

***Partnering / Co-funding***

Applicants should provide an indication of additional partners and funding opportunities that can be appropriately leveraged as part of their proposal. Partners can include, but are not limited to industry, government/regulatory organizations, research institutes, etc. Statements from potential partners should be included in the proposal package.

***Fit with LRI objectives / Possible regulatory and policy impact involvements / Dissemination***

Applicants should provide information on the fit of their proposal with LRI objectives and an indication on how and where they could play a role in the regulatory and policy areas. Dissemination plans should also be laid down.

***References***

* *Nur Hazimah Mohamed Nor, Merel Kooi, Noel J. Diepens, Albert A. Koelmans. Lifetime accumulation of microplastic in children and adults. ES&T. 2021*
* *SAPEA. A scientific perspective on microplastics in nature and society. 2019*
* *WHO. Microplastics in drinking-water. 2019*

**DEADLINE FOR SUBMISSIONS: Aug 15th , 2021**

**Please see** [**www.cefic-lri.org/funding-opportunities/apply-for-a-grant/**](http://www.cefic-lri.org/funding-opportunities/apply-for-a-grant/) **for general LRI objectives information, project proposal form and further guidance for grant applications.**